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The Influences Of Atmospheric Cues On Consumer Behavioral Intentions: An Affordance Perspective

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Abstract

Online social shopping emerges from the idea of using social networking features to benefit traditional e-commerce activities. Technology-driven shopping environments not only support shopping task completion and self-entertainment, more importantly, these new shopping environments become alternate outlets for consumers to interact with others. This dissertation aims to understand the effects of atmospheric cues on consumers' behavioral intentions in online social shopping environments.

This dissertation study proposes and validates a research model that predicts consumers' diverse behavioral intentions (approach and avoidance) toward using online shopping environments due to website atmospheric cues. This research model is constructed based on theoretical perspectives including stimulus-organism-response framework, the technology acceptance model, the theory of affordances, and activity theory.

The empirical study used a three-factorial between-subject field experiment approach to validate the research model and hypotheses. A total of 360 valid responses were collected from Amazon Mechanical Turk. Each of the subjects was randomly assigned to one of the eight experimental conditions. Data was analyzed using three-way MANOVA and PLS-SEM. Analysis results largely supported the research model. Three path coefficients surprisingly had different signs from their correlation coefficients, and further mediation analysis indicated that: perceived usefulness fully mediated the effects of perceived utilitarian affordances, perceived sociability of use fully mediated the effects of perceived social affordances, and that perceived usefulness and perceived fun fully mediated the effects of perceived sociability of use on behavioral intentions.

This dissertation theoretically contributes to online social shopping research by building a well-grounded research model that integrates several theories from different disciplines. The instrument for measuring perceived affordances provides an operationalized solution to understand interaction mechanism between technology-driven environments and users. Practically, investigating the effects of atmospheric cues and decomposing process-based and outcome-based evaluations suggest different aspects that online merchants can work on to improve consumer experiences.

THE INFLUENCES OF ATMOSPHERIC CUES ON CONSUMER BEHAVIORAL INTENTIONS: AN AFFORDANCE PERSPECTIVE

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Chapter 1: Problem Statement and Overview

This chapter provides an overview of this dissertation research, which includes an introduction to the research phenomenon, motivation of the study, research objectives, a brief discussion of theories and research methods, and the expected outcomes and contributions. This dissertation research investigates how atmospheric cues of online stores influence consumers' evaluations and behavioral intentions in online social shopping environments.

1.1 Introduction

In recent years, online shopping websites have become major shopping outlets, and a report from comScore (Fulgoni, Lipsman, & Essling, 2014) shows total U.S. digital-commerce in Quarter 3 of 2014 grew 14 percent year-over-year and expected that total online retail spending for November to December period would raise 16 percent from a year ago to $61.0 billion (comScore, 2014). The success of e-commerce strategies and the rapid growth of social networking sites (SNS), such as Facebook, Twitter, and Google Plus, have transformed the way business is done in online environments.

Online social commerce is a form of commercial activity that builds on advanced information technology and refers to a subset of e-commerce, supporting social interactions, transactional activities, and user content contribution in both offline and online environments (T.-P. Liang & Turban, 2011; C. Wang & Zhang, 2012). Online social commerce can potentially benefit practitioners and merchants by promoting products or services with consumer-based advertising (e.g., online word-of-mouth) and information sharing (e.g., posts in social networking sites) and is considered to be a rapidly growing web 2.0-based business strategy (I.

Lee & Lee, 2012). Web 2.0 refers to the network in which users consume and remix data from multiple resources, and create network effects through a wide scope of participation (O' Reilly, 2007).

The inclusion of social elements in shopping websites extends the space and possibility for social interactions among consumers and their social contacts. The innovative shopping platforms allow for a higher degree of flexibility for consumers' social interactions. For instance, a consumer may visit an online shopping site not just to make purchases; he or she may also take the opportunity to have fun and socialize with others. Some website features, such as consumer comments, ratings, and polls, create more spaces for consumers to deliver their messages and express themselves. Because online social shopping has just emerged in recent years, the literature on consumer behaviors in this context is very limited.

Consumer behavior research is a long-standing topic in the marketing literature, and many studies have investigated factors influencing consumer behaviors in both offline and online shopping environments. Factors, such as product categories, pricing, supply-demand, and brand (Degeratu, Rangaswamy, & Wu, 2000), are found to have different impacts on various consumer behaviors (Donovan, Rossiter, Marcoolyn, & Nesdale, 1994).

The blooming of e-commerce directs research attention to the role of technological factors in influencing consumer behavior (e.g., Childers, Carr, Peck, & Carson, 2001; Yoon, 2002). Based on a collection of empirical studies, Darley et al. (2010) constructed an integrated framework for online consumer behavior and summarize four groups of external factors that influence online consumer behavior, namely, individual characteristics, social influence, situational and economic factors, and the online environment. The online environment refers to

characteristics of website design, such as website quality and website interfaces, further

demonstrating the importance of technological factors in understanding consumer behavior.

The significance of technology in influencing consumer behaviors demands knowledge

from the realms of information systems (IS) and human-computer interaction (HCI) to guide

research to demystify questions regarding consumer behaviors.

In the IS literature, a large number of studies focused on users' rational beliefs and were

constructed based on the *theory of reasoned action* (TRA) (Fishbein & Ajzen, 1975) and its

derived research models, such as the *theory of planned behavior* (Ajzen, 1991) (TPB) and the

technology acceptance model (TAM) (F. D. Davis, 1989). These studies present an in-depth

understanding of how users' cognitive beliefs, such as perceived usefulness and perceived ease

of use, influence behavioral intentions and actual behavior of IT (information technology) use in

various contexts (e.g., F. D. Davis, Bagozzi, & Warshaw, 1989; Koufaris, 2002; Venkatesh,

Thong, & Xu, 2012).

Subsequently, researchers recognized that they had paid excessive attention to the

rationality of user behavior and were concerned about the predominant emphasis on the

cognitive or utilitarian aspects of IT use. Studies have been extended to focus on both the

cognitive and affective aspects of individual IT use, and they argued studies that incorporate both

the utilitarian and hedonic elements of technology design can provide a relatively complete

picture of the determinants of technology use in broader contexts (de Guinea & Markus, 2009;

Lowry, Gaskin, Twyman, Hammer, & Roberts, 2013; van der Heijden, 2004; P. Zhang, 2013; P.

Zhang & Li, 2004). Yet few studies have investigated the influences of social aspects of

individual IT use until the recent rise of social media (Ellison, Steinfield, & Lampe, 2007).

1.2 Motivation

Social media increases the possibilities of interpersonal communications in online space and are also considered as potential channels for merchant's promotions and sales. Online social shopping is one way of integrating commercial and social elements, and this research is motivated by increasing interest in this underinvestigated phenomenon.

Online social shopping is built on advanced IT, and it is interesting to examine how the IT-enabled shopping environments satisfy consumers' needs and influence their shopping behaviors. Online shopping websites have become outlets that support consumer activities with varying purposes, including goal-directed shopping, self-entertainment, or social interaction. Therefore, research efforts are needed to understand consumers' perceptions of the utilitarian, hedonic, and social aspects of online shopping environments and particularly how technology-enabled environments influence consumer behaviors.

Social shopping, representing the idea of combining of both commercial and social activities (T.-P. Liang & Turban, 2011), captures the utilitarian, hedonic, and social aspects of shopping activities and has the potential to satisfy consumers' needs in different ways. Because of the novelty of online social shopping, there are only a few academic studies in the extant literature (e.g., Curty & Zhang, 2013; Kang & Park-Poaps, 2011b; H. Kim, Suh, & Lee, 2013; Shen, 2012), and most current publications are primarily practitioner-oriented blogs, reports, or articles. Therefore, online social shopping, as a research phenomenon, has not yet been fully understood (Z. Huang & Benyoucef, 2013; C. Wang & Zhang, 2012). This study is therefore motivated by the need for an enriched understanding of the social shopping phenomenon, and attempts to make a contribution by addressing some of the gaps in the literature.

First of all, there has been an ongoing discussion on the conceptual clarity of online

social shopping (Yadav, de Valck, Hennig-Thurau, Hoffman, & Spann, 2013). Online social

shopping has sometimes been used interchangeably with online social commerce (e.g., Leitner &

Grechenig, 2007; Leitner & Grechenig, 2008a). However, more researchers have argued to

differentiate online social shopping from online social commerce, as the former emphasizes

collaborative actions among buyers, whereas the latter indicates interactions which involve both

buyers and sellers (Kang & Park-Poaps, 2011a, 2011b; T.-P. Liang, Y.-T. Ho, Y.-W. Li, & E.

Turban, 2011; Marsden, 2009; Pagani & Mirabello, 2011; Stephen & Toubia, 2010).

Second, although a number of theoretical frameworks have been proposed or borrowed

from other disciplines to guide research on online social commerce in general, they provide

limited explanations of how shopping environments influence consumer behaviors. Several

research papers use descriptive theoretical models to present important components of online

social commerce, providing a general overview of different parties involving in online social

commerce activities. Leitner (2007) designed a framework that integrates the main entities: the

consumer, product, repository, and vendor. Liang and Turban (2011) proposed a research

framework and suggested that online social commerce is an integration of social media

technologies, community interactions, and commercial activities. Wang and Zhang (2012)

analyzed the evolution of online social commerce with a four-dimensional descriptive

conceptual framework (information, people, technology, and organization, and society).

These models are descriptive in nature and do not provide any further illustrations of

interdependent relationships among these components. Therefore, they lack the predictive power

of addressing determinants of online social shopping behavior. Exceptions, such as the *social

commerce acceptance model* (SCAM) constructed by Hajli (2012) and the research model

developed by Shen (2012), are behavioral research models that depict factors for consumers'

intentions to use shopping websites. These two studies showed substantial predictive power and

were primarily based on the technology acceptance model (TAM) (F. D. Davis, 1989). However,

consumer behaviors in online social shopping environments are not equal to rational technology

adoption behaviors. Instead, consumer behaviors can be triggered by rational, emotional, or

social factors. Thus, these two types of research models, the high-order descriptive research

frameworks and research models that merely focus on rational evaluations are limited in

presenting the richness of influencing factors for consumer behaviors in online social shopping

environments.

Third, the concept of affordances (Gibson, 1977, 1979) was introduced to human-

computer interaction research to understand the discrepancy between designed objects and users

(Norman, 1988). The notion of affordances suggests relational attributes between the object and

humans, indicating that characteristics of designed objects are perceived by users as action

possibilities. Very few studies have attempted to operationalize this concept in empirical

investigations. This dissertation examines design characteristics of shopping websites from an

affordance perspective and proposes a way to understand perceived affordances within a

hierarchical structure suggested by activity theory.

Lastly, the merging of commercial and social networking platforms especially boost the

chance of various consumer behaviors (Kang & Park-Poaps, 2011b) and calls for a common

ground to understand those behaviors at a more refined level. Approach and avoidance indicate

two directions for consumer action tendencies and represent an overarching categorization of

consumer behaviors. Extant research on approach and avoidance raises inconsistent

conceptualizations of these two types of behaviors, which represent two ends of the same

continuum (Wu, Cheng, & Yen, 2008) or form an orthogonal relationship (Mehrabian & Russell, 1974). More theoretical and empirical evidence is needed to tackle the question regarding the underlying relationships between approach and avoidance.

Overall, research on online social shopping faces several challenges, including ambiguous definitions of terminologies, inadequate theoretical support to guide investigations on factors influencing consumer behaviors, limited knowledge in interaction mechanisms between technology features and consumer reactions, and insufficient understanding of an overarching classification of behavioral intentions. In response to these challenges, this dissertation research aims to clarify the definition and scope of online social shopping. To deepen the understanding of consumer behaviors in online social shopping environments, this research also proposes and validates a research model that presents some insights into interactions between consumers and technology-enabled environments.

1.3 Research Objectives and Questions

The main objective of this dissertation is to develop and validate a research model that captures the dynamic relationships among atmospheric cues, consumer evaluations, and their behavioral intentions. This study takes a holistic view on consumers' evaluations of online shopping environments (cognitive, affective, and social) and their subsequent behavioral intentions. It adopts the lens of affordances from ecological psychology and proposes two dimensions of consumer evaluations: process-based and outcome-based, indicating immediate and summative evaluations of shopping environments. This research aims to address the following research questions:

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RQ1: How do atmospheric cues of an online social shopping environment elicit consumers' evaluations of those environments?

RQ2: How do consumers' evaluations of an online social shopping environment influence their behavioral intentions?

RQ2.1: How do consumers' process-based evaluations influence their outcome-based evaluations?

RQ2.2: How do consumers' outcome-based evaluations influence their behavioral intentions?

RQ1 focuses on investigating how different atmospheric cues may induce consumers' perceptions of surrounding environments, particularly from the perspective of affordances to understand how consumers perceive action possibilities within certain shopping environments. RQ2 includes two sub-questions and aims to investigate how consumers' evaluations of a shopping environment affect their behavioral intentions toward that environment. RQ2.1 places emphasis on the distinction and interplay between process-based and outcome-based evaluations of the shopping environment. RQ2.2 examines those two dimensions of evaluations from three aspects, including cognitive, affective, and social aspects of a shopping environment. The goal of this study is to advance the theory development of online consumer behavior research. This dissertation proposes and validates a research model describing consumer evaluations and behavioral intentions in online social shopping environments.

1.4 Overview of Theoretical Foundations and Methodological Approach

Several theories, including the *stimulus-organism-response* (S-O-R) framework (Mehrabian & Russell, 1974) from environmental psychology, the technology acceptance model

(TAM) (F. D. Davis, 1989) from information systems, the *theory of affordances* (Gibson, 1979) from ecological psychology, and *activity theory* (Leont'ev, 1974) from cultural-historical psychology that are used in human-computer interaction research, jointly contribute to constructing a research model to depict the consumer-environment relationship.

The S-O-R framework was proposed by Mehrabian and Russell (1974) and depicts the interplay among three core components in person-environment interactions, including environmental stimuli (S), internal organisms (O), and responses (R). TAM was developed by Davis (1989) to depict that a person's cognitive beliefs about a technology can influence his or her technology use intentions. The theory of affordances was proposed by Gibson (1977, 1979) and introduced by Norman (1988, 1999) to human-computer interaction research, providing insight about the relational properties of an environment in supporting human actions. Activity theory (Kaptelinin & Nardi, 2006; Leont'ev, 1974) was used to explain the mediation role of tools in human-computer interaction and to justify levels of abstraction of internal responses (Organism) that includes process-based and outcome-based evaluations, and furthermore, to understand the role of affordances in consumers' internal responses from the structural perspective of human activity.

The S-O-R framework is used as an overarching framework in the proposed research model because it presents relationships among three core components (environmental stimuli, internal organisms, and behavioral responses) in a parsimonious but meaningful way. However, as is suggested by Jacob (2002), the fundamental S-O-R framework is limited by its simplicity and more work is needed to enrich the understanding of the original model. The TAM is greatly valued in studies that investigate the cognitive aspect of technology use behavior, particularly the influences of belief assessments on behavioral intentions in technology-driven contexts (Pavlou,

2003). In online social shopping environments, technology characteristics are fundamental to the accomplishment of shopping tasks, recreational activities, and social interactions. Therefore, the TAM still sustains power in studying users' behavioral intentions to adopt new technologies (Dennis, Morgan, Wright, & Jayawardhena, 2010; Hajli, 2012; Shen, 2012).

The theory of affordances emphasizes reciprocal relationships between the properties of the environment and human beings (Gaver, 1991; Gibson, 1979). Affordances refer to action possibilities facilitated by properties of the environment. Researchers and practitioners in design-related venues have increasingly recognized the importance of the concept of affordances because it presents a different lens for researchers to investigate the relational attributes between technology products and users' action capabilities. In this research, the theory of affordances contributes to establishing the connections between environmental stimuli and consumers' internal responses.

This dissertation posits that process-based and outcome-based evaluations represent aspects to assess technology-driven environment. To improve the conceptual soundness of this distinction, activity theory (Bannon & Bødker, 1991) lays out a theoretical foundation to differentiate human beliefs at different levels of abstraction (process-based vs. outcome-based), although it does not directly contribute to constructing the research model.

A literature review by Darley et al. (2010) shows that the most common research method in online consumer behavior research is survey, but they suggest that future research endeavors should adopt experimental designs to readdress the research issues because these make it possible to observe people's reactions to a stimulus and indicate a stronger causality (Sternthal, Tybout, & Calder, 1994). The goal of this research is to propose and validate a research model that explains and predicts consumers' behavioral intentions in response to their evaluations of

atmospheric cues in shopping environments. Field experiments have the strength of engaging participants in a natural shopping environment, and this method has also been commonly used in shopping behavior studies in the literature (e.g.,Gefen, Karahanna, & Straub, 2003; M.-H. Huang, 2000). Therefore, this dissertation research uses field experiments with a follow-up questionnaire to investigate the research phenomenon.

1.5 Theoretical and Practical Contributions

This study is expected to make theoretical and practical contributions to user behavior research in technology-driven environments in general and consumer behavior research in online social shopping environments in particular.

Theoretically, the conceptual development of this research integrates multiple theoretical perspectives to address questions regarding factors that impact behavioral intentions toward technology-driven environments. This research proposes and validates a research model that takes into account cognitive, affective, and social aspects of person-environment interaction. The conceptual development creates new insight in interpreting the interaction mechanisms between a person and the surrounding environment with the lens of affordances. It also expands a person's internal reactions to cover cognitive, affective and social aspects of evaluations. In addition, this research posits to decompose internal reactions of technology-driven environments into process-based and outcome-based evaluations based on a hierarchical structure of human activity. This research presents a refined view of online social shopping behavioral intentions based on the generic distinction between approach and avoidance behaviors.

Practically, understanding how atmospheric cues elicit different consumer reactions can suggest ways for designers and practitioners to improve their website designs. Knowing why

consumers tend to approach shopping websites can help merchants to succeed in attracting potential customers and sustaining long-term customer relations. Moreover, understanding why people avoid a shopping website can help merchants to identify strategies that reduce the chance of losing customers.

1.6 Definitions of Terms

It is notable that some of the core constructs have been used or conceptualized in different ways in the literature. To avoid conceptual confusion, the following definitions of core concepts and constructs used in this study are provided.

Online Social Shopping refers to a range of activities that involve consumer-consumer interaction and consumer-website interaction in a shopping process (Kang & Park-Poaps, 2011b).

Perceived affordances are defined as a consumer's perception of the action possibilities facilitated by features of shopping sites to mediate the interaction between consumers and their designated objects.

- **Perceived utilitarian affordances** are defined as a consumer's perception of the action possibilities facilitated by website features to acquire goal-directed information.

- **Perceived hedonic affordances** are defined as a consumer's perception of the action possibilities facilitated by website features to entertain themselves through interaction with the sites.

- **Perceived social affordances** refer to a consumer's perception of the action possibilities facilitated by website features to interact with others through the sites.

Perceived usefulness is defined as a consumer's conclusive estimation of the degree that using a website enhances the shopping performance (Koufaris, 2002) .

Perceived Fun is a consumer's conclusive evaluation of hedonic experiential outcomes of using shopping sites (Nah, Eschenbrenner, & DeWester, 2011; P. Zhang, 2013).

Perceived Sociability of Use is defined as a consumer's conclusive belief that using a shopping site can or cannot satisfy one's desire to socialize with others and enhance social connectivity (Iivari, 2014; Junglas, Goel, Abraham, & Ives, 2013; Kreijns, Kirschner, & Jochems, 2002).

Approach behavioral intentions are defined as a consumer's desire or willingness to perform behaviors that lead them to move toward the shopping site.

Avoidance behavioral intentions are defined as a consumer's desire or willingness to perform behaviors that lead them to get away from the shopping site.

Web 2.0 is defined as the network in which users consume and remix data from multiple resources, and create network effects through a wide scope of participation (O' Reilly, 2007).

Atmospheric cues are defined as perceptible information clues of shopping environments that exert influences on consumers' goal attainment, shopping experience, and social interaction.

Chapter 2: Literature Review

With the rise of social media, online social commerce has gained great attention from researchers and practitioners. Online social commerce is a combination of social networking activities and e-commerce activities. Online social shopping, as a subset of online social commerce, focuses on the consumer side of commercial activities. Section 2.1 presents an overview of online social commerce and online social shopping research; Section 2.2 reviews studies on shopping behaviors in both offline and online environments; Section 2.3 introduces research on technology use behaviors, which is an indispensable element of online social shopping; Section 2.4 briefly introduces neuroIS, a relatively novel trend in IS research; Section 2.5 discusses the relationships between online shopping and social media activities; Section 2.6 reviews studies on atmospheric cues in both offline and online shopping environments; Section 2.7 presents how prior studies have addressed factors influencing human behaviors from utilitarian, hedonic, and social dimensions; and Section 2.8 summarizes other factors that affect consumer behaviors.

2.1 Online Social Commerce and Online Social Shopping

2.1.1 Business-to-Consumer (B2C) E-commerce

Online environments have become an alternative channel for business transactions and service delivery, and e-commerce is a broad concept that covers multiple facets of commercial activities on the Internet (Kalakota & Whinston, 1997). In general, e-commerce is a form of business transaction that involves a buyer and seller and the process of exchanging goods or services through electronic communications (DeLone & McLean, 2004). Online shopping

websites are a type of business-to-consumer (B2C) e-commerce that supports business transactions between buyer and seller. They are outlets where direct interactions between consumers and sellers occur, and the design of these websites have a significant impact on consumer behavior (Hong, Thong, & Tam, 2004). Efficiency and effectiveness once were the priority of B2C e-commerce website design because the goals were to make online shopping easier and faster (e.g.,Rust & Kannan, 2003; Turban & Gehrke, 2000). However, the early online stores did not win over traditional retail stores as expected when supporting business activities or establishing consumer relationships, and the slow progress of B2C e-commerce was attributed to the technology-centric design and its emphasis on utilitarian features (Korper & Ellis, 2001).

Concerns about the technology-centric strategy made merchants and designers adjust their emphases and consider improving other aspects of shopping website design. In addition to completing shopping tasks, some consumers like shopping for its own sake. Hirschman and Holbrook (1982) brought the idea of hedonic consumption and posited that the consumption experience is a phenomenon directed toward the pursuit of fantasies, feelings, and fun. Their research into hedonic consumption is the first of many research attempts that aim to investigate consumers' experiential or recreational needs in both offline and online shopping environments (Babin, Darden, & Griffin, 1994; Childers et al., 2001; Hausman & Siekpe, 2009). Design elements, such as store layout, product display, and website aesthetics are identified to be important factors for consumers' consumption experiences (Porat & Tractinsky, 2012).

Yet the social elements that are naturally embedded in retail stores were initially not supported by B2C e-commerce websites, which was considered more impersonal, anonymous, and automated than traditional face-to-face commerce (Hassanein & Head, 2007). Designers have gradually added social elements in shopping websites, such as live chat, to support

interpersonal communications. The rise of social media has contributed to the progress of transforming e-commerce environments into more social and customer-centered environments (Wigand, Benjamin, & Birkland, 2008).

2.1.2 Online Social Commerce

The term *social commerce* was first introduced by Yahoo! (Rubel, 2005). Given that social elements are naturally embedded in offline commercial activities, this dissertation uses *online social commerce* to make a distinction between social commerce in online and offline environments. Online social commerce has diverse definitions in extant literature. O'Reilly (2007) defined social commerce as a commerce activity built on the basis of a web 2.0 network, which consumes and remixes data from multiple resources and creates network effects through a wide scope of participation. Marsden (2010) defined social commerce as a subset of e-commerce that uses social media to support social interactions and user contributions to improve online shopping experiences. Liang and Turban (2011) stated that online social commerce is comprised of two fundamental elements: social media activities and commercial activities, which emphasizes that social media activity is an important add-on to normal commercial activity. Although these definitions have emphasized different aspects of online social commerce, they share some similarities and the common view is that online social commerce refers to a subset of e-commerce that is mediated by social media, supporting social interactions and transactional activities in online environments (T.-P. Liang & Turban, 2011; C. Wang & Zhang, 2012; Yadav et al., 2013).

Prior studies have attempted to investigate different issues regarding online social commerce, such as its history, disciplinary position, research orientation, and practical

implementation (e.g.,Curty & Zhang, 2013; Z. Huang & Benyoucef, 2013; T.-P. Liang & Turban, 2011; C. Wang & Zhang, 2012). Liang and Turban (2011) outlined a framework that describes essential research themes about online social commerce. Wang and Zhang (2012) used a four-dimensional framework (i.e., people, management, technology, and information) to examine the chronological evolution of online social commerce. Compared with Liang and Turban's (2011) framework, which encompasses a broad range of topics related to social commerce, Wang and Zhang (2012) presented a detailed review of the characteristics of online social commerce and suggested a practical landscape for future research. These conceptual works have the strength of creating theoretical foundations to understand the online social commerce phenomenon in general. More recently, researchers have investigated how online social commerce emerges with its unique social features in practice. Curty and Zhang (2013) conducted a chronological analysis of the evolution of social features used by major e-commerce vendors. Huang and Benyoucef (2013) investigated specific design features of social commerce websites and summarized the expected and desirable technical features that characterize social commerce websites, such as social content presentation and community support.

These studies have contributed to online social commerce research by framing its disciplinary position and research scope (e.g., T.-P. Liang & Turban, 2011; C. Wang & Zhang, 2012; L. Zhou, Zhang, & Zimmerman, 2013). However, confusion over conceptual definitions still exists and conceptual development of online social commerce mostly provides descriptive information. Thus, further research is needed to improve conceptual clarity and to consolidate theoretical foundations of online social commerce research.

2.1.3 Online Social Shopping

Online social shopping and online social commerce are not equivalent. Stephen and Toubia (2010) distinguished online social shopping from online social commerce, as the former emphasizes the act of sharing consumers' collaborative shopping experience, while the latter covers a broad scope and includes both buying and selling activities. Liang et al. (2011) defined online social commerce as an emerging shopping platform where consumers conduct social sharing and social shopping behavior. Similarly, Liang and Turban's (2011) conceptual framework of online social commerce also suggests social commerce covers a broader range of research themes than social shopping (e.g., firm performance, network analysis, adoption strategy, business model, and enterprise strategies). Wang and Zhang (2012) also argued that there are differences in scope and contend that online social shopping is a subset of online social commerce. In short, online social commerce is a subset of e-commerce that integrates social networking features and commercial features to assist social interaction, induce online purchases, and enhance shopping experiences. Online social shopping, however, has an emphasis on the consumer and focuses on the use of social networking site (SNS) features to increase opportunities of social interactions so as to benefit traditional e-commerce activities (K.-L. Hsiao, Lin, Wang, Lu, & Yu, 2010; T.-P. Liang & Turban, 2011).

In line with the distinction between online social commerce and online social shopping, this dissertation posits that online social shopping are activities conducted by consumers at the individual level. *Online social shopping* is defined as a range of activities that involve consumer-consumer interaction and consumer-website interaction during a shopping process (Kang & Park-Poaps, 2011b). Thus, online social shopping covers a narrower scope than online social commerce and is particularly focused on the consumer side of commerce activities.

Another term that denotes the social aspect of shopping activities is collaborative shopping. Online social shopping is similar to collaborative shopping because both concepts emphasize the social experience in online shopping activities. However, these two are not equivalent because the latter has a specific interest in the co-presence or co-navigation of peer shoppers (Zhu, Benbasat, & Jiang, 2010) and refers to a "shopping activity conducted by two or more people together" (Goswami, Tan, & Teo, 2007, p.33). Online social shopping covers a relatively broader scope than collaborative shopping because it also includes consumer activities beyond co-navigation or co-presence.

To clarify the differences discussed above, including B2C e-commerce, online social commerce, and online social shopping, the relationships among these terms is shown in Figure 1. Social commerce is a subset of e-commerce that incorporates social networking features to support commercial activities. Social shopping is a part of social commerce that primarily focuses on the side of consumer-consumer interaction and consumer-website interaction.

Figure 1: A Network of Terms

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2.1.4 Online Social Shopping Practices

Overall, the commercial component and social component are two fundamental elements of online social shopping (T.-P. Liang & Turban, 2011). The idea of online social shopping has been implemented with different forms in design practices, such as using social networking features, and creating space for interpersonal communications. In practice, online social shopping environments have different foci and lead to two orientations of social shopping environments: commercial-focused or social-focused.

Commercial-focused social shopping environments refer to shopping sites that retain an emphasis on transactional activities and add social features to encourage social interactions and consumer contributions. Online merchants, such as Amazon, Target, and Walmart, have gradually added features to support social interactions, such as customer reviews, ratings, forums, and wish lists (Curty & Zhang, 2013). Social-focused shopping environments refer to shopping sites where social interactions and user contributions are core functions. This type of social shopping environment leverages the power of social media technologies to create spaces for individual collaborations, opinion sharing, and socializing, and transactional activities are not a salient focus of interest. Social-focused shopping environments have mostly emerged in recent years, and examples of this category are Pinterest and Polyvore.

Design features of those shopping sites facilitate commercial and social activities with different levels of support. Huang and Benyoucef (2013) conducted a heuristic evaluation of design features of two target shopping sites: Amazon (commercial-focused) and the Starbucks Facebook homepage (social-focused), and they confirmed that the commercial-focused social shopping environments tend to provide more informational and transactional support whereas the

social-focused social shopping environments do a better job facilitating conversations among users.

2.2 Consumer Behaviors: A Process or a Dual-Choice

Consumer behaviors encompass a variety of actions undertaken by consumers in marketplaces (Robertson & Kassarjian, 1991). Researchers from multiple disciplines have studied consumer behaviors with diverse foci. This dissertation is particularly interested in consumer behaviors situated in a technology-enabled environment, and thus the scope of the literature review on consumer behaviors is restricted to the marketing and information systems fields.

Consumers' shopping processes are sometimes regarded as a decision-making or a dual-choice process. The process view analyses the thinking process of individuals when they engage in shopping activities and thus breaks the shopping procedure into different steps. One widely used framework conceptualizing consumer behaviors is the Engel-Kollat-Blackwell (EKB) decision-making process model. According to the EKB model, shopping is composed of five steps: problem recognition, search for information, evaluation of alternatives, choice, and outcome evaluation (Engel, Kollat, & Blackwell, 1978). Many later studies adapted the EKB model and focused on a single or multiple phase(s) of the process (T.-P. Liang & Lai, 2002; L.-Y. Lin & Chen, 2006; H. Park & Cho, 2012; Teo & Yeong, 2003).

Research on consumer behaviors in the information systems (IS) literature also studies user behaviors in different temporal phases. For instance, intention to purchase (Jiang & Benbasat, 2007), online purchase, and online repurchase are three key blocks of research that investigate consumer behaviors in the IS literature (Cheung, Chan, & Limayem, 2005; N. Li &

Zhang, 2006). A literature review conducted by Saeed, Hwang, and Yi (2003) supports the temporal phases of consumer behaviors and groups them into three categories: website usage, online purchase, and post-purchase (Cheung et al., 2005).

A large body of literature also investigates consumer behaviors from a dual-choice perspective (Donovan et al., 1994; Eroglu, Machleit, & Davis, 2003; Kawaf & Tagg, 2012). The dual-choice view is a concise way to look into consumer behavioral responses toward a shopping environment. This perspective positions consumer behaviors as an outcome of person-environment interaction and emphasizes the importance of environment in influencing consumer behaviors. Studies that adopt this perspective are built on the theoretical foundation of environmental psychology, which has a great interest in the effects of environmental stimuli on a person's internal states and behavioral responses (Mehrabian & Russell, 1974).

Approach and *avoidance* represent two generic directions of a person's behavioral responses toward the environment he or she resides in (Mehrabian & Russell, 1974), indicating the fundamental differences of human motivation and behavioral responses (Arnold & Reynolds, 2012; Elliot, 2006; H. G. Liang & Xue, 2009). Approach describes a person's desire or willingness to move towards and stay within the environment, but avoidance refers to a person's desire or willingness to leave or escape from the environment (Kawaf & Tagg, 2012; Mehrabian & Russell, 1974; Whiting, 2009). Many studies followed this line of research and found that a store's atmosphere has a significant impact on the consumers' tendency to stay or leave. For instance, Huang (2000) applied the approach-avoidance distinction in studying users' behavior toward online shopping sites, including the desire to stay, desire to explore, and desire to shop.

The process view and the dual-choice view represent two general types of conceptualization regarding consumer behaviors, and outcome variables in many studies on

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consumer behaviors can be categorized into one of these two groups. In online social shopping environments, consumer behaviors can also be examined from these two perspectives. More importantly, it is clear that consumer behaviors cannot be executed independently of technological platforms, and, in fact, consumer activities involve substantial technology use during the online shopping process. Therefore, knowledge about information technology use can significantly contribute to investigations on factors for online consumer behaviors.

2.3 Online Shopping and Information Technology Use

The advancement of information technology (IT) facilitates well-functioning online shopping platforms. Technology-enabled shopping platforms are information systems that are designed to specifically support interactions among sellers, buyers, and products. Online consumer behaviors involve a substantial amount of technology use, and thus the technology has become a key component that shapes online consumer behaviors. Online social shopping environments are a type of technology-driven shopping environment that integrates technological features to support interactions. Thus, online consumer behaviors have been largely affected by technology factors and much of this work has been the focus of the IS field (Straub & Watson, 2001). Online social shopping activities happen within technology-driven environments, and thus literature on technology use will shed light on consumer behaviors in these environments.

IT use and system use are often used interchangeably in the IS literature. System use is a key variable in IS research, and has been investigated at different levels of abstraction by scholars in the field (Barki, Titah, & Boffo, 2007; Burton-Jones & Straub, 2006; DeLone & McLean, 1992). Despite the complexity of the system use construct, consumers' interactions

with shopping websites primarily fall into the category of individual behaviors in a volitional context, and thus consumer behaviors are tightly related to individual technology use.

The individual level of system use is defined as "an individual user's employment of one or more features of a system to perform a task" (Burton-Jones & Straub, 2006, p. 231). Research in the IS field once had a keen interest in rationales of technology use behaviors. Theoretical perspectives, such as the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the theory of planned behavior (TPB) (Ajzen, 1985, 1991), and the technology acceptance model (TAM) (F. D. Davis, 1989), dominantly guide this thread of research (S. S. Kim & Malhotra, 2005; Szajna, 1996). The excessive interest in rationales of technology use behavior raises a concern with overemphasizing cognitive determinants of user behaviors (de Guinea & Markus, 2009). Thus, researchers began calling attention to affective determinants of technology use. For instance, Beaudry and Pinsonneault (2010) argued for the direct and indirect effects of emotion on technology use and suggest several theoretical frameworks other than TAM, such as the stimulus-organism-response framework from the discipline of environmental psychology to position the role of emotion in user-technology interaction.

In line with the dominant focus on cognitive determinants of user behaviors, consumer behavior studies in the IS field also emphasizes the rational aspect of consumer decisions (e.g., Gefen et al., 2003; S. Ha & Stoel, 2009; Pavlou & Fygenson, 2006). Similarly, in the marketing literature, researchers have noticed the lack of attention to the affective aspect of shopping behaviors, and a group of studies follows the path of Holbrook and Hirschman (1982), showing an increasing interest in the effects of affective evaluation on consumer behaviors (Eroglu et al., 2003; Havlena & Holbrook, 1986; Novak, Hoffman, & Yiu-Fai, 2000).

Cheung et al. (2005) reviewed prior studies on online consumer behaviors and identified several major factors for these behaviors, including individual/consumer characteristics, environmental influences, product/service characteristics, medium characteristics, and merchants and intermediate characteristics. Darley et al. (2010) synthesized the literature and found similar categories of factors for online consumer behaviors, such as individual characteristics and the online environment.

2.4 NeuroIS Research

Research on technology use behavior in IS field predominantly collected subjective perception data. An increasing interest has emerged in collecting objective data directly from human body, which can possibly supplement and complement perception data. NeuroIS is a general term encompassing research activities that rely on neuroscience, neurophysiological theories and tools to better understand the development, use, and impact of information technologies (IT), and "seeks to contribute to (1) the development of new theories that make possible accurate predictions of IT-related behaviors, and (2) the design of IT artifacts that positively affect economic and non-economic variables (e.g., productivity, satisfaction, adoption, and well-being" (Riedl et al., 2010, p. 245). Non-invasive brain activity detecting equipment, such as functional Magnetic Resonance Imaging (fMRI), functional Near-Infrared Spectroscopy (fNIRS) and Electroencephalography (EEG), provide more possibilities to improve the efficiency and convenience to collect physiological data.

Prior studies have suggested neurophysiological approaches in investigating human emotion (Davidson, Ekman, Saron, Senulis, & Friesen, 1990; Heller, 1993), memory (Tulving, Kapur, Craik, Moscovitch, & Houle, 1994), and behavioral tendency (Ohme, Reykowska,

Wiener, & Choromanska, 2010). Dimoka et al. (2012) argued that psychophysiological theories and tools can provide considerable opportunity for consumer behavior research. Several studies have used brain image technologies to collect neuroscientific evidence about consumers' subconscious mind, especially consumers' emotional reactions (Gregor, Lin, Gedeon, Riaz, & Zhu, 2014; Kenning, Plassmann, & Ahlert, 2007; Kuan, Zhong, & Chau, 2014; Ohme et al., 2010), and their findings basically confirmed that positive emotions are more related to left frontal activation, whereas negative emotions are more related to right frontal activation.

Even though neurophysiological techniques have been applied in IS research, no consistent rules or guidelines have been established to support neuroIS research. For instance, Gregor et al. (2014) used the beta frequency of EEG activity (16.5−20Hz) to analyze emotional reactions to experimental stimuli, whereas Kuan et al. (2014) used a lower frequency band—alpha frequency(8−12Hz)—to interpret EEG activity. Gregor et al.'s findings (2014) partially matched the results from Davidson et al. (1990), indicating the instability of using neurophysiological tools to collect data and analyze human emotions. Kenning et al. (2007) called for caution when market researchers use neuroscience technologies to study consumer behavior. vom Brocke and Liang (2014) proposed some guidelines for conducting neuroIS research but they also clarified these approaches were still far from standards.

These studies showed that results of using neurophysiological devices depend on what devices were selected and standards that were applied to handle the devices and as well as analyze collected data. Theoretically, substantive knowledge on the related neurophysiological anatomy is needed to guide measurement decisions and consolidate interpretation of collected data. Methodologically, NeuroIS research is still in its early stage and more research work is needed to reach a rigorous research design (vom Brocke & Liang, 2014). Therefore, although

neurophysiological data is considered a more accurate and objective measurement, researchers still prefer to triangulate self-reported data and brain activity data to interpret emotion experiences (e.g., Gregor et al., 2014; Kuan et al., 2014; M. Li, Jiang, Tan, & Wei, 2014), and subjective perception data is still valuable in IS research.

In addition to substantive technology use, social interactions and communications have become critical components in online social shopping activities, so the literature on social media use is useful for providing insight into the social aspect of shopping behavior. In the following section, the literature review will turn its attention to social media use.

2.5 Online Shopping and Social Media

Online social shopping indicates a combination of consumers' commercial and social activities. Even though online social shopping activities are not the same as social media activities, strengths and advantages of social media sites are transferrable to social shopping websites. The wide adoption of social media implies that users are familiar with the mechanisms of online interpersonal communication and these platforms become new outlets for consumer activities (Heinonen, 2011). Research on social media use can assist the investigation of consumer behaviors in online social shopping environments.

Social media refers to a group of internet-based applications that builds on the web 2.0 technical infrastructure (Kaplan & Haenlein, 2010). Social media, such as Facebook, Twitter, MySpace, and weblogs, have attracted millions of users. For instance, as of June 30, 2014, Facebook has 1.32 billion monthly active users worldwide (Facebook, 2014). Social networking sites (SNSs) are defined as web-based services that allow individuals to "(1) construct a public or semi-public profile with a bounded system, (2) articulate a list of other users with whom they

share a connection, and (3) view and traverse their list of connections and those made by others within the system" (boyd & Ellison, 2007, p.211). SNSs allow multi-directional information exchange, and users are highly encouraged to participate in online activities, such as information sharing, online collaboration, and relationship management. On these platforms, users are no longer passive information receivers; instead, they become more expressive and active in terms of self-expression, interpersonal communication, and content contribution (Heinonen, 2011; Kaplan & Haenlein, 2010; Stewart & Pavlou, 2002).

2.6 Online Shopping Environments

Environmental stimuli, such as design characteristics of shopping environments, are considered influential factors for consumer behaviors. A large body of research has investigated how characteristics of shopping environments influence consumer behaviors in both offline (Baker, Levy, & Grewal, 1982, 1992; Kotler, 1973) and online contexts (Cai & Xu, 2011; Deng & Poole, 2012; Eroglu, Machleit, & Davis, 2001; Eroglu et al., 2003). The following section will present the review of literature on characteristics of online shopping environments.

Shopping websites are portals where consumers have access to online stores, and the interfaces of these websites are places where direct interaction happens. Research on characteristics of shopping environments can date back to the time when there were no online stores. The term *atmospherics* was defined by Kotler (1973) as "the conscious designing of space to create certain buyer effects. More specifically, [it is] the effort to design buying environments to produce specific emotional effects in the buyer that enhance his purchase probability" (p.50). Baker (1986) suggested a framework which describes three components of a store environment, including ambient factors, design factors, and social factors. Ambient factors refer to the

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background conditions of the environment (e.g., music and lighting); design factors are the functional and aesthetic elements (e.g., color and display); social factors (e.g., friendless of sales people) are the people components of the environment. Turley and Milliman (2000) placed atmospheric stimuli into five basic categories: external variables, general interior variables, layout and design variables, point-of-purchase and decoration variables, and human variables. Both frameworks indicate that human and design variables are critical factors affecting shopping environments.

With the emergence of online shopping websites, the word "web" was added as the prefix to atmospherics (i.e., web atmospherics) to indicate design characteristics of online shopping sites (Eroglu et al., 2001). Others terms, such as medium characteristics, online environment (Darley et al., 2010), atmospheric cues (D. M. Koo & Ju, 2010), or platform characteristics (Yadav et al., 2013) are also used to represent design characteristics of shopping websites. When the marketplace moved from offline to online, shopping environments became more technology-driven and consumers also took the role of computer user (Koufaris, 2002). Website characteristics do not function equally when they influence consumers' experiences (Clark, Ezell, Clark, & Sheffield, 2009; J. Kim, Lee, Han, & Lee, 2002; Valacich, Parboteeah, & Wells, 2007). For instance, Valacich et al. (2007) examined website interface characteristics from three macro categories (structural firmness, functional convenience, and representation delight), which indicate a hierarchical structure of needs associated with e-commerce website design. On the basis of Baker's (1986) typology, Eroglu et al. (2001) referred to stimuli as atmospheric cues that are visible and audible to shoppers and classify them into high task-relevant cues and low task-relevant cues. High task-relevant cues are atmospheric cues that primarily facilitate and enable consumers' shopping goal attainment, such as the description of merchandise and navigation aids

(Eroglu et al., 2001). Low task-relevant cues are atmospheric cues that are not directly related to the completion of the shopping task, such as colors, fonts, and background style (Eroglu et al., 2001). Shopping websites can be designed to be high task-relevant (e.g., functionality cues) or low task-relevant cues (e.g., entertainment) (Eroglu et al., 2003; Richard, 2005).

The labels of *high task-relevant cue* or *low task-relevant cue* may cause some confusion as the notions of high task and low task are tied with a task. Thus, Parboteeah et al. (2009) used the term task-relevant and mood-relevant to clarify the distinction. Mood indicates a free-floating core affect (Russell, 2003) that is expressed by shopping websites. The term also matches Kotler's (1973) argument that atmospheric cues can be purposely designed to build a shopping environment to produce specific emotional effects and possibly enhance consumer trust, satisfaction, and purchase probability.

A third category of atmospheric cues, that is, social cues, is the most underinvestigated category (Karimov, Brengman, & Van Hove, 2011). When the marketplace moved to an online environment, consumers did not lose much of the utilitarian and hedonic parts of the shopping experience. However, the social component has been underdeveloped since the beginning of e-commerce. Social cues represent situational factors that convey social meanings among consumers and the intended goals of social cues are to encourage social interactions among consumers, so as to increase customer intimacy and the sense of relatedness in the shopping context (Hu & Jasper, 2006). Social aspects of atmospheric cues, such as live help (Qiu & Benbasat, 2005), human image (Cyr, Head, Larios, & Pan, 2009), and avatar (Holzwarth, Janiszewski, & Neumann, 2006) are found to influence consumers' evaluations of shopping environments (Cyr, Hassanein, Head, & Ivanov, 2007; Hassanein & Head, 2007). The rise of web 2.0-based applications, such as blogs, social networking sites, and virtual worlds, opens the

opportunity for establishing social interaction in online spaces, where the needs of socializing can surely be satisfied.

Table 1 presents a synthesis of three types of atmospheric cues that have been studied in the literature. Researchers used various labels to describe similar characteristics. For instance, Olbrich and Holsing (2011) referred to product description as one of direct shopping features, whereas Eroglu et al. (2001, 2003) labelled it as high-task relevant. Ng (2003) treated color feature as a model of simulation, and Parboteeah et al. (2009) manipulated color as a condition of mood-relevant cues. Emphasis and labeling of social cues are more complex than the other two categories. Baker et al. (2002) studied the influences of professional-looking of store employees on consumers' reactions. Olbrich and Holsing (2011) referred to social shopping features as recommendation lists, ratings, styles, tags, and user profiles.

Overall, these atmospheric cues can be categorized into three groups: information cues, entertainment cues, and social cues. The group of information cues includes design features that focus on product, service, and processes of completing shopping tasks. The group of entertainment cues covers design features that are not directly related to products or shopping tasks, such as color, music, and layout. The group of social cues includes more diverse design features, for instance. In traditional retail environments, social cues were naturally embedded, including salespersons, store employees, and customers (Baker et al., 2002). In online shopping environments, social cues represent those design features that transform interpersonal communications into online space, such as social sharing, user profiles, and user-generated content (Shen, 2012) .

Table 1: A Synthesis of Prior Studies on Atmospheric Cues

	Labels	Examples	Studies
Information cues	Decision support	Recommendation agent, decision guidance	Goswami et al. (2007)
	Direct shopping features	Search field, filter mechanism, product details	Olbrich and Holsing (2011)
	High-task relevant	Description of merchandise, product information, promotion, sales policies	Eroglu et al. (2001, 2003)
	Information load	Information complexity, information scale, and information crowdedness	Huang (2003)
	Task-relevant cues	Navigability	Parboteeah et al.(2009)
	Utilitarian atmospheric	Navigational structure	Lorenzo-Romero et al. (2011)
Entertainment Cues	Ambient factors	Store music	Baker et al. (2002)
	Design factors	Color, display accent rim, layout, and general organization of the merchandise	
	Hedonic atmospherics	Music in the web	Lorenzo-Romero et al. (2011)
	Low-task relevant environment	Color	Eroglu et al. (2001, 2003)
	Modes of stimulation	Lighting, Color, Music, Ambient noise, odour, Temperature and touch, crowding	Ng (2003)
	Mood-relevant cues	Visual appeal	Parboteeah et al. (2009)
	Site entertainment	Colors, graphics, and text	Mazaheri et al. (2014)
Social Cues	Communication support	Text chat and voice chat	Zhu et al. (2010)
	Navigation support	Shared navigation	
	Features to support socializing	Audio/video chat, co-browsing	Goswami et al. (2007)
	Human-related environmental stimuli	Other customers and sales associates	Kim and Kim (2012)
	Social cues	Blogs and groups, photos and videos, questions and answers, ratings and reviews, and wish lists and favorites	Leitner and Grechenig (2008b)
		Language, human voice, interactivity, and social role	Wakerfield et al. (2011)
	Social factor	Store employees	Baker et al. (2002)
	Social sharing	User profile, shopping list, blog, polls, and social bookmarking	Shen (2012)
	Social shopping features	Recommendation lists, ratings, styles, tags, and user profiles	Olbrich and Holsing (2011)

It is notable that the collection of environmental cues is only one part of the whole

package provided by the merchants to serve consumers (Kotler, 1973), and other factors, such as

product, price, and brand are a set of non-technological factors that are considered to be

determinants of consumers' shopping behaviors (Bhatnagar, Misra, & Rao, 2000; Chu, Arce-Urriza, Cebollada-Calvo, & Chintagunta, 2010; Hassanein & Head, 2005; N. Li & Zhang, 2006). Individual factors refer to variables that are largely dependent on the consumer themselves. Several examples of individual characteristics, such as personal traits, age, gender, and prior experience with online shopping, are found to predict or moderate people's shopping behaviors (Hernández, Jiménez, & Martń, 2011; Menon & Kahn, 2002; Slyke, Comunale, & Belanger, 2002), but these factors are not the focus of interest in this dissertation.

2.7 The Utilitarian, Hedonic, and Social Dimensions of Shopping Motivations

Utilitarian, hedonic, and social dimensions are three major dimensions by which researchers investigate user evaluations and behaviors in different contexts, such as consumer shopping behavior (Tauber, 1972), technology adoption (Venkatesh & Brown, 2001), social virtual world use (Jung & Pawlowski, 2014; Z. Zhou, Jin, Vogel, Fang, & Chen, 2011), and social media use (Iivari, 2014).

Batra and Ahtola (1991) suggested that utilitarianism and hedonism are two components of consumer attitudes and behaviors. Utilitarian dimensions measure the instrumentality of an object, and hedonic dimensions refer to the experiential affect associated with the object (Batra & Ahtola, 1991). Utilitarian and hedonic components are two prominent elements that are embedded in shopping motivations (Babin et al., 1994; Childers et al., 2001). Batra and Ahtola (1991) also emphasized that the utilitarian and hedonic components can coexist within an object, and a third component, such as a social component, is also relevant for some products or consumer behaviors. Arnold and Reynolds (2003) examined the hedonic aspect of shopping motivation and categorize social shopping motivation as one type of hedonic shopping

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motivation. However, more studies tend to separate the need for socializing and the need for personal enjoyment.

The traditional marketplace is the center of social activities and can satisfy consumers' needs for entertaining and socializing in addition to goal-directed purchases (Holbrook & Hirschman, 1982; Tauber, 1972). Consumers who participate in shopping activities are not merely information processors; more importantly, they are social beings who are looking for information, affiliation, support, and affirmation (Sproull & Faraj, 1997). Thus, the importance of social aspects of consumption has been acknowledged (Belk, 1988; Holbrook and Hirschman, 1982; Solomon, 1983; Bellenger and Korgaonkar, 1980). Rohm and Swaminathan (2004) referred to consumers' desires to seek out social contacts in retail and service settings as social motives for shopping, and framed the enjoyment of shopping for its own sake as the retail shopping experience. Hu and Jasper (2006) stated that shopping is a socially visible activity accompanied by friends or family, and that consumers seek to satisfy social needs when shopping, such as a social experience outside the home, communication with others, being among a peer group, status and authority, and the pleasure of a bargain.

The generic dimensions of shopping motivation emerge in the literature. Table 2 presents a synthesis of shopping motivations that have been discussed in prior literature. Utilitarian dimension of shopping motivation represents driving forces that direct consumers toward task completion, such as shopping convenience (Rohm & Swaminathan, 2004) and shopping efficiency (Wagner & Rudolph, 2010). Hedonic dimension of shopping motivation focuses on the experiential side of driving forces, such as entertainment, leisure, and gratification (Parsons, 2002). In alignment with distinctions between hedonic and social motivation that are raised in the literature, this dissertation clarifies that hedonic motivation tends to focus on the fun or

enjoyment of shopping for its own sake, whereas social motivation places more emphasis on interactions with others.

Table 2: A Synthesis of Three Dimensions of Shopping Motivations

	Labels	Description	Studies
Utilitarian Dimension	Cognitive needs	Intrinsic desire for information acquisition for knowledge and understanding.	Sangran et al. (2009)
	Efficiency shopping	Consumers' goal to realize a fast and effortless shopping process.	Wagner and Rudolph (2010)
	Information seeking	Searching, comparing, and accessing information in a shopping context.	Rohm and Swaminathan (2004)
	Shopping convenience	Time and effort saving in shopping.	
	Variety seeking	The need for varied behavior or the need to vary choices of stores, brands, or products.	
	Utilitarian motivation	Concerned with purchasing products in an efficient and timely manner to achieve their goals with a minimum of irritation.	Childers et al. (2001)
Hedonic Dimension	Hedonic consumption	Satisfy approach needs, such as seeking excitement, and satisfy avoidance needs, such as escaping to a fantasy world of shopping.	Arnold and Reynolds (2003) (2012)
	Affective needs	Emotional experiences and the desire to feel pleasure.	Sangran et al. (2008)
	Experiential value	Playfulness and aesthetical appeal	Hu and Jasper (2006)
	Hedonic motivation	Pure enjoyment and fun of the shopping experience.	Childers et al. (2001)
	Personal motive	Role playing, diversion, self-gratification, physical activity, and sensory stimulation	Tauber (1972) Parsons (2002)
	Retail shopping experience	The enjoyment of shopping as a leisure-based activity and taps into aspects of the enjoyment of shopping for its own sake.	Rohm and Swaminathan (2004)
	Sensory stimulation	Individuals' need to maintain an optimal stimulation level and their desire to be in a pleasant physical environment.	Wagner and Rudolph (2010)
	Tension release	The need to relax, escape and be diverted from problems and routines	Sangran et al. (2009)
Social Dimension	Personal integrative needs	A person's desire to appear credible, to be perceived as confident, and to have high self-esteem.	Sangran et al. (2009)
	Social integrative needs	Affiliation needs where buyers want to belong and to be recognized as part of a group.	
	Social interaction	Consumers' desire to seek out social contacts in retail and service settings.	Rohm and Swaminathan (2004)
	Social shopping motive	Social experiences outside the home, communication with others, peer group attraction reflecting a desire to be with one's peer group or a reference group to which one aspires to belong, status and authority, and the pleasure of bargaining	Hu and Jasper (2006) Tauber (1972) Parsons (2002)
	Socializing	The desire to be around and communicate with other individuals	Wagner and Rudolph (2010)

In IS research, Venkatesh and Brown (2001) decomposed the attitudinal belief structure of technology adoption into utilitarian outcomes (e.g. perceived usefulness), hedonic outcomes (e.g., perceived enjoyment), and social outcomes (e.g., social status and social image). Studies adopted the approach of use and gratification (U&G) (Katz, Blumler, & Gurevitch, 1973) and found similar categories of use gratifications (i.e. utilitarian gratifications, hedonic gratifications, and social gratifications) in social virtual worlds (Z. Zhou et al., 2011) and social networking environments (H. Li, Liu, Xu, & Heikkila, 2013). Shen and Eder (2009) found that perceived usefulness (utilitarian) and enjoyment (hedonic) affect users' intention to use Second Life for business. Eisenbeiss et al. (2012) identified socializing as a motivational driver of virtual world participation. Park et al. (2009) found using Facebook can satisfy the needs for information, entertainment, socializing, and self-status seeking. Information is related to the details regarding specific products and services. Entertainment is relevant for leisure and amusement needs. Socializing and self-status seeking are generally about the interaction with others and sense of community.

2.8 Summary

This chapter has presented an overview of research on online social commerce and reviewed prior studies on consumer behavior and its relationships with information technology use and social media use. Consumer behaviors are influenced outcomes and have been examined in different ways. Consumer behaviors or consumer behavioral intentions have been conceptualized as single-facet constructs or multifacet constructs. The process view indicates research investigations treat shopping as a multifacet construct with multiple steps or multiple dimensions; the dual-choice view refers to consumer behaviors with a generic directional

distinction, such as to purchase or not to purchase, to revisit or not to revisit. This chapter also

presents a synthesis of research on shopping atmospheric cues and shopping motivations.

Chapter 3: Theoretical Foundation and Conceptual Development

Chapter 3 presents the conceptual development of this dissertation research. Prior studies on consumer behavior research are built on knowledge from multiple disciplines, including marketing, psychology, and information systems. To further understand how the technology-enabled online social shopping environment induces consumers' internal responses and behavioral intentions, this research adaptively employs multiple theories. The conceptual development aims at advancing the theory development of consumer behavior research in online social shopping environments and introducing new insights and connections among these theories.

This chapter is comprised of two sections. Section 3.1 introduces theories that directly or indirectly contribute to the conceptual development of the research model, including the stimulus-organism-response framework (S-O-R), the technology acceptance model (TAM), the theory of affordances, and activity theory. Section 3.2 presents the research model and hypotheses.

3.1 Theoretical Foundation

The literature review by Cheung et al. (2005) indicates that dominant theories used heavily in online consumer behavior research focus primarily on influences of subjective beliefs, including the technology acceptance model (TAM) and its ancestor theories, the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), and the theory of planned behavior (TPB) (Ajzen, 1991). These theories have the strength of explaining relationships between subjective beliefs and attitudes and their influences on subsequent behavioral intention, which is the

immediate antecedent of actual behavior. It is also notable that studies based on these belief-oriented theories undertake a user-centric view and do not give enough attention to the effects of behavioral settings. Environmental psychology is known for its emphasis on the setting-specific rather than person-specific determinants of people's reactions to environments (Stokols, 1978). Human beings are not seen as passive products of their environment. Instead, they are goal-directed beings who act upon the environment and who are influenced by it (Ittelson, Proshansky, Rivlin, Winkel, & Dempsey, 1974).

Douglas et al. (1994) suggested that strong theoretical and conceptual frameworks can be developed through an integration of constructs from different research traditions and disciplines. Figure 2 depicts how selected theories jointly constitute the theoretical foundation of this research. The general logic of integrating these theories is discussed as follows.
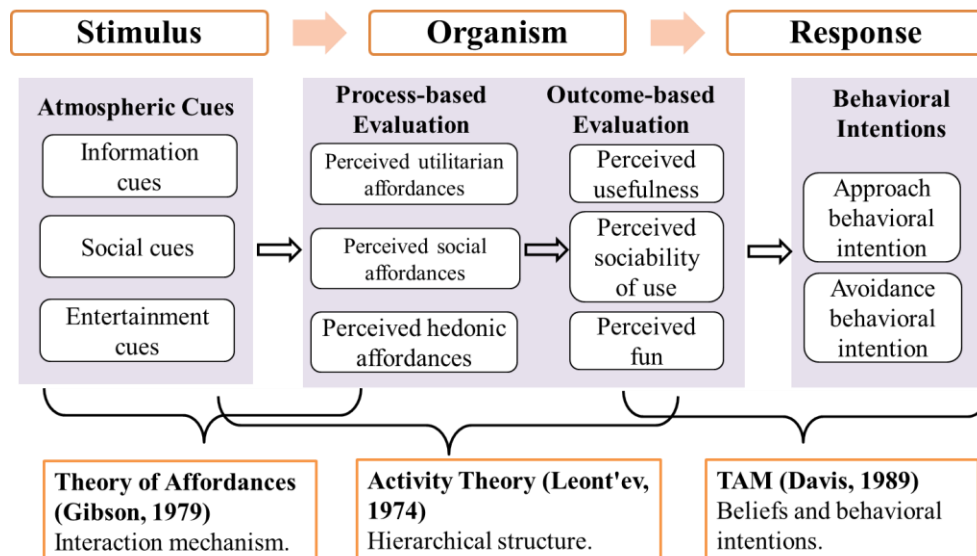
Figure 2: An Overview of Theoretical Foundations in this Study

The stimulus-organism-response (S-O-R) framework (Mehrabian & Russell, 1974) focuses on the effects of behavioral settings on human behaviors. Especially in the marketing

literature, the S-O-R framework has been a dominant conceptual model to investigate how

environment characteristics influence consumer behaviors in offline and online marketplaces

(Arora, 1982; Baker et al., 1992; Bitner, 1992; Eroglu et al., 2001; Kawaf & Tagg, 2012;

Sherman, Mathur, & Smith, 1997). The S-O-R framework has the strength of laying out critical

components of person-environment interaction and suggesting potential interrelationships among

those components (Clark et al., 2009).

On the basis of the original S-O-R framework, researchers extend the internal state

component (organism) beyond the scope of emotion factors. For instance, Bitner (1992)

constructed a framework that delineates internal responses toward the physical environment that

include cognitive, emotional, and physiological aspects. Eroglu et al. (2001) incorporated the

cognitive factor in studying the internal responses by extending the organism component from

Mehrbian and Russell's PAD (pleasure-arousal-dominance) taxonomy. The TAM is applied to

explain the influences of cognitive beliefs on behavioral intentions in a technology-driven

context. Its focus on the cognitive aspect of internal responses can supplement the S-O-R

framework by enhancing the explanatory power of consumers' rational behaviors and

strengthening the link between organism (O) and response (R).

As the S-O-R framework was initially developed based on a summative review of factors

influencing human behaviors discussed in earlier psychological studies, this framework presents

interrelationships among those components in a concise way, but it lacks sufficient illustration on

interaction mechanisms between human beings and environmental stimuli. The theory of

affordances (Gibson, 1979) from the ecological psychology field presents a new angle to

understand the reciprocal relation between external environments and human capabilities. The

notion of affordances indicates that perceptions of attributes of the environment are

interdepependent with humans' capabilities to perceive them. This theoretical lens is introduced to interpret relationships between technological features and users in the human-computer interaction research (Norman, 1988). In this dissertation, incorporating the lens of affordances can further contribute to an enriched illustration of the interaction mechanisms between stimuli (S) and organism (O) from an ecological perspective.

Activity theory posits the mediating role of technology in bridging human subjects and their objectives. Activity theory claims a hierarchical structure of human activity and breaks it down into different levels, including activity, action, and operation. According to activity Theory, different layers in the hierarchical structure of an activity correspond with objectives within a hierarchical structure, including motives, goals, and sub-goals (Kaptelinin & Nardi, 2006). The notion of affordances indicates a stage of preliminary information processing that describes a person's intuitive understanding of possible interactions with external environments. The preliminary information processing can be interpreted as an individual's assessment of action possibilities facilitated by the environment during the interaction process, which is named *process-based evaluation* in this dissertation. In addition to process-based evaluation, there is a stage of information processing that reflects the summative assessment of interaction, which in turn leads to more conclusive evaluation. This is labeled *outcome-based evaluation* in the dissertation. The process-based evaluation and outcome-based evaluation correspond with the hierarchical structure of human activity. Specifically, the process-based evaluation (perceived affordances) focuses on the possibility for action to meet specific goals, and the outcome-based evaluation indicates more summative assessments, and the whole activity aims to fulfill an overarching motive.

To foster an understanding of consumer behaviors in online social shopping environments, I chose to use the stimulus-organism-response (S-O-R) framework as a meta-framework to delineate the major components and boundaries of person-environment interactions. The notion of affordances assists in strengthening the link between stimulus (S) and organism (O) and explaining the reciprocal relation between external environmental stimuli and human internal processing. The O component in Mehrabian and Russell's model only includes the emotion factor of internal responses to environmental stimuli. Later studies extend the scope of the O component and include both cognitive and affective aspects when assessing internal responses (Eroglu et al., 2001). The TAM model helps to elaborate the cognitive aspect of the O component by illustrating relationships between normative beliefs and behavioral intentions (F. D. Davis, 1989). Activity theory introduces a hierarchical view of human activity to justify the differences between process-based and outcome-based evaluations and also provides the theoretical support to explain the bridging role of technology between subject and object.

The rest of Section 3.1 will present detailed reviews of all the theories that have contributed to the conceptual development of this dissertation.

3.1.1 Stimulus-Organism-Response (S-O-R) Framework

Mehrabian and Russell (1974) proposed the stimulus-organism-response framework (S-O-R) (Figure 3) to summarize the effects of environmental stimuli (physical or social) on human emotions, and subsequently, their behaviors in that environment. Stimuli can be physical or social stimuli in the environment. The organism refers to the internal processes that mediate the effects of stimuli external to the person on their action or responses. In Mehrabian and Russell's model, the organism is theorized as three orthogonal dimensions of emotion: pleasure, arousal,

and dominance. Human actions towards the environmental stimuli and can be expressed as approach or avoidance responses. Approach responses mean that the person tends to stay and explore the environment and communicate with others, whereas avoidance responses mean the person would like to leave or escape from the environment (Mehrabian & Russell, 1974).

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│  Stimulus(S) │─────▶│ Organism(O)  │─────▶│ Response(R)  │
└──────────────┘      └──────────────┘      └──────────────┘
```
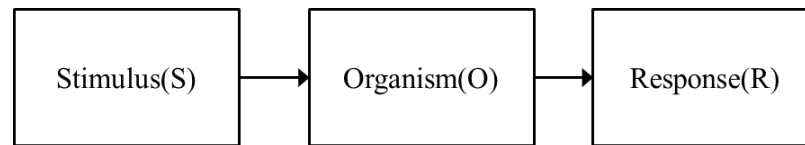
Figure 3: The Stimulus-Organism-Response Framework

3.1.1.1 Stimulus

Stimulus represents the environmental elements that trigger internal responses. Early literature in the field of environmental psychology studied individual physical variables or behavioral variables without presenting a concise or systematic framework to understand the behavioral settings. For instance, Winick and Holt (1961) explored the influences of arrangements of chairs differing in color and shape on their patients' emotional responses. Markus (1967) found that workers preferred windows with "meaningful" views in an office.

Mehrabian and Russell (1974) argued that no systematic frameworks existed to connect those diverse findings, and they commented that measures for describing environments in prior studies were not useful and lacked a concise list of descriptors for relating environments to people's behaviors. The S-O-R framework posited by Mehrabian and Russell (1974) characterized the physical and social stimuli in the environment, through factors such as color, heat, light, sound, and personality, as a function of three basic emotional descriptors, including pleasure, arousal, and dominance. Later studies based on this framework investigated the stimuli

from the perspective of human senses and focus on the tangible stimuli in the environment, for instance, store atmospherics as discussed in the marketing literature (Donovan et al., 1994).

Store atmospherics or atmospheric cues represent all related environmental stimuli in a shopping setting (Eroglu et al., 2001; Kotler, 1973). Baker (1986) proposed a typology of three categories of environmental cues: ambient factors (nonvisual cues such as smells and sounds), design factors (visual cues such as layout, clutter, cleanliness, color), and social factors (the people in the store, customers, and employees) in a retail store environment. In the context of online shopping, Eroglu et al. (2001) developed a model proposing that online stores create an atmosphere that affects shoppers' reactions and categorized the atmospheric cues into high task-relevant and low task-relevant cues. A number of studies follow this line of classification and empirically demonstrated atmospheric cues can affect consumers' emotional reactions (e.g., Eroglu et al., 2003; Y. Ha & Lennon, 2010; Parboteeah et al., 2009).

3.1.1.2 Organism

In Mehrabian and Russell's (1974) S-O-R framework, the organism only indicates a person's emotional reaction to the environmental stimuli, which can be characterized along three orthogonal dimensions: pleasure, arousal, and dominance (PAD). Arousal–non-arousal refers to the degree of excitement, stimulation, alertness, or activeness a person feels in this situation; pleasure–displeasure refers to the degree to which the person feels good, joyful, happy, or satisfied in the situation; and dominance–submissiveness refers to the extent to which the individual feels in control of, or free to act in, the situation (Donovan & Rossiter, 1982, p. 38). Empirical studies identify that dominance is the weakest component of the research model and that the combination of arousal and pleasure can explain the majority of the variance of response (Donovan & Rossiter, 1982; Donovan et al., 1994; Russell & Pratt, 1980), and thus dominance

was eliminated from later studies when measuring the organism (Ballantine & Fortin, 2009; Mummalaneni, 2005; Sherman et al., 1997).

Despite the convenience of the polarized measurements of the PAD instrument proposed by Mehrabian and Russell (1974), Westbrook (1987) suggested that a unipolar view of human emotion can serve better than the bipolar view in measuring human emotion because the bipolar conceptualization allows for the ambiguity of the joint state of pleasant and unpleasant, and fails to capture the richness of human emotion. Babin et al. (1998) demonstrated that positive and negative affect are not completely mutually exclusive, showing that the feeling of positive emotion cannot prevent the occurrence of negative emotion. Jang and Namkung (2009) also suggested that the unipolar view is more appropriate in understanding consumption emotion because it can capture both positive and negative emotions of consumers in the shopping environment. Eroglu et al. (2001) recommended that researchers consider measuring an entire set of emotions (Richins, 1997) or selecting the ones that are relevant in their specific research context. For instance, researchers have attempted to study specific instances of emotion such as enjoyment (Childers et al., 2001; H.-H. Lee, Kim, & Fiore, 2010) and shopping excitement (Jayawardhena & Wright, 2009) or a group of specific emotions (Éthier, Hadaya, Talbot, & Cadieux, 2006).

Affective evaluation only covers one aspect of intermediary organismic states between environmental stimuli and human actors, but the organismic state is not limited to the affective evaluation. Eroglu et al. (2001) stated that affective and cognitive evaluations are two intermediate states that represent the organism. The cognitive aspect of the organism indicates "everything that goes in the consumers' minds concerning the acquisition, processing, retention, and retrieval of information," and the affective state can be conceptualized along a number of

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dimensions, such as the PAD dimensions of affective responses used in most work in environmental psychology (Eroglu et al., 2001, pp. 180-181).

In line with this argument, Demangeot and Broderick (2007) commented that online environments are perceived in a more cognitive manner than offline environments because a computer-mediated activity is less intuitive than the activity of offline shopping and requires larger cognitive efforts. Chang and Chen (2008) stated that the organism includes cognitive and affective intermediary states and processes, mediating the relationships between the stimulus and an individual's responses. Adding the perspective of cognition in the S-O-R paradigm makes the link between O and R more informative. The cognitive appraisal theory of emotion has been very popular in consumer behavior research and strongly suggests that emotion is experienced as a result of cognitive appraisals (Bagozzi, Gopinath, & Nyer, 1999; Watson & Spence, 2007). Researchers even argue that stimuli have no direct effect on emotion. Instead, a consumer forms cognitive appraisals of stimuli first and then specific emotions emerge (Smith & Ellsworth, 1985). Overall, a literature review shows that many articles include both emotion and cognition as organisms, which play mediator roles between environmental stimuli and behavioral responses (Kawaf & Tagg, 2012).

3.1.1.3 Response

Approach and avoidance responses in the S-O-R framework are defined in a broad sense that includes "physical movement toward, or away from, an environment or stimulus, degree of attention, exploration, favorable attitudes such as verbally or nonverbally expressed preferences or liking, approach to a task (the level of performance), and approach to another person (affiliation)" (Mehrabian & Russell, 1974, p. 96). This definition is based on an investigation of literature on human behaviors towards physical environments in prior environmental psychology

studies. Mehrabian and Russell extracted the concept of approach-avoidance to indicate the generic distinction among those behaviors. Donovan and Rossiter (1982) postulated four aspects of approach-avoidance behavior (p.37):

- A desire physically to stay in (approach) or to get out of (avoid) the environment

- A desire or willingness to look around and to explore the environment (approach) versus a tendency to avoid moving through or interacting with the environment or a tendency to remain inanimate in the environment (avoidance)

- A desire or willingness to communicate with others in the environment (approach) as opposed to a tendency to avoid interacting with others or to ignore communication attempts from others (avoidance)

- The degree of enhancement (approach) or hinderance (avoidance) of performance and satisfaction with task performances.

These four aspects can be interpreted from a hierarchical view of consumer involvement with the environment, from basic store patronage intention (physical visits), to exploratory approach and avoidance (in-store searches), to communication approach and avoidance (interaction with others), and then finally to approach or avoidance at the performance or satisfaction level (e.g., repeated visits, shopping time, and expenditures). The empirical studies based on the S-O-R framework have examined approach-avoidance as actual behavior or behavioral intentions.

Approach-avoidance also refers to the direction of human motivations that drive behaviors. Elliot (2006) stated that approach-avoidance is a hierarchical structure of motivation that represent two types of energy and directions for human behaviors. Approach motivation encourages behaviors towards the positive stimuli, whereas avoidance motivation directs

behaviors away from negative stimuli. In the coping literature, approach and avoidance are conceptualized as two distinctive action strategies undertaken by people to cope with stress, which involve both cognitive and behavioral efforts to manage the internal and external environment (Finset, Steine, Haugli, Steen, & Laerum, 2002; Folkman, Lazarus, Gruen, & DeLongis, 1986). Specifically, approach-avoidance is the major coping behavior adopted by individuals when they need to manage the encounters or stressors in the environment, which lead them toward or away from those threats (Roth & Cohen, 1986; Skinner, Edge, Altman, & Sherwood, 2003).

Duhachek (2005) combined both mental and behavioral aspects and defined avoidance as "attempts to create psychic or physical distance between oneself and stress, to try to take one's mind off the problem, and to distract oneself by doing other things" (p.46). Whiting (2009) specifically highlighted the differences existing in the mental and behavioral aspects of avoidance and labeled the mental aspect of avoidance as "distancing" and the behavioral aspect of avoidance as "avoidance." Ignoring is an example of the mental aspect of avoidance, which indicates the psychic distance from the stressor or stimuli, such as "ignoring everyone around," "ignor[ing] the situation," and "just keep[ing] to myself" (Whiting, 2009). Essentially, the mental aspect of approach and avoidance focuses on altering the subject's feelings or cognitions, while the behavioral aspect of approach-avoidance refers to actions intended to alter the stimuli. Based on these findings, it is important to note that mental or behavioral approach-avoidance results from different coping strategies and processing mechanisms. Approach and avoidance responses that are restricted to the mental category normally happen in situations where the activities of stimuli are not fully under control, such as online advertising, so people need to adjust their

feelings. In the case of online shopping, consumers have the freedom to leave or stay in shopping sites, and thus approach and avoidance are mostly reflected in their behavioral responses.

Ample evidence suggests that the S-O-R framework has been used widely in the marketing literature to study influences of store environments to consumers (Baker et al., 2002; Deng & Poole, 2010; Y. Ha & Lennon, 2010). Even though not always explicitly claimed, in general, approach and avoidance indicate underlying directional distinctions of various human behaviors. In online shopping contexts, examples of approach behavior are browsing, choosing, and purchasing; examples of avoidance behavior include delaying, deferring, and leaving without purchasing. The S-O-R framework is used as a predictive model to forecast consumers' behavioral responses toward shopping environments (e.g., Eroglu et al., 2001, 2003; Jang & Namkung, 2009; Turley & Milliman, 2000). Specifically, it helps to enhance explanatory power of how atmospheric cues influence in-store and online shopping (e.g., M.-H. Huang, 2003; Parboteeah et al., 2009; Y. J. Wang, Minor, & Wei, 2011). Overall, consumer approach and avoidance behaviors and outcomes can be demonstrated in any combination of one or more types of activities: (1) a desire to stay (approach) or leave (avoid); (2) a desire to further explore and interact (approach) or a tendency to ignore (avoidance); (3) a desire to communicate with others (approach) or to ignore (avoid) them; and (4) feelings of satisfaction (approach) or dissatisfaction (avoidance) with the service experience (Bitner, 1992; Donovan & Rossiter, 1982; Turley & Milliman, 2000).

3.1.2 Theory of Affordances

The theory of affordances is an ecological psychology theory developed by Gibson (1979), and the affordances of the environment are "what it offers the animal, what it provides or

furnishes, either for good or ill" (p.127). Gibson (1979) argued that the affordances of objects can be directly perceived by animals because of their salient information clues, but at the same time the animals need to be capable of picking up that information. Affordances are an important aspect of environments, and their existence is independent of the animals' needs.

The concept of affordances was introduced by Norman (1988) to understand the design of technologies in human-computer interaction research in his book *The Psychology of Everyday Things* (POET), and then became widely used in the field. The general concept is that affordances of environment are the action possibility directly perceived by animals. For instance, the shape and material of chairs hint that they can be sat on; the color, smell, and texture of an apple tell animals that they are edible. The extent to which such sensory information can be picked up depends on the action capabilities of animals. For instance, if a child were not tall enough, the chair would not be suitable for him or her to sit; if one person does not have strong teeth, he or she might not bite the round-shaped colorful item.

The process of perceiving affordances does not merely happen in the natural environment. The examples given above (i.e., chair and apple) are tangible and physical objects in the physical environment. The evolution of technology altered the environment where people live and interact with others, and the affordances became a powerful concept for thinking about the interactions between technologies and the people who use them.

It is notable that Gibson's affordance framework was proposed in an age with limited technological advancement, and this framework predominantly views humans as animals in the natural environment, which led to ongoing debates on the conceptual developments and explorations of affordances in HCI studies (Kaptelinin & Nardi, 2012). Thus, the framework by Gibson lacks "an appropriate apparatus for understanding technologies as a special type of object,

that is, a tool mediating human interaction with the environment" (Kaptelinin & Nardi, 2012, p. 971). A growing number of studies in the HCI field seek other theoretical perspectives to re-ground the conceptual development of affordances. For instance, Bærentsen and Trettvik (2002) situated the notion of affordances within the structure of human activity. Zhang (2008a) proposed the concept of motivational affordances and posited it as a lens to investigate how the properties of objects can support motivational needs, such as *afford relatedness*.

The following subsections will further elaborate the relational properties of affordances, the perceptions, and structural characteristics of affordances as described in the literature. More importantly, the discussion will bridge affordances of environmental stimuli with human actions by borrowing insights from the framework of activity theory.

3.1.2.1 Properties of Affordances

Affordance "cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy," and it reflects the complementary relationship between the animal and its environment and brings benefits or harms to organisms (Gibson, 1979, p. 129). Some conflicting views of affordances emerged after it was initially proposed by Gibson (Chemero, 2003): (1) the *selectionist view* (resource-based view) claims that affordances are resources in the environment and that properties of objects might be exploitable by some animal (Reed, 1996); (2) the *dispositional view* argues that affordances are dispositional properties of the environment, and human beings can make them to be manifest properties in certain circumstances (Turvey, 1992); and (3) the *relational view*, which, unlike the first two views that merely focus on the side of environment or the side of human beings, posits a bridging position of affordances between these two entities. The relational view is closer to Gibson's interpretation of affordances. The affordances, as the action possibilities between the animals and environment, are a generally

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agreed upon understanding, even while there have been debates on the attributes of affordances

and some interpretations go beyond the original scope of the theory.

The concept of affordances is not only applied to guide the design of technology; Markus

and Silver (2008) used the functional affordances to characterize the materiality of IT artifacts

and to explain IT uses and effects. Markus and Silver's interpretation of affordances is in

accordance with Gibson's relational view, and the functional affordances refer to the possibilities

facilitated by technical objects for goal-directed actions for a specified user given the user's

capabilities and goals (M. L. Markus & Silver, 2008).

3.1.2.2 Affordances and Perceptions

Various conceptualizations and interpretations of affordances have been brought up by

researchers. The generally accepted argument is that the affordances of an environment are

perceptible by animals in that environment, but the focus of debates concentrates on whether the

affordances are directly perceptible or not (Bærentsen & Trettvik, 2002; Gaver, 1991; Gibson,

1979; Kaptelinin & Nardi, 2012; M. L. Markus & Silver, 2008; Mcgrenere & Ho, 2000).

Gibson's (1979) original conceptualization indicates that affordances are directly

perceptible, and it is the form of perception that does not require internal processing or prior

knowledge from an actor. For instance, when a person sees a flat, solid, and upright surface, he

can perceive that he is able to stand on it. Norman (1988) introduced the concept of affordances

in his POET book, but the relatively simple introduction without much further elaboration and

clarification led to some inaccurate uses of affordances in HCI studies as well as design practice

(Mcgrenere & Ho, 2000). Norman's (1999) argument was not entirely in agreement with

Gibson's view of affordances, and he specifically emphasized the potential mismatch between

real affordances and perceived affordances. For example, the intended design function of a door

handle is to be pulled (real affordance), but the visible feature of this door handle may mislead a user to push it (perceived affordance). Moreover, the perception of affordances is based on mental interpretation and past knowledge and experience (Norman, 1999). Norman's argument, to some extent, corresponds with Gaver's (1991) framework for separating the affordances from perceptual information available about them, such as *false affordances* and *perceptible affordances* (SeeMcgrenere & Ho, 2000).

Mcgrenere and Ho (2000) pointed out that Gibson's affordances exist independent of users' experience and knowledge, while Norman's affordances are interdependent with respect to users' experience, knowledge, and mental interpretation, leading to the differentiation of designed use and possible use of artifacts. Bærentsen and Trettvik (2002) agreed with the direct perceptible properties of affordances, but they also raised the argument that the affordances can be learned from the process of adaptation to the environment and that knowledge might be handed down from generation to generation, for instance, children invested with the perceptual learning efforts at the stage of infancy. By observing others, children learn that a cup can contain water and that they can also use it to store pencils. For newly invented artifacts, such as the smart phone, people know affordances of those devices by learning, and then they prepare knowledge and experiences to perceive the affordances of similar artifacts in the future.

Considering different views on the perception of affordances, Kaptelinin and Nardi (2012) reasoned that Gibson primarily focused on the direct perception of affordances because his theory views humans as animals acting in their natural habitats, and therefore, his affordances were the so-called *natural affordances*. Later scholars developed the notion of affordances beyond the scope of natural affordances and situated the relational properties in the social-

cultural environments in which the perception of affordances can be learned and determined by prior experiences and knowledge (Bærentsen & Trettvik, 2002; Kaptelinin & Nardi, 2012).

3.1.2.3 Structure of Affordances

Gibson (1979) proposed to use the affordances as a lens to examine how the environment can support animal actions, but he did not provide a substantial explanation of the animal actions. When examining the extant studies on affordances, the prominent advancement of theorizing of this concept lies in the discussion on the structured characteristic of affordances (Gaver, 1991). In alignment with Gibson's conceptualization of the action possibility of affordances, Gaver (1991) argued that the notion of affordances might extend beyond passive perception and that the sequential affordances and nested affordances are more applicable to understanding more complex human actions. Sequential affordances indicate that the affordances of technologies can be revealed over time as a person takes a series of interdependent actions, for instance, the person needs to grasp the handle (graspable) and then to detect that it can be twisted (twistable). Nested affordances mean affordances that are grouped in space and one affordance is a means toward realizing another affordance, for instance, the affordance that a software window is scrollable is perceived based on the scrollbar's affordance of draggability to uncover the window (Gaver, 1991).

Bærentsen and Trettvik (2002) outlined a three-dimensional framework of affordances that were contextualized in the unit of human activity. In accordance with the hierarchical structure of activity (activity, action, and operation), the affordances of objects were constructed as needs related affordances, instrument affordances, and operational affordances. The needs related affordances corresponded with the overall motive of a human activity; the instrument

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affordances were related to a lower-level action that was directed by a specific goal; the

operational affordances were posited to relate to operations that could be carried out.

Hartson (2003) proposed a technology design and evaluation framework incorporating

four types of affordances: physical affordance, sensory affordance, cognitive affordance, and

functional affordance. These four types of affordances form a hierarchical structure and Hartson

claimed that physical affordance is the real affordance indicated by Norman (1999). Sensory

affordance means using a human being's sensory ability to detect the affordance, and it is the

base of cognitive affordance and physical affordance. Functional affordance is "built" on the

basis of the other three affordances, and it is the first to be appraised in the evaluation stage.

Grange and Benbasat (2011) further investigated the hierarchical view of affordances and

positioned the role of affordances in IT artifacts design research. They proposed a two-

dimensional guiding framework with three levels of affordances. The two dimensions are

affordances and perceived affordances, which correspond to the views of technology design from

two parties of design activity: the designer and the user. The three levels are hierarchically built,

ranging from structural affordances and functional affordances, to action affordances.

3.1.2.4 Affordances and Human Needs

Affordances, as described by Gibson (1979), are independent of human needs. In other

words, whether the affordances exist or not is not influenced by needs of the observers. Gibson

emphasized:

> The affordance of something does not change as the need of the observer changes. The
> observer may or may not perceive or attend to the affordance, according to his needs, but
> the affordance, being invariant, is always there to be perceived. An affordance is not
> bestowed upon an object by a need of an observer and his act of perceiving it. The object
> offers what it does because it is what it is (p.138).

While Gibson argued for the irrelevant relationship between the affordances and situational human needs, Gaver (1991) posited that the actual perception of affordances is partially determined by the observer's cultural and social setting, experience, and intentions. However, Gaver also clarified that the determining effects rested on the prerequisite that affordances, information available about the affordances, and the observer's perceptions should be differentiated. The role that personal needs play in influencing the perception of affordances become more salient when contextualized in a particular human activity.

Bærentsen and Trettvik (2002) situated affordances as a mediating tool between the subject and the object from the perspective of activity theory and theorized the affordances along a three-dimensional structure of human activity. One of the three types of affordances, the needs related affordances, corresponds with the overall activity motive. In addition, Zhang (2008) explicitly posited the concept of *motivational affordances* that refer to the properties of ICT (information and communication technologies) that support one's motivational needs, and elaborated on the examples of motivational affordances based on three types of human motivational needs (physiological, psychological, and social). Kaptelinin and Nardi (2012) agreed with the interdependent relationship between the perceptions of affordances and human needs and specifically indicated that the affordances of "tools can be adjusted to situational needs" (p.973). Some studies investigate specific aspects of human needs, for instance, van Vugt et al. (2006) investigated the affective affordances of interface characters to engage users in human-computer interaction. Gibbs et al. (2013) applied the affordances perspective to study functional and social aspects of affordances of social media in organizations to support knowledge-sharing activities. Kaptelinin and Nardi (2012) made a similar argument on the

mediating function of technological affordances and the dynamic nature of tools to adjust to a

situational need.

Table 3 and Table 4 below present a comparison of different conceptualizations of

affordances that are based on Gibson's original theory and other theoretical perspectives (e.g.,

activity theory and motivation theory). The conceptualizations based on Gibson's original theory

are called Gibson Grounded, and the other conceptualizations that integrated different theoretical

perspectives are named non-Gibson grounded. The comparative analysis of these different

conceptualizations focuses on the following aspects: properties of affordances, perceptions,

structures, and relationships with human needs. Despite the overall uncertainty of the meaning of

affordances in the HCI field, the more accepted understanding of affordances is "the action

possibility offered by the environment" (Kaptelinin, 2013). In this dissertation, I approach the

concept of affordances within the structural view of activity theory. From the perspective of

activity theory, affordances are laid out in a hierarchical structure, which corresponds with

different levels of human activity (activity, action, and operation)(Bærentsen & Trettvik, 2002;

Kaptelinin & Nardi, 2006).

Table 3: Comparison of Different Views on the Concept of Affordances—Gibson Grounded

	Affordances	Properties	Perceptions	Human' needs	Structure
Views on affordances grounded in Gibson's theory	**Gibson (1979)** "What it offers the animal, what it provides or furnishes, either for good or ill".	1. Relational properties 2. Action possibilities relate to the action capability of human	1. Directly perceptible affordances 2. Not learnable, formed by biological evolution, maturation	Independent of situational needs	N/A
	Norman (1988, 1999) "The term affordance refers to the perceived and actual properties that determine just how the things could possibly be used…" (p.9).	1. Relational properties 2. Related to the mental and perceptual capabilities of the actor	Perceived with past knowledge and experience	Independent of situational needs	N/A
	Gaver (1991, 1992) Affordances are action possibilities between the technology and the actor. The physical attributes of objects are compatible with the action capabilities of the actor; the perceptible information about those attributes is available in a form compatible with a perceptual system.	1. Relational properties 2. Action possibilities relate to the action capability of human	Perceptible information of the affordances is separate from the perception of the affordance	Related to situational needs	1. Sequential affordances 2. Nested affordances
	McGrenere and Ho (2000) Affordances exist (or are nested) in a hierarchical structure and have different degrees along two dimensions: perceptible information of the affordance and the designed affordance	1. Relational properties 2. Action possibilities relate to the action capability of human	Perceptible information of the affordances is separate from the perception of the affordance	Related to situational needs	1. Sequential affordances 2. Nested affordances

Table 4: Comparison of Different Views on the Concept of Affordances—Non-Gibson Grounded

<table>
<tr><th></th><th>Affordances</th><th>Properties</th><th>Perceptions</th><th>Human' needs</th><th>Structure</th></tr>
<tr>
<td rowspan="4">Views on affordances not grounded in Gibson's theory</td>
<td>**Baerenten and Trettvik (2002)** "Affordances are activity-relationships between actors and objects" (p.59)</td>
<td>1. Relationship between organism and features and the environment 2. Action possibilities between subjects and objects in a social-cultural context</td>
<td>Perceptible, and can be the outcome of learning</td>
<td>Independent of individual organism but relate to a particular activities for a particular species</td>
<td>1. Needs related affordances 2. Instrumental affordances 3. Operational affordances</td>
</tr>
<tr>
<td>**Zhang (2008a, 2008b)** "The term affordance refers to the actionable properties between an object and an actor…Motivational affordances comprise the properties of an object that determine whether and how it can support one's motivational needs" (p.145).</td>
<td>Relational properties of ICT</td>
<td>Perceptible</td>
<td>Related: take actions to satisfy certain motivational needs</td>
<td>1. Afford physiological needs 2. Afford psychological needs 3. Afford social needs</td>
</tr>
<tr>
<td>**Markus and Silver (2008)** "Functional affordances are defined as the possibilities for goal-oriented action afforded to specified user groups by technical objects" (p. 622)</td>
<td>Relationship between technical object and the user</td>
<td>Perceptible</td>
<td>Related to a specific user in a particular inquiry</td>
<td>N/A</td>
</tr>
<tr>
<td>**Kaptelinin and Nardi (2012)** "Technological affordances as possibilities for human action mediated by cultural means conceived as a relational properties of a three-way interaction between the person, mediated means, and environment" (p. 967)</td>
<td>1. Relational properties 2.Action possibilities mediated by socially developed means</td>
<td>Perceptible, and can be the outcome of learning</td>
<td>Related: tool affordances can be adjusted to situational needs</td>
<td>1. Instrumental technology affordances 2. Auxiliary technological affordances 3. Learned affordances</td>
</tr>
</table>

3.1.3 Technology Acceptance Model

Over the past 25 years, a large body of research has focused on identifying factors that influence technology acceptance and use behavior. The technology acceptance model (TAM) (F. D. Davis, 1989; F. D. Davis et al., 1989) is established as a concise yet very powerful model for explaining and predicting usage intention and behavior (Yi & Hwang, 2003). It was developed on the basis of the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) to study the behavior of people in a specific situation. TRA theorizes that an individual's behavioral intention is the immediate antecedent of actual behavior, and TAM elaborates that the behavioral intention is determined by cognitive evaluations, including perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness refers to the extent to which a person believes that using the technology can enhance job performance, and the perceived ease of use is defined as the extent to which a person believes that using the technology will be free of effort (F. D. Davis, 1989). TAM posits that the effects of other external variables on behavioral intention are fully mediated by these two beliefs (PU and PEOU).

Many studies have investigated the interrelationships among TAM constructs or have combined TAM constructs with constructs from TRA or TPB. Based on the robust core constructs in TAM, later studies also extended and updated to TAM2 (Venkatesh & Davis, 2000), the intrinsic and extrinsic motivation model (F. D. Davis, Bagozzi, & Warshaw, 1992), the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Gordon, & Davis, 2003), and TAM3 (Venkatesh & Bala, 2008). TAM postulates that external variables influence technology usage indirectly by influencing PU and PEOU. The extended models have suggested other important factors influencing technology adoption, such as perceived enjoyment,

computer self-efficacy (Compeau & Higgins, 1995), task-technology fit (D. L. Goodhue & Thompson, 1995), and social influence (Venkatesh et al., 2003). TAM3 integrated TAM2 and the determinants of PEOU to provide a more complete nomological network of the determinants of individuals' IT adoption and use (Venkatesh & Bala, 2008).

In addition to being applied in the information system research, TAM has been used to predict technology acceptance in different contexts, including e-commerce (S. Ha & Stoel, 2009; Pavlou, 2003), e-learning (Roca, Chiu, & Mart ńez, 2006), and health care (Holden & Karsh, 2010). Particularly, the TAM variables are considered key predictors of e-commerce acceptance because these activities have become more technology-driven (Gefen et al., 2003; Pavlou, 2003).

Despite the dominance of TAM in guiding technology acceptance research, Benbasat and Barki (2007) explicitly expressed their concerns that the overly intense focus on TAM has diverted researchers' attention away from other important research issues and led to a state of theoretical chaos, and they suggested that researchers investigate beyond the range of TAM constructs by directing the research focus on the antecedents or consequences of technology acceptance.

3.1.4 Activity Theory

Activity theory states that an activity involves a subject and an object, which are mediated by some tools (Kaptelinin & Nardi, 2006; Kuutti, 1996). According to Kuutti (1996):

> Activity has a double nature; every activity has both an external and an internal side. The subject and the object of an activity are in a reciprocal relationship with each other: the subject is transforming the object, while the properties of the object penetrate into the subject and transform him or her (p.32).

Activity theory contributes to the conceptual development of this research in two ways. First, the structural view of human activity indicates that an activity comprises three hierarchical levels (Kuutti, 1996; Bærentsen, 2000; Bærentsen and Trettvik, 2002). The first level is the activity level, and the activity is encouraged by an overarching motive; the second level is the action level, which is goal-oriented and relates to specific tasks; the third level is the operational level, including specific procedures to finish tasks. For instance, publishing a piece of news is the general motive of an activity (activity level). A user can write a Facebook post or send an email to a listserv to publish the news (action level). The user needs to log in to the system, type the message, and to hit the "send" button (operational level). The structural review of human activity can provide some insight in understanding people's preliminary evaluations and conclusive evaluations of technology-enabled environments, as these two interdependent assessments can be interpreted to correspond with different levels of activity.

Second, activity theory emphasizes the mediation effect of tools in subject-object relationships, and tools can shape the way human beings interact with reality (Kaptelinin & Nardi, 2006). As activity theory presents that technologies play a mediation role between the subject and the object, which is conceptually similar to the relational properties of affordances in Gibson's theory, some researchers have attempted to contextualize the affordances of technology from the perspective of activity theory (Albrechtsen, Andersen, Bødker, & Pejtersen, 2001; Bærentsen & Trettvik, 2002; Kaptelinin & Nardi, 2012; Kaptelinin & Nardi, 2006). Affordances were typically interpreted in terms of low-level manipulation with physical artifacts, and the conceptualization was limited to the level of operations. Bærentsen and Trettvik (2002) framed these affordances as *operational affordances*, but they also argue that affordances can be

extended to the level of actions and activities. From the perspective of activity theory, the notion of affordances needs to be extended to human activity as a whole (Kaptelinin & Nardi, 2006).

Section 3.2 presents the research model with detailed descriptions of each construct in the model, and then provides the justifications for research hypotheses.

3.2. Conceptual Development

According to Lewin (1951), two sets of factors lead to the emergence of human behaviors. One set includes individual-level factors (e.g., personality) and the other includes the factors of the surrounding environment (i.e. behavioral setting). The focus of this dissertation primarily is the effects of environmental surroundings on human behaviors, and particularly the role atmospheric cues have in influencing consumer evaluations and behavioral intentions towards the environment. Therefore, this dissertation used an experimental approach to examine consumer responses towards particular website designs. Individually specific exogenous factors that cannot be fully manipulated in an experiment design, such as prior purchasing experiences and social media use experiences, are considered as control variables and not the focus of interest in this study. The developed research model takes into account the utilitarian, hedonic, and social aspects of consumers' evaluations to provide a more comprehensive understanding of the person–environment interactions in online social shopping environments.

This section presents the conceptual development and research hypotheses. To provide a clear picture of the conceptualization process, this section introduces the theoretical development at two levels of abstraction. The conceptual framework at a higher level of abstraction (Figure 4) presents how the S-O-R framework serves as the meta-framework and that how the other three theories contribute to an enriched understanding of core components. The research model

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(Figure 7) at a lower level of abstraction illustrates more details of specific constructs and research hypotheses.

3.2.1 Conceptual Framework at a High Level of Abstraction

Figure 4 illustrates a conceptual framework at a high-level of abstraction that builds on the structure of the S-O-R framework. The notion of perceived affordances captures the interactions between environmental stimuli (S) and a person's internal changes (O) and thus helps to elaborate the link between the S and O components.
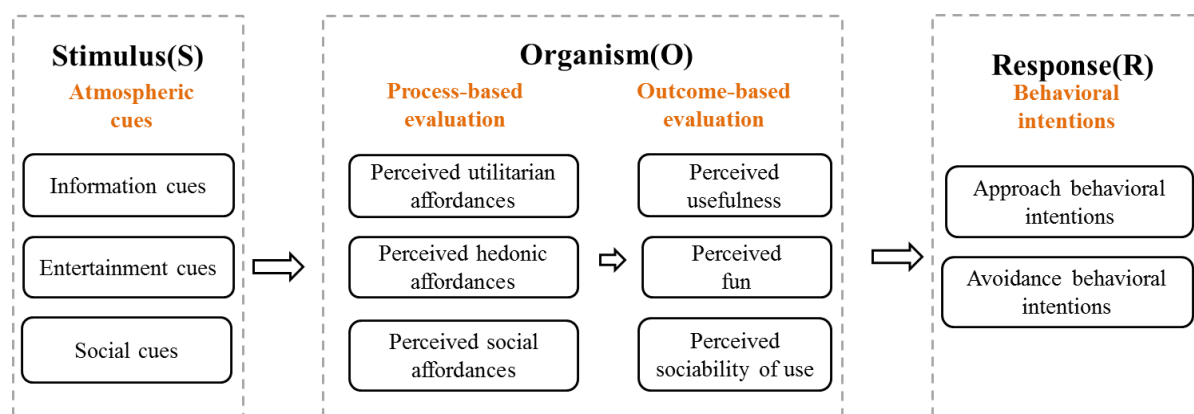
Figure 4: A Research Model with a High-level of Abstraction

The differentiation of process-based and outcome-based evaluations introduces an enriched meaning of the organism (O) component. Activity theory suggests a hierarchical structure that helps to make a distinction between process-based and outcome-based evaluations by relating them to different levels of human activity. The process-based evaluations (perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances) indicate assessments of possibilities of action; the outcome-based evaluations (perceived usefulness, perceived fun, and perceived sociability of use) refer to summative assessments of overall experiences.

In this research model, the R component particularly indicates behavioral tendency or intentions because both theoretical and empirical evidence supports that behavioral intentions are an immediate antecedent of actual behavior in many prior studies (Ajzen & Madden, 1986; Bagozzi, 1981; Fishbein & Ajzen, 1975; Malhotra & Galletta, 1999; Webb & Sheeran, 2006). The response (R) component is conceptualized along two directions suggested by Mehrabian and Russell (Mehrabian & Russell, 1974): approach behavioral intentions and avoidance behavioral intentions.

The following sections introduce the constructs in the research model and posit hypotheses. A scenario about Mary's online shopping can help to explain relationships among these constructs. This scenario will be revisited throughout this research to illustrate various concepts.

3.2.1.1 A Scenario

Mary is looking for a dress to wear to a wedding ceremony. She has no idea what to buy exactly, so she decides to go to an online website and shop for the dress. When she visits one online shopping site, she starts searching for dresses to find out what the store carries, checking the product details to learn about each product, and reading other customers' reviews to learn about what others think about the product. While in the shopping environment, she sees features, such as zoom in/out, a search box, and a navigation panel, have the potential to allow her to find detailed information about the product; other features, such as the clean layout, video clips and construct-your-own-style board, seem to be relaxing and entertaining to play with; features, such as sharing through social media (e.g., Facebook, Twitter, Google Plus) provide possible ways for her to communicate with others, including peer consumers, friends, or family members. Finally, Mary finds a nice dress with a good price for the wedding ceremony. She thinks this

online shopping saves her time and money. She also finds the visit to this shopping site is fun and

enjoyable, and using this website also satisfies her desire to communicate with others and helps

her establish some connections with other consumers or friends. After this visit, Mary thinks she

would like to stay, explore, or shop at this website.

3.2.1.2 Stimulus: Atmospheric Cues

Consistent with previous arguments that web design is a multidimensional construct,

Karimov et al (2011) posited three broad categories of web design features, visual design, social

cue design, and content design. Environmental stimuli are converted into meaningful information

and used by consumers to comprehend the environments before making any judgments or

performing further responses. Particularly in a shopping context, Baker et al. (1994) suggested

that atmospherics are influential to consumer behaviors and summarized three categories of

atmospheric cues that have significant impacts on a store's image. These categories are ambient

factor (e.g., music and lighting), design factor (e.g., color and display), and social factor (e.g.,

sales people).

Early e-commerce websites did not fully support human sensory channels that were

naturally embedded in retail stores. Eroglu et al. (2001) stated that channels of human sense,

such as scent, are absent in early shopping websites, but visual cues retained their impacts on

consumer behaviors as they were still directly visible to consumers. Thus, the effects of visual

characteristics (e.g., color, layout, and order) on consumer behaviors became the foci of research

investigations (e.g., Cyr et al., 2009; Lavie & Tractinsky, 2004; Zviran, Glezer, & Avni, 2006).

Additionally, researchers also recommended studying design elements from a high-order and

more holistic perspective, which may yield better insights regarding the influences of website

characteristics than isolating individual design characteristics (Catherine Demangeot &

Broderick, 2010; Porat & Tractinsky, 2012). Therefore, this dissertation builds on prior studies on store atmospherics (e.g.,Eroglu et al., 2001; Karimov et al., 2011; Parboteeah et al., 2009) and investigates three dimensions of atmospheric cues: information, entertainment, and social.

Information cues

Information cues are characteristics that are relevant to goal-directed tasks in an online shopping environment. Information cues are similar to task-relevant cues in the literature, which focus on assisting the consumers to attain their shopping goals (Parboteeah et al., 2009). Information cues are by nature utilitarian characteristics (Childers et al., 2001) because they are closely relevant to shopping efficiency and effectiveness. Many website characteristics can be regarded as information cues. Examples of information cues are the navigation bar, product description, and shopping cart. The intention of this research is not to provide an exhaustive list of information cues but to investigate how the variety of this type of cue may lead to changes in consumers' perceptions. For example, in the scenario, information cues are "zoom in/out, a search box and a navigation panel" that Mary can use to know about products.

Entertainment cues

Entertainment cues refer to characteristics that are related to a consumer's enjoyment while visiting a shopping website but do not directly support goal-directed tasks. Low task-relevant (Eroglu et al., 2001) or mood-relevant cues (Parboteeah et al., 2009) are coined to represent atmospheric cues that do not directly affect the fulfillment of a shopping task. Low-task-relevant cues can create "an atmosphere that has the potential to make the shopping experience more pleasurable" but are "relatively inconsequential to the completion of the

shopping task" (Eroglu et al., 2001, p. 180). As these cues are important in creating the mood at a website, Parboteeach et al. (2009) referred to them mood-relevant cues.

However, the term *low task-relevant* does not accurately describe atmospheric cues that are relevant to consumers' experiential feelings, and the term *mood* indicates a long lasting affective state that is not necessarily induced by a stimulus (Russell, 2003). In this dissertation, the term *entertainment cues* is used to encompass characteristics that indicate the fun and playfulness associated with shopping, and thus reflects the experiential side of shopping, such as pleasure, curiosity, fantasy, escapism, and fun (Eroglu et al., 2001; Scarpi, 2012; Wolfinbarger & Gilly, 2001). Entertainment cues include aesthetic characteristics that allow consumers to enjoy an online social shopping environment in its own right. Entertainment cues can be relevant to visual appearance, such as website complexity and order (van der Heijden, 2003), color (Parboteeah et al., 2009) or graphical style (Zeithaml, Parasuraman, & Malhotra, 2002), or many other design elements, for instance, style board, or virtual avatar (Holzwarth et al., 2006). For instance, in the scenario, entertainment cues are "clean layout, video clips and construct-your-own-style board."

Social cues

Social is a broad term that can be interpreted in different ways (Junglas et al., 2013), and *social cues* have been used to describe different types of socially-related elements in offline and online shopping environments. Social cues or social factors generally refer to presences of other customers and sales personnel in traditional marketplaces. For instance, Baker et al. (1994) investigate how the presence of sales personnel influences consumers' responses towards retail stores (W. Koo & Kim, 2013). In online marketplaces, social cues have been progressively incorporated in shopping website design.

The application of social cues in online websites can be categorized into two types. One major stream of social cues are design elements that introduce a sense of social presence, such as human images (Cyr et al., 2009; Gefen & Straub, 2004) and the socialness of a website (Wakefield et al., 2011). This category of social cues does not necessarily incorporate real interpersonal activities to imply the idea of social cues. The other stream of social cues focuses on supporting interpersonal interactions and becomes popular with the growth of social networking sites. Through some design features of social networking sites, such as Facebook share, Twitter post, and Google plus circle, consumers are given the opportunities to interact with peer buyers, friends, or potentially anyone else. The influences of the second category of social cues are underinvestigated due to its novelty.

This dissertation particularly constrains the scope of social cues to interpersonal interaction characteristics related to consumers. Social cues refer to characteristics that are associated with a consumer's social interactions with others in an online social shopping environment. For instance, in Mary's scenario, social cues are "features, such as sharing through social media (e.g., Facebook, Twitter, Google Plus)."

3.2.1.3 Organism: Process-based and Outcome-based Evaluations

Organism refers to consumers' internal processing of external stimuli. This dissertation investigates the organism (O) component from cognitive, affective, and social aspects and differentiates process-based evaluations and outcome-based evaluations of interactions with technology-driven environments.

IS researchers have noted the difference between process-based evaluations and outcome-based evaluations. The former focuses on the means and tactics that relate to behavioral actions

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(e.g., perceived ease of use), whereas the latter is closely related to goals and consequences of using the technology (e.g., perceived usefulness) (F. D. Davis et al., 1989; F. D. Davis & Venkatesh, 2004).

According to activity theory, an activity has an overall motive and can be decomposed into a sequence of actions with immediate goals (Kaptelinin & Nardi, 2006; Leont'ev, 1974). The original idea of activity theory is to break an activity into three layers: activity, action, and operation. This research particularly focuses on the two higher layers (activity and action) (see Figure 5) because operation level indicates a more primitive level of human behavior that is without a clear goal and relevant for more fundamental technology infrastructure. Thus, the operation level is outside the scope of this dissertation.
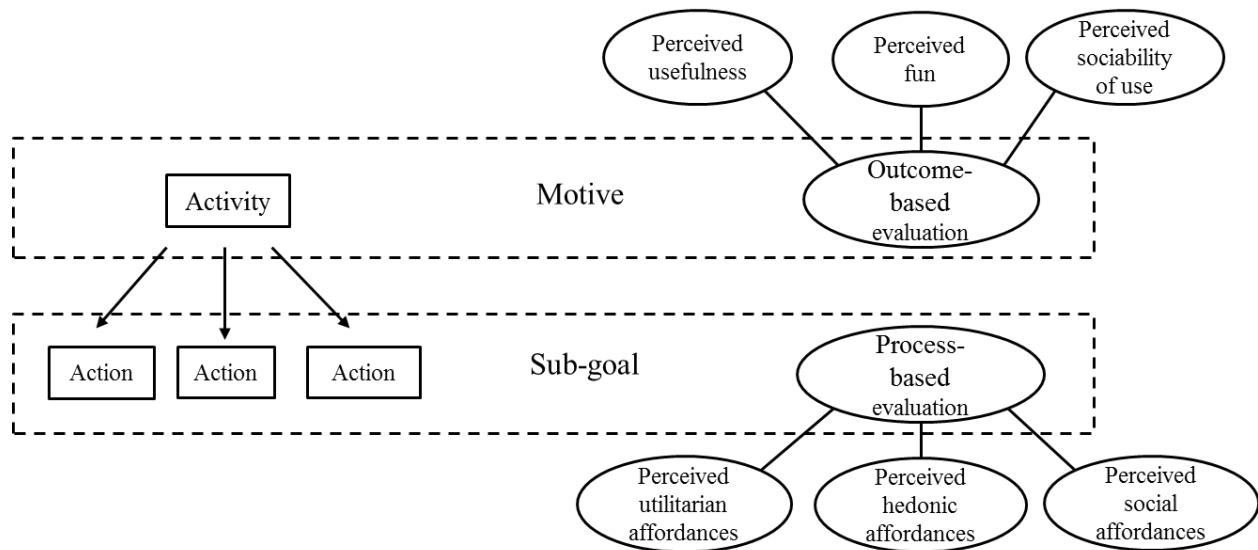
Figure 5: The Hierarchical Structure of Activity. Activities are composed of actions. These two levels correspond, respectively, to the outcome-based and process-based evaluations.

The two-layer structure of activity provides theoretical support to differentiate process-based and outcome-based evaluation. Figure 5 visualizes how process-based and outcome-based evaluations correspond with these two levels: activity and action. The process-based evaluation

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relates to particular actions directed to certain sub-goals, and the outcome-based evaluation relates to the activity level with an overall motive. When referring to Mary's scenario, the activity is "go to an online website and shop for the dress" with an overall motive of "looking for a dress to wear to a wedding ceremony."

Dimensions of Process-based Evaluations

Affordances refer to action possibilities that are mediated by information technology between a subject and an object, which reflect the instrumental value of technology in supporting the interaction between the subject and the object (Kaptelinin & Nardi, 2012). Affordances of an IT-enabled environment indicate the possibility for an action rather than the action itself, which depends on a person's capability to perceive and then execute this action (Ann Majchrzak & Markus, 2012). Researchers also argue that perceptions of affordances are better understood and described via a vocabulary of process rather than end-states (Bloomfield, Latham, & Vurdubakis, 2010). Thus, perceived affordances denote the process-based evaluations.

Researchers and designers have increasingly adopted an affordance perspective when studying digital technologies and social media adoption and use (Cabiddu, Carlo, & Piccoli, 2014), given the nature of affordances that captures the possibilities for action. Markus and Silver (2008) suggested that affordances are considered possibilities for goal-oriented action, and material objects do not merely afford cognition and action, but also affect. Scheepers and Middleton (2013) abstracted three dimensions of affordances of personal ICTs–utilitarian, connective, and hedonic–that indicate different mediated actions supported by technology. In Scheepers and Middleton's conceptual development, the utilitarian affordances indicate the use of personal ICT as a tool (for effectiveness and efficiency outcomes); the hedonic affordances

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refer to using ICTs as a means for entertainment or leisure; and the connective affordances mean using personal ICTs as a medium to connect to other individuals, systems or technologies (Scheepers & Middleton, 2013).

In this dissertation, perceived affordances refer to a consumer's perception of mediated action possibilities between a person and his or her designated objects. The notions of three dimensions of perceived affordances are further refined based on their designated objects of actions (see Figure 6).

Subject	**Technology**	**Object**
	Perceived utilitarian affordances ———	Information
Consumer ———	Perceived hedonic affordances ———	Self-experience
	Perceived social affordances ———	Others
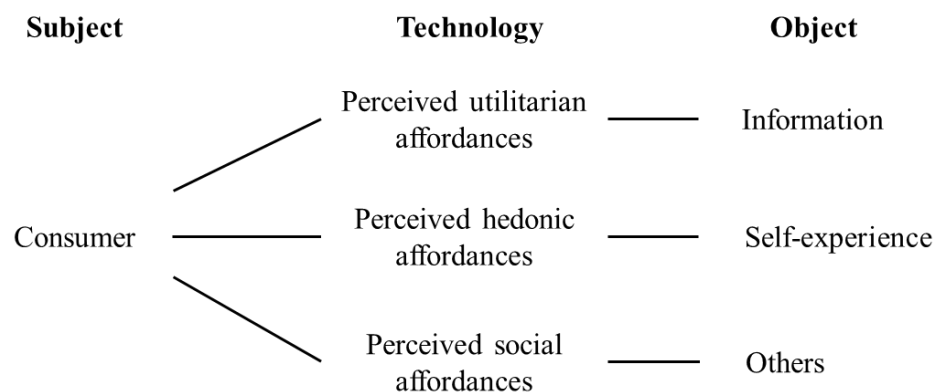
Figure 6: Three Dimensions of Perceived Affordances

Consequently, this dissertation presents an integrative view of perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances that indicate mediated action possibilities between consumers and their objects of actions: information, self-experience, and others, respectively. In the context of online social shopping, Figure 6 shows the conceptual mapping of three types of perceived affordances. At the top of the figure, technology plays the mediating role between the subject and the object. At the bottom, different types of perceived affordances indicate action possibilities mediated by technology between a consumer and his or her designated objects. In other words, the consumer corresponds with the subject;

information, self-experience, and others indicate three objects of the consumer; and three types of perceived affordances indicate mediated action possibilities facilitated by the technology.

Perceived utilitarian affordances (PUA)

Perceived utilitarian affordances are defined as a consumer's perception of the action possibilities facilitated by features of shopping sites to acquire goal-directed information, such as product characteristics, prices, and brand. PUA indicates the mediated actions between a consumer and the information object, and particularly refers to the possibilities of performing actions that support acquiring task-relevant information. In the provided scenario, "features, such as zoom in/out, a search box, and a navigation panel, have the potential to allow her to find detailed information about the product" indicates perceived utilitarian affordances of the shopping website.

Perceived hedonic affordance (PHA)

Affordances do not only have utilitarian characteristics (goal-oriented actions and interactions), material objects may also afford affective and empathetic actions and interactions (van Osch & Mendelson, 2011). The hedonic aspect of affordances relates to affective characteristics of technology design. Hedonic affordances invite emotional reactions from users, as the physical attributes of products lead to users' appraisals of products (Khalid & Helander, 2006). In this sense, perceived hedonic affordances (PHA) are defined as a consumer's perception of the action possibilities facilitated by features of shopping sites to entertain themselves through interaction with the sites.

The notion of perceived hedonic affordances is different from other relevant affective constructs, such as computer playfulness. Computer playfulness or microcomputer playfulness

was initially studied as a personal trait or a state, and then it became an aspect of users'

interaction with computers (Webster & Martocchio, 1992), whereas perceived hedonic

affordances capture the momentary possibilities that users perceive to enjoy themselves. For

instance, "other features, such as the clean layout, video clips and construct-your-own-style

board, seem to be relaxing and entertaining to play with" indicates the perceived hedonic

affordances of the shopping website.

Perceived social affordances (PSA)

Gaver (1996) used the term *affordances for interaction* to describe material properties of

an environment that stimulates interactions among people. Some characteristics of the

environment were posited to obtain social affordances and enable particular kinds of interactions

among people of a group (Bradner, Kellogg, & Erickson, 1999). For instance, social affordances

of a coffee machine in a workspace represent possibilities perceived by people to gather and

have informal conversations about different topics (Kirschner, Strijbos, Kreijns, & Beers, 2004).

Kreijns et al. (2013) referred to social affordances as the properties of a computer-supported

collaborative learning (CSCL) environment that act as social-contextual facilitators relevant for

the socio-emotional interaction among learners. Sutcliffe et al. (2011) stated that social

affordances of social media technologies focus on promoting social relationships. Sun (2011)

posited that social affordances are main characteristics of social commerce websites.

Essentially, social affordances indicate the mediated actions supported by information

technology between a subject and someone else who could be their friends or other consumers.

Therefore, in this dissertation, *perceived social affordances* refer to a consumer's perception of

the action possibilities facilitated by features of shopping sites to interact with others. In Mary's

scenario, "features, such as sharing through social media (e.g., Facebook, Twitter, Google Plus)

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provide possible ways for her to communicate with others, including peer consumers, friends, or family members" indicates the perceived social affordances of the shopping website.

Dimensions of Outcome-based Evaluation

Outcome-based evaluations focus on summative experiences or conclusive assessments of using a shopping website. The notion of outcome-based evaluations has been studied in the literature. For instance, Venkatesh and Brown (2001) identified three types of outcomes–utilitarian outcomes, hedonic outcomes (i.e., fun), and social outcomes–that may influence users' intentions to adopt a personal computer outside of the workplace (i.e. home environments). Utilitarian outcomes refer to the enhancement of effectiveness by using personal computers in home activities; hedonic outcomes indicate the pleasure that is derived from personal computer adoption; social outcomes are about the public recognition or reference power that one gains from using innovative technology products (Venkatesh & Brown, 2001). In this dissertation, the notions of utilitarian and hedonic outcomes of online social shopping are similar to those of personal computer adoption, but social outcomes of using shopping websites are not restricted to consumers' public images or self-status. Social outcomes are framed to be relevant to the degree that using the shopping website can satisfy consumers' desire for socializing with others. Three aspects of outcome-based evaluations are perceived usefulness, perceived fun, and perceived sociability of use.

Perceived Usefulness (PU)

Perceived usefulness is a core construct of the TAM model and mostly indicates users' evaluations of information technology in a workplace. Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her

job performance" (F. D. Davis, 1989, p. 320). PU is mostly related to the rational assessments of

adopting or using a particular technology within certain contexts and has been demonstrated to

be the primary determinant of intention to use that technology (F. D. Davis et al., 1989; Heshan

Sun & Zhang, 2006).

In the context of online social shopping, *perceived usefulness* is defined as a consumer's

conclusive estimation of the degree that using a website can help to enhance the shopping

performance (Koufaris, 2002) . In the provided scenario, perceived usefulness is reflected in

Mary's evaluation that "she thinks this online shopping saves her time and money."

Perceived Fun (PF)

Van der Heijden (2004) pointed out that perceived usefulness "draws attention to the

outside benefit, external to the system-user interaction"(p. 697). The cognitive evaluation of IT

use rests on the assumption that users are rational human beings, and overlooks the affective

factors for technology use (Beaudry & Pinsonneault, 2010). Especially in the shopping context,

hedonic outcomes indicate the pleasure derived from the consumption, or use, of a product

(Babin et al., 1994; Hirschman & Holbrook, 1982; Holbrook & Hirschman, 1982). Affective

evaluation is a more complex concept that can be studied from a multidimensional perspective (P.

Zhang, 2013). Process-based affective evaluations are one dimension for viewing affective

evaluations of ICT and focus on the interaction process; outcome-based affective evaluations

concentrate on interaction outcomes (P. Zhang, 2013). Process-based affective evaluations are

more immediate and preliminary, and do not relate to any further goals, such as immediate visual

aesthetics. Outcome-based affective evaluations are more conclusive assessment of one's direct

ICT interaction experience, such as the affective award (Reinig, Briggs, Shepherd, Yen, &

Nunamaker, 1995). *Perceived fun* is a consumer's conclusive evaluation of hedonic experiential

outcomes of using shopping sites. For example, in the scenario, "she also finds the visit to this shopping site is fun and enjoyable."

Perceived Sociability of Use (PSOU)

Social evaluation is a relatively less studied aspect of technology use in the literature because the early information systems were mostly designed for work environments or individual entertainment. The social outcomes of using a technology could be diverse. Some examples of social outcomes include self-image or social status (Venkatesh & Brown, 2001), social interaction and social presence (H. Li, et al., 2013), and satisfaction of social desire (Iivari, 2014).

The term *sociability* has different layers of meanings in the literature. Sociability could be a characteristic of a given technology (Animesh, Pinsonneault, Yang, & Oh, 2011; H. Zhang, Lu, Gupta, & Zhao, 2014) or the outcome of using this technology (Iivari, 2014; Junglas et al., 2013). For instance, Preece (2001) identified usability and sociability as objective measures of online community technologies and indicators of success of technology platforms. Animesh et al. (2011) attributed sociability as one characteristic of a social virtual world. However, in other research, perceived sociability (Junglas et al., 2013) or perceived sociability of use (Iivari, 2014) describes the outcome of using a technology, such as to create and maintain social contacts, or even satisfy social desire.

This dissertation uses the term *perceived sociability of use* proposed by Iivari (2014) to denote social outcomes of using a shopping website, and is defined as a consumer's conclusive belief that using a shopping site can satisfy one's desire to socialize with others (Iivari, 2014; Junglas et al., 2013; Kreijns et al., 2002). Similarly, studies on social aspects of ICT evaluations make a distinction between more primitive evaluation (i.e. social affordances), and overall

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assessment (i.e. perceived sociability) (Junglas et al., 2013; Kreijns, 2004). In Mary's scenario, perceived sociability of use indicates her evaluation that "using this website also satisfies her desire to communicate with others and helps her establish some connections with other consumers or friends."

Attitude is a common construct that is considered to be the mediating factor between beliefs and behavioral intentions (F. D. Davis, 1989). Fishbein and Ajzen (1975) defined attitude as the intensity of affect one feels for or against some object or behavior, and distinguish two types of attitudes by their objects: attitudes toward objects (ATO) and attitudes towards behaviors (ATB) (Hartwick & Barki, 1994; Wixom & Todd, 2005). Research on technology adoption has generated inconsistent and inconclusive findings on the effects of attitudes on behavioral intentions. The intervention of attitudes between beliefs and intentions is found to be far less than hypothesized by either TRA or TAM (F. D. Davis et al., 1989). Hence, the attitude construct is dropped from the subsequent specification of models on technology acceptance, such as TAM2 and UTAUT (Venkatesh & Davis, 2000; Venkatesh et al., 2003). Venkatesh and Brown (2001) decomposed unidimensional attitudinal beliefs into utilitarian outcomes, hedonic outcomes, and social outcomes.

In this study, the organism component is decomposed to process-based and outcome-based evaluations that encompass cognitive, affective, and social assessments of users' feelings.

3.2.1.4 Response: Online Social shopping behavioral intentions
Approach and avoidance

Online shopping involves a significant amount of technology use. Many studies investigated online consumer behaviors from the perspective of technology acceptance (Cheung et al., 2005; Darley et al., 2010). Being an important variable of TAM and other related research

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models (e.g., TAM2 and UTAUT), intention to use or not to use is one of the most studied

behavior variables in IS research. When examining consumer behaviors in online shopping

environments, researchers retain interest in using the intention to behave or not to behave to

represent behavioral outcomes (e.g., Gefen et al., 2003; H. Kim et al., 2013; Vijayasarathy,

2004). Responses refer to consumer behaviors towards online social shopping environments that

are determined by a set of assessments of the environments.

In addition, researchers have also attempted to conceptualize consumer behaviors into

multiple dimensions. For instance, Kang and Park-Poaps (2011b) developed a multidimensional

construct of social shopping behaviors. The multidimensional view of social shopping behaviors

has the strength of elaborating specific types of consumer behaviors, but it is not concise enough

to present an overarching view of those behaviors. On the contrary, the dominant outcome

variable in technology acceptance research is intention to use, but this stream of research does

not cover the influences that lead to intentions to avoid.

This research attempts to find a balance between detailed and concise ways of

investigating consumer behaviors, and proposes to conceptualize the consumer behaviors along

two main dimensions: approach or avoidance. According to the S-O-R framework, an

individual's responsive behavior emerges following the exposure to stimuli and the development

of their inner evaluations. Approach and avoidance indicate two generic directions of human

behaviors that contain physical approach, exploration, nonverbal indexes of interest, verbal

expressions of preference, level of performance at work, and the desire to affiliate with others

(Mehrabian & Russell, 1974). An approach versus avoidance tendency toward a website not only

reflects the generic distinct directions of behavior, but also can predict further consumer actions,

such as customer satisfaction, total number of website hits, users' return rate, future patronage, and so on (Deng & Poole, 2010).

Prior studies have conceptualized approach-avoidance as two ends of the same continuum (e.g., Wu et al., 2008), or merely have covered the approach response (e.g., Deng & Poole, 2010; Fiore & Jin, 2003), which is not consistent with the original conceptualization in Mehrabian and Russell's (1974) framework. Following the two-end illustration of approach-avoidance, some studies simply operationalized the approach-avoidance behavior as purchase intentions (Hausman & Siekpe, 2009; D. M. Koo & Ju, 2010), which overlooked the conceptual difference between the intention not to behave and the intention to avoid. Prior studies also demonstrate that approach and avoidance behaviors may be triggered by different stimuli and processed by different human information systems (behavioral approach system vs. behavioral inhibition system) (Cacioppo, Gardner, & Berntson, 1997; Carver, 2006; Davidson, 1998). Therefore, this research argues that approach and avoidance indicate two types of action tendency and are not the two ends of a continuum. When referring to Mary's scenario, behavioral intentions describe that "Mary thinks she would like to stay, explore, or shop at this website."

Intention and behavior

Behavioral intention indicates a person's willingness to try or make effort to perform a behavior (Fishbein & Ajzen, 1975). An intention is assumed to be the immediate determinant of an actual behavior, which captures the motivational factors influencing a behavior (Ajzen, 1991). Behavioral intentions are users' visions of their potential use of technology products and have been found to be the direct antecedent of actual behavior. Prior research, especially in the information systems (IS) field, has used behavioral intentions as dependent variables (Ajzen,

1991; F. D. Davis, 1989) which have the most proximal influence on behaviors and mediates the other determinants of behaviors (Venkatesh & Brown, 2001). Intentions are strong predictors of actual behavior unless constraints prevent individuals from controlling the event and prevent intention from becoming action (Schifter & Ajzen, 1985).

In addition, understanding users' behavioral intentions is especially important for new technology development because the awareness of users' behavioral intentions can provide suggestions to improve technology products and avoid potential failures. Therefore, even though there have been concerns with the inconsistency between behavioral intentions and actual behaviors, I argue that research on behavioral intentions is still valuable in this new technology-driven shopping environment.

3.2.1.5 Revisiting Mary's Scenario

Following the analysis of various constructs proposed in the research model, the section presents the interpretation of Mary's scenario with concepts used in this study.

Mary is looking for a dress to wear to a wedding ceremony (motive). She has no idea what to buy exactly, so she decides to go to an online website and shop for the dress (activity). When she visits one online shopping site, she starts searching for dresses (action) to find out what the store carries (sub-goal), checking the product details (action) to learn about each product (sub-goal), and reading other customers' reviews (action) to learn about what others think about the product (sub-goal). While in the shopping environment, she sees features, such as zoom in/out, a search box, and a navigation panel (information cues), have the potential to assist her actions to find the product details (perceived utilitarian affordances); other features, such as the clean layout, video clips and construct-your-own-style board (entertainment cues), seem to be relaxing and entertaining to play with (perceived hedonic affordances); features, such as

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sharing through social media (e.g., Facebook, Twitter, Google Plus) provide possible ways for her to communicate with others, including peer consumers, friends, or family members (perceived social affordances). Finally, Mary finds a nice dress with a good price for the wedding ceremony. She thinks this online shopping saves her time and money (perceived usefulness). She also finds the visit to this shopping site is fun and enjoyable (perceived fun), and using this website also satisfies her desire to communicate with others and helps her establish some connections with other consumers or friends (perceived sociability of use). After this visit, Mary thinks she would like to stay, explore, or shop at this website (behavioral intentions).

3.2.2 Research Model and Hypotheses

In the previous section, Figure 4 illustrated the conceptual framework of the study by presenting the relationships among environmental stimuli, organismic evaluations, and behavioral intentions at a high level of abstraction. This section presents a testable research model (Figure 7) that explains how atmospheric cues influence consumers' process-based and outcome-based evaluations and their subsequent behavioral intentions.

Figure 7 shows the proposed research model. Information cues, entertainment cues, and social cues are three dimensions of atmospheric cues in online social shopping environments. Perceived utilitarian affordances (PUA), perceived hedonic affordances (PHA), and perceived social affordances (PSA) are process-based evaluations that mediate the effects of external environment stimuli to internal changes. Perceive usefulness (PU), perceived fun (PF), and perceived sociability of use (PSOU) indicates consumers' overall assessments of using experiences with the shopping environments. Approach behavioral intentions (APP) and

avoidance behavioral intentions (AVD) refer to action tendencies that move toward or get away from the stimuli.
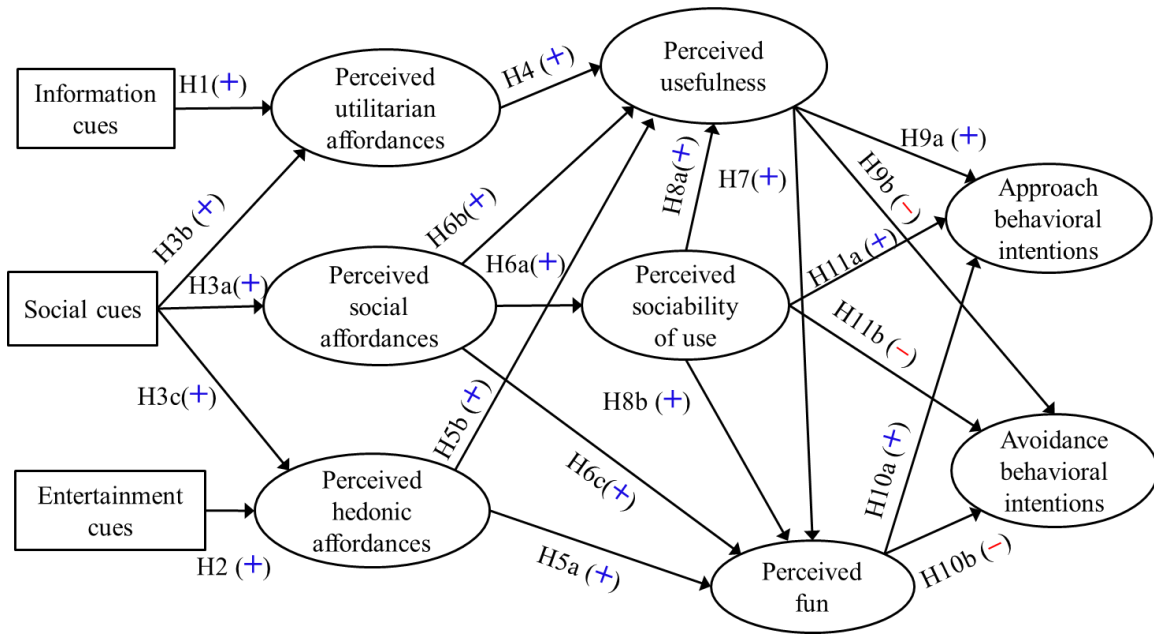
Note. Blue plus signs indicate positive relationships, and red minus signs indicate negative relationships.

Figure 7: The Research Model

This research model conforms to the fundamental argument of the interrelationships among environment stimuli, organism, and response. The following sections present research hypotheses.

3.2.2.1 Impacts of Atmospheric Cues on Process-based Evaluation

One goal of this dissertation is to investigate interacting mechanisms between atmospheric cues and consumers' internal evaluations (process-based and outcome-based). Research on store atmospherics has identified a discrepancy between the intended and perceived atmosphere (Kotler, 1973). The intended atmosphere is the set of qualities that designers seek to imbue in the space, and the perceived atmosphere depends on consumers' capabilities to capture those environmental stimuli and interpret the atmosphere (Kotler, 1973).

The notion of affordances opens a new venue to interpret interactions between environmental stimuli and human subjects. Gibson argues that "the central question for the theory of affordances is not whether they exist and are real but whether information is available in ambient light for perceiving them" (Gibson, 1979, p. 140). Gaver (1991) had a similar argument that "When affordances are perceptible, they offer a direct link between perception and action" (p. 79). Hsiao et al. (2012) found that perceptible information, such as hint, clear information, symbol, and appearance feature, are important characteristics that impact users' perceptions of affordances. Based on these arguments, the perceptible clues of environments can significantly affect people's perceived affordances of the environments.

Atmospheric cues are perceptible clues in online social shopping environments, which directly affect consumers' perceptions of the possibilities for actions upon the environments. Three types of atmospheric cues− information, entertainment, and social−are perceptible clues that elicit consumers' perceived affordances of online shopping environments.

Information cues are characteristics that are directly relevant to goal attainment or task completion, and therefore they can induce consumers' perceptions of possibilities to acquire goal-directed information. Information cues in the shopping environments invite consumers to take actions to seek what they need. Being informative is one major factor that affects consumers' evaluations in both offline and online shopping environments (Chen & Wells, 1999; M.-H. Huang, 2000). A shopping website with a large number of information cues can make consumers see more possibilities to acquire the information they are searching for. Therefore, the hypothesis is:

H1: A shopping website with a higher level of information cues induces higher level of perceived utilitarian affordances.

Entertainment cues encompass a set of characteristics that are related to attractiveness (van der Heijden, 2003) and visual appeal (Parboteeah et al., 2009) of websites. These characteristics are found to influence users' hedonic assessments. When referring to hedonic assessments, researchers usually indicate experiential feelings (e.g., fun or fantasy) that are not relevant to particular purposes or tasks (Hirschman & Holbrook, 1982). Perceived hedonic affordances indicate a consumer's perceptions whether the website can support their actions of self-entertainment or satisfy non-task relevant experiential feelings. Therefore, the hypothesis is:

H2: A shopping website with a higher level of entertainment cues induces a higher level of perceived hedonic affordances.

Shopping is a social activity through which interpersonal interaction happens, and social cues are key to the establishment of social meaning in shopping websites. Social meanings cover a wide range of content. In early marketing studies, social cues were the presence of sales people and other customers (Baker et al., 2002). Then, the social meanings were delivered by social characteristics of live assistance, such as the socialness of online agents (Wakefield et al., 2011). Social cues, such as social media features, are embedded in websites to give the impression of social presence and face-to-face interaction (Karimov et al., 2011; D. Lee & LaRose, 2011). The presence of social cues implies the possibility for consumers to take actions to connect with others. Therefore, the hypothesis is:

H3a: A shopping website with social cues induces a higher level of perceived social affordances than a shopping website that does not have social cues.

Through interacting with others, consumers have multiple sources to acquire information about products, services, and merchants. These sources of information include peer consumers, friends, and other active buyers. Therefore, the presence of social cues indicates more channels for consumers to seek information, and the hypothesis is:

H3b: A shopping website with social cues induces a higher level of perceived utilitarian affordances than a shopping website that does not have social cues.

The presence of others or possibilities of communicating with others can elicit the affective reactions from consumers (Cyr et al., 2009). In the context of online shopping, the presence of social cues indicates opportunities to interact with others. Consumers may consider using these cues for the purpose of self-entertaining, and the presence of social cues actually indicates action possibilities to relax themselves. Therefore, the hypothesis is:

H3c: A shopping website with social cues induces a higher level of perceived hedonic affordances than a shopping website that does not have social cues.

3.2.2.2 Impacts of Process-based Evaluations on Outcome-based Evaluations

In an information technology-enabled environment, perceived affordances refer to a person's perceptions of action possibilities facilitated by the information technology, and the notion of affordances indicates the instrumental value of technology when mediating the action between a subject and an object (Kaptelinin & Nardi, 2012). According to activity theory (Kaptelinin & Nardi, 2006), a set of actions with sub-goals join together to accomplish an activity with an overall motive. When the affordances are identified, they invite the user to act in

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accordance with the perceived affordances (Kreijns et al., 2002), and then the user can decide whether the overall motive has been satisfied with those actions. Therefore, a set of actions contributes to the completion of an activity, and consumers' evaluations of the process may influence their conclusive or summative assessments.

Specifically in the online social shopping context, perceived affordances refer to consumers' perceptions of the action possibilities facilitated by features of shopping websites to mediate the interaction between consumers and their designated objects. Perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances are three process-based evaluations of information technology that may further affect consumers' overall assessment of the technology use. Perceived utilitarian affordances indicate the mediated actions possibilities between a person and the goal-directed information; perceived hedonic affordances refer to the mediated action possibilities between a person and his or her own self-experience; perceived social affordances depict the mediated actions possibilities between a person and others.

A number of studies on social virtual worlds adopt the use and gratification approach and find three broad categories of gratifications (utilitarian, hedonic, and social) (H. Li et al., 2013; Z. Zhou et al., 2011). Iivari (2014) posits similar underlying motivation for people who use social media websites (i.e. useful and beneficial, enjoyable, and socially related). These assessments tie to users' overall evaluations, and thus are termed as outcome-based evaluations. In the context of online social shopping, three types of outcome-based evaluations, namely, perceived usefulness, fun, and sociability, correspond with three overarching gratifications that can be satisfied through using shopping websites.

Perceived usefulness (PU) represents the rational and cognitive evaluations, and is defined as a consumer's estimation of the degree that using a website can help to enhance the shopping performance. PU is the outcome assessment of an e-shopping environment that is determined by a set of process-based belief variables, and that influences intention to e-shop (S. Ha & Stoel, 2009). The utilitarian affordances of shopping environments are instrumental to acquiring goal-directed information. Therefore:

H4: Perceived utilitarian affordances positively affect perceived usefulness.

A different term that is similar to hedonic affordances−*affective affordances*−has been used to describe the action possibility that interface characteristics influence a user's engagement with the interface (van Vugt et al., 2006). The hedonic affordances of shopping environments indicate possibilities for consumers to take actions to entertain themselves. After interacting with online shopping environments that provide more opportunities to explore and relax, consumers may conclude that the overall experience with the environment is pleasurable and fun. Therefore, the hypothesis is:

H5a: Perceived hedonic affordances positively affect perceived fun.

Berkowitz (1993) made a distinction between lower-order affective reactions that arise from relatively automatic processes and higher-order affective reactions that arise from relatively more controlled process. Leventhal (2008) proposed that affective reactions can arise from an innate route and a memory route. The former is accompanied by sensory simulation and indicates more primitive affective reaction, and the latter involves semantic and conceptual processing, supporting the existence of primitive and higher-order processing. LeDoux (2009) argued that *low-road* affective reactions, *high-road* cognitive processes, and *high-road* affective

processes occur in sequence. Perceived hedonic affordances indicate an automatic process that include consumers' reactions to the environment stimuli. Perceived usefulness describes a higher-order cognitive process. Therefore, the hypothesis is:

H5b: Perceived hedonic affordances positively affect perceived usefulness.

Prior studies have considered social affordances as "properties of the environment that act as social-contextual facilitators relevant for the learner's social interactions" (Kreijns et al., 2002, p. 13). Social affordances relate to the properties of objects, for instance, specific design features of shopping websites. Perceived sociability is determined by a specific set of environmental characteristics that have designated social affordances (Junglas et al., 2013; Kreijns, Kirschner, Jochems, & van Buuren, 2007), which affects one's summative assessments whether using the technology can create a social space or not (Kreijns et al., 2013, p. 229).

In the context of online social shopping, perceived social affordances concern action possibilities that are supported by a shopping website to build or maintain interpersonal connections. In alignment with findings in prior literature, social affordances indicate more tangible characteristics of an environment; however, sociability is related to consumers' overall assessments of the degree that using a website for shopping can simultaneously satisfy their desire for social interaction and social connectivity. Therefore, the hypothesis is:

H6a: Perceived social affordances positively affect perceived sociability of use.

In addition to the effects on the overall social motive, the mediated actions between an individual and others lead to information sharing among consumers and consequently result in accumulated social capital (Ellison et al., 2007). Prior studies have also found the size and centrality of social network positively affect shared information and knowledge (K.-Y. Lin & Lu,

2011). The increased knowledge of goal-directed information may lead to enhanced performance of shopping activities. Therefore, the hypothesis is:

H6b: Perceived social affordances positively affect perceived usefulness.

When consumers involve themselves in interactions with others, the possibility of connecting with others can maintain and expand the social network of consumers, which may result in pleasant experiences through interacting with others (K.-Y. Lin & Lu, 2011) or from helping with others (Chiu, Hsu, & Wang, 2006). Therefore, the hypothesis is:

H6c: Perceived social affordances positively affect perceived fun.

3.2.2.3 Impacts among Outcome-based Evaluations

Perceived fun describes consumers' beliefs about the hedonic outcomes of using a shopping website. Perceive fun represents the hedonic aspect of using an information system. Prior studies identified the link between affective evaluations and cognitive evaluations. Sun and Zhang (2006) resembled multiple theoretical perspectives and denoted the possibilities of mutual influence between affective reaction and cognitive evaluation. The direction of influence largely depended on the research contexts. Positive affective evaluations encourage consumers to allocate more mental resources to interaction with the technologies (Heshan Sun & Zhang, 2006). For instance, Agarwal and Karahanna (2000) found cognitive absorption is an important predictor of perceived usefulness, and enjoyment is one of the subdimensions of cognitive absorption. Venkatesh et al. (2002) also confirmed that the effects of enjoyment on behavioral intentions are mediated by perceived usefulness. Yi and Huang (2003) further supported that enjoyment has a positive effect on perceived usefulness because information systems are perceived to be more useful when users have fun using them. On the other hand, LeDoux (1996)

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differentiated high-road affective reactions from low-road affective reactions and argued that the high-road affective reactions occur relatively slowly, arising from the outcome of high-road cognitive processes. Parboteeah et al. (2009) demonstrated the influence of cognition on affect in the context of impulsive buying. Perceived fun indicates a higher-order hedonic outcome of visiting shopping websites. Therefore, the hypothesis is:

H7: Perceived usefulness positively affects perceived fun.

Although the social elements of information technology have been found to be critical factors for users' perceptions, very few studies look into the influences of perceived sociability of use (Iivari, 2014). Prior studies have addressed the influences of social factors with different foci of interest. For instance, Li et al. (2005) examined the influences of socially related beliefs on behavioral intentions in the context of instant messaging. Iivari (2014) posited that perceived sociability of use (PSOU) positively influences perceived benefits of social media use, which refer to users' beliefs of the beneficial consequences that are separable from the use activity. The notion of perceived benefits shares similar meanings of perceived usefulness because both of them denote the beneficial outcomes of using an information system. Therefore, the hypothesis is:

H8a: Perceived sociability of use positively affects perceived usefulness.
Apart from the fulfillment of social desire, sociability also has some playful characteristics that may result in a pleasurable experience, creating the feeling of affection (Junglas et al., 2013; Kreijns et al., 2007). Perceived fun describes consumers' summative and conclusive evaluation of hedonic outcome. Fun covers a broad scope of holistic pleasant experiences with the information system, which can either result from interacting with shopping websites or one-to-many social interactions with others. The social component of shopping websites provide

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channels for consumers to create and maintain social contacts, and further leads to enjoyable shopping experiences in this environment (Iivari, 2014; Junglas et al., 2013). Therefore, the hypothesis is:

H8b: Perceived sociability of use positively affects perceived fun.

3.2.2.4 Impacts of Outcome-based Evaluations on Online Social Shopping Intentions

Approach-avoidance behavioral intentions refer to the extent to which consumers plan to move toward or get away from online social shopping environment. Approach and avoidance are two behavioral directions that are summarized by Mehrabian and Russell (1974) when investigating person–environment relationships. Approach and avoidance behaviors are triggered by different motivation systems. Individuals are motivated to approach positive stimuli and avoid negative stimuli (Deng & Poole, 2010).

Approach behavioral intentions and avoidance behavioral intentions refer to two types of behavioral tendencies of consumers who plan to move toward or get away from online social shopping environments. Approach behavioral intentions refer to the tendency to move close and stay within online social shopping environments. When using a website seems to enhance the overall performance, consumers are more willing to move toward and interact with the website. On the contrary, when using a website is estimated to contribute little to the improvement of shopping performance, consumers would rather leave the shopping website. Therefore, the hypotheses are:

H9a: Perceived usefulness positively influences approach behavioral intentions.

H9b: Perceived usefulness negatively influences avoidance behavioral intentions.

Perceived fun indicates a consumer's concluding assessment of hedonic outcome of using a shopping website. People approach pleasant settings more than they approach unpleasant ones (Russell & Mehrabian, 1978), and a primary function of affective processing is to elicit approach or avoidance responses (Crawford & Cacioppo, 2002). Consumers are energized to behave in the direction of approaching, such as staying with or exploring the environment, when they feel the experiences are pleasant. Studies have found that factors such as pleasure influence repurchase intention (Gupta & Kim, 2007), and that the enjoyable experiences in 3D virtual worlds positively influence the behavioral intention to visit them (Nah et al., 2011). On the contrary, when the visiting experience is unpleasant and the hedonic needs are not satisfied, consumers tend to leave the environment (Deng & Poole, 2010). Therefore, the hypotheses are:

H10a: Perceived fun positively influences approach behavioral intentions.

H10b: Perceived fun negatively influences avoidance behavioral intentions.

Perceived sociability of use (PSOU) is defined as a consumer's conclusive belief that using a shopping website will satisfy one's desire to socialize with others. The perception of sociability of an online environment is a social-emotional evaluation that involves the nonutilitarian assessment. The sense of being sociable in the created social space can lead to a pleasant experience (Junglas et al., 2013). When a consumer perceives a shopping website with higher degree of sociability, it is more likely that the shopping website supports the establishment of social space where consumers can interact and build interpersonal relationships. As a result, consumers are more actively engaged in the shopping activities. On the contrary,

when sociability is perceived to be low, the consumer may choose to play a more silent role. On one hand, the role of social elements has been increasingly important in encouraging consumer behavior to participate in social interactions and self-expression. On the other hand, the absence of social elements does not necessarily discourage a consumer from visiting the shopping website. Therefore, the hypotheses are:

H11a: Perceived sociability of use positively influences approach behavioral intentions.

H11b: Perceived sociability of use negatively influences avoidance behavioral intentions.

3.3. Summary

This chapter has presented the theoretical foundations, conceptual development, and the different research hypotheses that can be posited based on constructs' relationships. In this dissertation research, several theories, including the S-O-R framework, the theory of affordances, the technology acceptance model and the activity theory, jointly contribute to a more enriched understanding of consumer behavioral intentions in online social shopping environments. The notion of affordances provides an insight into interaction mechanisms between atmospheric cues and consumers.

The research model (Figure 7) elaborates relationships among core components of person–environment interactions. The notions of process-based and outcome-based evaluations present a new angle to investigate users' internal evaluations, and offer a framework to examine these evaluations from three aspects (utilitarian, hedonic, and social). Lastly, a set of research hypotheses further explains how these evaluations influence their intentions to approach or avoid online social shopping environments.

Chapter 4: Methodology

This chapter describes the methodology of this dissertation research, including research design, rationales for choosing the particular research methods, and research platforms. The dissertation research uses a field experiment design because the research purpose is investigating how atmospheric cues may affect consumers' evaluations and subsequent behavioral intentions in an online shopping environment. This chapter contains a description of dissertation design, data analysis, and a discussion on reliability and validity.

4.1 Overall Research Design

Qualitative and quantitative approaches are two major strategies for research inquiry. Qualitative methods (e.g. ethnography research, interview, and case study) are usually related to exploratory research that aims to collect in-depth information about people's views; quantitative methods are usually used for relationship testing, such as model testing and theory construction (Creswell, 2009). This research intends to validate a research model and a set of hypotheses, and thus, quantitative methods are more appropriate for achieving this research goal.

Online surveys and experiments are two dominant research methods that have been used in online consumer behavior research (Darley et al., 2010). A survey is an effective method to collect numeric descriptions of trends, attitudes, or opinions of a population by studying a sample of that population, and this method is suitable to studies that aims at investigating relationships between multiple constructs simultaneously and enhancing the generalizability of research findings (Creswell, 2009). Compared to the survey method, the experiment has the advantage of manipulating the research conditions and is especially useful for cause-and-effect

relationship identification. The research purpose of this study is to investigate how atmospheric cues influence consumers' evaluations and behavioral intentions in online social shopping environments, and therefore, the experiment method is employed in the research design. Table 5 below describes how each research question relates to a particular research goal, and also explains how the research design can address the research questions.

Table 5: Goals and Solutions to Address Research Questions

Research Questions	Goals	Solutions
RQ1: How do atmospheric cues of online social shopping environments elicit consumers' evaluations of those environments?	Examine the influences of objective atmospheric cues on consumers' evaluations	Conceptual development and experiment study
RQ2: How do consumers' evaluations of a social shopping environment influence their behavior intentions? — RQ2.1: How do consumers' processed-based evaluations influence their outcome-based evaluations? — RQ2.2: How do consumers' outcome-based evaluations influence their behavioral intentions?	Examine the influences of consumers' evaluations and subsequent behavioral intentions	Conceptual development and experiment study

The research design consists of three stages: experiment preparation, pilot test, and the main experiment (See Figure 8). The experiment preparation included website development and instrument development. Experiment websites were developed by using an online commercial website builder called Wix (wix.com) and were hosted by the same platform. Instrument development followed an established protocol suggested by Moore and Benbasat (1991). Pilot studies aim to test the experiment's procedures, examine manipulation treatments, and validate instruments. Then, the third stage is the main experiment and the purpose was to validate the research model.
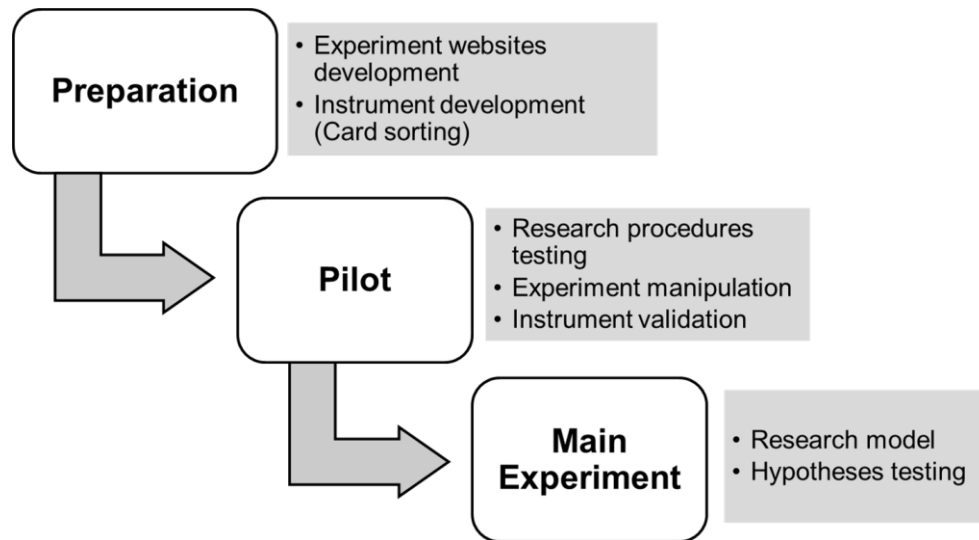
Figure 8: An Overview of Research Design

4.1.1 Rationale of Research Method

This research uses the field experiment approach to address research questions. A field experiment, as one of the two basic types of experimental methods, has been characterized differently in various disciplines. One generally accepted distinction is that the field experiment occurs in the "real world" and the laboratory experiment is conducted in a lab situation (Babbie, 2008). Based on a literature review of research in the information systems (IS) field, Boudreau et al. (2001) clarified the differences between field experiments and laboratory experiments, indicating that laboratory experiments use settings especially created for research investigations where researchers have full control over the independent variables, whereas field experiments happen within a naturally occurring system and the experimental manipulation changes one or more variables.

Neuman (2003) strengthened the differences between field experiments and laboratory experiments in terms of internal validity and external validity, and stated that field experiments tend to have greater external validity but lower internal validity, whereas laboratory experiments

tend to have greater internal validity but lower external validity. Harrison and List (2004), from

the perspective of economics, claimed that simply viewing field experiments as less controlled

variants of laboratory experiments would seriously mischaracterize them, and they propose six

factors that can be used to determine the field context of an experiment: "the nature of the

subject pool, the nature of the information that the subjects bring to the task, the nature of the

commodity, the nature of the task or trading rules applied, the nature of the stakes, and the

environment that subjects operate in the field of empirical economic science" (p.1012).

The preceding discussion outlines the distinction between laboratory experiments and

field experiments. Several reasons account for the decision to select the field experiment method

for this study.

First, in the consumer behavior literature, prior studies have used controlled laboratory

experiments (L. Davis, Wang, & Lindridge, 2008; Eroglu et al., 2003; Parboteeah et al., 2009)

and field experiments (Hui, Teo, & Lee, 2007; Morrison, Gan, Dubelaar, & Oppewal, 2011) to

investigate the effects of website features on consumer behaviors. Although a laboratory

experiment has the strength of ruling out unrelated factors and controlling the treatments, the

field experiment method has the strength of supporting shopping activities in more natural

environments. Thus, the field experiment has also been well accepted in online shopping

behavior research (e.g.,Childers et al., 2001; Gefen et al., 2003; M.-H. Huang, 2000; Konradt,

Wandke, Balazs, & Christophersen, 2003; Senecal & Nantel, 2004).

Second, the targeted research population is Internet users. Unlike laboratory experiments

that usually use an undergraduate student population as the standard sample, field experiments

can use field subjects that cover a wider range of demographic characteristics (Harrison & List,

2004). By interacting with a real shopping website and completing some assigned shopping tasks, participants can experience real feelings in a shopping environment.

Third, one important characteristic of online social shopping sites is the social component. The embedded social elements, such as the links between consumers, personal profiles, user-generated content, represent naturally formed social connections among consumers. Being exposed to this naturally formed social environment helps participants recognize and use the social elements of the shopping environment. Given these characteristics, using an online field experiment method followed by a questionnaire is appropriate for accomplishing the research goals.

It is notable that this research does not focus on the effects of a particular individual website feature, but aims to study more abstract design dimensions based on the classification of three types of atmospheric cues. The goal of this research is to address questions on how consumers form their perceptions of the affordances of online shopping environments based on the perceptible atmospheric cues of that environment. Perceived affordances are perceived action possibilities that indicate consumers' perceptions of the relational attributes between environment characteristics and consumers' capabilities, so perceived affordances by themselves capture the properties of technology-enabled shopping environment and do not tie to particular individual design features. In addition, Porat and Tractinsky (2012) suggested that studying more abstract design dimensions is likely to yield better insights because of the context-dependent nature of HCI design. Therefore, experimental treatments focus on high-level design dimensions, instead of isolating individual design features.

4.1.2 Rationale for a Recruitment Platform: Amazon's Mechanic Turk (MTurk)

Participants of this study were recruited from Amazon Mechanical Turk (MTurk). The following paragraphs describe what MTurk is and discuss the rationale for using it as the recruitment platform.

MTurk is an online labor market where people can request and participate in jobs. *Human intelligence tasks* (HITs) are the unit of jobs available in this online labor market. There are two types of participants in MTurk. One who accepts tasks posted by others is called a worker, and one who posts the task is named the requester. When HITs are posted, workers can voluntarily choose to participate and get paid upon successful completion of the task. MTurk was initially invented for computation tasks, but it has recently become a popular source for behavioral research in social science (Paolacci, Chandler, & Ipeirotis, 2010). Online studies have used MTurk mainly for three purposes: (1) combining the outputs of a small number of cheaply paid workers; (2) comparing the quality of data from MTurk with that of data from laboratory subjects, and (3) using the MTurk for behavioral experiments (Mason & Suri, 2012). Compared to the traditional social science research settings, Mason and Suri (2012) highlight that the strength of using MTurk for research includes the access to a large and diverse subject pool, low cost to access and collect data, and a fast theory/experiment cycle.

Since MTurk is a relatively novel environment for academic research, researchers have initiated the discussion on whether it could effectively be used as a means of collecting valid data (Buhrmester, Kwang, & Gosling, 2011; Paolacci et al., 2010; Suri & Watts, 2011). Two major concerns with recruiting participants from MTurk are the representativeness of the population and data quality (Paolacci et al., 2010). Based on the demographic surveys conducted in MTurk, researchers are able to demonstrate that the population of MTurk is representative of the U.S.

population (Ipeirotis, 2010; Paolacci et al., 2010), and even more representative of the general population than U.S. college samples that are heavily used in social science research (Buhrmester et al., 2011). Berinsy et al. (2012) further demonstrated that respondents recruited from MTurk are often more representative of the U.S. population than in-person convenience samples but less representative than subjects in Internet-based panels or national probability samples.

The targeted research population is anyone in the general population who may choose to shop online, as this study aims to investigate consumers' responses to shopping environment based on their process-based and outcome-based evaluations of atmospheric cues. MTurk is an ideal platform to recruit participants with a wider coverage of demographic information.

The second concern regarding the use of MTurk is data quality. The comparison experiments conducted by Komarov et al. (2013) suggest there are no significant differences between findings from experiments conducted in Amazon Turk or those in lab environments. The worker can be rewarded with as little as $0.01 per HIT, and rarely exceeds $1.00 per HIT (Horton, Rand, & Zeckhauser, 2011). Even though the cost of recruiting a participant through MTurk is low, the quality of the data is not undermined by the amount of payment. Burhrmester et al. (2011) conducted a study on how the compensation amounts (2, 10, or 50 cents) affect the participation rate and data quality, and found that the payment does not significantly influence data quality.

4.1.3 Population and Sampling

The research population is Internet users who may shop online. Amazon Mechanical Turk (MTurk) workers have good knowledge and skills using websites and can potentially be

online consumers. The recruitment was restricted to workers who were geographically located within the United States. Qualtrics was the research platform that hosted this study. Qualtrics has a function to enforce the restriction of geographical locations by examining the subjects' IP addresses. In addition, all the subjects were required to access the survey with desktops or laptops to ensure similar browsing experiences. Mobile devices, such as tablets and smart phones, were prohibited in this study.

Sample size is the number of participants from whom researchers collect evidence to understand the research phenomenon. Sample size should be adequate to conduct significance tests and inferential analysis. Whether sample size is adequate enough is determined by three main parameters: significance level, effect size, and power.

Two typical errors in statistical analysis are Type I and Type II errors. A Type I error (α) is the probability of incorrectly rejecting a true null hypothesis. There are three common significance levels used in social science research ($\alpha = .05, .01, .001$). A Type II error (β) is the probability of failing to reject a truly false null hypothesis. Statistical power (π) is defined by Cohen (1988) as the probability of rejecting a truly false null hypothesis. Power is calculated by the equation 1- β, and a commonly desired power is .80 (Cohen, 1988).

Effect size indicates the extent to which the value of one parameter of one population differs from that of another population (Cohen, 1988). A larger effect size will lead to a greater likelihood that the null hypothesis will be rejected (Cohen, 1992b). Several effect size indices are suggested by Cohen (1988), depending on the specificity of various statistical tests (Cohen, 1988).

A rule of thumb recommend by Chin (1998) and Gefen et al. (2000) is that the minimum sample size for a PLS analysis should be the larger of (1) ten times the number of items for the

most complex construct or (2) ten times the largest number of independent variables impacting a dependent variable. In the proposed research model, the most complex construct has five items (PUA, PHA, PSA) and the largest number of independent variables estimated for a dependent variable is six, so the minimum required sample size is 60 (10×6). According to the power analysis calculation from Cohen (1992a), a group size of 44 is enough for a power of .80 to detect the medium effect size ($f^2 = .15$) at the significance level of .05 ($\alpha = .05$) (Cohen, 1992a). Therefore, this study needs at least 352 subjects.

4.2 Instrument Development

Measurements of three new constructs, perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances, were developed by following an established instrument development procedure (Moore & Benbasat, 1991). Measures for the rest of the constructs were adapted from the literature.

4.2.1 Pre-validated Instruments

Measures of five constructs, including perceived usefulness (PU), perceived fun (PF), perceived sociability of use (PSOU), approach behavioral intentions (APP), and avoidance behavioral intentions (AVD), were adapted from established instruments in prior studies. PU is a primary belief construct in technology acceptance research, and measurements of this construct were adapted from Gefen (2003) and van der Heijden (2004). PF emphasizes the summative and concluding affective evaluation of the shopping activity, and measurements of this construct are adapted from the enjoyment construct from Nah et al. (2011). Measures of PSOU have been adapted from items (Animesh et al., 2011; Iivari, 2014; Kreijns et al., 2013; H. Zhang et al.,

2014). Measures of APP and AVD are adapted from Mehrabian and Russell's (1974) original scales of approach and avoidance behaviors.

4.2.2 Self-developed Instruments

Prior studies that investigate perceived affordances mostly focus on conceptual development (Kaptelinin & Nardi, 2012; M. L. Markus & Silver, 2008; P. Zhang, 2008a), and only a few researchers attempt to operationalize the concepts in empirical investigations (Grange & Benbasat, 2010; Kuo, Tseng, Tseng, & Lin, 2013). New measurements were developed for three constructs, perceived utilitarian affordances (PUA), perceived hedonic affordances (PHA), and perceived social affordances (PSA). The developing procedure was guided by Moore and Benbasat's (1991) work on new instrument development and validation.

4.3 Experiment Treatments

The main experiment uses a 2 (information cues: high vs. low) $\times 2$ (entertainment cues: high vs. low) $\times 2$ (social cues: presence vs. absence) factorial, between-subject design (Campbell, Stanley, & Gage, 1963). Eight gift shop websites were created that varied in the amount of information and entertainment cues they used. Four of these websites had social cues, such as social media icons, customer reviews, and product ratings, and the other four websites did not have these social elements. Ha and Lennon (2010) found that product-related cues gain more attention than service-related cues (e.g., website information). Therefore, in this research, the manipulation of information cues focuses on product information. Table 6 below describes the details of experiment treatments. The manipulated environment cues are selected based on experiment treatments that were used in prior studies (Eroglu et al., 2003; Everard & Galletta,

2005; Y. Ha & Lennon, 2010; Parboteeah et al., 2009). Screen captures of each experiment

website are provided in Appendix 1.

Table 6: Experiment Treatments

Independent Variables	Treatment (high or presence)	Treatment (low or absence)
Information cues (IC) (High vs. low)	• More product details (multiple pictures, detailed product description) • More navigation options (occasions, price ranges, on sale, topics) • Information about the website (about us and FAQ)	• Very simple product information (single product picture, brief description) • One navigation option (occasions) • No information about the website
Entertainment cues (EC) (High vs. low)	• Warm and clean color scheme • Clean fonts • Gift ideas • Gift tips	• Overly bright colors • Complicated fonts • No gift ideas • No gift tips
Social cues (SC) (Presence vs. absence)	• Social media icons (e.g., Facebook, Twitter, Google+) • Product ratings • Customer review	Absent of any social cues

Product characteristics, such as product type (Mudambi & Schuff, 2010) and price

information (J.-C. Wang & Chang, 2013), were identified as factors that affect consumers'

shopping behaviors. For instance, Nelson (1970, 1974) classified a product by its search and

experience attributes. Search goods are products dominated by product attributes, and this

information can be acquired prior to purchase, such as price, size, and color; experience goods

are products dominated by attributes that cannot be known until purchase and use of that product,

such as how good a book is (Klein, 1998). The experiment websites are designed to be gift

shopping websites. To control the effects of product characteristics, the same collection of gift

products was used in all experiment conditions, and the selection of gift items are based on a

prior study (Deng & Poole, 2010). Product information from several actual online merchants,

including Amazon, Notonthehighstreet, Hallmark, and Things Remembered, was used to

populate the website. To control for any effects that could be attributed to any brands, all brand information were removed from the pictures and product descriptions.

4.4 Experiment Procedures

A total of 360 subjects were recruited from Amazon Mechanical Turk (MTurk) and randomly assigned to the eight treatment conditions, with 45 in each condition. Subjects saw the recruitment material in the MTurk. Once they accepted the assignment, they were directed to the Qualtrics platform. The subjects first read and signed a consent form, and then subjects were randomly assigned to eight treatment conditions to ensure the sum of subjects' past experiences were homogenous across conditions. They saw a webpage with task instruction and were informed about the experiment procedures (see Appendix 2). Subjects may have different prior experiences in online shopping. The pilot experiment showed that that the subjects compared the experiment websites with different commercial websites (e.g. Amazon).

This research adopts the benchmark solution that was recommended and applied in several experiment studies in the IS literature (Jiang & Benbasat, 2007; Zhu et al., 2010). Providing a common benchmark helped the subjects to have the same baseline, and then the differences across experiment conditions were caused by the experiment treatments.

Figure 9 describes the flow of experiment procedures. The subjects were first asked to examine the design of a baseline website prior to entering their assigned websites. They were shown a website with small number of information cues, low visual appeal, and no social cues, and the products in this baseline website were similar but not the same as those used in real experimental websites. The subjects were asked to treat the sample website as the baseline

against which to judge the experiment websites. Each subject was then directed to the assigned experiment website and asked to find a birthday gift.

Two pilots were conducted to pre-test reliability (internal consistency and unidimensional reliability) and construct validity (discriminant validity, convergent validity, and factorial validity). The validity statistics provide evidence for item reduction. Items with low loadings with their own constructs or with high loadings with other constructs were examined and adjusted.

Figure 9: The Flow of Experiment Procedures

4.5 Data Analysis Methods

Data analysis includes descriptive analysis of participants' demographic information, manipulation check of experiment treatments, instrument testing, research model validation, and common method bias assessment. Data analysis was conducted with software packages, including SPSS 20.0 and PLS-Graph 3.0. Figure 10 presents an overview of statistical analysis methods that are used to validate the research model.

This research uses a $2 \times 2 \times 2$ factorial between-subject experiment design. Three MANOVA tests were conducted to examine subjects' demographic information, manipulation check and hypotheses testing, respectively.

Some additional independent variables that cannot be readily incorporated or controlled in an experiment design may represent a potential source of variance, which is referred to as

noise (Gamst, Meyers, & Guarino, 2008). Therefore, the first three-way MANOVA test was conducted on subjects' demographic information. The second three-way MANOVA test was conducted to examine manipulation check. The third three-way MANOVA was conducted to test the effects of experiment treatments on three response variables, namely, perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances. When multiple comparisons exist, the inflation of Type I is a concern. The *experimentwise error rate* indicates the probability of making a Type I error in a set of comparisons (Keppel, 1991). Hummel and Sligo (1971) found that a MANOVA followed by univariate ANOVAs is most efficient in controlling *experimentwise error rate*.
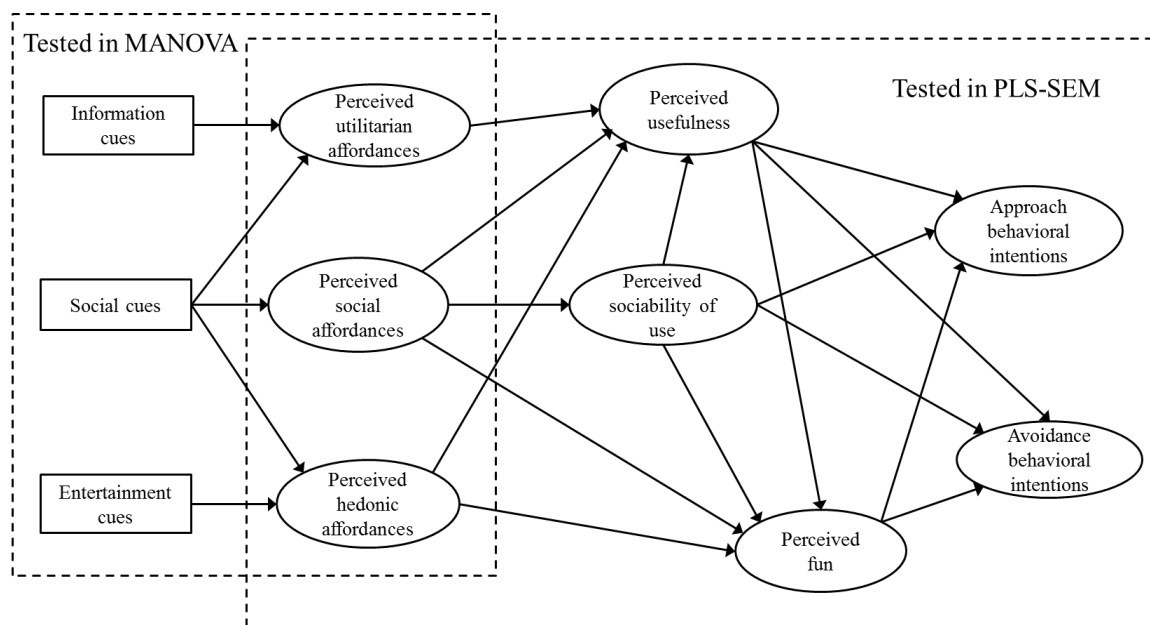
Figure 10: An Overview of Data Analysis Plan

Three assumptions of MANOVA should be taken into account: (1) the multivariate normality of dependent variables; (2) homogeneity of covariance matrices, and (3) independent observations of participants (Weinfurt, 1995). Box's M test was conducted to examine the multivariate normality of dependent variables, and Levene's test was used to verify the

homogeneity of each dependent variable. However, it is also important to note that MANOVA is fairly robust when there are violations of the first two assumptions. Stevens (1986) concluded that violation of the multivariate normality assumption has a small effect on the actual alpha level with which the researcher is working, and that if the size of each experimental group is approximately equal, violation of the homogeneity of covariance matrices assumption will lead to a slight reduction in statistical power. Eta-square shows the effect size of MANOVA, which is roughly equivalent to the R^2 used in multiple regression analysis.

Two major approaches of *structural equation modeling* (SEM) are *partial least squares* (PLS) and the covariance-based (CB) approach. The PLS-SEM approach is a causal modeling method that aims at maximizing the explained variance of the dependent constructs, and the CB-SEM approach for SEM modeling is to develop a theoretical covariance matrix based on a specified set of structural equations and to minimize the difference between the theoretical covariance matrix and estimated covariance matrix (Hair, Ringle, & Sarstedt, 2011). CB-SEM approach rests on several statistical assumptions, such as multivariate normality and minimum sample size, and the results can be highly imprecise when the assumptions are violated, whereas the PLS-SEM approach is relatively robust, remaining stable in the face of deviations from a multivariate distribution, and supports both exploratory and confirmatory research (Chin, 1998; Gefen & Straub, 2000). CB-SEM approach is more appropriate when the research objective is theory validation and confirmation, and the PLS approach is preferred when the research objective is prediction and theory development (Chin, 1998; Hair et al., 2011). The goal of this research is to validate the proposed research model, and thus, the PLS-SEM approach was selected to analyze quantitative data collected from the online questionnaire.

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4.6 Internal Validity and External Validity

The validity of research design should always be considered when planning a study. In the design of an experiment, internal validity is concerned with the elimination of biases and drawing conclusions based on experimental manipulations (Keppel, 1991). The ideal situation for experiment design is to hold constant all important variables except for the experiment manipulations. However, complete control is not possible in reality and some techniques were introduced to reduce biases caused by nuisance factors (Keppel, 1991). Randomly assigning participants to different experimental conditions can spread the influence of uncontrollable factors equally across groups. In this study, the designs of experimental websites were fully under control, and the subjects were randomly assigned to different experiment groups. Therefore, the internal validity of the experiment's design should not be a serious concern.

External validity refers to the ability to generalize research findings beyond the experiment conditions (Creswell, 2009; Keppel, 1991). Several factors can be taken into account when evaluating the external validity. This research uses a field experiment approach. The subjects were recruited from Amazon Mechanical Turk (MTurk). Although the generalizability of research findings could be affected by characteristics of MTurk workers, this pool of subjects is more diverse than student populations that are commonly used in empirical studies. Additionally, the subjects visited the experiment websites without any interference from researchers in their daily environments. Overall, this research design holds a good balance between internal and external validity.

Chapter 5: Data Analysis and Results

This chapter presents the results from data analysis and the research findings. The chapter is comprised of results from a card-sorting experiment, two pilot studies, and the main experiment.

5.1 Results of Card Sorting

The card-sorting experiment followed a procedure developed by Moore and Benbasat (Moore & Benbasat, 1991). Measurements of three new constructs (i.e., perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances) were developed through a three-stage procedure (Figure 11).
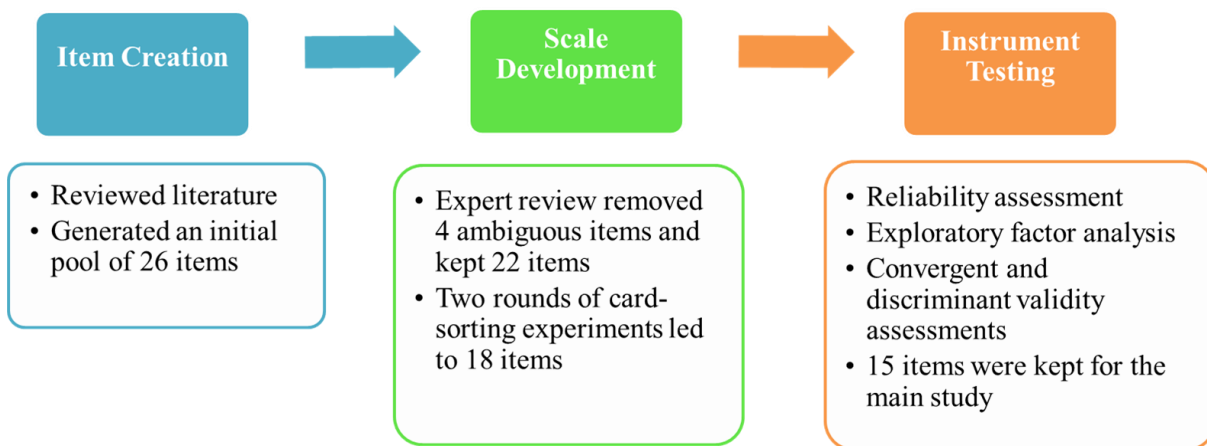
Figure 11: The Instrument Development Procedure

Key elements used in measuring three perceived affordances constructs were identified through a literature review on studies about consumer experiences, consumption values, and social networking activities. The affordances indicate action possibilities supported by features of environments, identified by phrases such as "with the assistance of website features," "allow to," and "action possibilities". These terms emphasize the notion of supporting and facilitating

human actions. Keywords for perceived utilitarian affordances were identified from studies on task-oriented or goal-oriented consumer behaviors. Keywords for items measuring perceived hedonic affordances come from the marketing literature that focuses on consumers' hedonic consumption experiences (Dholakia, Bagozzi, & Pearo, 2004; Hirschman & Holbrook, 1982; Wolfinbarger & Gilly, 2001). Keywords for items measuring perceived social affordances are identified in the literature on social networking activities (N. Park et al., 2009). Ajzen and Fishbein (1980) suggested including behavioral elements (e.g., actual behavior, target to which the behavior is directed, context of the behavior, and time frame) when designing items measuring behavioral perceptions (from Moore & Benbasat, 1991). This guideline was applied to design items measuring perceived affordances.

The initial pool included 26 items. Four items were dropped because an expert reviewer found the meanings of these items to be ambiguous. Hence, the item creation stage produced 22 items: 7 for perceived utilitarian affordances, 7 for perceived hedonic affordances, and 8 for perceived social affordances. Details of these items are available in Table 11.

5.1.1 Card-Sorting Procedure

Two rounds of card-sorting experiments were conducted to refine the initial pool. Four judges were recruited for the first-round card-sorting experiment, which took approximately 2.5 hours. Each item was printed on a 4.1×2.3 inch paper card. Prior to sorting the cards, judges were asked to read a one-page instruction that had been tested with a separate judge to ensure its comprehensiveness and comprehensibility.

Prior studies demonstrated that a trial sorting is a helpful experience to ensure that judges understand the card-sorting procedures (Moore & Benbasat, 1991). Therefore, all four judges

were asked to conduct a trial sort task first. Ten items that were created by Davis (1989) and adapted by Sun (2007) were used in the trial sort task. Among the ten items, four of them measure perceived usefulness (PU), and four items measure perceived ease of use (PEOU). Two ambiguous items were included in this trial sort, so judges would know that the ambiguous cards could be re-sorted to different categories.

The judges were told to sort the ten items into categories based on their interpretations of items' meanings. After the trial sorting, all judges understood that they should categorize the items by their underlying connections. They were also told that there was no limit on the number of categories they could create or the number of items that could be placed in each category, but one item can belong to only one category. Items that were considered ambiguous would automatically go to a category named "Not applicable."

The trial sorting took about 25 minutes, and afterward all the judges were asked to discuss their category labels and reasons for grouping choices. The judges were encouraged to ask questions about others' justifications of categories and labels. All the judges identified two categories that have similar meanings to PU and PEOU respectively. After the debrief stage, they reached consensus for the purposes of this card-sorting experiment. Then, the judges were directed to move on to the main task.

The first sorting task was the individual task. Every judge was asked to sort a pool of 22 items. This individual task took around 40 minutes. After all of the judges finished their tasks, they spent 15 minutes debriefing their results. Every judge was able to share with the panel how many categories he or she had created, what labels they chose, and why. The group task took around 60 minutes. The judges firstly compared their individual sorting results and reached a consensus of possible categories. All judges actively participated in the debrief stage and group

sorting task. Four items were marked as unclear by three of the four judges when they were

working on the individual tasks, and were still regarded as ambiguous in the group discussion.

Therefore, these four items were dropped and 18 remaining items were passed to the second

sorting round.

In the second round, four new judges were asked to sort the remaining items into

categories provided to them. Unlike the first round, construct definitions were provided, and also

a "too ambiguous/ doesn't fit" category was also included to ensure that the judges did not force

a fit to a category.

5.1.2 Results of First and Second Rounds of Card-Sorting Experiments

To assess the reliability of the sorting conducted by the judges, two different measures

were calculated across all pairs of judges—the level of agreement and the placement ratio. The

level of agreement is determined by two indexes, the raw agreement and Cohen's Kappa. Table 7

shows the raw agreements between each pair of judges. Cohen's Kappa has the strength of

controlling the random effects that a judge makes a decision on an item by chance. We obtained

an average raw agreement of .79 and an average Kappa of .70. Table 8 shows the placement

ratios. We have an overall placement ratio of .81 for round one.

For the second round sorting, the average of the placement ratio was .86. The raw

agreement was .78, and Cohen's Kappa was .67. Prior studies considered Cohen's Kappa scores

greater than .65 to be acceptable (Jarvenpaa, 1989; Moore & Benbasat, 1991). Overall, the

interrater reliability was satisfactory in both rounds of card-sorting experiments.

Table 7: Raw agreement and Cohen's Kappa

	First Round		Second Round	
	Raw agreement	Cohen's Kappa	Raw agreement	Cohen's Kappa
	.86	.80	.78	.67
	.86	.81	.83	.74
	.77	.66	.83	.75
	.82	.74	.78	.66
	.68	.54	.72	.60
	.73	.62	.72	.60
Average	**.79**	**.70**	**.78**	**.67**

Table 8: Placement Ratios of Two Rounds of Card Sorting

	First Round						Second Round					
	1	2	3	N/A	Total	Ratio (%)	1	2	3	N/A	Total	Ratio (%)
PUA	**26**			2	28	93	**26**		1	1	28	93
PHA	5	**16**	1	6	28	57	3	**16**		1	20	80
PSA	3		**29**		32	91	3		**20**	1	24	83
	Total items placement: 88		**Hits: 71**		**Overall Hit Ratio: 81%**		**Total items placement: 72**		**Hits: 62**		**Overall Hit Ratio: 86%**	

Four judges in the first round of card sorting came up with four to six categories in their individual sorting tasks, and the group discussion resulted in five categories (Table 9). Category labels from the individual sorting task show that three common themes—information, entertainment, and social—emerged in all judges' labels, which correspond with the utilitarian, hedonic, and social affordances of shopping websites. A further examination of category labels revealed that some categories could be merged. For example, "Interaction" and "Usability of seeking other people's feedback" (from Judge 1), and "information seeking", "learning about product", and "viewing product" (from Judge 4) were all about acquiring information.

Table 9: Categorization of the First Round of Card Sorting

Constructs	Judge 1	Judge 2	Judge 3	Judge 4	Group
Perceived utilitarian affordances	Usability of searching products	Information seeking	Product information	Information seeking	Information seeking
		Technical affordances (assist task about looking for things)	Evaluating (1 item)	Learning about product	Learning
			Search	Viewing product	Affordances (task and goals)
Perceived hedonic affordances	Leisure	Passive feelings (non goal-related)	Entertainment	Enjoyability	Entertainment
	Inspire				
Perceived social affordances	Interaction	Social experiences	Direct contact	Communicate	Social
	Usability of seeking other people's feedback		Consumer reviews		

5.2 Results of Pilot Studies

Two pilot studies were conducted to test the experiment design. The purposes of pilot studies are threefold: (1) ensure the experiment task instruction is understandable, (2) test the effectiveness of experiment manipulations, and (3) assess construct reliability and validity. To achieve the first two goals, an open question was included to allow subjects to comment on the task instruction and website designs. After reviewing the comments, adjustments were made accordingly. The third goal was achieved through some validation statistical analysis. Ninety-six (96) valid responses were collected in the first pilot, and each subject spent an average of 13 minutes on the task. A total of 50 valid responses were collected in the second pilot, and the subjects spent an average of 11 minutes.

5.2.1 Reliability

Cronbach's coefficient alpha is the most commonly reported estimate of scale reliability, and measures the internal consistency of all the items within a single construct. Cronbach's coefficient alpha indicates whether all the items of the same construct point toward the same direction (Cronbach & Meehl, 1955). In general, reliability coefficients above .70 are considered "adequate", and values around .80 are "very good" (Kline, 2011). The reliability of items was assessed using Cronbach's alpha scores with SPSS 20.0. Cronbach's alpha scores of all three constructs showed sufficient reliability, ranging from .86 to .96 (Appendix 4).

5.2.2 Principle Component Analysis

An exploratory principle component analysis (PCA) was conducted on the dataset from the first pilot study using Varimax rotation in SPSS 20.0 to further examine the convergent and discriminant validity of newly developed scales. Varimax rotation is selected among many rotation methods because it constrains factors to be uncorrelated and generates a simple factor structure (Fabrigar, Wegener, MacCallum, & Strahan, 1999).

Results show that three components had eigenvalues greater than 1, and the three components explained 74% of the variance. The scree plot (Figure 12) also shows that the elbow appears at the fourth component. Therefore, the three-component solution was considered most appropriate (Table 10). A further examination of factor loadings showed that items measuring the same construct loaded very well on the same component. All item loadings are greater than .50 with cross-factor loading lower than .40.
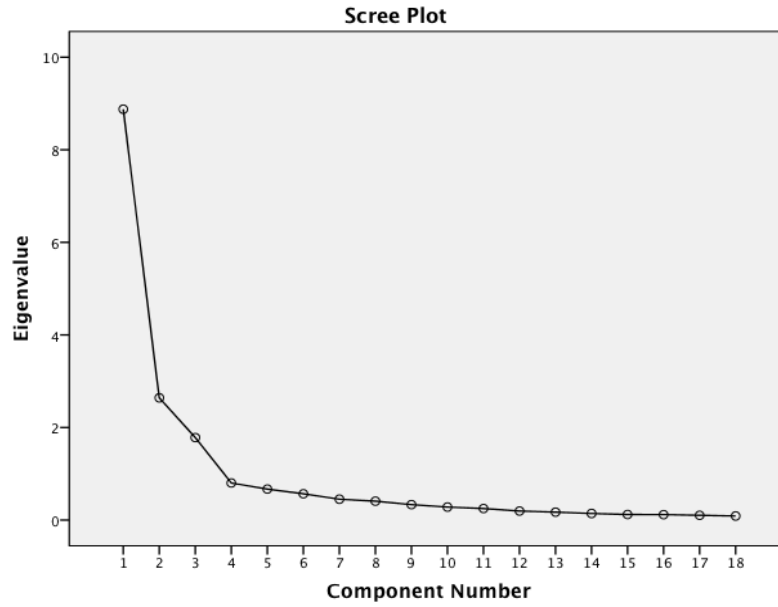
Figure 12: A Scree Plot of Exploratory Factor Analysis

Table 10: Results of the Exploratory Factor Analysis of New Instrument

		Components		
	Items	1	2	3
Perceived utilitarian affordances	PUA1	**.824**	.116	.258
	PUA2	**.862**	.162	.254
	PUA3	**.802**	.245	.303
	PUA4	**.671**	.252	.059
	PUA5	**.826**	.148	.237
	PUA6	**.614**	.351	.261
	PUA7	**.776**	.203	.289
Perceived hedonic affordances	PHA1	.383	**.585**	.136
	PHA3	.157	**.790**	.199
	PHA4	.333	**.627**	.231
	PHA5	.175	**.837**	.014
	PHA6	.118	**.893**	.105
Perceived social affordances	PSA3	.248	.159	**.867**
	PSA4	.198	.107	**.921**
	PSA5	.172	.129	**.913**
	PSA6	.294	.156	**.839**
	PSA7	.243	.102	**.816**
	PSA8	.260	.153	**.881**

Table 11: Item Pool

Construct	Item ID	Item	Procedure		
		While using this website for shopping	**Card sorting**	**Pilot**	**Final Study**
Perceived Utilitarian Affordances	PUA1	it has features that allow me to find product details	√	√	√
	PUA2	it has features that allow me to learn about a product	√	√	√
	PUA3	it has features that allow me to gather product details	√	√	√
	PUA4	It has features that allow me to narrow down the product search	√		
	PUA5	It has features that allow me examine about product	√	√	√
	PUA6	It has features that allow me to navigate products	√		
	PUA7	It has features that allow me to evaluate the product	√	√	√
		While using this website for shopping	**Card sorting**	**Pilot**	**Final Study**
Perceived Hedonic Affordances	PHA1	I am inspired about shopping	√		
	PHA2	the features of this website allow me to hunt for deals			
	PHA3	I can relax my mind	√	√	√
	PHA4	I can wander around just out of curiosity	√	√	√
	PHA5	I can kill time by myself	√	√	√
	PHA6	I can pass time at the website when I am bored	√	√	√
	PHA7	I can look for ideas on shopping			
		While using this website for shopping	**Card sorting**	**Pilot**	**Final Study**
Perceived social affordances	PSA1	It has features that allow me to know what products others bought			
	PSA2	It has features that allow me to know what products others liked			
	PSA3	It has features that allow me to interact with others	√		
	PSA4	It has features that allow me to communicate with others	√	√	√
	PSA5	It has features that allow me to share my experience with others	√	√	√
	PSA6	It has features that allow me to seek others' opinions	√	√	√
	PSA7	It has features that allow me to contact others (e.g., friends)	√	√	√
	PSA8	It has features that allow me to talk about things with others	√	√	√

Note. "√" indicates items that were kept after each procedure.

To ensure construct validity, a confirmatory factor analysis (CFA) using PLS-Graph 3.0 (Chin, 2001) was conducted on the dataset collected in the second pilot study. The results revealed that PUA4, PUA6 and PHA1 had low factor loading on their relevant constructs. Given that these three items also had fairly low factor loadings in the EFA analysis, PUA4, PUA6 and PHA1 were dropped. Therefore, 15 items measuring PUA, PHA, and PSA were kept in the main experiment. Table 11 above shows what items were selected after each procedure.

5.2.3 Response Format of Scales

Response format of scales may impact subjects' information processing and even their answers to questions. Two major characteristics of response formats are scale width and scale labeling. The question of whether the width of the scale may influence responses and bias the results is the subject of ongoing discussion in the literature (Cox III, 1980; Dawes, 2008; Felix, 2011). Preston and Colman (2010) examined the influences of the number of scale points, ranging from 2 to 11 and also a 101-point scale, on subjects' responses and found that statistical indices significantly improved with a higher number of response categories (up to seven). Felix (2010) confirmed a wider scale could increase the number of options used by subjects, but would not affect important statistical characteristics, such as mean, standard deviation, and skewness. Overall, the seven-point scale has the strength of providing more choices for respondents to reveal their feelings and does not require too much effort from respondents to differentiate the more finely graded response categories. Thus, the seven-point Likert scale was used to measure most constructs (1=strongly disagree, 7 = strongly agree).

All constructs except approach behavioral intentions (APP) and avoidance behavioral intentions (AVD) were measured with bipolar scales, that is, from strongly disagree to strongly

agree. APP and AVD are conceptualized as two orthogonal dimensions of consumer behavioral

tendencies, because they are aroused by different human information processing systems

(Davidson, 1998) and do not represent two ends of a continuum (Mehrabian & Russell, 1974)

The debates regarding the effects of response format (or response labeling) are not new in

the literature, especially for the discussions on bipolarity of affect scales (Russell & Carroll,

1999; Russell & Pratt, 1980; Segura & González-Romá, 2003). After reviewing a series of

studies on positive affect and negative affect, Russell and Carroll (1999) suggested that response

formats could bias the results; they recommend using ambiguous scales in that subjects would

have more flexibility to interpret the middle point.

Considering the debates over bipolarity of response formats, two pilots were conducted to

examine whether bipolar or unipolar scales should be used to measure APP and AVD. The first

pilot with 96 subjects used ambiguous unipolar scale measuring APP and AVD (1 = not at all, 7

= extremely likely). The correlation coefficient between APP and AVD was -0.65 ($p < .001$).

The second pilot recruited 50 subjects and used an ambiguous bipolar scale. The correlation

coefficient between APP and AVD was $-.78$ ($p < .001$). Russell and Carroll (1999) suggested

that a coefficient of -.47 or lower is needed to demonstrate a 90-degree relationship between

latent factors using a unipolar scale and that a coefficient close to -1.00 indicates a 180-degree

relationship between latent factors using bipolar scales. Results of two pilot studies showed that

the relationship between APP and AVD is neither bipolar nor orthogonal. Instead, APP and AVD

indicate an angle around 135 degrees. The use of bipolar scales might force the subjects to think

one is the opposite of the other, and thus items of APP and AVD use ambiguous unipolar scales

(from not at all likely to extremely likely).

5.3 Results of the Main Experiment

This section presents analysis results of data collected in the main experiment.

5.3.1 General Background

In the main experiment, a total of 393 completed responses were collected from Amazon Mechanical Turk (MTurk). Thirty-three (33) responses were deleted for the following reasons: (1) the records showed that some subjects had participated in the pilot studies; (2) the subjects completed the experiment within 3 minutes (the experiment was estimated to take 10–15minutes); and/or (3) the responses had the same answer to all questions (e.g., all 7s). In all, the main experiment collected 360 valid responses and each experiment group had 45 subjects.

Table 12 provides the descriptive analysis of subjects' demographic information. Among the 360 subjects, 223 (62%) were female and 84 (38%) were male. One hundred fifty-two (152) subjects were between 25 and 34 years old (42%); 278 of them were Caucasian/White (77%), followed by African-American/Black (8%), Asian/Pacific Island (6%), Hispanic (5%), and multiracial (5%).

Table 13 shows the gender composition in each experiment condition. A chi-square test indicated that there was no significant difference regarding the numbers of male and female subjects across eight experiment groups, χ^2 (7, $N = 360$) = 4.02, p = .775. A three-way MANOVA did not reveal any significant differences in terms of age, gender, income, education, social media usage, or prior purchase experience (see Table 14).

Table 12: Demographic Information of Subjects

Variables		Value	Percentage (%)
Gender	Female	223	62
	Male	137	38
Age	Under 24	64	18
	25–34	152	42
	35–44	76	21
	45–54	45	13
	55–64	21	6
	65 and above	1	0
Ethnicity	African-American/Black	29	8
	Asian/Pacific Island	22	6
	Caucasian/White	278	77
	Hispanic	19	5
	Multiracial	12	5
Annual House Income	Under $15,000	41	11
	$15,000–$34,999	89	25
	$35,000–$49,999	68	20
	$50,000–$74,999	99	28
	$75,000–$99,999	41	11
	$100,000 and over	22	6
Education	High School or below	115	32
	Bachelor's degree	185	51
	Professional degree	14	4
	Graduate degree	46	13
Social media hours (on a typical day)	Never	22	6
	0–1 hour	115	32
	1–2 hours	112	31
	More than 2 hours	111	31
Online shopping frequency (over the past 7 days)	0–3 times	297	83
	3–5 times	52	14
	More than 5 times	11	3

Table 13: Gender Composition in Each Treatment Condition

Web	IC	EC	SC	*N*	Female (*N*)	Male (*N*)
1	H	H	Present	45	29	16
2	H	H	Absent	45	25	20
3	H	L	Present	45	30	15
4	H	L	Absent	45	28	17
5	L	H	Present	45	25	20
6	L	H	Absent	45	28	17
7	L	L	Present	45	32	13
8	L	L	Absent	45	26	19
Total				*360*	*223*	*137*

Table 14: Three-way MANOVA on Subjects' Demographic Information

	df1	*df2*	*F*	Sig.	η^2	Power
Information Cue (IC)	5	348	0.83	0.531	0.01	0.30
Entertainment Cue (EC)	5	348	1.09	0.366	0.02	0.39
Social Cue (SC)	5	348	0.47	0.799	0.01	0.18
IC*EC	5	348	0.84	0.520	0.01	0.30
IC*SC	5	348	0.74	0.593	0.01	0.27
EC*SC	5	348	0.71	0.616	0.01	0.26
IC*EC*SC	5	348	0.67	0.648	0.01	0.24

Note. Demographic variables included were: age, education, income, social media usage and purchase experience.

Given that the subjects' backgrounds were homogenous across different experimental conditions, background information was not considered as a moderator or covariate in subsequent data analysis.

5.3.2 Manipulation Check

A three-way MANOVA was conducted to check whether the manipulation of different levels of information cues (IC), entertainment cues (EC), and social cues (SC) were successful. Scales for measuring each treatment were either adapted from prior literature (Y. Ha & Lennon, 2010) or self-developed. Cronbach's alpha scores were calculated to assess reliability, and the results showed sufficient reliability (Appendix 5). The results indicate that subject's perceptions of IC, EC, and SC were significantly different across experiment conditions (Table 15). Box's M test shows a significant p-value ($p < .001$), indicating that the assumption of homogeneity of covariances across groups was violated. However, since each experiment had the same sample size, analysis results should not be strongly affected by this violation. Neither the two-way interactions nor the three-way interaction showed statistical significance, indicating no interaction effects among manipulation treatments. Although the three-way interaction

(IC×EC×SC) was close to a significant level at $\alpha = .05$ ($p = .051$), the effect size (.02) was small and the power was low (.47). Thus, the three-way interaction was considered nonsignificant.

Table 15: Three-way MANOVA of Manipulation Check

	df1	*df2*	*F*	Sig.	η^2	Power
IC	3	350	36.42	.000	.23	1.00
EC	3	350	35.76	.000	.23	1.00
SC	3	350	177.11	.000	.61	1.00
IC*EC	3	350	1.41	.240	.01	.23
IC*SC	3	350	1.31	.272	.01	.21
EC*SC	3	350	1.23	.297	.01	.19
IC*EC*SC	3	350	2.62	.051	.02	.47

To examine how each manipulative treatment differed in each experiment condition, *post hoc* univariate ANOVAs were performed by running ANOVA for each of the three treatments (IC, EC, and SC), where the design treatment was the independent variable and the dependent variable was the scale measuring perceptions of that treatment. A more rigorous approach of manipulation check included all three treatments in ANOVAs, and the results could inform whether each treatment had a significant effect on related perceptions of that treatment even in the presence of the other treatments. This approach was recommend by Perdue and Summers (1986) and used by Wells et al. (2011). Table 16 shows that each treatment sustained significant effects on perceptions of that treatment in both sets of ANOVAs.

Table 16: Univariate ANOVA of Manipulation Check

ANOVA with One Treatment and One DV	Perceptions of IC		Perceptions of EC		Perceptions of SC	
	F	Sig.	F	Sig.	F	Sig.
Information cues (high/low)	102.04	.000				
Entertainment cues (high/low)			94.43	.000		
Social cues (presence/absence)					494.83	.000
ANOVA with Three Treatments and One DV	**Perceptions of IC**		**Perceptions of EC**		**Perceptions of SC**	
	F	Sig.	F	Sig.	F	Sig.
Information cues (high/low)	**109.04**	**.000**	25.34	.000	2.51	.114
Entertainment cues (high/low)	7.9	.005	**103.77**	**.000**	9.32	.002
Social cues (presence/absence)	11.43	.001	4.21	.041	**514.53**	**.000**

5.3.3 Reliability

Cronbach's alpha scores were calculated to examine the internal consistency of measurements in the main experiment, and the scores of all constructs were above the threshold (.70). Variance inflation factors (VIFs) were calculated to examine whether multicollinearity was a concern. In the context of PLS-SEM, the cut-off values of VIFs is 5 (Hair et al., 2011), and ideally lower than 3.3 (Diamantopoulos & Siguaw, 2006). VIFs lower than the cut-off values showed that multicollinearity would not be a serious concern. Table 17 shows that VIFs of all latent variables are far below the cut-off value and only two variables (PU and PF) were a little above 3.3. Therefore, multicollinearity should not be a concern.

Table 17: Reliability and Multicollinearity Analysis of Constructs in Main Experiment

	Number of Items	Item-Total Correlation	Cronbach's Alpha	VIFs
Perceived utilitarian affordances	5	.664–.890	.918	1.74
Perceived hedonic affordances	4	.614–.813	.871	1.89
Perceived social affordances	5	.896–.938	.973	2.50
Perceived usefulness	5	.827–.928	.961	3.40
Perceived fun	4	.911–.937	.969	3.88
Perceived sociability of use	5	.834–.917	.956	2.92
Approach behavioral intentions	3	.841–.879	.929	2.59
Avoidance behavioral intentions	3	.784–.812	.897	2.36

5.3.4 MANOVA and Univariate ANOVAs for Hypothesis Testing

Table 18 shows the results of the three-way MANOVA of three response variables: perceived utilitarian affordances (PUA), perceived hedonic affordances (PHA), and perceived social affordances (PSA). The results revealed three significant main effects, one significant two-way interaction effect, and one significant three-way interaction effect. Box's test of equality of covariance matrices reveals a significant result ($p < .001$), implying that the assumption of

homogeneity of covariance matrices is violated. However, because each experiment group has

equal sample size ($N = 45$), MANOVA should be robust to this violation. MANOVA test using

latent factor scores also was conducted and generated similar results as using means of items.

The latent factor scores are standardized values. Because it is more intuitive to examine the

actual values of each item, analysis results using means of items are reported here.

The MANOVA of three perceived affordances induced by experiment treatments showed

a significant three-way interaction effect, Wilks' lambda $= 0.96$, F (3, 350) $= 4.80$, $p = .003$,

effect size $\eta^2 = .04$, and power $= .81$, indicating an effect size between small and medium (Cohen,

1988). Main effects only indicate the effects of one independent variable with averaging the

effects of all other variables on dependent variables, and interpretations of main effects become

meaningless if higher-order interactions are significant (Maxwell & Delaney, 2000). In general,

higher-order interactions (i.e. three-way interaction effect) supersede lower-order (i.e. two-way

interaction effect interactions, and lower-order interactions supersede main effects (Gamst et al.,

2008; Maxwell & Delaney, 2000). The results of three-way MANOVA indicated that three

experiment treatments (IC, EC, and SC) interacted with each other when affecting the response

variables (PUA, PHA, and PSA). Therefore, further analysis should focus on higher-order

interaction effect, that is, the three-way interaction.

Table 18: Three-way MANOVA of Response Variables (PUA, PHA, and PSA)

	df1	*df2*	*F*	Sig.	η^2	Power
Information Cue (IC)	3	350	19.12	.000	.14	1.00
Entertainment Cue (EC)	3	350	4.44	.004	.04	.78
Social Cue (SC)	3	350	168.00	.000	.59	1.00
IC×EC	3	350	1.38	.249	.01	.22
IC×SC	3	350	3.62	.013	.03	.65
EC×SC	3	350	2.20	.088	.02	.39
IC×EC×SC	3	350	4.80	.003	.04	.81

A significant three-way interaction implies that the effect of one factor is not consistent in all combinations of the other two factors. This three-way interaction can be interpreted by breaking it down into a set of two-way interactions. For instance, a three-way interaction (A×B×C) can be examined from three perspectives: (1) The A×B interaction is different at individual levels of C; (2) The A×C interaction is different at individual levels of B; and (3) The B×C interaction is different at individual levels of A (Maxwell & Delaney, 2000, p. 330). These three perspectives are equivalent and the pattern differences would be found regardless of which factor is selected to split the dataset (Gamst et al., 2008). Maxwell and Delaney (2000) suggested that in practice it is usually best not to perform all three tests, but to test only the questions that are of most interest and have theoretical support.

After breaking the data into subsets for analysis, the effects of individual treatment is called *simple effect*. *Post hoc* univariate ANOVA was conducted to investigate the simple effects of each treatment. The significance level was set at .017 (0.05/3) to control for Type I error inflation arising from multiple comparison tests. The following paragraphs discuss the univariate ANOVAs of the three response variables (i.e., PUA, PHA, and PSA), respectively.

5.3.4.1 Univariate ANOVA on Perceived Utilitarian Affordances (PUA)

Table 19 presents means of PUA in each experiment group, and each cell represents one experiment group. The univariate ANOVAs of PUA reveal a significant three-way interaction ($F (1, 352) = 8.28$, $p = .004$) at the significance level of .017 (.05/3) (Table 20). Leven's test was conducted to examine the homogeneity of error variance across experiment group. The significance result ($p < .001$) indicates that the homogeneity assumption is violated. However, given that each group has an equal sample size, the analysis is robust to this violation. The three-

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way interaction is a higher-order effect, indicating the two-way interaction is not the same at each level of the third factor.

Table 19: Means of PUA in Experiment Groups

	Entertainment Cue Low		Entertainment Cue High	
	Social Cue Absent	Social Cue Present	Social Cue Absent	Social Cue Present
Information Cue Low	3.86	5.35	4.71	5.16
Information Cue High	5.59	5.58	5.60	5.96

Table 20: Univariate Three-way ANOVA of PUA

	df	Mean Square	F	Sig.
Information Cue (IC)	1	75.08	56.04	.000
Entertainment Cue (EC)	1	6.19	4.62	.032
Social Cue (SC)	1	29.36	21.91	.000
IC×EC	1	.37	0.28	.598
IC×SC	1	14.40	10.75	.001
EC×SC	1	2.64	1.97	.162
IC×EC×SC	1	11.10	8.28	.004

*Note. * $p < .017$*

The first interaction analysis was conducted to examine whether the simple effects of IC on PUA vary within certain level of SC and EC. Table 21 shows the results of testing IC×SC interaction at each level of EC. The mean differences between IC high and IC low are significant when the SC is absent and the EC is low, $F (1,352) = 50.20$, $p < .001$, when the SC is absent and the EC is high, $F (1,352) = 18.14$, $p < .001$, and when the SC is present and the EC is high, $F (1,352) = 14.40$, $p < .001$. The only exception is that when the SC is present and the EC is low, there is no significant mean difference of PUA between IC high and IC low, $F (1,352) = 1.16$, $p = .354$.

Table 21: Simple Effects of IC on PUA

Entertainment cues	Social cues	Information cues	Mean	Mean difference	*F*	Sig.
Low	Absence	Low	3.86	−1.73	50.20	**.000**
		High	5.59			
	Presence	Low	5.35	−.23	.86	.354
		High	5.58			
High	Absence	Low	4.71	−.90	13.54	**.000**
		High	5.60			
	Presence	Low	5.16	−.80	10.75	**.001**
		High	5.96			

Note. Based on estimated marginal means. The mean difference is significant at α = .017.
The adjustment for multiple comparisons: Bonferroni.

Two plots (Figure 13) aid understanding of the statistically significant three-way interaction. The plot on the left shows an interaction effect between IC and SC when the EC is low, and the plot on the right shows there is no interaction effect between IC and SC when the EC is high. Overall, the higher level of IC leads to a higher level of PUA.
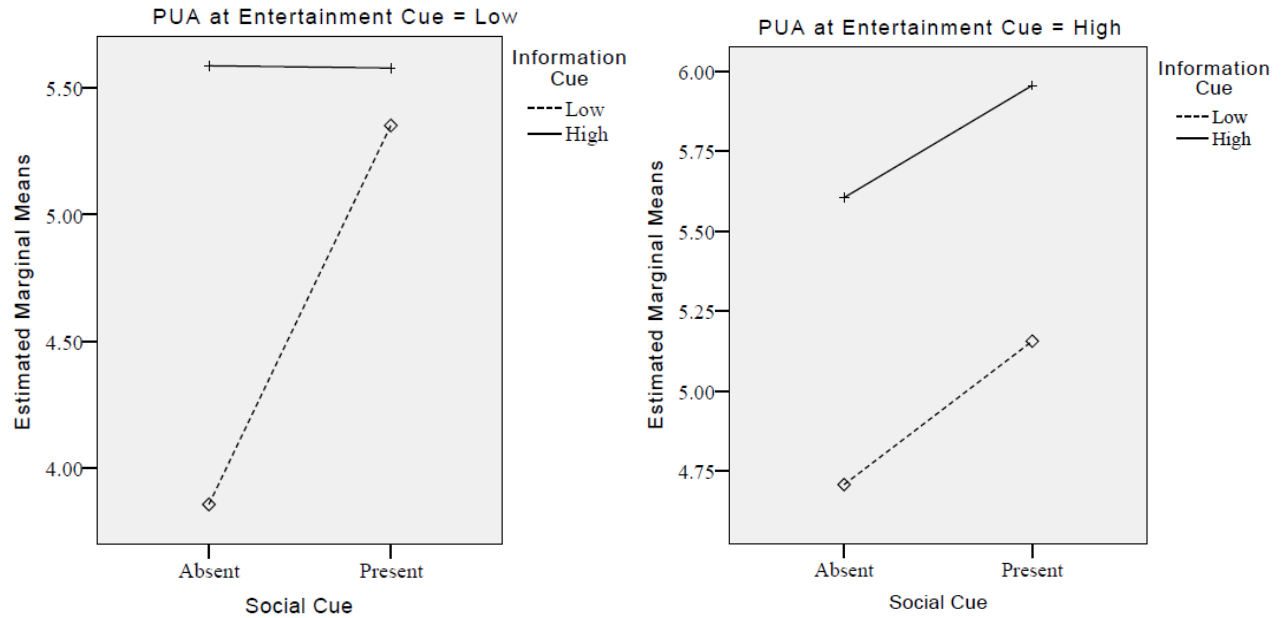

Figure 13: Simple Effects of IC on PUA (IC × SC Interaction at Two Levels of EC)

The second interaction analysis was conducted to examine whether the simple effects of SC on PUA vary within certain level of IC and EC (see Table 22). The mean difference between SC present and SC absent is significant when the EC is low and the IC is low, $F (1, 352) = 37.46$, $p < .001$). However, there are no significant mean differences between SC present and SC absent when the EC is high and the IC is low, $F (1, 352) = 3.38$, $p = .067$, when the EC is high and the IC is high, $F (1,352) = 2.07$, $p =. 151$, or when the EC is low and the IC is high, $F (1,352) = .00$, $p = .971$.

Table 22: Simple Effects of SC on PUA

Entertainment cues	Information Cues	Social Cues	Mean	Mean difference	F	Sig.
Low	Low	Absence	3.86	−1.49	37.46	**.000**
		Presence	5.35			
	High	Absence	5.59	.01	.00	.971
		Presence	5.58			
High	Low	Absence	4.71	−.45	3.38	.067
		Presence	5.16			
	High	Absence	5.60	−.35	2.07	.151
		Presence	5.95			

Note. Based on estimated marginal means. The mean difference is significant at α = .017.
The adjustment for multiple comparisons: Bonferroni.

Two plots (Figure 14) aid understanding of the statistically significant three-way interaction. The plot on the left shows an interaction effect between IC and SC when the EC is low, and the plot on the right shows there is no interaction effect between IC and SC when the EC is high.
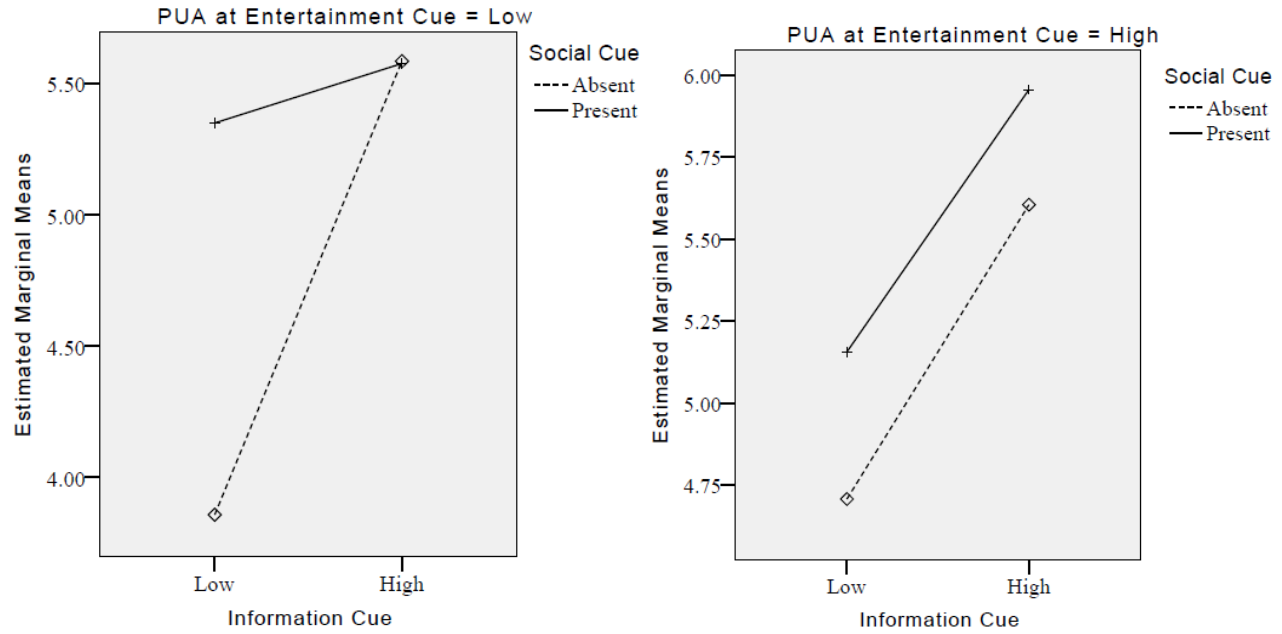
Figure 14: Simple Effects of SC on PUA (IC $\times$ SC Interaction at Two Levels of EC)

5.3.4.2 Univariate ANOVA on Perceived Hedonic Affordances (PHA)

Table 23 presents means of PHA in each experiment group. The univariate ANOVA of PHA also reveals a significant three-way interaction ($F (1, 352) = 7.29$, $p = .007$) at the level of .017 (.05/3) (Table 24). Levene's test was conducted to examine the homogeneity of error variance across experiment group. The significant result ($p = .034$) indicates that the homogeneity assumption is violated. However, given that each group has an equal sample size, the analysis is robust to this violation. The three-way interaction is a higher-order effect, indicating the two-way interaction is not the same at each level of the third factor.

Table 23: Means of PHA in Experiment Groups

	Information Cue Low		Information Cue High	
	Social Cue Absent	Social Cue Present	Social Cue Absent	Social Cue Present
Entertainment Cue Low	3.57	4.76	4.74	5.74
Entertainment Cue High	4.73	4.64	4.95	5.17

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Table 24: Univariate Three-way ANOVA of PHA

	df	*Mean Square*	*F*	**Sig.**
Information Cue (IC)	1	20.43	11.85	.001
Entertainment Cue (EC)	1	15.73	9.12	.003
Social Cue (SC)	1	9.59	5.56	.019
IC×EC	1	.98	.57	.452
IC×SC	1	4.28	2.48	.116
EC×SC	1	6.33	3.67	.056
IC×EC×SC	1	12.56	7.29	.007

Note. * $p < .017$

The first interaction analysis examined whether the effects of EC on PHA vary within certain level of SC and IC. Table 25 shows that mean difference between EC high and EC low is significant when the SC is absent and the IC is low, $F(1,352) = 30.33$, $p < .001$. However, there are no significant mean differences between EC high and EC low when the SC is present and the IC is high, $F(1,352) = 2.33$, $p = .128$, when the SC is present and the IC is low, $F(1,352) = .18$, $p =. 674$, or when the SC is absent and the IC is high, $F(1,352) = .55$, $p = .458$.

Table 25: Simple Effects of EC on PHA

Information Cues	**Social Cues**	**Entertainment Cues**	**Mean**	**Mean difference**	***F***	**Sig.**
Low	Absent	Low	3.57	−1.16	17.60	**.000**
		High	4.73			
	Present	Low	4.76	.12	.18	.674
		High	4.64			
High	Absent	Low	4.74	−.21	.55	.458
		High	4.95			
	Present	Low	4.74	−.42	2.33	.128
		High	5.16			

Note. Based on estimated marginal means. The mean difference is significant at α = .017.
The adjustment for multiple comparison: Bonferroni.

Two plots (Figure 15) assist interpretation of the statistically significant three-way interaction. The plot on the left shows an interaction effect between IC and SC when the EC is low, and the plot on the right shows there is no interaction effect between IC and SC when the EC is high.
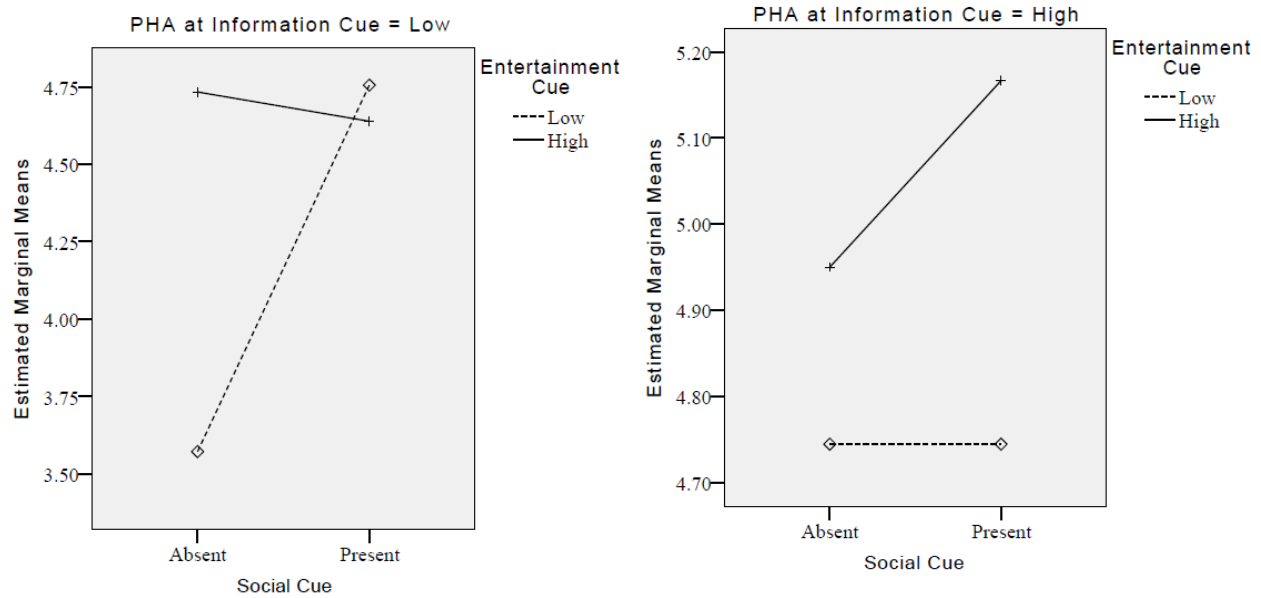
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Figure 15: Simple Effects of EC on PHA (EC × SC Interaction at Two Levels of IC)

Table 26 shows the simple effects of SC on PHA within certain level of EC and IC. The mean difference between the SC present and the SC absent is significant when the EC is low and the IC is low, F (1,352) = 18.27, $p < .001$. However, there are no significant mean differences between the SC present and the SC absent when the EC is high and the IC is low, F (1, 352) = .12, $p = .733$, when the EC is high and the IC is high, F (1, 352) = .61, $p =. 434$, or when the EC is low and the IC is high, F (1, 352) = .00, $p = 1.000$.

Table 26: Simple Effects of SC on PHA

Information Cues	Entertainment Cues	Social Cues	Mean	Mean difference	F	Sig.
Low	Low	Absent	3.57	−1.18	18.27	**.000**
		Present	4.75			
	High	Absent	4.73	.09	.12	.733
		Present	4.64			
High	Low	Absent	4.74	.00	.00	1.000
		Present	4.74			
	High	Absent	4.95	−.22	.61	.434
		Present	5.17			

Note. Based on estimated marginal means. The mean difference is significant at α = .017.
The adjustment for multiple comparisons: Bonferroni.

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Two plots (Figure 16) assist interpretation of the statistically significant three-way interaction. The plot on the left shows an interaction effect between EC and SC when the IC is low. The value of PHA was much higher when the SC was present given that the EC was low at the level of IC low. However, when EC became high, the value of PHA increases sharply even though the SC was absent. The plot on the right shows the value of PHA increases when the SC is present and the EC became high.
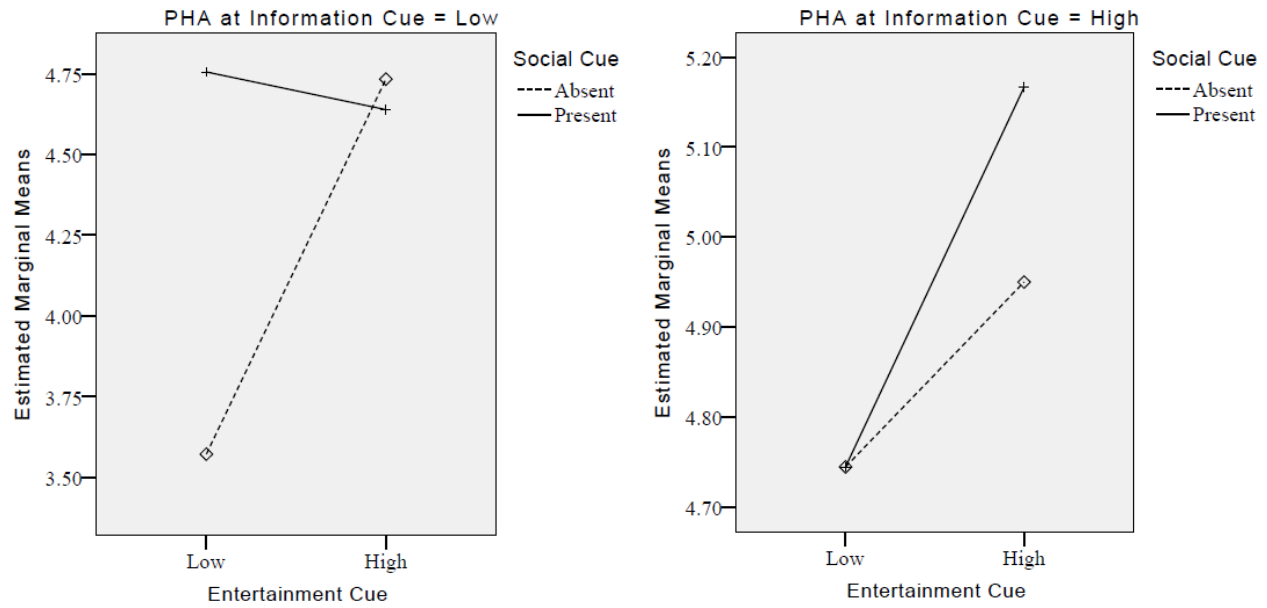
Figure 16: Simple Effects of SC on PHA (SC × EC Interaction at Two Levels of IC)

5.3.4.3 Univariate ANOVA on Perceived Social Affordances (PSA)

Table 27 presents means of PSA variable in each experiment group. The univariate ANOVA of PSA also reveals a significant three-way interaction (F (1, 352) = 9.54, p = .002) at the level of .017 (.05/3) (Table 28). Leven's test was conducted to examine the homogeneity of error variance across experiment group. The significance result ($p < .001$) indicates that the homogeneity assumption is violated. However, given that each group has an equal sample size,

the analysis is robust to this violation. The three-way interaction is a higher-order effect, indicating the two-way interaction is not the same at every level of the third factor.

Table 27: Means of PSA in Experiment Groups

	Information Cue Low		Information Cue High	
	Entertainment Cue Low	Entertainment Cue High	Entertainment Cue Low	Entertainment Cue High
Social Cue Absent	1.79	3.20	2.82	2.84
Social Cue Present	5.60	5.54	5.55	5.78

Table 28: Univariate Three-way ANOVA of PSA

	df	Mean Square	F	Sig.
Information Cue (IC)	1	4.18	2.51	.114
Entertainment Cue (EC)	1	14.40	8.66	.003
Social Cue (SC)	1	786.18	472.61	.000
IC×EC	1	6.83	4.11	.043
IC×SC	1	1.30	.78	.378
EC×SC	1	8.59	5.16	.024
IC×EC×SC	1	15.88	9.54	.002

*Note. *$p < .017$

Table 29 shows the simple effects of SC on PSA within certain level of EC and IC. The mean difference between SC present and SC absent is significant in all conditions. Two plots (Figure 17) also support that the value of PSA is much higher when the SC is present.

Table 29: Simple Effects of SC on PSA

Information Cues	Entertainment Cues	Social Cues	Mean	Mean difference	F	Sig.
Low	Low	Absent Present	1.80 5.60	−3.80	195.77	.000
	High	Absent Present	3.19 5.54	−2.35	74.49	.000
High	Low	Absent Present	2.82 5.54	−2.72	100.40	.000
	High	Absent Present	2.83 5.78	−2.95	117.44	.000

Note. Based on estimated marginal means. The mean difference is significant at $\alpha = .017$.
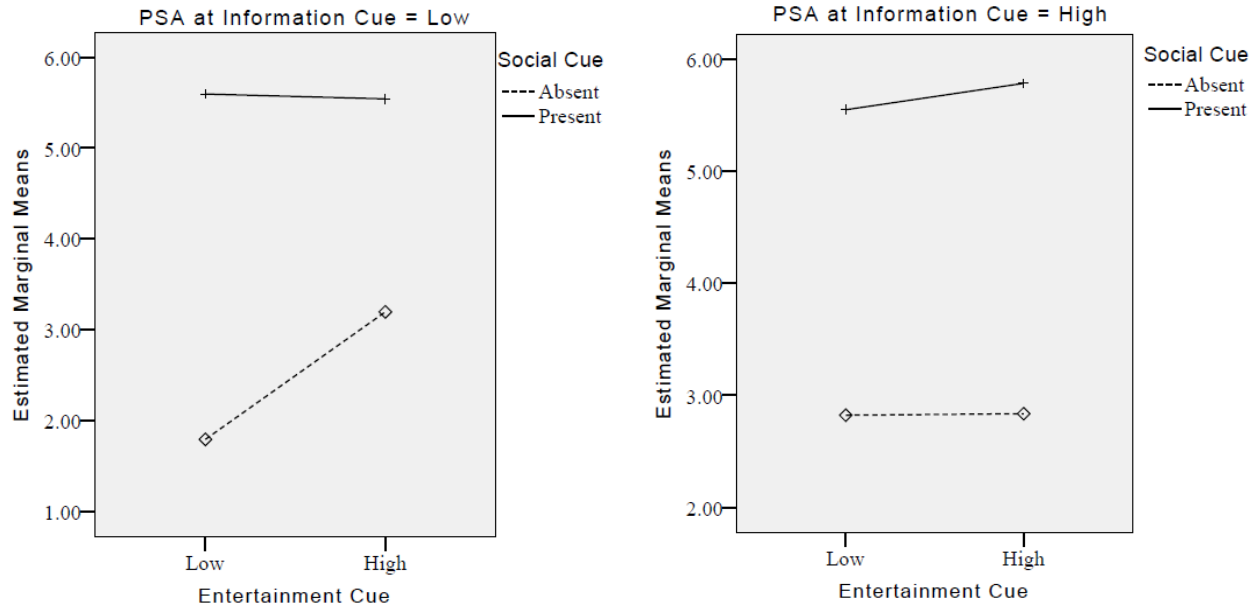The adjustment for multiple comparisons: Bonferroni.

Figure 17: Simple Effects of SC on PSA (SC × EC Interaction at Two Levels of IC)

5.3.4.4 Summary of MANOVA and Post Hoc ANOVAs

Table 30 presents a summary of hypothesis testing with MANOVA and *post hoc*

univariate ANOVAs. H1 proposes that a shopping website with higher level of information cues

(IC) induces a higher level of perceived utilitarian affordances (PUA). The empirical results (see

Table 21) show that the PUA is significantly higher at the IC high than the value at the IC low

except for when the entertainment cue (EC) is low and the social cue (SC) is present. This

implies that the presence of SC is meaningful to PUA. H2 concerns that a higher level of EC

would induce a higher level of perceived hedonic affordances (PHA). The value of PHA is

significantly higher at the level of EC high when the IC is low and the SC is absent (see Table

25). H3a proposes that the presence of SC leads to a higher level of perceived social affordances

(PSA). The data analysis supports that the value of PSA is significantly higher when SC is

present (see Table 29). H3b suggests that the presence of SC leads to a higher level of PUA. The

results also support that the value of PUA is higher when the SC is present within the IC low and

EC low condition (see Table 22). H3c argues that the presence of SC can also induce a higher level of PHA. The results show that the value of PHA is significantly higher when SC is present within the IC low and EC low condition (see Table 26).

Table 30: A Summary of Hypothesis Testing with MANOVA Analysis

Hypothesis	Supported?
H1: Information cues→(+) Perceived utilitarian affordances	Supported
H2: Entertainment cues → (+) Perceived hedonic affordances	Supported
H3a: Social cues→(+) Perceived social affordances	Supported
H3b: Social Cues →(+) Perceived utilitarian affordances	Supported
H3c: Social cues →(+) Perceived hedonic affordances	Supported

The following paragraphs move on to the second phase of data analysis using the structural equation modeling (SEM) technique to validate the research model.

5.3.5 Measurement Model

A partial least square (PLS) SEM analysis was conducted to examine the measurement model. The data analysis is comprised of two stages: measurement model assessment and structural model assessment.

Construct reliability is assessed with Cronbach's alpha. Convergent validity is concerned with whether a set of items measures the same construct. Convergent validity is examined with average variance extracted (AVE), composite reliability (CR), and item factor loadings. Individual items with loadings greater than .70 on their relevant constructs are considered adequate (Chin, 1998; Fornell & Larcker, 1981). The average variance explained (AVE) measures the variance captured by items and the value should be greater than .50 (Barclay, Higgins, & Thompson, 1995). Composite reliability should be larger than .70 to indicate a good convergent validity of measurement model (Fornell & Larcker, 1981). On the contrary,

discriminant validity aims to reveal whether a set of items presumed to measure different

constructs show relatively low intercorrelations (Kline, 2011). One item's loading on its related

construct should be much higher than all of its cross loadings on other constructs to ensure

discriminant validity (Hair et al., 2011). The correlation coefficients between latent factors

should be lower than the square root of their AVEs.

Table 31 presents composite reliability scores of all latent factors are well above .70, and

AVEs range from .76 to .91. The square roots of AVEs are higher than the correlation

coefficients between each pair of latent factors, indicating good discriminant validity.

Table 31: Correlation Coefficients between Latent Factors

Construct	CR	AVE	1	2	3	4	5	6	7	8
1. Perceived utilitarian affordances	.94	.76	**.87**							
2. Perceived hedonic affordances	.91	.72	.49	**.85**						
3. Perceived social affordances	.98	.90	.40	.35	**.95**					
4. Perceived usefulness	.97	.87	.59	.58	.38	**.93**				
5. Perceived fun	.98	.91	.44	.62	.38	.77	**.96**			
6. Perceived sociability of use	.97	.85	.34	.37	.75	.52	.54	**.92**		
7. Approach behavioral intentions	.96	.88	.35	.55	.30	.68	.74	.47	**.94**	
8. Avoidance behavioral intentions	.94	.83	−.37	−.49	−.20	−.66	−.71	−.33	−.66	**.91**

Note. CR: Composite Reliability; AVE: Average Variance Extracted. Diagonal elements are the square roots of the AVE. Off-diagonal elements are the correlations among latent constructs. Diagonal elements should be greater than off-diagonal elements in order to demonstrate discriminant validity. All correlation coefficients are significant at $\alpha = .001$.

Table 32 shows that all items had the highest factor loadings on their relevant latent

factors (all above .70), indicating good convergent validity. The differences between one item's

factor loadings and cross-factor loadings on other constructs are at least .20, indicating good

discriminant validity (Gefen & Straub, 2000).

Table 32: Loadings and Cross-loadings of Items

Construct	Items	PUA	PHA	PSA	PU	PF	PS	APP	AVD
Perceived utilitarian affordances	PUA1	**.893**	.416	.284	.482	.347	.224	.307	−.312
	PUA2	**.924**	.379	.369	.510	.377	.304	.305	−.321
	PUA3	**.939**	.408	.352	.513	.374	.291	.309	−.326
	PUA5	**.830**	.431	.233	.501	.369	.247	.282	−.342
	PUA7	**.769**	.501	.537	.559	.454	.457	.329	−.315
Perceived hedonic affordances	PHA3	.398	**.868**	.266	.536	.607	.331	.508	−.463
	PHA4	.522	**.766**	.307	.470	.441	.239	.356	−.356
	PHA5	.354	**.904**	.293	.453	.490	.278	.461	−.391
	PHA6	.392	**.857**	.341	.530	.575	.393	.541	−.438
Perceived social affordances	PSA4	.385	.346	**.961**	.361	.350	.688	.271	−.185
	PSA5	.385	.340	**.958**	.353	.330	.701	.267	−.178
	PSA6	.368	.323	**.946**	.360	.359	.718	.290	−.197
	PSA7	.377	.328	**.933**	.375	.381	.704	.314	−.230
	PSA8	.394	.343	**.955**	.352	.362	.732	.284	−.183
Perceived usefulness	PU1	.555	.555	.378	**.948**	.726	.512	.636	−.623
	PU2	.551	.540	.347	**.943**	.710	.468	.622	−.621
	PU3	.532	.551	.321	**.956**	.721	.458	.636	−.627
	PU4	.547	.534	.384	**.886**	.710	.479	.619	−.594
	PU5	.535	.537	.334	**.915**	.707	.480	.631	−.579
Perceived fun	PF1	.418	.611	.337	.737	**.965**	.503	.710	−.680
	PF2	.428	.610	.350	.762	**.952**	.513	.740	−.716
	PF3	.445	.587	.368	.734	**.957**	.510	.688	−.690
	PF4	.380	.573	.378	.706	**.950**	.533	.674	−.642
Perceived sociability of use	PSU1	.353	.379	.667	.530	.570	**.892**	.469	−.331
	PSU2	.330	.328	.766	.467	.465	**.925**	.405	−.282
	PSU3	.345	.343	.714	.509	.479	**.910**	.435	−.305
	PSU4	.279	.326	.633	.436	.484	**.940**	.430	−.296
	PSU5	.286	.317	.663	.442	.492	**.950**	.421	−.289
Approach behavioral intentions	APP1	.321	.517	.279	.658	.706	.461	**.948**	−.623
	APP2	.321	.540	.255	.601	.673	.388	**.930**	−.606
	APP3	.340	.491	.309	.638	.685	.463	**.929**	−.617
Avoidance behavioral intentions	AVD1	−.306	−.423	−.192	−.566	−.622	−.316	−.617	**.909**
	AVD2	−.353	−.485	−.215	−.632	−.702	−.333	−.627	**.919**
	AVD3	−.349	−.418	−.151	−.591	−.625	−.238	−.552	**.904**

The measurement model shows good construct convergent validity and discriminant validity. The second part of PLS-SEM analysis is to validate the hypothesized structural model.

5.3.6 Structural Model

PLS-Graph 3.0 (Chin, 2001) was used to validate the structural model. PLS-SEM is a component-based SEM method and is relatively robust to violation of statistical assumptions, including normal distribution and sample size (Chin, 1998; Dale L. Goodhue, Lewis, & Thompson, 2012). Bootstrap resampling was performed to examine significance levels of path coefficients.

The structural model shown in Figure 18 was used to test the hypothesized relationships. PUA had a significant effect on PU ($\beta = .36$, $p < .001$), supporting H4. PHA had a significant effect on PF ($\beta = .26$, $p < .001$), supporting H5a, and PHA had a significant effect on PU ($\beta = .32$, $p < .001$), supporting H5b. PSA had a significant impact on PSOU ($\beta = .75$, $p < .001$), supporting H6a. However, the signs of path coefficients from PSA to PU ($\beta = −.20$, $p < .01$) and PF ($\beta = −.10$, p = .076) were different from the correlation coefficients (see Table 31). PSOU had significant effects on PU ($\beta = .41$, $p < .001$) and PF ($\beta = .24$, $p < .001$), supporting H8a and H8b. PU had a significant effect on PF ($\beta = .52$, $p < .001$), supporting H7. PU had significant effects on APP ($\beta = .26$, $p < .001$) and AVD ($\beta = −.29$, $p < .001$), supporting H9a and H9b. PF had significant effects on APP ($\beta = .51$, $p < .001$) and AVD ($\beta = −.56$, $p < .001$), supporting H10a and H10b. PSOU did not have a significant effect on APP ($\beta = .06$, $p = .201$). Although PSOU had a significant effect on AVD ($\beta = −.13$, $p < .01$), the sign was different from the correlation coefficient between PSOU and AVD (see Table 31).
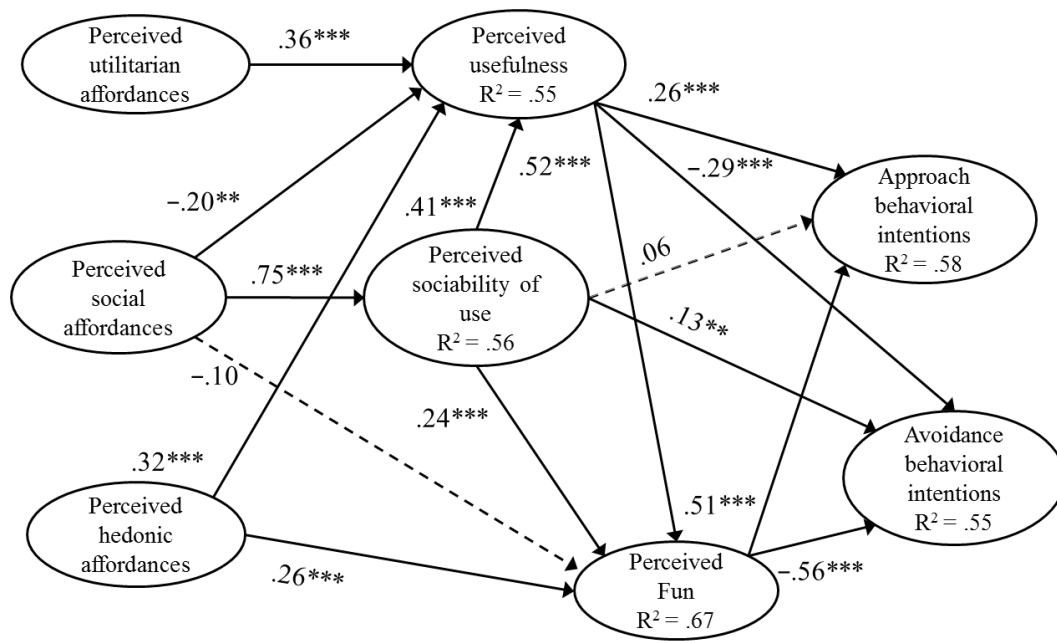
Note. All path coefficients are standardized, bootstrapping with 5000 samples, 360 bootstrap cases.
Solid line indicates significant path coefficients, and dash line indicates nonsignificant path coefficients.
*p < .05, **p < .01, *** p < .001* (two-tailed)

Figure 18: PLS-SEM Analysis of Research Model

Table 33 provides a summary of hypothesis testing through PLS-SEM. The structural

model revealed three surprising paths that had reversed signs (PSA → PU, PSA → PF, and

PSOU → AVD). The effect size (f^2) was the following formula (Chin, 1998; Cohen, 1992b):

$$f^2 = (R^2_{included} - R^2_{excluded}) / (1 - R^2_{included}).$$

$R^2_{included}$ indicates variance of a construct explained when a predictor is included in the

structural model, and $R^2_{excluded}$ indicates variance of a construct explained when the predictor is

removed from the structural model. The thresholds of small, medium, and large effect size (f^2)

recommended by Cohen (1988) are .02, .15, and .35, respectively. Two paths (PSA → PF and

PSOU → APP) had very small effect size, and effect sizes of other two paths (PSA →PU and

PSOU →AVD) were just above the threshold of small. These four paths corresponded with the

unsupported research hypotheses, and the other path coefficients have medium to large effect

size. Further discussion and analyses is presented on these four hypotheses in the following

paragraphs.

Table 33: PLS SEM Testing for Research Hypotheses

Hypothesis	Path Coefficient (β)	T-statistics	Sig.	Supported?	Effect Size
H4: PUA →(+) PU	.36	7.33	**.000**	Supported	.203
H5a: PHA →(+) PF	.26	6.49	**.000**	Supported	.134
H5b: PHA →(+) PU	.32	6.44	**.000**	Supported	.166
H6a: PSA → (+) PSOU	.75	26.83	**.000**	Supported	1.268
H6b: PSA →(+) PU	−.20	3.40	**.001**	Not Supported	.035
H6c: PSA → (+) PF	−.10	1.78	.076	Not Supported	.015
H7: PU →(+) PF	.52	12.94	**.000**	Supported	.452
H8a: PSOU →(+) PU	.41	8.53	**.000**	Supported	.163
H8b: PSOU → (+) PF	.24	4.26	**.000**	Supported	.069
H9a: PU → (+) APP	.26	4.99	**.000**	Supported	.061
H9b: PU →(−) AVD	−.29	4.74	**.000**	Supported	.073
H10a: PF →(+) APP	.51	8.83	**.000**	Supported	.231
H10b: PF →(−) AVD	−.56	9.60	**.000**	Supported	.267
H11a: PSOU →(+) APP	.06	1.28	.201	Not Supported	.007
H11b: PSOU →(−) AVD	.13	2.87	**.004**	Not Supported	.024

Note. PUA = Perceived utilitarian affordances, PHA = Perceived hedonic affordances
PSA = Perceived social affordances, PU = Perceived usefulness
PF = Perceived fun, PSOU = Perceived sociability of use,
APP = Approach behavioral intentions, AVD = Avoidance behavioral intentions.

The reason for the reversed coefficient sign may be suppression effect. However, a

further examination of the literature and theory shows the suppression effect cannot explain the

relationships among these variables. Several other possible reasons had been tested, including

group effects, moderation, covariates, and direction of path links. None of the above could

explain the reversed sign. The research model has multiple mediators and even multistep

mediators. It is possible that some mediators may transmit the effects of independent variables

on them to the succeeding mediator, and thus the effects of those mediators become deactivated

(see a similar case in Singh, Yeo, Lin, & Tan, 2007). Considering this structural model has

multiple mediators, further mediation tests were conducted, which explained reasons for the

reversed sign of path coefficients.

5.3.7 Mediation Analysis

Baron and Kenny (1986) posited a causal-steps test to analyze simple mediation effects, requiring significant effects from independent variable to dependent variable, from independent variable to mediator, and from mediator to dependent variable. MacKinnon et al. (2002) proposed a joint significance test that does not require the total effect between the predictor and the outcome to be significant, and also noted the benefits of using resampling methods. Unlike product-of-coefficients tests, such as Sobel test (Sobel, 1982), the resampling methods do not make the assumption of normal distribution of product of two regression coefficients. Several researchers also suggested that bootstrapping is an effective technique to identify confidence intervals of indirect effects (Hayes, 2009; MacKinnon, Lockwood, & Williams, 2004). Taylor et al. (2010) tested six mediation methods in detecting the three-path mediated effect and found three methods (i.e. joint significance test, the percentile bootstrap, and the bias-corrected bootstrap) had consistently high power and good control over Type I errors.

Although PLS-Graph 3.0 had bootstrap estimates of standardized path coefficients, it does not provide limits of confidence intervals through bootstrapping and the standardized coefficients cannot be easily interpreted, compared to unstandardized coefficients. Mediation tests using regression methods is the most common technique to address this (Preacher & Hayes, 2008a). The mediation tests of this study aim to address issues regarding the reversed path coefficients and demonstrate the potential mediating effects. Therefore, regression method was selected for mediation tests. In addition, three predictors (PUA, PHA, and PSA) exert effects on outcome variables through different mediators, and therefore mediation tests separately examined each predictor and outcome variable.

5.3.7.1 PUA to APP and AVD

Figure 19 shows results of simple mediation tests between PUA and APP (PUA and AVD), through each of the two mediators. The total effects between PUA and APP (PUA and AVD) were significant, but the direct effects became nonsignificant after including PU or PF. Evidently, PU or PF mediated the effects of PUA on outcome variables.
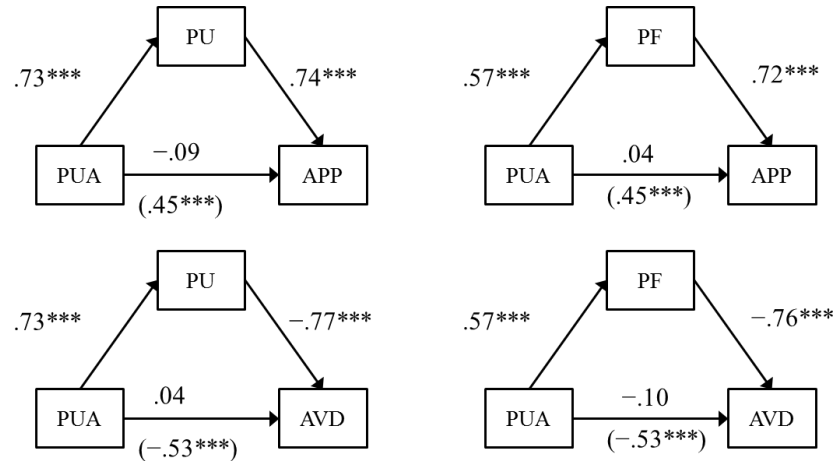
Note. All path coefficients are unstandardized. Coefficients in parenthesis are total effects between predictor and outcome variable. *$p < .05$. **$p < .01$. ***$p < .001$

Figure 19: The Path Diagrams from IV (PUA) − MV−DV Mediation Analysis

Because there are multiple mediators between predictors and outcome variables, one mediator may only transmit the effects to the succeeding mediator and then get deactivated (Singh et al., 2007). Three separate mediation tests aimed to check the effects of PUA on PF by PU, on APP by PU and PF, and on AVD by PU and PF. Z score was calculated using multivariate delta method as discussed in Preacher and Hayes (Preacher & Hayes, 2008b), dividing the indirect effect by the standard error. The test results (Table 34) show that the effects of PUA on PF were fully mediated by PU ($z = 11.37$, $p < .001$), the 95% confidence internals of the indirect effects excluded zero. The indirect effects from PUA on APP (AVD) through PU and PF were both significant, and the 95% confidence intervals of the indirect effects also excluded zero.

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Table 34: The Indirect Effects of the Proximal and Distal Variables (IV = PUA)

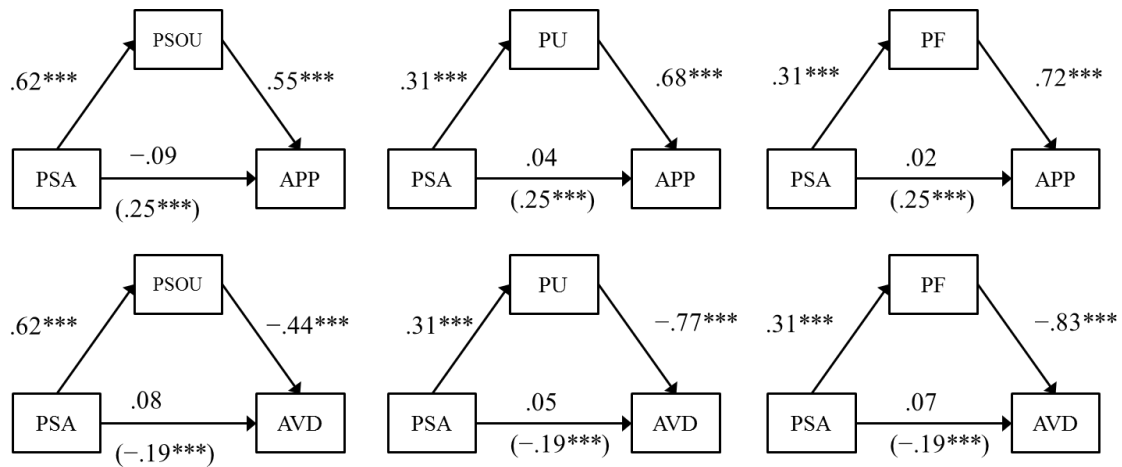| Mediator	Dependent Variable	Direct effect of IV	Indirect effect	SE	Z-score	Sig.	Confidence Interval (95%)
PU	PF	−.02 (*p* = .700)	.59	.05	11.37	**.000**	(.50, .70)
PU	APP	−.08 (*p* = .147)	.23	.04	5.15	**.000**	(.15, .33)
PF			.30	.04	7.11	**.000**	(.23, .39)
PU	AVD	.02 (*p* = .707)	−.23	.06	3.99	**.000**	(−.35, −.12)
PF			−.32	.05	6.55	**.000**	(−.42, −.23)

Note. 95% confidence intervals are from bias corrected bootstrapping; 5000 bootstrap samples.

5.3.7.2 PHA to APP and AVD

Figure 20 shows results of simple mediation tests between PHA and APP (PUA and AVD), through PU or PF. The total effects between PHA and APP (PUA and AVD) were significant. The direct effects became less significant after including PU and became nonsignificant after including PF. Evidently, PU or PF mediated the effects of PHA on outcome variables.
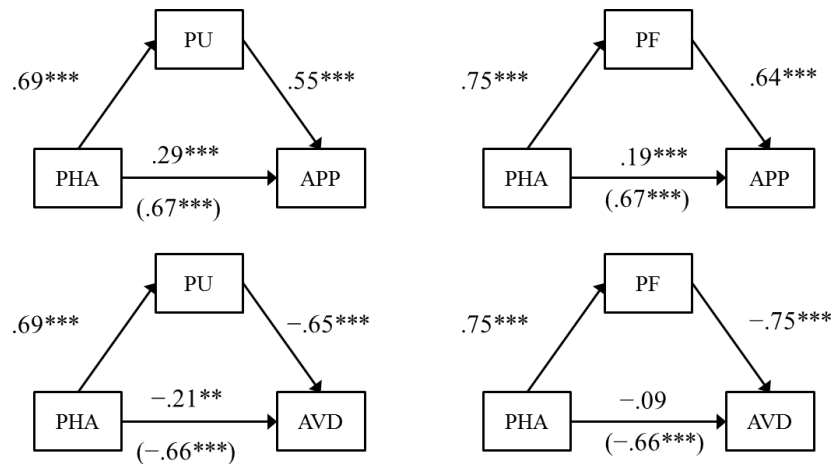
Note. All path coefficients are unstandardized. Coefficients in parenthesis are total effects between predictor and outcome variable. **p < .05. **p < .01. ***p < .001*

Figure 20: The Path Diagrams from IV (PHA) − MV−DV Mediation Analysis

Three separate mediation tests aimed to check the effects of PHA on PF by PU, on APP by PU and PF, and on AVD by PU and PF. The test results (Table 35) show that the effects of PHA on PF were partially mediated by PU (z = 10.37, *p* < .001). The indirect effects from PHA

on APP (AVD) through PU and PF were both significant, and the 95% confidence intervals of

the indirect effects also excluded zero.   .

Table 35: The Indirect Effects of the Proximal and Distal Variables (IV = PHA)

Mediator	Dependent Variable	Direct effect of IV	Indirect effect	SE	Z-score	Sig.	Confidence Interval (95%)
PU	PF	.31 ($p < .001$)	.43	.04	10.37	**.000**	(.35, .52)
PU PF	APP	.14 ($p < .05$)	.17 .36	.04 .04	4.07 7.43	**.000** **.000**	(.09, .26) (.27, .46)
PU PF	AVD	−.03 ($p = .628$)	−.20 −.42	.06 .05	3.77 7.40	**.000** **.000**	(−.31, −.11) (−.56, −.32)

Note. 95% confidence intervals are from bias corrected bootstrapping; 5000 bootstrap samples

5.3.7.3 PSA to APP and AVD

Figure 21 shows results of simple mediation tests between PSA and APP (PUA and

AVD), through PSOU, PU, or PF. The total effects between PSA and APP (PUA and AVD)

were significant. The direct effects became less significant after including PU, PF, or PSOU.

Evidently, PU, PF, or PSOU mediated the effects of PSA on outcome variables.

Four separate mediation tests aimed to check the effects of PSA on PU by PSOU, on PF

by PSOU and PU, on APP by PSOU, PU and PF, and on AVD by PSOU, PU and PF. The test

results (see Table 36) show that PSA only had a direct effect on PSOU. The effects of PSA on

two other mediators and outcome variables were fully mediated by PSOU.

PSOU carried the effects on to its next two mediators, PU and PF. However, the indirect

effects became deactivated when predicting APP or AVD. This indicates that PSOU only

mediated the effects from PSA to PU and PF, and had no direct effects on two outcome

variables, namely, APP ($z = 1.76$, $p = .078$) or AVD ($z = 1.46$, $p = .144$). The 95% confidence

internals of indirect effects through PSOU on APP or AVD both included zero, indicating PSOU

was not a mediator between PSA and outcome variables.

Note. All path coefficients are unstandardized.
Coefficients in parenthesis are total effects between predictor and outcome variable.
*p < .05. **p < .01. ***p < .001
Figure 21: The Path Diagrams from IV (PSA) − MV−DV Mediation Analysis

Table 36: The Indirect Effects of the Proximal and Distal Variables (IV = PSA)

Mediator	Dependent Variable	Direct Effect of IV	Indirect effect	SE	Z-score	Sig.	Confidence Interval (95%)
PSOU	PU	−.01 (p = .830)	.32	.04	8.62	**.000**	(.25, .40)
PSOU	PF	−.05 (p = .272)	.15	.04	3.87	**.000**	(.08, .23)
PU			.21	.03	6.92	**.000**	(.15, .27)
PSOU	APP	−.06 (p = .156)	.07	.04	1.76	.078	(−.01, .16)
PU			.08	.02	4.06	**.000**	(.04, .12)
PF			.16	.03	5.79	**.000**	(.11, .21)
PSOU	AVD	.04 (p = .377)	.06	.04	1.46	.144	(−.02, .15)
PU			−.10	.02	4.30	**.000**	(−.15, −.06)
PF			−.19	.04	5.37	**.000**	(−.27, −.13)

*Note*. 95% confidence intervals are from bias corrected bootstrapping; 5000 bootstrap samples

Two assumptions should be noted in the mediation tests. First, the mean, instead of latent factor score, was used in mediation analysis. Second, each independent variable and outcome variables was separated, but this should not undermine the results of multistep mediation tests (A. B. Taylor, MacKinnon, & Tein, 2008).

The mediation tests provide explanation for the reversed path coefficients between PSA and PU, PSA and PF, and PSOU and AVD. The effects from PSA to the other variables were

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fully mediated by PSOU, so there should be no direct effects from PSA to other variables in the research model. Similarly, the effects from PSOU to APP or AVD were fully mediated by PU and PF, and thus no direct effects exist from PSOU to APP or AVD.

5.3.8 Revised Structural Model

Figure 22 shows the empirical model that was generated from the data analysis. Some interesting findings were unfolded in this empirical model.
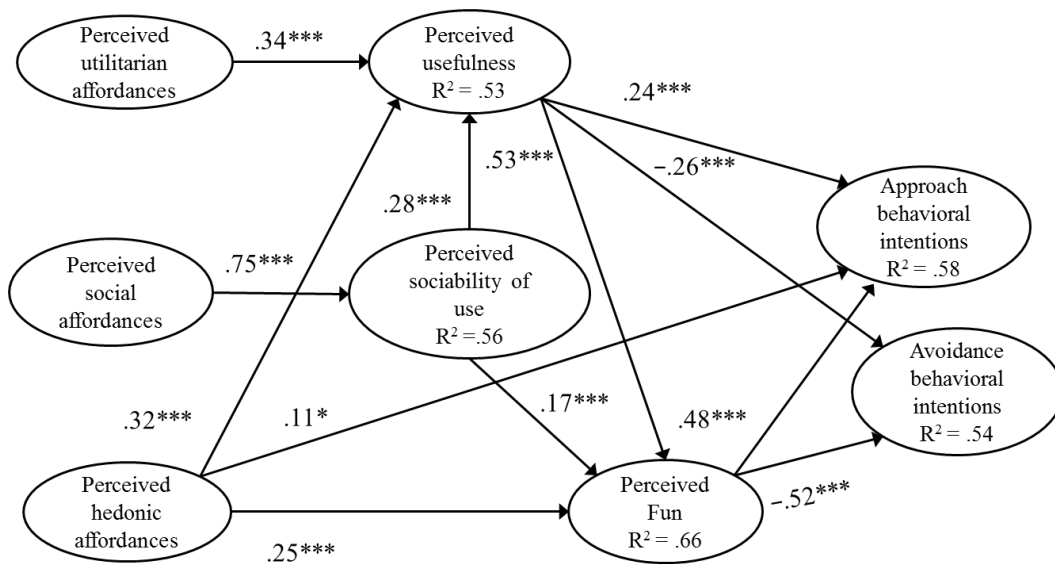
Note. All path coefficients are standardized, bootstrapping with 5000 samples, 360 bootstrap cases.
Solid line indicates significant path coefficients, and dash line indicates nonsignificant path coefficients.
*p < .05, **p < .01, *** p < .001 (two-tailed)

Figure 22: Revised Structural Model Based on PLS-SEM Analysis

Data analysis suggested no direct effects from perceived social affordances (PSA) to perceived usefulness (PU) or perceived fun (PF), from perceived sociability of use (PSOU) to approach behavioral intentions (APP) or avoidance behavioral intentions (AVD). The empirical model reveals that the effects of two process-based evaluations–PUA and PSA–were fully mediated by corresponded outcome-based evaluations, PU and PSOU. The full mediating relationships support that process-based and outcome-based evaluations were distinct from each

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other, and these two types of evaluations should be differentiated from each other. Only perceived hedonic affordances (PHA) had a positive direct effect on APP ($\beta = .11$, $p < .05$), but not on AVD, supporting that APP and AVD were affected by different factors. In addition, the significant path between PHA and APP also suggested that primitive affective reactions to shopping environments can directly affect behavioral intentions.

5.3.9 Data Analysis with a Nonlinear Approach

In the sections above, mediation tests were used to explain the reversed sign of path coefficient, and an empirical research model was drafted based on data analysis. In this section, a different approach was used to address this issue.

Most statistical methods in the literature have assumed linear relationships between variables in behavioral science (Hayes & Preacher, 2010; Kock, 2014). The linearity between variables is also undertaken by most of SEM programs. Yet, it is not uncommon that relationships between variables form a U-curve or a S-curve shape in social sciences, which is nonlinear (Kock, 2010). WarpPLS 4.0 is a PLS-SEM software tool that was developed by Kock (2013) and it can identify both linear and nonlinear relationships among variables.

The research model was validated with the linear PLS-SEM program, PLS-Graph 3.0. In this section, the Warp3 regression algorithm provided in WarpPLS4.0 was used to assess three paths with reversed signs (i.e., PSA$\rightarrow$ PU, PSA$\rightarrow$PF, and PSOU$\rightarrow$AVD), and the other paths were still set to be linear. Bootstrap resampling with 999 samples was performed to calculate the significance levels of path coefficients.

Figure 23 shows the analysis results of structural model with WarpPLS 4.0. Unlike the results generated by PLS-Graph 3.0, three paths using Warp3 algorithm have the same sign as

the correlation coefficients between latent constructs. Perceived social affordances (PSA) had a significant positive effect on perceived usefulness (PU) ($\beta = .14$, $p < .05$), supporting H6b. PSA had a positive effect on PF, but this path is nonsignificant ($\beta = .09$, $p = .086$), not supporting H6c. Perceived sociability of use (PSOU) had a significant negative effect on avoidance behavioral intentions (AVD) ($\beta = -.11$, $p < .05$), supporting H11b.
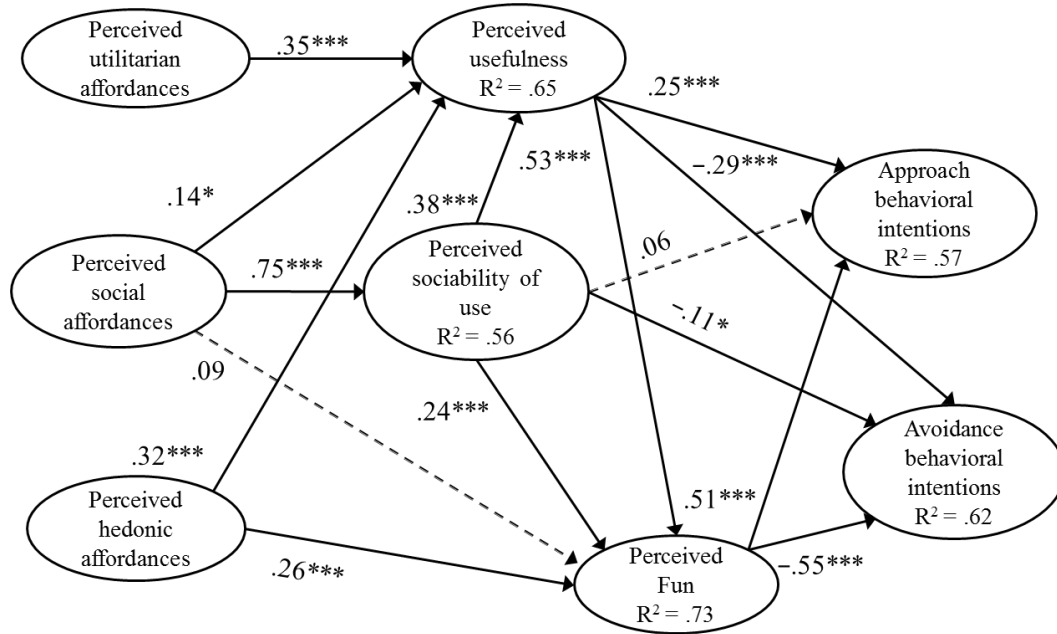

Note. All path coefficients are standardized, bootstrapping with 5000 samples, 360 bootstrap cases.
Solid line indicates significant path coefficients, and dash line indicates non-significant path coefficients.
*p < .05, **p < .01, *** p < .001 (two-tailed)

Figure 23: PLS-SEM Analysis of Research Model (WarpPLS 4.0)

Three plots (Figure 24, Figure 25, and Figure 26) aid understanding of the nonlinear relationships. The blue line in Figure 24 shows a flat S curve (PSA➔PU), indicating the positive effects of PSA on PU was large at the beginning and then decreased. When PSA goes above a certain point, the effects of PSA on PU became larger. The blue line in Figure 25 shows a flat S curve (PSA➔PF), indicating the positive effects of PSA on PF was bigger at the beginning but then the effects got smaller after certain point.
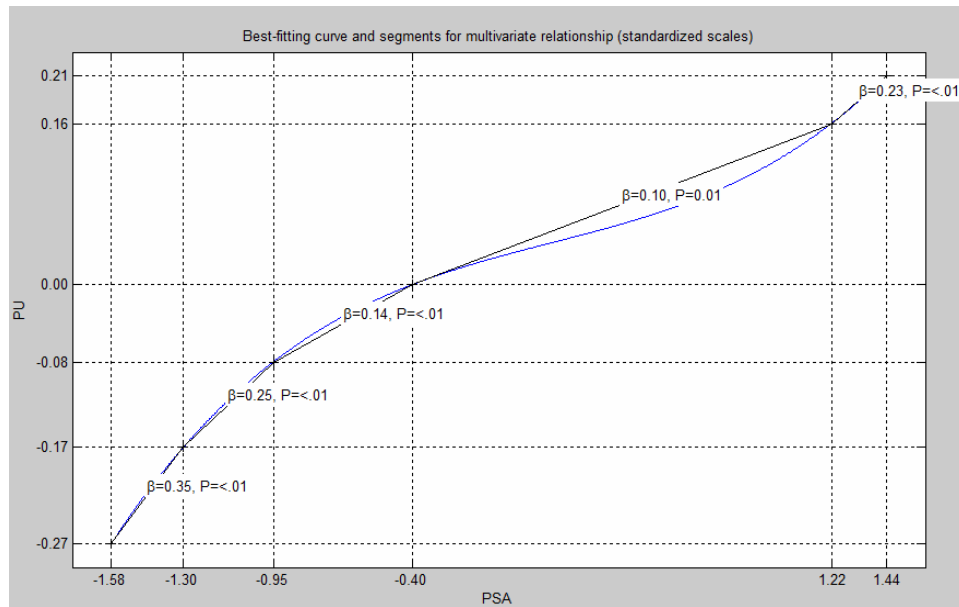
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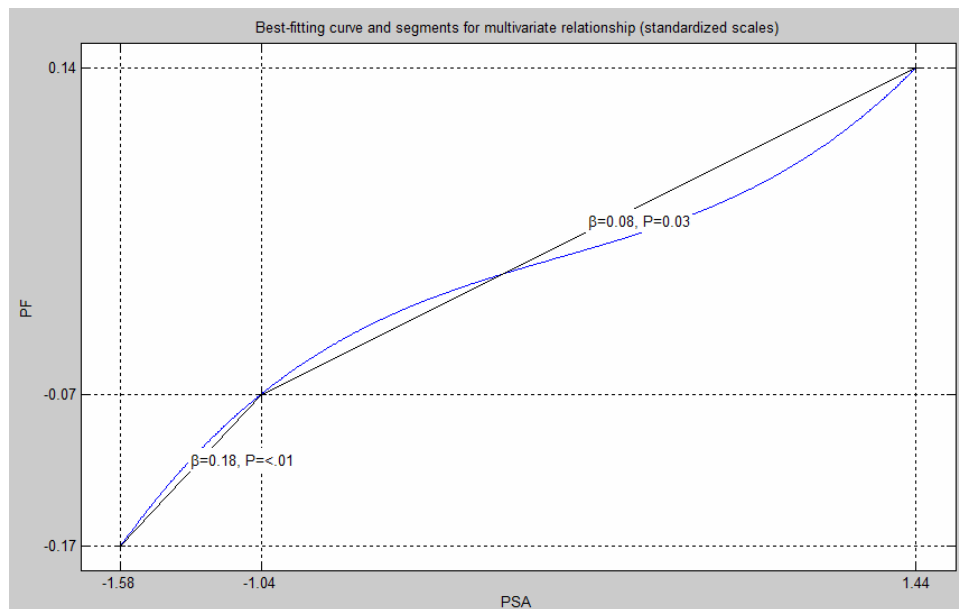**Figure 24: Nonlinear Relationship between PSA and PU**

Figure 25: Nonlinear Relationship between PSA and PF

An interesting nonlinear relationship is shown in Figure 26. The blue curve between PSOU and AVD is similar to a U-shaped curve. As PSOU increased, the AVD decreased.

However, when PSOU reached to a higher level (i.e., *SD* = 1.93), there was an increasing tendency to the intention to avoid.
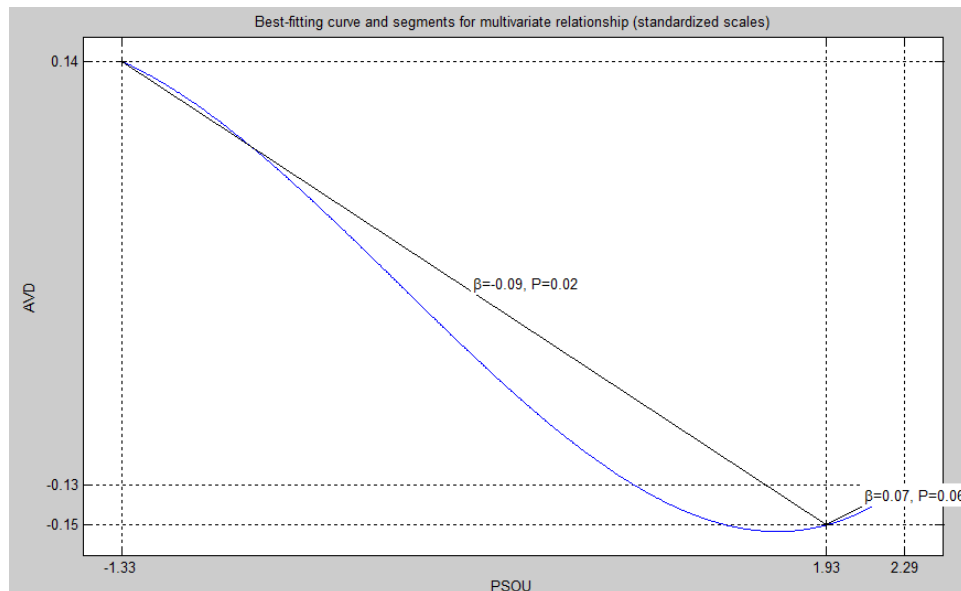

Figure 26: Nonlinear Relationship between PSOU and AVD

5.3.10 Common Method Bias

Common method bias is related to the common method variance, which is attributable to the measurement method rather than to the constructs the measures represent (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Common method variance is usually considered a potential problem in behavioral research because all the measurements are collected by the same method, which constitutes a threat to the analysis if one latent construct accounts for all indicator variables.

Several approaches were used to test common methods variance (CMV). The first one was Harman's single factor test (Podsakoff et al., 2003), because Podsakoff et al. argued that if there is substantial common method influence, "(a) a single factor will emerge from exploratory factor analysis (unrotated) or (b) one general factor will account for the majority of the

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covariance among the measures" (p. 889). An exploratory factor analysis was conducted with 34 items in eight major constructs of interest. More than one factor emerged to explain the variance in this factor analysis (unrotated) and the most variance explained by one factor is 47.91%. This finding indicates that common methods bias is not likely to contaminate the data analysis results.

The second test used a PLS approach documented in IS literature (H. Liang, Saraf, Hu, & Xue, 2007; Wells et al., 2011), which is based on the approach suggested by Podsakoff et al. (2003). One common method factor (CMF) was added to the measurement model, and this common method factor was loaded with all the major constructs' indicators. Because PLS does not allow items to load on more than one construct and does not generate random error statistics, the individual items were first converted to be single-indicator constructs. All major constructs of interest and common method factor became second-order constructs. In this way, the factor loadings between measurement items and latent constructs were converted to be the path coefficients (H. Liang et al., 2007). Finally, a structural model was calculated with all the single-indicator constructs (first-order), major constructs of interest (second-order), and common method factor (second-order). In the structural model, the major constructs of interest have path links to their related single indicator construct, and the common method factor has path links to all the single indicator constructs.

Table 37 shows the assessment results of common method bias. All of the path coefficients (factor loadings) from major constructs to their related measurement items are significant. Only 11 of the 34 paths from the common method factor to the measurement items were significant and were substantially smaller in magnitude than corresponding loading to the related latent construct, providing support that the influences of common method were not

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substantial. Both tests provided evidence that the study results were not affected by common method bias.

Table 37: Analysis Results of Common Method Bias with PLS Approach

Constructs	Items	Factor Path/ Loading (Major construct)	Factor Squared Loading(R^2)	Method Path/ Loading (CMF)	Method Squared Loading(R^2)
Perceived utilitarian affordances	PUA1	.956***	.914	−.096**	.009
	PUA2	.958***	.918	−.051	.003
	PUA3	.983***	.966	−.066**	.004
	PUA5	.848***	.719	−.027	.001
	PUA7	.582***	.339	.283***	.080
Perceived hedonic affordances	PHA3	.839***	.704	.040	.002
	PHA4	.751***	.564	.021	.000
	PHA5	1.008***	1.016	−.145***	.021
	PHA6	.790***	.624	.093*	.009
Perceived social affordances	PSA4	.974***	.949	−.019	.000
	PSA5	.975***	.951	−.026	.001
	PSA6	.943***	.889	.004	.000
	PSA7	.909***	.826	.037	.001
	PSA8	.951***	.904	.005	.000
Perceived usefulness	PU1	.924***	.854	.029	.001
	PU2	.984***	.968	−.047	.002
	PU3	1.040***	1.082	−.096**	.009
	PU4	.777***	.604	.125*	.016
	PU5	.917***	.841	−.001	.000
Perceived fun	PF1	.996***	.992	−.036	.001
	PF2	.891***	.794	.071	.005
	PF3	.948***	.899	.011	.000
	PF4	.990***	.980	−.046	.002
Perceived sociability	PSU1	.788***	.621	.138***	.019
	PSU2	.923***	.852	.002	.000
	PSU3	.872***	.760	.051	.003
	PSU4	1.008***	1.016	−.091***	.008
	PSU5	1.017***	1.034	−.089***	.008
Approach behavioral intentions	APP1	.937***	.878	.014	.000
	APP2	.967***	.935	−.048	.002
	APP3	.904***	.817	.034	.001
Avoidance behavioral intentions	AVD1	.926***	.857	.023	.001
	AVD2	.866***	.750	−.076*	.006
	AVD3	.941***	.885	.053	.009

Note. *p<.05, ** p<.01, *** p <.001

5.4 Summary

This chapter presents the results of card-sorting experiments, two pilot studies, and the main experiment. Atmospheric cues of shopping websites were manipulated in different experimental conditions, and MANOVA tests supported that the variations of atmospheric cues could elicit different degrees of perceived affordances. Shopping websites with more information cues are perceived to have a higher level of utilitarian affordances; shopping websites with high entertainment cues induce a higher level of perceive hedonic affordances; and shopping websites with social cues lead to a higher level of social affordances perceived by consumers.

PLS-SEM analysis confirmed that perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances lead to different outcome-based evaluations. Three outcome-based evaluations—perceived usefulness, perceived fun, and perceived sociability of use—affect approach behavioral intentions and avoidance behavioral intentions in different ways. Mediation analysis revealed that perceived usefulness fully mediated the effects of perceived utilitarian affordances on other variables and that perceived sociability of use fully mediated the effects of perceived social affordances, whereas it does not have a direct effect on behavioral intentions. Two outcome-based evaluations, perceived usefulness and perceived fun, fully mediate the effects of perceived sociability of use on behavioral intentions.

Additionally, this chapter presented PLS-SEM analysis with a nonlinear approach. The results generally overlapped with findings from the linear approach, and the only difference was that the issue of reversed path coefficients no longer existed. The findings indicated some potential for examining relationships between variables with a nonlinear perspective.

Chapter 6: Discussions and Conclusion

This dissertation research was motivated by an increasing interest in online social shopping, and especially how technological features of environments affect consumers' evaluations and behavioral intentions. Extant literature lacks a solid theoretical foundation to explain underlying interaction mechanisms between users and technology-driven environments. By integrating theoretical perspectives, such as stimulus-organism-response framework, the theory of affordances, technology acceptance model, and activity theory, this dissertation attempts to illustrate the interaction mechanisms situated in online social shopping environments. This chapter presents the discussions of finding, limitations, contributions, and lastly, directions for future research.

6.1 Discussions of Findings

Overall, the final outcomes of this dissertation research include (1) a new two-dimensional view of users' evaluations of information technologies: the process-based evaluations and outcome-based evaluations; (2) an instrument for measuring perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances; (3) a confirmed analysis of relationships between approach and avoidance behavioral intentions; and (4) a research model that describes predictive relationships between consumer evaluations and behavioral intentions.

Decomposing users' evaluations of information technologies provides a new perspective in studying human information processing. Process-based evaluations (perceived affordances) describe more primitive assessments and capture the relational attributes between users and

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environments; outcome-based evaluations indicate the summative and concluding assessments of overall experiences. Users may emphasize different aspects when interacting with technologies, whether the process of using the technology seem intuitive and indicates possibilities for various actions, or the overall experience of using the technology seems useful, fun, or social.

The research findings show that the effects of process-based evaluations are mostly mediated by outcome-based evaluations. The distinctions between process-based and outcome-based evaluations are consistent with some arguments raised by researchers on affect and cognition interaction. For instance, Berkowitz (1993) proposed that low-order reactions and higher-order reactions happen in sequence when an individual is exposed to a stimulus: firstly an automatic primitive affective reaction, then a deliberative, higher-order cognitive processing, and finally a conclusive, higher-order affective evaluation, which may finally result in action tendencies.

An instrument that measures three dimensions of perceived affordances was developed and validated. Perceived affordances describe the connections between users and their designated objects when interacting with technology-enabled shopping environments. The extant conceptualization proposes three major objects online social shopping environments: information, self-experience, and other people.

This research extended the discussion on approach and avoidance behavioral intentions. The research findings confirmed that approach and avoidance behavioral intentions were not two ends of the same continuum, but form an angle of approximate 135 degrees. This implies that approach and avoidance behaviors may be triggered by different factors. For instance, the empirical data analysis reveals that perceived hedonic affordances directly impact consumers'

approach behavioral intentions, but do not have a direct effect on consumers' avoidance behavioral intentions.

The research findings confirmed the research model in general. Consistent with the stimulus-organism-response framework and technology acceptance model, affective evaluations (i.e. perceived fun) and cognitive evaluations (i.e. perceived usefulness) are significant predictors of behavioral intentions. Compared to these two types of evaluations, PLS-SEM analysis with a linear approach generated reversed path links. The following mediation tests revealed that the effects of social evaluations (i.e., perceived sociability of use) on behavioral intentions were fully mediated by the other two evaluations. These findings are in line with prior research that affective and cognitive evaluations are two major human information processing systems, whereas the social aspect of evaluations affect behavioral intentions through affective reactions (Junglas et al., 2013).

A PLS-SEM analysis with a nonlinear approach did not output any reversed path links. Perceived social affordances had a moderately positive effect on perceived usefulness and perceived fun, and perceived sociability of use had a moderately negative effect on consumers' avoidance behavioral intentions. These contradictory signs of three path coefficients from linear and nonlinear approaches deserve further discussion.

Conceptually, research on the influences of social elements in technology-driven environments is fairly novel, and thus the relationships between social elements and human reactions are underinvestigated. Most research using quantitative methods takes the assumption of linear relationships. However, it is possible that in some circumstances, the social elements could be overwhelming and lead to counteractive effects. It is also likely that some hidden variables not covered in this research moderate the effects of social elements.

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Methodologically, compared to programs using linear algorithms, the PLS-SEM program using nonlinear algorithms is relatively new, increasing the challenge to interpret results of nonlinear analysis.

6.2 Limitations

Several limitations should be considered when interpreting and generalizing the research findings. The experiment subjects were all Amazon Mechanical Turk (MTurk) workers, who live in the United States. It is possible that consumers who do not work in MTurk have different perceptions of online shopping activities. On average, these subjects were familiar with online purchasing and social media, and may still be representative of the general population of online consumers. The experiment context was set to be gift shopping, and the generalizability of research findings may be affected when applying to different contexts.

The subjects participated in the experiment with their own computer devices. Although the research platform restricted subjects to participate through desktops or laptops, individual website download speed was not controlled. Consumers might have experienced different loading speed, which has been confirmed to be an important factor for website quality assessment (Galletta, Henry, McCoy, & Polak, 2006; Wells et al., 2011). The experiment websites were developed from scratch, and they were not as sophisticated as commercial websites. The introduction of a baseline website helped to set up a benchmark for the subjects' evaluations, but it was still possible that some subjects might relate to their prior experiences with more well-developed shopping websites.

Additionally, this research particularly focused on consumers' behavioral intentions. Although behavioral intentions can largely predict consumers' actual behaviors, the research finding would provide more insights if both intention and behavioral data could be collected and compared. However, the website builder, Wix.com, does not support functions, such as event-tracking or click-through data collection. Future studies may address this question by using different platforms.

6.3 Contributions

This dissertation makes several significant contributions to user behaviors toward information technologies in general and consumer behavior in technology-driven environments in particular.

This research refined the scope of online social shopping and integrated several bodies of work to expand the understanding how atmospheric cues affect consumer behaviors in online social shopping environments. This dissertation leads to new directions for investigating users' evaluations of technology-enabled environments. As noted at the beginning of this dissertation, this research aimed to fill in several gaps in the literature.

This research extended the concept of perceived affordances by proposing three dimensions—perceived utilitarian affordances, perceived hedonic affordances, and perceived social affordances—providing a more enlightened understanding of affordances of technology-driven environments. The use of S-O-R framework and activity theory allows for a theoretically justified interpretation of perceived affordances. Employing the notion of affordances presents an enriched understanding of the underlying mechanism between technological features and consumers' reactions. Overall, this study developed a theoretical model that is tightly linked to

the phenomenon being studied and is grounded in multiple theories. Results of the empirical study generally validated the research model and yielded some interesting findings.

Methodologically, prior studies on online social shopping primarily focused on descriptive analysis and conceptual development. This experimental study implemented manipulations to design features of shopping websites and directly examined the effects of environmental stimuli on consumers' beliefs and behavioral intentions. The design of this research also answered the call for experiment studies on consumer behavior research by Darley et al. (2010). Additionally, this research applied linear and nonlinear statistical methods in validating the research model. The contradictory findings suggested some directions for future research, conceptually and methodologically, and call for more work to enhance interpretations of nonlinear relationships between variables.

The research findings also generate some practical implications. The results support that incorporating social cues positively associate with perceived social affordances and then satisfy their social desire as well as enhance social connectedness. However, satisfying the social desire should eventually make consumers feel using the website is useful and fun. In other words, including social features should not be a single add-on of social media icons, the value of social features rise from the improvement of knowledge of product or services. Therefore, when designing social features, designers should think how those features can actually lead to their improvement of product knowledge and help with the shopping process, such as encourage consumers to share their actual experiences of products or provide real-time notifications along with product details for consumers to their friends. In addition, the nonlinear PLS-SEM analysis indicated a U-curve relationship between perceived sociability of use and avoidance behavioral intentions, that is, overly application of social elements in shopping websites could lead to some

reactance intention from consumers. Therefore, merchants or designers should seek a balance when implementing social features to online shopping websites.

6.4 Future Research

How technology-driven environments affect users' evaluations and behavioral intentions, while continuously receiving attention from information systems researchers and HCI researchers, is a topic that still deserves more research investigations to achieve an adequate understanding. Online social shopping is a new trend that integrates shopping and social activities within the same technology-enabled platform. Situated in the context of online social shopping, this research attempted to reveal the underlying interaction mechanisms between atmospheric cues (stimuli) and consumers' reactions.

Although the notion of affordances has been used in human-computer interaction research to explain the interactions, very few studies operationalize affordances in empirical studies. Perceived affordances are decomposed into three dimensions that relate to users' designated objects when using the information technology. This research only focuses on the aid aspect of affordances. However, the other side, obstacles or the lack of affordances could be an interesting direction for future research.

The idea of process-based and outcome-based evaluations can be extended to other research contexts. It is interesting to recognize that consumers' reactions to atmospheric cues tend to relate to the process or the outcome. Applying this research model in different contexts could further validate the rigorousness. This research model could also be applicable in other social-oriented environments, such as social virtual world, social networking sites. In addition to the desktop-based B2C e-commerce, the mobile-based B2C e-commerce has emerged to be a big

potential market. Therefore, future research can examine the explanatory power of this research model in the context of mobile-commerce.

In this research design, entertainment cues are restricted to visual appeal, and social cues only focus on the consumer reviews, consumer ratings, and social media linkages. However, other social related elements that are popular in online social shopping websites, such as style board, user profiles, and consumer polls, were not included in this study. Future research could investigate how these features affect consumption experiences. It is notable that this research focuses on one type of social shopping website, the e-commerce website with add-on social features, and it would be interesting to investigate how the research model explains consumer reactions in more social-oriented shopping environments. In addition to behavioral intentions, consumers' actual behavior is also of great interest, so future research can expand the research model to include actual behavioral component. It will also be interesting to conduct a longitudinal study to monitor the progress of consumers' evaluations and behaviors toward online social shopping websites.

References

Abbasi, A., Chen, H. C., & Nunamaker, J. F. (2008). Stylometric Identification in Electronic Markets: Scalability and Robustness. *Journal of Management Information Systems, 25*(1), 49-78. doi: 10.2753/mis0742-1222250103

Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly, 24*(4), 665-694.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. doi: 10.1016/0749-5978(91)90020-t

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology, 22*, 453-474.

Albrechtsen, H., Andersen, H., Bødker, S., & Pejtersen, A. (2001). Affordances in activity theory and cognitive systems engineering. *Retrieved March, 14*, 2006.

Animesh, A., Pinsonneault, A., Yang, S.-B., & Oh, W. (2011). An odyssey into virtual worlds: exploring the impacts of technological and spatial environments on intention to purchase virtual products. *MIS Quarterly, 35*(3), 789-810.

Arnold, M. J., & Reynolds, K. E. (2003). Hedonic shopping motivations. *Journal of Retailing, 79*, 77-95.

Arnold, M. J., & Reynolds, K. E. (2012). Approach and Avoidance Motivation: Investigating Hedonic Consumption in a Retail Setting. *Journal of Retailing, 88*(3), 399-411.

Arora, R. (1982). Validation of an S-O-R Model for Situation, Enduring, and Response Components of Involvement. *Journal of Marketing Research, 19*(4), 505-516. doi: 10.2307/3151723

Babbie, E. (2008). *The basics of social research* (4th ed.). Belmont, CA: Thomson Higher Education.

Babin, B. J., Darden, W. R., & Babin, L. A. (1998). Negative Emotions in Marketing Research: Affect or Artifact? *Journal of Business Research, 42*(3), 271-285. doi: 10.1016/s0148-2963(97)00124-0

Babin, B. J., Darden, W. R., & Griffin, M. (1994). Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value. *Journal of Consumer Research, 20*(4), 644-656.

Bærentsen, K. B., & Trettvik, J. (2002, October 19-23, 2002). *An activity theory approach to affordance.* Paper presented at the Second Nordic Conference on Human-Computer Interaction, Aarhus, Denmark.

Bagozzi, R. P. (1981). Attitudes, intentions, and behavior: A test of some key hypotheses. *Journal of Personality and Social Psychology, 41*(4), 607-627. doi: 10.1037/0022-3514.41.4.607

Bagozzi, R. P., Gopinath, M., & Nyer, P. U. (1999). The role of emotions in marketing. *Journal of the Academy of Marketing Science, 27*(2), 184-206.

Baker, J. (1986). The role of the environment in marketing services: the consumer perspective. *The services challenge: Integrating for competitive advantage*, 79-84.

Baker, J., Grewal, D., & Parasuraman, A. (1994). The influence of store environment on quality inferences and store image. *Journal of the Academy of Marketing Science, 22*(4), 328-339. doi: 10.1177/0092070394224002

Baker, J., Levy, M., & Grewal, D. (1982). An experimental approach to making retail store environmental decisions. *Journal of Retailing, 68*(4), 445-460.

Baker, J., Levy, M., & Grewal, D. (1992). An experimental approach to making retail store environmental decisions. *Journal of Retailing, 68*(4).

Baker, J., Parasuraman, A., Grewal, D., & Voss, G. B. (2002). The Influence of Multiple Store Environment Cues on Perceived Merchandise Value and Patronage Intentions. *Journal of Marketing, 66*(2), 120-141. doi: 10.2307/3203418

Ballantine, P. W., & Fortin, D. R. (2009). The effects of interactivity and product information on consumers' emotional responses to an online retail setting. *International Journal of Internet Marketing and Advertising, 5*(4), 260-271.

Bannon, L. J., & Bødker, S. (1991). Beyond the interface: Encountering artifacts in use. In J. M. Carroll (Ed.), *Designing interaction: Psychology at the human-computer interface* (pp. 227-253). New York, NY: Cambridge University Press.

Barclay, D., Higgins, C., & Thompson, R. (1995). The partial least squares (PLS) approach to causal modeling: Personal computer adoption and use as an illustration. *Technology studies, 2*(2), 285-309.

Barki, H., Titah, R., & Boffo, C. (2007). Information System Use—Related Activity: An Expanded Behavioral Conceptualization of Individual-Level Information System Use. *Information Systems Research, 18*(2), 173-192. doi: 10.2307/23015401

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182. doi: 10.1037/0022-3514.51.6.1173

Batra, R., & Ahtola, O. (1991). Measuring the hedonic and utilitarian sources of consumer attitudes. *Marketing Letters, 2*(2), 159-170. doi: 10.1007/bf00436035

Beaudry, A., & Pinsonneault, A. (2010). The Other Side of Acceptance: Studying the Direct and Indirect Effects of Emotions on Information Technology Use. *MIS Quarterly, 34*(4), 689-710.

Benbasat, I., & Barki, H. (2007). Quo vadis, TAM. *Journal of the Association for Information Systems, 8*(4), 211-218.

Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating Online Labor Markets for Experimental Research: Amazon.com's Mechanical Turk. *Political Analysis, 20*(3), 351-368. doi: 10.1093/pan/mpr057

Berkowitz, L. (1993). Towards a general theory of anger and emotional aggression: Implications of the cognitive-neoassociationistic perspective for the analysis of anger and other emotions. In R. S. Wyer & T. K. S. Jr (Eds.), *Perspectives on anger and emotion* (pp. 1-46). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Bhatnagar, A., Misra, S., & Rao, H. R. (2000). On risk, convenience, and Internet shopping behavior. *Commun. ACM, 43*(11), 98-105. doi: 10.1145/353360.353371

Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *Journal of Marketing, 56*(2), 57-71.

Bloomfield, B. P., Latham, Y., & Vurdubakis, T. (2010). Bodies, Technologies and Action Possibilities When is an Affordance? *Sociology, 44*(3), 415-433.

Boudreau, M.-C., Gefen, D., & Straub, D. W. (2001). Validation in Information Systems Research: A State-of-the-Art Assessment. *MIS Quarterly, 25*(1), 1-16.

boyd, d. m., & Ellison, N. B. (2007). Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210-230. doi: 10.1111/j.1083-6101.2007.00393.x

Bradner, E., Kellogg, W. A., & Erickson, T. (1999). *The adoption and use of 'Babble': A field study of chat in the workplace.* Paper presented at the 6th European Conference on Computer Supported Cooperative Work, Copenhagen, Denmark.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk A New Source of Inexpensive, Yet High-Quality, Data? *Perspectives on Psychological Science, 6*(1), 3-5.

Burton-Jones, A., & Straub, D. W. (2006). Reconceptualizing System Usage: An Approach and Empirical Test. *Information Systems Research, 17*(3), 228-246. doi: doi:10.1287/isre.1060.0096

Cabiddu, F., Carlo, M. D., & Piccoli, G. (2014). Social media affordances: Enabling customer engagement. *Annals of Tourism Research, 48*(0), 175-192.

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1997). Beyond bipolar conceptualizations and measures: The case of attitudes and evaluative space. *Personality and Social Psychology Review, 1*(1), 3-25. doi: 10.1207/s15327957pspr0101_2

Cai, S., & Xu, Y. J. (2011). Designing Not Just for Pleasure: Effects of Web Site Aesthetics on Consumer Shopping Value. *International Journal of Electronic Commerce, 15*(4), 159-187. doi: 10.2753/jec1086-4415150405

Campbell, D. T., Stanley, J. C., & Gage, N. L. (1963). *Experimental and quasi-experimental designs for research*: Houghton Mifflin Boston.

Carver, C. (2006). Approach, avoidance, and the self-regulation of affect and action. *Motivation and Emotion, 30*(2), 105-110. doi: 10.1007/s11031-006-9044-7

Chang, H. H., & Chen, S. W. (2008). The impact of online store environment cues on purchase intention: Trust and perceived risk as a mediator. *Online Information Review, 32*(6), 818-841.

Chemero, A. (2003). An outline of a theory of affordances. *Ecological Psychology, 15*(2), 181-195.

Chen, Q., & Wells, W. D. (1999). Attitude toward the Site. *Journal of Advertising Research, 39*(5), 27-37.

Cheung, C. M. K., Chan, G. W. W., & Limayem, M. (2005). A critical review of online consumer behavior: empirical research. *Journal of Electronic Commerce in Organizations, 3*(4), 1-19.

Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing, 77*(4), 511-535.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research, 295*(2), 295-336.

Chin, W. W. (2001). PLS-Graph user's guide. *CT Bauer College of Business, University of Houston, USA*.

Chiu, C.-M., Hsu, M.-H., & Wang, E. T. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems, 42*, 1872-1888.

Chu, J., Arce-Urriza, M., Cebollada-Calvo, J.-J., & Chintagunta, P. K. (2010). An Empirical Analysis of Shopping Behavior Across Online and Offline Channels for Grocery Products: The Moderating Effects of Household and Product Characteristics. *Journal of Interactive Marketing, 24*(4), 251-268. doi: http://dx.doi.org/10.1016/j.intmar.2010.07.004

Clark, W. R., Ezell, J., Clark, J., & Sheffield, D. N. (2009). Stay or leave: Applying Approach-avoidance theory to virtual environments. *Journal of Database Marketing & Customer Strategy Management, 16*(4), 231-240.

Clemons, E. K., & Madhani, N. (2010). Regulation of Digital Businesses with Natural Monopolies or Third-Party Payment Business Models: Antitrust Lessons from the

Analysis of Google. *Journal of Management Information Systems, 27*(3), 43-80. doi: 10.2753/mis0742-1222270303

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, J. (1992a). A power primer. *Psychological Bulletin, 112*(1), 155-159. doi: 10.1037/0033-2909.112.1.155

Cohen, J. (1992b). Statistical Power Analysis. *Current Directions in Psychological Science, 1*(3), 98-101.

Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 189-211.

comScore. (2014). comScore Forecasts 16 Percent Growth to $61 Billion in 2014 U.S. Holiday E-Commerce Spending on Desktop and Mobile.   Retrieved November 23, 2014, from https://www.comscore.com/Insights/Press-Releases/2014/11/comScore-Forecasts-16-Percent-Growth-to-61-Billion-Dollar-in-2014-US-Holiday-E-Commerce-Spending

Cox III, E. P. (1980). The optimal number of response alternatives for a scale: A Review. *Journal of Marketing Research, 17*(4), 407-422.

Crawford, L. E., & Cacioppo, J. T. (2002). Learning Where to Look for Danger: Integrating Affective and Spatial Information. *Psychological Science (Wiley-Blackwell), 13*(5), 449-453.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, Carlifonia: Sage Publications, Incorporated.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*(4), 281-302. doi: 10.1037/h0040957

Curty, R., & Zhang, P. (2013). Evaluating The Website Features That Gave Rise To Social Commerce. *Electronic Commerce Research and Applications*.

Cyr, D., Hassanein, K., Head, M., & Ivanov, A. (2007). The role of social presence in establishing loyalty in e-Service environments. *Interacting with Computers, 19*(1), 43-56. doi: 10.1016/j.intcom.2006.07.010

Cyr, D., Head, M., Larios, H., & Pan, B. (2009). Exploring human images in website design: a multi-method approach. *MIS Quarterly, 33*(3).

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Darley, W. K., Blankson, C., & Luethge, D. J. (2010). Toward an integrated framework for online consumer behavior and decision making process: A review. *Psychology and Marketing, 27*(2), 94-116. doi: 10.1002/mar.20322

Davidson, R. J. (1998). Anterior electrophysiological asymmetries, emotion, and depression: Conceptual and methodological conundrums. *Psychophysiology, 35*(5), 607-614.

Davidson, R. J., Ekman, P., Saron, C. D., Senulis, J. A., & Friesen, W. V. (1990). Approach-withdrawal and cerebral asymmetry: Emotional expression and brain physiology: I. *Journal of Personality and Social Psychology, 58*(2), 330-341. doi: 10.1037/0022-3514.58.2.330

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*(3), 319-340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science, 35*(8), 982-1003.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. *Journal of Applied Social Psychology, 22*(14), 1111-1132. doi: 10.1111/j.1559-1816.1992.tb00945.x

Davis, F. D., & Venkatesh, V. (2004). Toward preprototype user acceptance testing of new information systems: implications for software project management. *Engineering Management, IEEE Transactions on, 51*(1), 31-46.

Davis, L., Wang, S., & Lindridge, A. (2008). Culture influences on emotional responses to on-line store atmospheric cues. *Journal of Business Research, 61*(8), 806-812.

Dawes, J. (2008). Do data characteristics change according to the number of scale points used. *International journal of market research, 50*(1), 61-77.

de Guinea, A. O., & Markus, M. L. (2009). Why Break the Habit of a Lifetime? Rethinking the Roles of Intention, Habit, and Emotion in Continuing Information Technology Use. *MIS Quarterly, 33*(3), 433-444.

Degeratu, A. M., Rangaswamy, A., & Wu, J. (2000). Consumer choice behavior in online and traditional supermarkets: The effects of brand name, price, and other search attributes.

International Journal of Research in Marketing, 17(1), 55-78. doi: http://dx.doi.org/10.1016/S0167-8116(00)00005-7

DeLone, W. H., & McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research, 3*(1), 60-95. doi: 10.2307/23010781

DeLone, W. H., & McLean, E. R. (2004). Measuring e-commerce success: Applying the DeLone & McLean information systems success model. *International Journal of Electronic Commerce, 9*(1), 31-47. doi: 10.2307/27751130

Demangeot, C., & Broderick, A. J. (2007). Conceptualising consumer behaviour in online shopping environments. *International Journal of Retail & Distribution Management, 35*(11), 878-894.

Demangeot, C., & Broderick, A. J. (2010). Consumer perceptions of online shopping environments: A gestalt approach. *Psychology & Marketing, 27*(2), 117-140.

Deng, L., & Poole, M. S. (2010). Affect in web interfaces: A study of the impacts of web page visual complexity and order. *MIS Quarterly, 34*(4), 711-730.

Deng, L., & Poole, M. S. (2012). Aesthetic design of e-commerce web pages - Webpage Complexity, Order and preference. *Electronic Commerce Research and Applications, 11*(4), 420-440. doi: 10.1016/j.elerap.2012.06.004

Dennis, C., Morgan, A., Wright, L. T., & Jayawardhena, C. (2010). The influences of social e-shopping in enhancing young women's online shopping behaviour. *Journal of Customer Behaviour, 9*(2), 151-174.

Dholakia, U. M., Bagozzi, R. P., & Pearo, L. K. (2004). A social influence model of consumer participation in network-and small-group-based virtual communities. *International Journal of Research in Marketing, 21*(3), 241-263.

Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management, 17*(4), 263-282. doi: 10.1111/j.1467-8551.2006.00500.x

Dimoka, A., Banker, R. D., Benbasat, I., Davis, F. D., Dennis, A. R., Gefen, D., . . . Weber, B. (2012). On the use of neurophysiological tools in IS research: Developing a research agenda for NeuroIS. *MIS Quarterly, 36*(3), 679-702.

Donovan, R. J., & Rossiter, J. R. (1982). Store atmosphere: An environmental psychology approach. *Journal of Retailing, 58*, 34-57.

Donovan, R. J., Rossiter, J. R., Marcoolyn, G., & Nesdale, A. (1994). Store atmosphere and purchasing behavior. *Journal of Retailing, 70*(3), 283-294. doi: http://dx.doi.org/10.1016/0022-4359(94)90037-X

Duhachek, A. (2005). Coping: A Multidimensional, Hierarchical Framework of Responses to Stressful Consumption Episodes. *Journal of Consumer Research, 32*(1), 41-53. doi: 10.1086/426612

Eisenbeiss, M., Blechschmidt, B., Backhaus, K., & Freund, P. A. (2012). "The (Real) World Is Not Enough:" Motivational Drivers and User Behavior in Virtual Worlds. *Journal of Interactive Marketing, 26*(1), 4-20. doi: http://dx.doi.org/10.1016/j.intmar.2011.06.002

Elliot, A. (2006). The Hierarchical Model of Approach-Avoidance Motivation. *Motivation and Emotion, 30*(2), 111-116.

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The Benefits of Facebook "Friends:" Social Capital and College Students' Use of Online Social Network Sites. *Journal of Computer-Mediated Communication, 12*(4), 1143-1168. doi: 10.1111/j.1083-6101.2007.00367.x

Engel, J. F., Kollat, D. T., & Blackwell, R. D. (1978). *Consumer behavior* (3rd ed.). Hinsdale, IL: Dryden.

Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2001). Atmospheric qualities of online retailing: A conceptual model and implications. *Journal of Business Research, 54*(2), 177-184.

Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2003). Empirical testing of a model of online store atmospherics and shopper responses. *Psychology & Marketing, 20*(2), 139-150.

Éthier, J., Hadaya, P., Talbot, J., & Cadieux, J. (2006). B2C web site quality and emotions during online shopping episodes: an empirical study. *Information & Management, 43*(5), 627-639.

Everard, A., & Galletta, D. F. (2005). How Presentation Flaws Affect Perceived Site Quality, Trust, and Intention to Purchase from an Online Store. *Journal of Management Information Systems, 22*(3), 55-95.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological methods, 4*(3), 272.

Facebook. (2014). Facebook Newsroom.   Retrieved Aug. 12, 2014, from http://newsroom.fb.com/company-info/

Felix, R. (2011). The impact of scale width on responses for multi-item, self-report measures. *Journal of Targeting, Measurement and Analysis for Marketing, 19*(3-4), 153-164. doi: http://dx.doi.org/10.1057/jt.2011.16

Finset, A., Steine, S., Haugli, L., Steen, E., & Laerum, E. (2002). The Brief Approach/Avoidance Coping Questionnaire: development and validation. *Psychology, Health & Medicine, 7*(1), 75-85.

Fiore, A. M., & Jin, H.-J. (2003). Influence of image interactivity on approach responses towards an online retailer. *Internet Research, 13*(1), 38-48.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Folkman, S., Lazarus, R. S., Gruen, R. J., & DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology, 50*(3), 571-579. doi: 10.1037/0022-3514.50.3.571

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18*(1), 39-50.

Fulgoni, G., Lipsman, A., & Essling, I. (2014). State of the U.S. Online Retail Economy in Q3 2014.   Retrieved November 23, 2014, from https://www.comscore.com/Insights/Presentations-and-Whitepapers/2014/State-of-the-US-Online-Retail-Economy-in-Q3-2014

Galletta, D. F., Henry, R. M., McCoy, S., & Polak, P. (2006). When the wait isn't so bad: The interacting effects of website delay, familiarity, and breadth. *Information Systems Research, 17*(1), 20-37.

Gamst, G., Meyers, L. S., & Guarino, A. (2008). *Analysis of variance designs: A conceptual and computational approach with SPSS and SAS*: Cambridge University Press.

Gaver, W. W. (1991). *Technology affordances*. Paper presented at the Proceedings of the
SIGCHI conference on Human factors in computing systems: Reaching through
technology, New Orleans, Louisiana, United States.

Gaver, W. W. (1992). *The affordances of media spaces for collaboration*. Paper presented at the
Proceedings of the 1992 ACM conference on Computer-supported cooperative work,
Toronto, Ontario, Canada.

Gaver, W. W. (1996). Situating action II: Affordances for interaction: The social is material for
design. *Ecological Psychology, 8*(2), 111-129.

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in Online Shopping: An
Integrated Model. *MIS Quarterly, 27*(1), 51-90.

Gefen, D., & Straub, D. W. (2000). Structural equation modeling and regression: Guidelines for
research practice. *Communications of the ACM, 4*(October), 1-77.

Gefen, D., & Straub, D. W. (2004). Consumer trust in B2C e-Commerce and the importance of
social presence: experiments in e-Products and e-Services. *Omega, 32*(6), 407-424. doi:
10.1016/j.omega.2004.01.006

Gibbs, J. L., Rozaidi, N. A., & Eisenberg, J. (2013). Overcoming the "Ideology of Openness":
Probing the Affordances of Social Media for Organizational Knowledge Sharing. *Journal
of Computer-Mediated Communication, 19*(1), 102-120. doi: 10.1111/jcc4.12034

Gibson, J. J. (1977). The theory of affordances *An ecological approach to visual perception*:
Houghton-Mifflin Co.

Gibson, J. J. (1979). *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Goodhue, D. L., Lewis, W., & Thompson, R. (2012). Comparing PLS to regression and LISREL:
A response to Marcoulides, Chin, and Saunders. *MIS Quarterly, 36*(3), 703-A710.

Goodhue, D. L., & Thompson, R. L. (1995). Task-Technology Fit and Individual-Performance.
MIS Quarterly, 19(2), 213-236.

Goswami, S., Tan, C.-H., & Teo, H.-H. (2007, July 2007). *Exploring the Website Features that
can Support Online Collaborative Shopping?* Paper presented at the 11th of Annual
Pacific-Asia Conference on Information Systems, Auckland, New Zealand.

Grange, C., & Benbasat, I. (2010, 5-8 Jan.). *Online Social Shopping: The Functions and Symbols of Design Artifacts.* Paper presented at the 43rd Hawaii International Conference on System Sciences

Grange, C., & Benbasat, I. (2011). *A guiding framework for developing theories investigating the design drivers of IT use and value.* Paper presented at the JAIS Theory Development Workshop.

Gregor, S., Lin, A. C. H., Gedeon, T., Riaz, A., & Zhu, D. (2014). Neuroscience and a Nomological Network for the Understanding and Assessment of Emotions in Information Systems Research. *Journal of Management Information Systems, 30*(4), 13-48. doi: 10.2753/MIS0742-1222300402

Gupta, S., & Kim, H.-W. (2007). The moderating effect of transaction experience on the decision calculus in on-line repurchase. *International Journal of Electronic Commerce, 12*(1), 127-158.

Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of Business Research, 62*(5), 565-571. doi: http://dx.doi.org/10.1016/j.jbusres.2008.06.016

Ha, Y., & Lennon, S. J. (2010). Online visual merchandising (VMD) cues and consumer pleasure and arousal: Purchasing versus browsing situation. *Psychology & Marketing, 27*(2), 141-165.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *The Journal of Marketing Theory and Practice, 19*(2), 139-152.

Hajli, M. (2012). An Integrated Model for E-commerce Adoption at the Customer Level with the Impact of Social Commerce. *International Journal of Information Science and Management*(May), 77-97.

Harrison, G. W., & List, J. A. (2004). Field Experiments. *Journal of Economic Literature, 42*(4), 1009-1055.

Hartson, R. (2003). Cognitive, physical, sensory, and functional affordances in interaction design. *Behaviour & Information Technology, 22*, 315-338. doi: 10.1080/01449290310001592587

Hartwick, J., & Barki, H. (1994). Explaining the role of user participation in information system use. *Management Science, 40*(4), 440-465.

Hassanein, K., & Head, M. (2005). The Impact of Infusing Social Presence in the Web Interface: An Investigation across Product Types. *International Journal of Electronic Commerce, 10*(2), 31-55.

Hassanein, K., & Head, M. (2007). Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping. *International Journal of Human-Computer Studies, 65*(8), 689-708. doi: 10.1016/j.ijhcs.2006.11.018

Hausman, A. V., & Siekpe, J. S. (2009). The effect of web interface features on consumer online purchase intentions. *Journal of Business Research, 62*(1), 5-13. doi: 10.1016/j.jbusres.2008.01.018

Havlena, W. J., & Holbrook, M. B. (1986). The Varieties of Consumption Experience: Comparing Two Typologies of Emotion in Consumer Behavior. *Journal of Consumer Research, 13*(3), 394-404.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*(4), 408-420.

Hayes, A. F., & Preacher, K. J. (2010). Quantifying and testing indirect effects in simple mediation models when the constituent paths are nonlinear. *Multivariate Behavioral Research, 45*(4), 627-660. doi: 10.1080/00273171.2010.498290

Heinonen, K. (2011). Consumer activity in social media: Managerial approaches to consumers' social media behavior. *Journal of Consumer Behaviour, 10*(6), 356-364. doi: 10.1002/cb.376

Heller, W. (1993). Neuropsychological mechanisms of individual differences in emotion, personality, and arousal. *Neuropsychology, 7*(4), 476-489. doi: 10.1037/0894-4105.7.4.476

Hernández, B., Jiménez, J., & Martín, M. J. (2011). Age, gender and income: do they really moderate online shopping behaviour? *Online Information Review, 35*(1), 113-133.

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic Consumption: Emerging Concepts, Methods and Propositions. *Journal of Marketing, 46*(3), 92-92.

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: consumer fantasies, feelings, and fun. *Journal of Consumer Research, 9*(2), 132-140.

Holden, R. J., & Karsh, B.-T. (2010). The technology acceptance model: its past and its future in health care. *Journal of Biomedical Informatics, 43*(1), 159-172.

Holzwarth, M., Janiszewski, C., & Neumann, M. M. (2006). The Influence of Avatars on Online Consumer Shopping Behavior. *Journal of Marketing, 70*(4), 19-36. doi: 10.2307/30162112

Hong, W., Thong, J. Y. L., & Tam, K. Y. (2004). Designing product listing pages on e-commerce websites: an examination of presentation mode and information format. *International Journal of Human-Computer Studies, 61*(4), 481-503. doi: 10.1016/j.ijhcs.2004.01.006

Horton, J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The online laboratory: Conducting experiments in a real labor market. *Experimental Economics, 14*(3), 399-425.

Hsiao, K.-L., Lin, J. C.-C., Wang, X.-Y., Lu, S.-P., & Yu, H. (2010). Antecedents and consequences of trust in online product recommendations: An empirical study in social shopping. *Online Information Review, 34*(6), 935-953.

Hsiao, S.-W., Hsu, C.-F., & Lee, Y.-T. (2012). An online affordance evaluation model for product design. *Design Studies, 33*(2), 126-159. doi: 10.1016/j.destud.2011.06.003

Hu, H., & Jasper, C. R. (2006). Social cues in the store environment and their impact on store image. *International Journal of Retail & Distribution Management, 34*, 25-48. doi: 10.1108/09590550610642800

Huang, M.-H. (2000). Information load: its relationship to online exploratory and shopping behavior. *International Journal of Information Management, 20*(5), 337-347.

Huang, M.-H. (2003). Modeling virtual exploratory and shopping dynamics: an environmental psychology approach. *Information & Management, 41*(1), 39-47.

Huang, Z., & Benyoucef, M. (2013). From e-commerce to social commerce: a close look at design features. *Electronic Commerce Research and Applications, In Press*.

Hui, K.-L., Teo, H. H., & Lee, S.-Y. T. (2007). The Value of Privacy Assurance: An Exploratory Field Experiment. *MIS Quarterly, 31*(1), 19-33. doi: 10.2307/25148779

Iivari, J. (2014). Perceived Sociability of Use and Individual Use of Social Networking Sites–A Field Study of Facebook Use in the Arctic. *1*(1), 23-53.

Ipeirotis, P. (2010). Demographics of mechanical turk.

Ittelson, W. H., Proshansky, H. M., Rivlin, L. G., Winkel, G. H., & Dempsey, D. (1974). *An introduction to environmental psychology*. Oxford, England: Holt, Rinehart and Winston, Inc.

Jacoby, J. (2002). Stimulus-Organism-Response Reconsidered: An Evolutionary Step in Modeling (Consumer) Behavior. *Journal of Consumer Psychology, 12*(1), 51-57. doi: 10.1207/s15327663jcp1201_05

Jang, S., & Namkung, Y. (2009). Perceived quality, emotions, and behavioral intentions: Application of an extended Mehrabian–Russell model to restaurants. *Journal of Business Research, 62*(4), 451-460.

Jarvenpaa, S. L. (1989). The effect of task demands and graphical format on information processing strategies. *Management Science, 35*(3), 285-303. doi: 10.2307/2631973

Jayawardhena, C., & Wright, L. T. (2009). An empirical investigation into e-shopping excitement: antecedents and effects. *European Journal of Marketing, 43*(9/10), 1171-1187.

Jiang, Z. J., & Benbasat, I. (2007). The effects of presentation formats and task complexity on online consumers' product understanding. *MIS Quarterly, 31*(3), 475-500.

Jung, Y., & Pawlowski, S. D. (2014). Virtual goods, real goals: Exploring means-end goal structures of consumers in social virtual worlds. *Information & Management, 51*(5), 520-531.

Junglas, I., Goel, L., Abraham, C., & Ives, B. (2013). The Social Component of Information Systems—How Sociability Contributes to Technology Acceptance. *Journal of the Association for Information Systems, 14*(10), 585-616.

Kalakota, R., & Whinston, A. B. (1997). *Electronic commerce: A manager's guide, *. Reading, MA: Addison-Wesley.

Kang, J., & Park-Poaps, H. (2011a). Motivational Antecedents of Social Shopping for Fashion and its Contribution to Shopping Satisfaction. *Clothing and Textiles Research Journal, 29*(4), 331-347.

Kang, J., & Park-Poaps, H. (2011b). Social Shopping for Fashion: Development and Validation of a Multidimensional Scale. *Family and Consumer Sciences Research Journal, 39*(4), 339-358.

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons, 53*(1), 59-68. doi: http://dx.doi.org/10.1016/j.bushor.2009.09.003

Kaptelinin, V. (2013). Affordances. In M. Soegaard & R. F. Dam (Eds.), *The Encyclopedia of Human-Computer Interaction* (2nd ed.). Aarhus, Denmark: The Interaction Design Foundation.

Kaptelinin, V., & Nardi, B. (2012). *Affordances in HCI: Toward a mediated action perspective*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Austin, Texas, USA.

Kaptelinin, V., & Nardi, B. A. (2006). *Acting with technology: Activity theory and interaction design*: MIT Press.

Karimov, F. P., Brengman, M., & Van Hove, L. (2011). The Effect of Website Design Dimensions on Initial Trust: A Synthesis of The Empirical Literature. *Journal of Electronic Commerce Research, 12*(4), 272-280,282-301. doi: 10.2307/1879431. jstor1879431.

Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *The Public Opinion Quarterly, 37*(4), 509-523.

Kauffman, R. J., & Sougstad, R. (2008). Risk Management of Contract Portfolios in IT Services: The Profit-at-Risk Approach. *Journal of Management Information Systems, 25*(1), 17-48. doi: 10.2753/mis0742-1222250102

Kawaf, F., & Tagg, S. (2012). Online shopping environments in fashion shopping: An S-O-R based review. *Marketing Review, 12*(2), 161-180.

Kenning, P., Plassmann, H., & Ahlert, D. (2007). Applications of functional magnetic resonance imaging for market research. *Qualitative Market Research: An International Journal, 10*(2), 135-152. doi: doi:10.1108/13522750710740817

Keppel, G. (1991). *Design and analysis: A researcher's handbook*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Khalid, H. M., & Helander, M. G. (2006). Customer Emotional Needs in Product Design. *Concurrent Engineering, 14*(3), 197-206. doi: 10.1177/1063293x06068387

Kim, H., Suh, K.-S., & Lee, U.-K. (2013). Effects of collaborative online shopping on shopping experience through social and relational perspectives. *Information & Management, 50*(4), 169-180. doi: http://dx.doi.org/10.1016/j.im.2013.02.003

Kim, J.-E., & Kim, J. (2012). Human factors in retail environments: a review. *International Journal of Retail & Distribution Management, 40*(11), 818-841.

Kim, J., Lee, J., Han, K., & Lee, M. (2002). Businesses as Buildings: Metrics for the Architectural Quality of Internet Businesses. *Information Systems Research, 13*(3), 239-254. doi: 10.1287/isre.13.3.239.79

Kim, S. S., & Malhotra, N. K. (2005). A Longitudinal Model of Continued IS Use: An Integrative View of Four Mechanisms Underlying Postadoption Phenomena. *Management Science, 51*(5), 741-755. doi: 10.1287/mnsc.1040.0326

Kirschner, P., Strijbos, J.-W., Kreijns, K., & Beers, P. (2004). Designing electronic collaborative learning environments. *Educational Technology Research and Development, 52*(3), 47-66. doi: 10.1007/bf02504675

Klein, L. R. (1998). Evaluating the Potential of Interactive Media through a New Lens: Search versus Experience Goods. *Journal of Business Research, 41*(3), 195-203. doi: http://dx.doi.org/10.1016/S0148-2963(97)00062-3

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York, NY: The Guilford Press.

Kock, N. (2010). Using WarpPLS in e-collaboration studies: Mediating effects, control and second order variables, and algorithm choices. *International Journal of E-Collaboration, 6*(4), 1-11.

Kock, N. (2013). WarpPLS 4.0 user manual. *Laredo, TX: ScriptWarp Systems*.

Kock, N. (2014). Advanced mediating effects tests, multi-group analyses, and measurement model assessments in PLS-based SEM. *International Journal of E-Collaboration, 10*(1), 1-13.

Komarov, S., Reinecke, K., & Gajos, K. Z. (2013). *Crowdsourcing performance evaluations of user interfaces*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Paris, France.

Konradt, U., Wandke, H., Balazs, B., & Christophersen, T. (2003). Usability in online shops: scale construction, validation and the influence on the buyers' intention and decision. *Behaviour & Information Technology, 22*(3), 165-174. doi: 10.1080/0144929031000107072

Koo, D. M., & Ju, S. H. (2010). The interactional effects of atmospherics and perceptual curiosity on emotions and online shopping intention. *Computers in Human Behavior, 26*(3), 377-388. doi: 10.1016/j.chb.2009.11.009

Koo, W., & Kim, Y.-K. (2013). Impacts of Store Environmental Cues on Store Love and Loyalty: Single-Brand Apparel Retailers. *Journal of International Consumer Marketing, 25*(2), 94-106.

Korper, S., & Ellis, J. (2001). *The E-commerce Book: Building the E-empire*. London, UK: Morgan Kaufmann.

Kotler, P. (1973). Atmospherics as a marketing tool. *Journal of Retailing, 49*(4), 48-64.

Koufaris, M. (2002). Applying the Technology Acceptance Model and Flow Theory to Online Consumer Behavior. *Information Systems Research, 13*(2), 205-223.

Kreijns, K. (2004). Sociable CSCL environments. Social affordances, sociability, and social presence.

Kreijns, K., Kirschner, P. A., & Jochems, W. (2002). The sociability of computer-supported collaborative learning environments. *Educational Technology & Society, 5*(1), 8-22.

Kreijns, K., Kirschner, P. A., Jochems, W., & van Buuren, H. (2007). Measuring perceived sociability of computer-supported collaborative learning environments. *Computers & Education, 49*(2), 176-192.

Kreijns, K., Kirschner, P. A., & Vermeulen, M. (2013). Social Aspects of CSCL Environments: A Research Framework. *Educational Psychologist, 48*(4), 229-242. doi: 10.1080/00461520.2012.750225

Kuan, K. K. Y., Zhong, Y., & Chau, P. Y. K. (2014). Informational and Normative Social Influence in Group-Buying: Evidence from Self-Reported and EEG Data. *Journal of Management Information Systems, 30*(4), 151-178. doi: 10.2753/MIS0742-1222300406

Kuo, F.-Y., Tseng, C.-Y., Tseng, F.-C., & Lin, C. S. (2013). A Study of Social Information Control Affordances and Gender Difference in Facebook Self-Presentation. *Cyberpsychology, Behavior, and Social Networking, 16*(9), 635-644.

Kuutti, K. (1996). Activity theory as a potential framework for human-computer interaction research. In B. A. Nardi (Ed.), *Context and consciousness: Activity theory and human-computer interaction* (pp. 17-44): The MIT Press.

Lavie, T., & Tractinsky, N. (2004). Assessing dimensions of perceived visual aesthetics of web sites. *International Journal of Human-Computer Studies, 60*(3), 269-298. doi: 10.1016/j.ijhcs.2003.09.002

LeDoux, J. E. (1996). *The Emotional Brain*. New York: Simon & Schuster.

Lee, D., & LaRose, R. (2011). The Impact of Personalized Social Cues of Immediacy on Consumers' Information Disclosure: A Social Cognitive Approach. *Cyberpsychology Behavior and Social Networking, 14*(6), 337-343. doi: 10.1089/cyber.2010.0069

Lee, H.-H., Kim, J., & Fiore, A. M. (2010). Affective and Cognitive Online Shopping Experience: Effects of Image Interactivity Technology and Experimenting With Appearance. *Clothing and Textiles Research Journal, 28*(2), 140-154. doi: 10.1177/0887302x09341586

Lee, I., & Lee, K. (2012). Social shopping promotions from a social merchant's perspective. *Business Horizons, 55*(5), 441-451. doi: http://dx.doi.org/10.1016/j.bushor.2012.04.001

Leitner, P., & Grechenig, T. (2007, December 7-9). *Community driven commerce: design of an integrated framework for social shopping.* Paper presented at the IADIS International Conference e-Commerce, Algarve, Portugal.

Leitner, P., & Grechenig, T. (2008a, June 15-18). *Collaborative shopping networks: Sharing the wisdom of crowds in E-commerce environments.* Paper presented at the 21st BLED 2008 Proceedings, Beld, Slovenia.

Leitner, P., & Grechenig, T. (2008b). *Customer generated content: embedding interactive collaboration tools into e-shops.* Paper presented at the IADIS International Conference e-Commerce, Amsterdam, The Netherlands.

Leont'ev, A. N. (1974). The problem of activity in psychology. *Journal of Russian and East European Psychology, 13*(2), 4-33.

Lewin, K. (1951). *Field theory in social science: Selected theoretical papers*: New York: Harper.

Li, D., Chau, P. Y. K., & Lou, H. (2005). Understanding individual adoption of instant messaging: An empirical investigation. *Journal of the Association for Information Systems, 6*(4), 102-129.

Li, H., Liu, Y., Xu, X., & Heikkila, J. (2013). *Please stay with me! An empirical investigation on hedonic IS continuance model for social network games.* Paper presented at the Thirty Fourth International Conference on Information Systems, Milan, Italy.

Li, M., Jiang, Q., Tan, C.-H., & Wei, K.-K. (2014). Enhancing User-Game Engagement Through Software Gaming Elements. *Journal of Management Information Systems, 30*(4), 115-150. doi: 10.2753/MIS0742-1222300405

Li, N., & Zhang, P. (2006). What makes consumers shop online? In J. Fjermestad & N. C. Romano Jr (Eds.), *Electronic customer relationship management* (Vol. 3, pp. 149-176): M.E. Sharpe publisher.

Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of Enterprise Systems: The Effect of Institutional Pressures and the Mediating Role of Top Management. *MIS Quarterly, 31*(1), 59-87.

Liang, H. G., & Xue, Y. J. (2009). Avoidance of Information Technology Threats: A Theoretical Perspective. *MIS Quarterly, 33*(1), 71-90.

Liang, T.-P., Ho, Y.-T., Li, Y.-W., & Turban, E. (2011). What Drives Social Commerce: The Role of Social Support and Relationship Quality. *International Journal of Electronic Commerce, 16*(2), 69-90.

Liang, T.-P., & Lai, H.-J. (2002). Effect of store design on consumer purchases: an empirical study of on-line bookstores. *Information & Management, 39*(6), 431-444.

Liang, T.-P., & Turban, E. (2011). Introduction to the Special Issue Social Commerce: A Research Framework for Social Commerce. *International Journal of Electronic Commerce, 16*(2), 5-14.

Liang, T. P., Ho, Y. T., Li, Y. W., & Turban, E. (2011). What drives social commerce: The role of social support and relationship quality. *International Journal of Electronic Commerce, 16*(2), 69-90.

Lin, K.-Y., & Lu, H.-P. (2011). Why people use social networking sites: An empirical study integrating network externalities and motivation theory. *Computers in Human Behavior, 27*(3), 1152-1161. doi: http://dx.doi.org/10.1016/j.chb.2010.12.009

Lin, L.-Y., & Chen, C.-S. (2006). The influence of the country-of-origin image, product knowledge and product involvement on consumer purchase decisions: an empirical study of insurance and catering services in Taiwan. *Journal of Consumer Marketing, 23*(5), 248-265.

Lorenzo-Romero, C., Gómez-Borja, M.-Á., & Mollá-Descals, A. (2011). Effects of utilitarian and hedonic atmospheric dimensions on consumer responses in an online shopping environment. *African Journal of Business Management, 5*(21), 8649-8667.

Lowry, P., Gaskin, J., Twyman, N., Hammer, B., & Roberts, T. (2013). Taking "Fun and Games" Seriously: Proposing the Hedonic-Motivation System Adoption Model (HMSAM) to Increase Understanding of Adoption of Hedonically Motivated Systems. *Journal of the Association for Information Systems, 14*(11), 617-671.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*(1), 83-104. doi: 10.1037/1082-989X.7.1.83

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99-128. doi: 10.1207/s15327906mbr3901_4

Majchrzak, A., & Jarvenpaa, S. L. (2010). Safe Contexts for Interorganizational Collaborations Among Homeland Security Professionals. *Journal of Management Information Systems, 27*(2), 55-86. doi: 10.2753/mis0742-1222270202

Majchrzak, A., & Markus, M. L. (2012). Technology Affordances and Constraints in Management Information Systems (MIS). *Encyclopedia of Management Theory,(Ed: E. Kessler), Sage Publications*.

Malhotra, Y., & Galletta, D. F. (1999, Jan. 5-8). *Extending the technology acceptance model to account for social influence: theoretical bases and empirical validation.* Paper presented at the 32nd Hawaii International Conference on System Sciences, Maui, HI.

Markus, M. L., & Silver, M. S. (2008). A Foundation for the Study of IT Effects: A New Look at DeSanctis and Poole's Concepts of Structural Features and Spirit. *Journal of the Association for Information Systems, 9*(10), 609-632.

Markus, T. A. (1967). The function of windows—a reappraisal. *Building Science, 2*(2), 97-121.

Marsden, P. (2009). The 6 dimensions of social commerce: Rated and reviewed. *Psychological Social*. http://socialcommercetoday.com/the-6-dimensions-of-social-commerce-rated-and-reviewed/

Marsden, P. (2010). *Social Commerce: Monetizing Social Media*: GRIN Verlag.

Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavior Research Methods, 44*(1), 1-23. doi: 10.3758/s13428-011-0124-6

Maxwell, S. E., & Delaney, H. D. (2000). *Designing experiments and analyzing data: A model comparison perspective*. New Jersey: Lawrence Erlbaum Associates.

Mazaheri, E., Richard, M. O., Laroche, M., & Ueltschy, L. C. (2014). The influence of culture, emotions, intangibility, and atmospheric cues on online behavior. *Journal of Business Research, 67*(3), 253-259. doi: http://dx.doi.org/10.1016/j.jbusres.2013.05.011

Mcgrenere, J., & Ho, W. (2000, May 2000). *Affordances : Clarifying and Evolving a Concept.* Paper presented at the Graphic Interface, Montreal.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. Cambridge, MA: MIT Press.

Menon, S., & Kahn, B. (2002). Cross-category effects of induced arousal and pleasure on the internet shopping experience. *Journal of Retailing, 78*(1), 31-40. doi: http://dx.doi.org/10.1016/S0022-4359(01)00064-1

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research, 2*(3), 192-222.

Morrison, M., Gan, S., Dubelaar, C., & Oppewal, H. (2011). In-store music and aroma influences on shopper behavior and satisfaction. *Journal of Business Research, 64*(6), 558-564. doi: http://dx.doi.org/10.1016/j.jbusres.2010.06.006

Mudambi, S. M., & Schuff, D. (2010). What makes a helpful online review?A study of consumer reviews on Amazon.com. *MIS Quarterly, 34*(1), 185-200.

Mummalaneni, V. (2005). An empirical investigation of Web site characteristics, consumer emotional states and on-line shopping behaviors. *Journal of Business Research, 58*(4), 526-532. doi: 10.1016/s0148-2963(03)00143-7

Nah, F. F.-H., Eschenbrenner, B., & DeWester, D. (2011). Enhancing brand equity through flow and telepresence: A comparison of 2d and 3d virtual worlds. *MIS Quarterly, 35*(3), 731-A719.

Nelson, P. (1970). Information and Consumer Behavior. *Journal of Political Economy, 78*(2), 311-329.

Nelson, P. (1974). Advertising as Information. *Journal of Political Economy, 82*(4), 729-754. doi: 10.2307/1837143

Neuman, W. L. (2003). *Social research methods: Quantitative and qualitative approaches* (5th ed.). Boston: Allyn and Bacon.

Ng, C. F. (2003). Satisfying shoppers' psychological needs: From public market to cyber-mall. *Journal of Environmental Psychology, 23*(4), 439-455. doi: 10.1016/s0272-4944(02)00102-0

Norman, D. A. (1988). *The Psychology of Everyday Things*. New York: Basic Books.

Norman, D. A. (1999). Affordance, conventions, and design. *Interactions, 6*(3), 38-42.

Novak, T. P., Hoffman, D. L., & Yiu-Fai, Y. (2000). Measuring the customer experience in online environments: A structural modeling approach. *Marketing Science, 19*(1), 22-42.

O' Reilly, T. (2007). What is Web 2.0: Design patterns and business models for the next generation of software. *Communications & Strategies, 65*(1), 17-37.

Ohme, R., Reykowska, D., Wiener, D., & Choromanska, A. (2010). Application of frontal EEG asymmetry to advertising research. *Journal of Economic Psychology, 31*(5), 785-793.

Olbrich, R., & Holsing, C. (2011). Modeling consumer purchasing behavior in social shopping communities with clickstream data. *International Journal of Electronic Commerce, 16*(2), 15-40.

Pagani, M., & Mirabello, A. (2011). The Influence of Personal and Social-Interactive Engagement in Social TV Web Sites. *International Journal of Electronic Commerce, 16*(2), 41-68.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running Experiments on Amazon Mechanical Turk. *Judgment and Decision Making, 5*(5), 411-419.

Parboteeah, D. V., Valacich, J. S., & Wells, J. D. (2009). The Influence of Website Characteristics on a Consumer's Urge to Buy Impulsively. *Information Systems Research, 20*(1), 60-78.

Park, H., & Cho, H. (2012). Social network online communities: information sources for apparel shopping. *The Journal of Consumer Marketing, 29*(6), 400-411.

Park, N., Kee, K. F., & Valenzuela, S. (2009). Being immersed in social networking environment: Facebook groups, uses and grateifications, and social oucomes. *CyberPsychology & Behavior, 12*(6), 729-733.

Parsons, A. G. (2002). Non-functional motives for online shoppers: Why we click. *The Journal of Consumer Marketing, 19*(4/5), 380-392.

Pavlou, P. A. (2003). Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model. *International Journal of Electronic Commerce, 7*(3), 101-134.

Pavlou, P. A., & Fygenson, M. (2006). Understanding and Predicting Electronic Commerce Adoption: An Extension of the Theory of Planned Behavior. *MIS Quarterly, 30*(1), 115-143. doi: 10.2307/25148720

Perdue, B. C., & Summers, J. O. (1986). Checking the success of manipulations in marketing experiments. *Journal of Marketing Research, 23*(4), 317-326.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903.

Porat, T., & Tractinsky, N. (2012). It's a Pleasure Buying Here: The Effects of Web-Store Design on Consumers' Emotions and Attitudes. *Human–Computer Interaction, 27*(3), 235-276.

Preacher, K. J., & Hayes, A. F. (2008a). Assessing mediation in communication research. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *The Sage sourcebook of advanced data analysis methods for communication research* (pp. 13-54). Thousand Oaks, CA: Sage.

Preacher, K. J., & Hayes, A. F. (2008b). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891.

Preece, J. (2001). Sociability and usability in online communities: Determining and measuring success. *Behaviour & Information Technology, 20*(5), 347-356. doi: 10.1080/01449290110084683

Qiu, L., & Benbasat, I. (2005). Online consumer trust and live help interfaces: The effects of text-to-speech voice and three-dimensional avatars. *International Journal of Human-Computer Interaction, 19*(1), 75-94.

Reed, E. S. (1996). *Encountering the world: Toward an ecological psychology*. New York: Oxford University Press.

Reinig, B. A., Briggs, R. O., Shepherd, M. M., Yen, J., & Nunamaker, J. F., Jr. (1995). Affective reward and the adoption of group support systems: Productivity is not always enough. *Journal of Management Information Systems, 12*(3), 171-185. doi: 10.2307/40398196

Richard, M.-O. (2005). Modeling the impact of internet atmospherics on surfer behavior. *Journal of Business Research, 58*(12), 1632-1642. doi: 10.1016/j.jbusres.2004.07.009

Richins, Marsha L. (1997). Measuring Emotions in the Consumption Experience. *Journal of Consumer Research, 24*(2), 127-146. doi: 10.1086/209499

Riedl, R., Banker, R. D., Benbasat, I., Davis, F. D., Dennis, A. R., Dimoka, A., . . . Weber, B. (2010). On the Foundations of NeuroIS: Reflections on the Gmunden Retreat 2009. *Communications of the Association for Information Systems, 27*(1), 243-264.

Robertson, T. S., & Kassarjian, H. H. (1991). *Handbook of Consumer Behavior*. Englewood Cliffs, NJ: Prentice Hall.

Roca, J. C., Chiu, C.-M., & Mart ńez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human-Computer Studies, 64*(8), 683-696.

Rohm, A. J., & Swaminathan, V. (2004). A typology of online shoppers based on shopping motivations. *Journal of Business Research, 57*(7), 748-757. doi: 10.1016/s0148-2963(02)00351-x

Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. *American Psychologist, 41*(7), 813-819.

Rubel, S. (2005). 2006 Trends to Watch Part II: Social Commerce.

Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*, 145-172.

Russell, J. A., & Carroll, J. M. (1999). On the bipolarity of positive and negative affect. *Psychological Bulletin, 125*(1), 3-30. doi: 10.1037/0033-2909.125.1.3

Russell, J. A., & Mehrabian, A. (1978). Approach-Avoidance and Affiliation as Functions of the Emotion-Eliciting Quality of an Environment. *Environment and Behavior, 10*(3), 355-387. doi: 10.1177/0013916578103005

Russell, J. A., & Pratt, G. (1980). A description of the affective quality attributed to environments. *Journal of Personality and Social Psychology, 38*(2), 311-322.

Rust, R. T., & Kannan, P. (2003). E-service: A new paradigm for business in the electronic environment. *Communications of the ACM, 46*(6), 36-42.

Saeed, K. A., Hwang, Y., & Yi, M. Y. (2003). Toward an Integrative Framework for Online Consumer Behavior Research: A Meta-Analysis Approach. *Journal of End User Computing, 15*(4), 1-26. doi: 10.4018/joeuc.2003100101

Sangran, S., Siguaw, J. A., & Guan, C. (2009). A comparative study of motivational differences for online shopping. *ACM SIGMIS Database, 40*(4), 28-42.

Scarpi, D. (2012). Work and Fun on the Internet: The Effects of Utilitarianism and Hedonism Online. *Journal of Interactive Marketing, 26*(1), 53-67. doi: http://dx.doi.org/10.1016/j.intmar.2011.08.001

Scheepers, R., & Middleton, C. (2013). Personal ICT ensembles and ubiquitous information systems environments: Key issues and research implications. *Communications of the Association for Information Systems, 33*(1), 381-392.

Schifter, D. E., & Ajzen, I. (1985). Intention, Perceived Control, and Weight-Loss - an Application of the Theory of Planned Behavior. *Journal of Personality and Social Psychology, 49*(3), 843-851.

Segura, S. L., & González-Romá, V. (2003). How do respondents construe ambiguous response formats of affect items? *Journal of Personality and Social Psychology, 85*(5), 956-968.

Senecal, S., & Nantel, J. (2004). The influence of online product recommendations on consumers' online choices. *Journal of Retailing, 80*(2), 159-169. doi: http://dx.doi.org/10.1016/j.jretai.2004.04.001

Shen, J. (2012). Social comparison, social presence, and enjoyment in the acceptance of social shopping websites. *Journal of Electronic Commerce Research, 13*(3), 198-212.

Shen, J., & Eder, L. B. (2009). Exploring intentions to use virtual worlds for business. *Journal of Electronic Commerce Research, 10*(2), 94-103.

Sherman, E., Mathur, A., & Smith, R. B. (1997). Store Environment and Consumer Purchase Behavior: Mediating Role of Consumer Emotions. *Psychology & Marketing, 14*(4), 361-378.

Singh, R., Yeo, S. E.-L., Lin, P. K., & Tan, L. (2007). Multiple mediators of the attitude similarity-attraction relationship: Dominance of inferred attraction and subtlety of affect. *Basic and Applied Social Psychology, 29*(1), 61-74.

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin, 129*(2), 216-269.

Slyke, C. V., Comunale, C. L., & Belanger, F. (2002). Gender differences in perceptions of web-based shopping. *Commun. ACM, 45*(8), 82-86. doi: 10.1145/545151.545155

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology, 48*(4), 813-838. doi: 10.1037/0022-3514.48.4.813

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological methodology, 13*, 290-312. doi: 10.2307/270723

Sproull, L., & Faraj, S. (1997). Atheism, sex, and databases: The net as a social technology. *Culture of the Internet*, 35-51.

Stephen, A. T., & Toubia, O. (2010). Deriving Value from Social Commerce Networks. *Journal of Marketing Research, 47*(2), 215-228.

Sternthal, B., Tybout, A. M., & Calder, B. J. (1994). Experimental design: generalization and theoretical explanation. In R. P. Bagozzi (Ed.), *Principles of marketing research* (pp. 195-223). Cambridge, MA: Blackwell Publishers.

Stevens, J. (1986). Principal components. *Applied Multivariate Statistics for the Social Sciences. Hillsdale, NJ: Lawrence Erlbaum Associate Publishers*.

Stewart, D. W., & Pavlou, P. A. (2002). From consumer response to active consumer: Measuring the effectiveness of interactive media. *Academy of Marketing Science. Journal, 30*(4), 376-376.

Stokols, D. (1978). Environmental psychology. *Annual Review of Psychology, 29*, 253-295.

Straub, D. W., & Watson, R. T. (2001). Research Commentary: Transformational Issues in Researching IS and Net-Enabled Organizations. *Information Systems Research, 12*(4), 337-345.

Sun, H. (2007). *Towards a better understanding of dynamics of IT use: A new concept of adaptive IT use.* ProQuest.

Sun, H. (2011, July 9-14). *Designing for social commerce experience as cultural consumption.* Paper presented at the Internationalization, Design and Global Development 4th International Conference (IDGD), Orlando, FL, USA.

Sun, H., & Zhang, P. (2006). The role of affect in IS research: A critical survey and a research model. In P. Zhang & D. Galletta (Eds.), *Human-computer interaction and management information systems - Foundations* (Vol. 1, pp. 295-329). Armonk, NY: M. E. Sharpe, Inc.

Suri, S., & Watts, D. J. (2011). Cooperation and contagion in web-based, networked public goods experiments. *PLoS One, 6*(3), e16836.

Sutcliffe, A. G., Gonzalez, V., Binder, J., & Nevarez, G. (2011). Social Mediating Technologies: Social Affordances and Functionalities. *International Journal of Human-Computer Interaction, 27*(11), 1037-1065. doi: 10.1080/10447318.2011.555318

Szajna, B. (1996). Empirical Evaluation of the Revised Technology Acceptance Model. *Management Science, 42*(1), 85-92.

Tauber, E. M. (1972). Why Do People Shop? *Journal of Marketing, 36*(4), 46-49.

Taylor, A. B., MacKinnon, D. P., & Tein, J.-Y. (2008). Tests of the three-path mediated effect. *Organizational Research Methods, 11*(2), 241-269. doi: 10.1177/1094428107300344

Taylor, P., & Hartson, H. R. E. X. (2010). Cognitive , physical , sensory , and functional affordances in interaction design. *Behaviour & Information Technology*. doi: 10.1080/01449290310001592587

Teo, T. S., & Yeong, Y. D. (2003). Assessing the consumer decision process in the digital marketplace. *Omega, 31*(5), 349-363.

Tulving, E., Kapur, S., Craik, F. I. M., Moscovitch, M., & Houle, S. (1994). Hemispheric encoding/retrieval asymmetry in episodic memory: positron emission tomography findings. *Proceedings of the National Academy of Sciences, 91*(6), 2016-2020.

Turban, E., & Gehrke, D. (2000). Determinants of e-commerce website. *Human Systems Management, 19*(2), 111.

Turley, L. W., & Milliman, R. E. (2000). Atmospheric Effects on Shopping Behavior: A Review of the Experimental Evidence. *Journal of Business Research, 49*(2), 193-211.

Turvey, M. T. (1992). Affordances and prospective control: An outline of the ontology. *Ecological Psychology*(4), 173 -187.

Valacich, J. S., Parboteeah, D. V., & Wells, J. D. (2007). THE ONLINE CONSUMER'S HIERARCHY OF NEEDS. *Communications of the ACM, 50*(9), 84-90.

van der Heijden, H. (2003). Factors influencing the usage of websites: the case of a generic portal in The Netherlands. *Information & Management, 40*(6), 541-549. doi: 10.1016/s0378-7206(02)00079-4

van der Heijden, H. (2004). User Acceptance of Hedonic Information Systems. *MIS Quarterly, 28*(4), 695-704. doi: 10.2307/25148660

van Osch, W., & Mendelson, O. (2011). *A typology of affordances: Untangling sociomaterial interactions through video analysis.* Paper presented at the Thirty Second International Conference on Information Systems, Shanghai, China.

van Vugt, H. C., Hoorn, J. F., Konijn, E. A., & Dimitriadou, A. D. (2006). Affective affordances: Improving interface character engagement through interaction. *International Journal of Human-Computer Studies, 64*(9), 874-888.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences, 39*(2), 273-315.

Venkatesh, V., & Brown, S. A. (2001). A longitudinal investigation of personal computers in homes: Adoption determinants and emerging challenges. *MIS Quarterly, 25*(1), 71-102. doi: 10.2307/3250959

Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science, 46*(2), 186-204.

Venkatesh, V., Morris, M. G., Gordon, B. D., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly, 27*(3), 425-478.

Venkatesh, V., Speier, C., & Morris, M. G. (2002). User acceptance enablers in individual decision making about technology: Toward an integrated model. *Decision Sciences, 33*(2), 297-316.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36*(1), 157-178.

Vijayasarathy, L. R. (2004). Predicting consumer intentions to use on-line shopping: the case for an augmented technology acceptance model. *Information & Management, 41*(6), 747-762. doi: 10.1016/j.im.2003.08.011

vom Brocke, J., & Liang, T.-P. (2014). Guidelines for Neuroscience Studies in Information Systems Research. *Journal of Management Information Systems, 30*(4), 211-234. doi: 10.2753/MIS0742-1222300408

Wagner, T., & Rudolph, T. (2010). Towards a hierarchical theory of shopping motivation. *Journal of Retailing and Consumer Services, 17*, 415-429. doi: 10.1016/j.jretconser.2010.04.003

Wakefield, R. L., Wakefield, K. L., Baker, J., & Wang, L. C. (2011). How website socialness leads to website use. *European Journal of Information Systems, 20*(1), 118-132. doi: 10.1057/ejis.2010.47

Wang, C., & Zhang, P. (2012). The Evolution of Social Commerce: An Examination from the People, Business, Technology, and Information Perspective. *Communications of the AIS, 31*, 105-127.

Wang, J.-C., & Chang, C.-H. (2013). How online social ties and product-related risks influence purchase intentions: A Facebook experiment. *Electronic Commerce Research and Applications*.

Wang, Y. J., Minor, M. S., & Wei, J. (2011). Aesthetics and the online shopping environment: Understanding consumer responses. *Journal of Retailing, 87*(1), 46-58.

Watson, L., & Spence, M. T. (2007). Causes and consequences of emotions on consumer behaviour: A review and integrative cognitive appraisal theory. *European Journal of Marketing, 41*(5/6), 487-511.

Wattal, S., Telang, R., & Mukhpadhyay, T. (2009). Information Personalization in a Two-Dimensional Product Differentiation Model. *Journal of Management Information Systems, 26*(2), 69-95. doi: 10.2753/mis0742-1222260204

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249-268. doi: 10.1037/0033-2909.132.2.249

Webster, J., & Martocchio, J. J. (1992). Microcomputer Playfulness: Development of a Measure with Workplace Implications. *MIS Quarterly, 16*(2), 201-226. doi: 10.2307/249576

Weinfurt, K. P. (1995). Multivariate analysis of variance. In L. G. G. P. R. Yarnold (Ed.), *Reading and understanding multivariate statistics* (pp. 245-276). Washington, DC, US: American Psychological Association.

Wells, J. D., Valacich, J. S., & Hess, T. J. (2011). What signal are you sending? How website quality influences perceptions of product quality and purchase intentions. *MIS Quarterly, 35*(2), 373-A318.

Westbrook, R. A. (1987). Product/Consumption-Based Affective Responses and Postpurchase Processes. *Journal of Marketing Research, 24*(3), 258-270. doi: 10.2307/3151636

Whiting, A. (2009). Push, scream, or leave: How do consumers cope with crowded retail stores? *The Journal of Services Marketing, 23*(7), 487-495.

Wigand, R. T., Benjamin, R. I., & Birkland, J. L. H. (2008). *Web 2.0 and beyond: implications for electronic commerce.* Paper presented at the Proceedings of the 10th international conference on Electronic commerce.

Winick, C., & Holt, H. (1961). Seating position as nonverbal communication in group analysis. *Psychiatry, 24*, 171-182.

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research, 16*(1), 85-102. doi: DOI 10.1287/isre.1050.0042

Wolfinbarger, M., & Gilly, M. C. (2001). Shopping Online for Freedom, Control, and Fun. *California Management Review, 43*(2), 34-55.

Wu, C. S., Cheng, F. F., & Yen, D. C. (2008). The atmospheric factors of online storefront environment design: An empirical experiment in Taiwan. *Information & Management, 45*(7), 493-498. doi: 10.1016/j.im.2008.07.004

Yadav, M. S., de Valck, K., Hennig-Thurau, T., Hoffman, D. L., & Spann, M. (2013). Social Commerce: A Contingency Framework for Assessing Marketing Potential. *Journal of Interactive Marketing, 27*(4), 311-323. doi: http://dx.doi.org/10.1016/j.intmar.2013.09.001

Yi, M. Y., & Hwang, Y. (2003). Predicting the use of web-based information systems: self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model. *International Journal of Human-Computer Studies, 59*(4), 431-449.

Yoon, S.-J. (2002). The antecedents and consequences of trust in online-purchase decisions. *Journal of Interactive Marketing, 16*(2), 47-63. doi: http://dx.doi.org/10.1002/dir.10008

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge. *Journal of the Academy of Marketing Science, 30*(4), 362-375.

Zhang, H., Lu, Y., Gupta, S., & Zhao, L. (2014). What motivates customers to participate in social commerce? The impact of technological environments and virtual customer experiences. *Information & Management, 51*(8), 1017-1030. doi: http://dx.doi.org/10.1016/j.im.2014.07.005

Zhang, P. (2008a). Motivational affordances: Fundamental reasons for ICT design and use. *Communications of the ACM 51*(11), 145-147.

Zhang, P. (2008b). Toward a positive design theory: Principles for designing motivating information and communication technology. In M. Avital, R. Bolland, & D. Cooperrider (Eds.), *Designing Information and Organizations with a Positive Lens*.

Zhang, P. (2013). The affective response model: A theoretical framework of affective concepts and their relationships in the ICT context. *MIS Quarterly, 37*(1), 247-274.

Zhang, P., & Li, N. (2004). *Love at first sight or sustained effect? The role of perceived affective quality on users' cognitive reactions to IT*. Paper presented at the Twenty-Fifth International Conference on Information Systems, Washington, DC.

Zhou, L., Zhang, P., & Zimmerman, H.-D. (2013). Social commerce research: An integrated view. *Electronic Commerce Research and Application, 12*(2), 61-68.

Zhou, Z., Jin, X.-L., Vogel, D. R., Fang, Y., & Chen, X. (2011). Individual motivations and demographic differences in social virtual world uses: An exploratory investigation in Second Life. *International Journal of Information Management, 31*(3), 261-271.

Zhu, L., Benbasat, I., & Jiang, Z. J. (2010). Let's Shop Online Together: An Empirical Investigation of Collaborative Online Shopping Support. *Information Systems Research, 21*(4), 872-891. doi: DOI 10.1287/isre.1080.0218

Zviran, M., Glezer, C., & Avni, I. (2006). User satisfaction from commercial web sites: The effect of design and use. *Information & Management, 43*(2), 157-178.
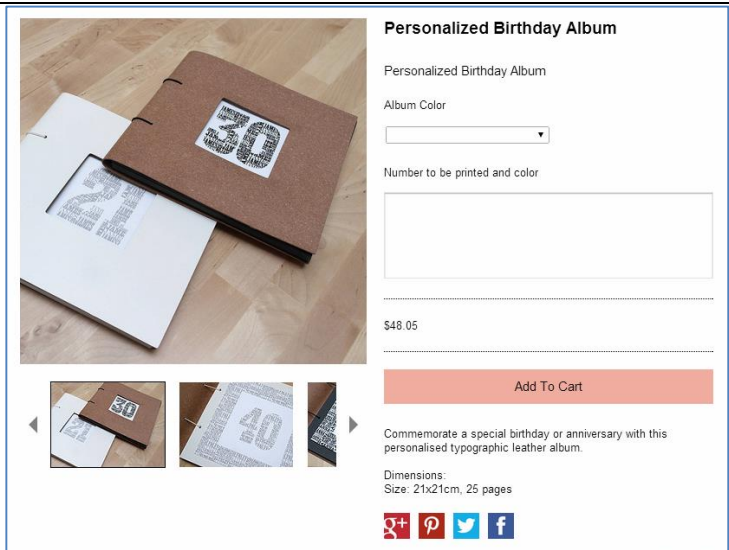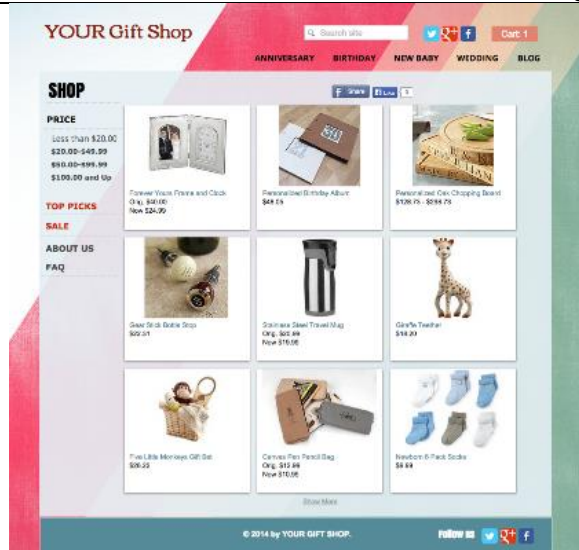
Appendices

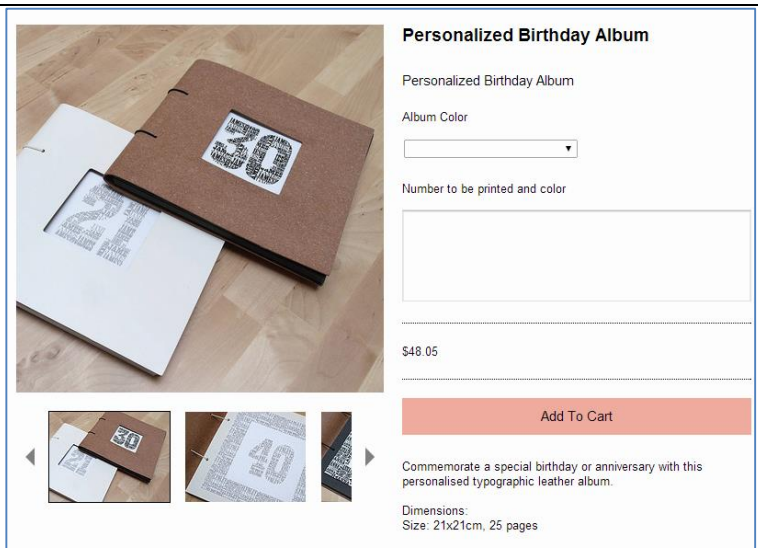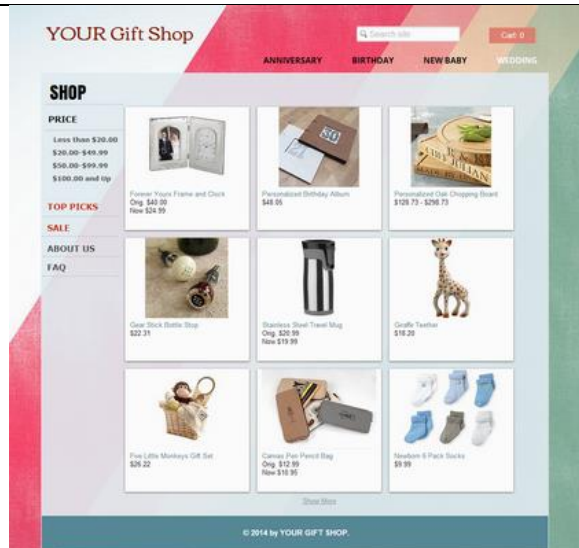## Appendix 1: Screen Captures of Experiment Websites

Website 1:
Information Cues – High: navigation, detailed product information, multiple product images
Entertainment Cues – High: warm color scheme, clean fonts, gift idea videoes
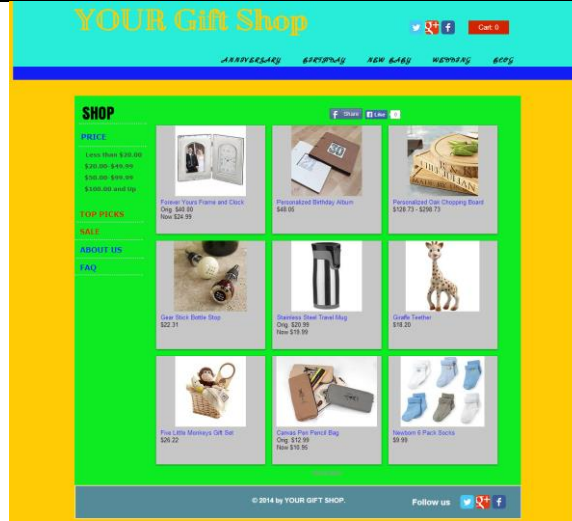Social Cues − Presence: social media icons, customer ratings, customer reviews

Website 2:
Information Cues – High: navigation, detailed product information, multiple product images
Entertainment Cues – High: warm color scheme, clean fonts, gift idea videoes
Social Cues − Absence: None

Website 3:
Information Cues – High: navigation, detailed product information, multiple product images
Entertainment Cues – Low: overly bright color scheme, unclear font
Social Cues − Presence: social media icons, customer ratings, customer reviews

Website 4:
Information Cues – High: navigation, detailed product information, multiple product images
Entertainment Cues – Low: overly bright color scheme, unclear font
Social Cues – Absence: none
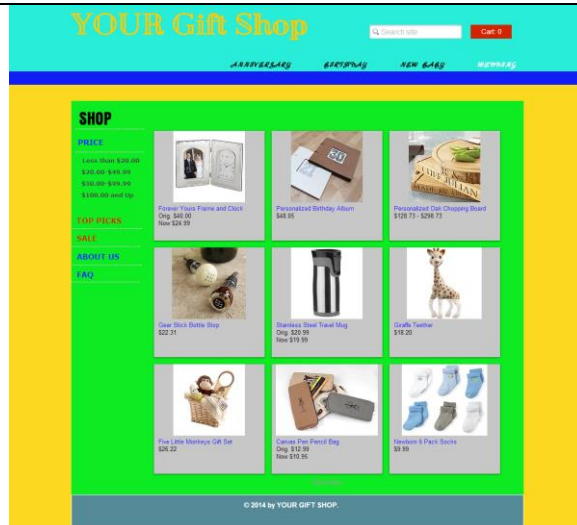
Website 5:
Information Cues – Low: no navigation bar, little product information, single product image
Entertainment Cues – High: warm color scheme, clean fonts, gift idea videoes
Social Cues − Presence: social media icons, customer ratings, customer reviews

Website 6:
Information Cues – Low: no navigation bar, little product information, single product image
Entertainment Cues – High: warm color scheme, clean fonts, gift idea videoes
Social Cues − Absence: None

Website 7:
Information Cues – Low: no navigation bar, little product information, single product image
Entertainment Cues – Low: overly bright color scheme, unclear font
Social Cues − Presence: social media icons, customer ratings, customer reviews

Website 8:
Information Cues– Low: no navigation bar, little product information, single product image
Entertainment Cues – Low: overly bright color scheme, unclear font
Social Cues − Absence: None

Appendix 2: Informed Consent

My name is Jian Tang, and I am a graduate student at Syracuse University. I am inviting you to participate in a research study. Participation in the study is voluntary, so you may choose to participate or not. This page will explain the study to you. I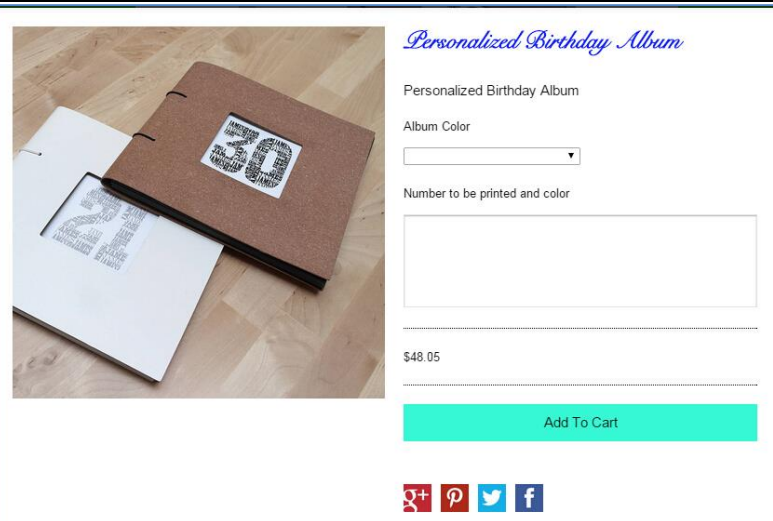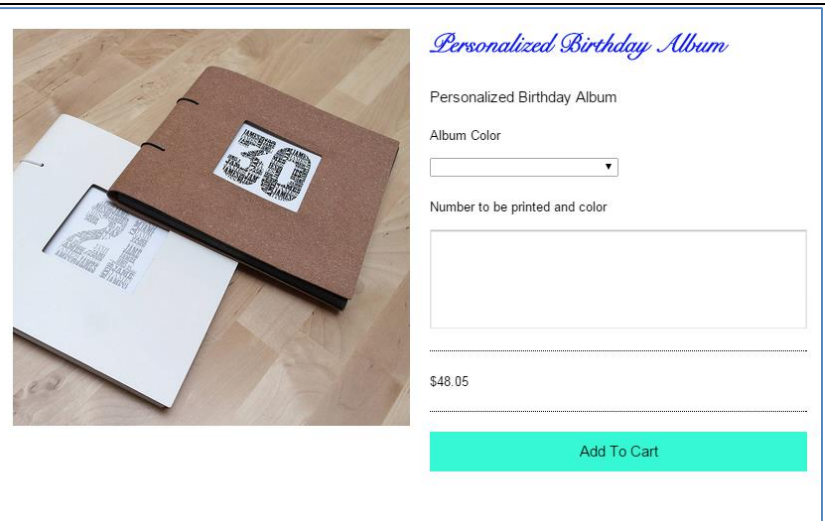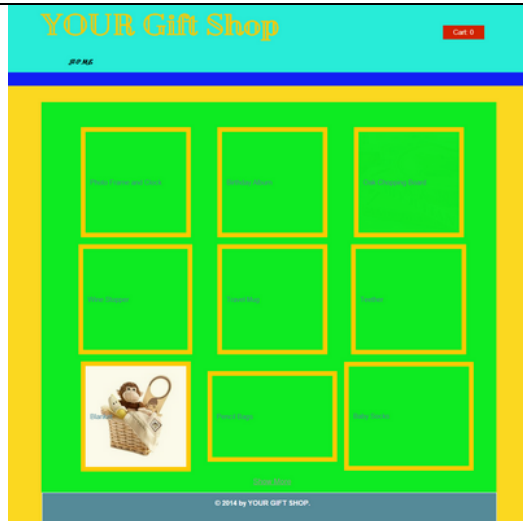 am interested in learning about how website design can influence consumer behaviors in online shopping environments. You will browse a shopping website and be asked your opinions about this website. This will take approximately 10-15 minutes of your time. You can participate in this study with a computer that is connected to Internet at any location you wish. All information will be kept confidential. In any articles I write or any presentations that we make, I will report aggregated results and will not reveal details about any personally identifiable information you provide. The benefit of this research is that you will be helping us to understand how the website design can enhance consumers' shopping experiences. The risks to you of participating in this study are no greater than those associated with using websites. You will be rewarded $0.50 for completing this task.

You may decide to not participate at any time, without penalty. If you accept this HIT, you give your informed consent to these terms. Whenever one works with email or the internet; there is always the risk of compromising privacy, confidentiality, and/or anonymity. Your confidentiality will be maintained to the degree permitted by the technology being used. It is important for you to understand that no guarantees can be made regarding the interception of data sent via the internet by third parties.

Contact Information:

If you have any questions, concerns, or complaints about the research, contact Jian Tang (jtang04@syr.edu). If you have any questions about your rights as a research participant, if you

have questions, concerns, or complaints that you wish to address to someone other than the

investigator, or if you cannot reach the investigator, contact the Syracuse University Institutional

Review Board at 315-443-3013.

I am 18 years of age or older, by clicking I agree to participate in this study.

Appendix 3: Experimental Task Instruction

Please read the hypothetical scenario carefully.

Your friend Alex needs to buy a birthday gift with a budget around $30. You are trying to help Alex to determine if a given website is a good place to shop. When considering which website to buy from, Alex is mostly concerned about the information about product characteristics, the interface presentation, and the features that are provided to interact with others.

You will examine the design of two gift websites in sequence. Then, you will be given a set of questions for you to answer.

Below are some instructions to examine the websites:

- Navigate the websites to know about available products.
- Find product information by clicking the image of the product in the gallery, and then click the individual image again to see more details in a pop-up window.
- Add a product to your shopping cart by clicking Add to Cart in the pop up window.
- You may be able to read what other consumers say about a product; or share the product page with your friends on social networks.
- You may be able to rate, like, or comment on a product.

Now you can click the link below to Website A that will open in a pop up window. After you finish browsing Website A, come back to this page.

Link to Website A

Now you can click the link below to Website B. Once you find the gift idea and put the product in the shopping cart, come back to this page and go to questions.

Link to Website B

Note that the purpose of browsing website A is to get some idea of the baseline.

However, you should answer all questions based on website B.

Now, please answer these questions about Website B.

What gift did you find on this website?_____

If you didn't find anything, why? _____

Appendix 4: Reliability of New Constructs in the First Pilot

Construct	Code	Items used in pilot test	Item-Total Correlation	Cronbach's Alpha	
				If deleted	Alpha Score
Perceived utilitarian affordances	PUA1	It has features that allow me to find product details	.796	.909	
	PUA2	It has features that allow me to learn about a product	.862	.901	
	PUA3	It has features that allow me to gather product details	.845	.903	
	PUA4	It has features that allow me to narrow down the product search	.603	.931	.92
	PUA5	It has features that allow me to examine about product	.804	.907	
	PUA6	It has features that allow me to navigate products	.664	.921	
	PUA7	It has features that allow me to evaluate the product	.788	.909	
Perceived hedonic affordances	PHA1	I am inspired about shopping	.555	.857	
	PHA3	I can relax my mind	.705	.819	
	PHA4	I can wander around just out of curiosity	.591	.848	
	PHA5	I can kill time by myself	.716	.816	.86
	PHA6	I can pass time at the website when I am bored	.808	.789	
Perceived social affordances	PSA4	It has features that allow me to communicate with others	.882	.954	
	PSA5	It has features that allow me to share my experience with others	.904	.950	
	PSA6	It has features that allow me to seek others' opinions	.894	.952	.96
	PSA7	It has features that allow me to contact others	.869	.956	
	PSA8	It has features that allow me to talk about things with others	.905	.950	

Appendix 5: Reliability of Manipulation Check Scales

Construct		Items	Item-Total Correlation	Cronbach's Alpha	
				If deleted	Alpha Score
Information Cues	IC1	Website B has effective product information.	.849	.920	
	IC2	Website B meets my information needs.	.918	.864	.94
	IC3	Website B has sufficient information to carry out my task.	.836	.930	
Entertainment Cues	EC1	Website B is visually pleasing.	.814	.898	
	EC2	Website B is beautiful	.889	.832	.92
	EC3	Website B is fun	.800	.907	
Social Cues	SC1	Website B has social networking opportunities	.895	.943	
	SC2	Website B has ways to communicate with others	.910	.932	.96
	SC3	Website B has channels for people to share their opinions	.913	.929	

Appendix 6: Adapted Measurements of Constructs

Construct	Item ID	Original Item	Adapted Item
Perceived usefulness (Gefen et al., 2003; van der Heijden, 2004)	PU1	The website improves my performance in CDs/books searching and buying	Using this website can improve my performance in shopping a gift.
	PU2	The website enhances my effectiveness in CDs/books searching and buying.	Using this website can enhance my productivity in shopping a gift.
	PU3	The website increases my productivity in CDs/books searching and buying.	Using this website can increase my effectiveness in shopping a gift.
	PU4	I can better decide which movie I want to go see than in the past.	Using this website helps me decide which gift I want to select.
	PU5	I can better decide whether I want to go see a particular movie or not.	Using this website improves my ability to make decisions on gift shopping.
Perceived fun (Nah et al., 2011)	PF1	I found my virtual tour of <hospital brand name> fun.	I find my visit to this website fun
	PF2	I found my virtual tour of <hospital brand name> enjoyable.	I find my visit to this website enjoyable.
	PF3	I found my virtual tour of <hospital brand name> interesting.	I find my visit to this website interesting.
	PF4	I found my virtual tour of <hospital brand name> boring.	I find my visit to this website entertaining.
Perceived sociability of use (Iivari, 2014; Junglas et al., 2013; H. Zhang et al., 2014)	PSU1	XX enables me to form close friendships with other customers in the environment	Using this website can help me form connections with other.
	PSU2	When using XX, I create acquaintance relationships.	Using this website can help me establish social linkages with other consumers.
	PSU3	XX enables me to get a good impression of other customers in the environment.	Using this can help me identify "opinion leaders."
	PSU4	Being social in SL is an aspect that I find very satisfying	Using this website can satisfy my desire to connect with others.
	PSU5	Overall, social interactions in SL are very satisfying.	Using this website can satisfy my desire to communicate with others.
Approach behavioral intention (Mehrabian & Russell, 1974)	APP1	How much time would you like to spend in the situation?	I would spend time on this website
	APP2	Once in the situation, how much would you enjoy exploring around?	I would wonder around on this website
	APP3	To what extent is this situation a good opportunity to think out some difficult task you have been working on?	I would shop on this website
Avoidance behavioral intention (Mehrabian & Russell, 1974)	AVD1	How much would you try to leave or get out of this situation?	I would get out of this website
	AVD2	How much would you try to avoid any looking around or exploration of this situation?	I would avoid exploring this website
	AVD3	How much would you dislike having to work in this situation?	I would dislike shopping on this website

Appendix 7: Reliability Analysis of Final Questionnaire

Construct	Items	Mean	SD	Item-Total Correlation	Cronbach's Alpha	
					If deleted	Alpha Score
PUA1	it has features that allow me to find product details	5.46	1.39	.819	.895	
PUA2	it has features that allow me to learn about a product	5.21	1.56	.867	.884	
PUA3	it has features that allow me to gather product details	5.15	1.55	.890	.879	.92
PUA5	it has features that allow me to examine about product	5.44	1.33	.737	.911	
PUA7	it has features that allow me to evaluate the product	4.86	1.66	.664	.928	
PHA3	I can relax my mind	4.57	1.59	.751	.825	
PHA4	I can wander around just out of curiosity	5.37	1.46	.614	.877	
PHA5	I can kill time by myself	4.61	1.65	.813	.799	.87
PHA6	I can pass time at the website when I am bored	4.11	1.76	.734	.833	
PSA4	it has features that allow me to communicate with others	4.22	2.07	.938	.964	
PSA5	it has features that allow me to share my experience with others	4.27	2.15	.934	.965	
PSA6	it has features that allow me to seek others' opinions	4.21	2.18	.915	.968	.97
PSA7	it has features that allow me to contact others	4.00	2.02	.896	.971	
PSA8	it has features that allow me to talk about things with others	3.99	2.06	.928	.966	
PU1	Using this website can improve my performance in shopping a gift.	4.15	1.69	.917	.947	
PU2	Using this website can increase my productivity in shopping a gift.	4.18	1.77	.908	.949	
PU3	Using this website can enhance my effectiveness in shopping a gift.	4.26	1.78	.928	.945	.96
PU4	Using this website helps me decide which gift I want to select.	4.63	1.70	.827	.962	
PU5	Using this website improves my ability to make decisions on gift shopping.	4.35	1.69	.869	.955	
PF1	I find my visit to this website fun	3.98	1.75	.937	.954	
PF2	I find my visit to this website enjoyable.	4.13	1.77	.915	.961	
PF3	I find my visit to this website interesting.	4.18	1.72	.923	.958	.97
PF4	I find my visit to this website entertaining.	3.95	1.71	.911	.962	

PSU1	Using this website can help me establish social linkages with other consumers.	3.31	1.80	.834	.954	
PSU2	Using this can help me identify "opinion leaders."	3.46	1.89	.881	.946	
PSU3	Using this website can satisfy my desire to connect with others.	3.21	1.73	.860	.949	.96
PSU4	Using this website can satisfy my desire to communicate with others.	3.00	1.76	.901	.942	
PSU5	Using this website can help me establish social linkages with other consumers.	3.06	1.80	.917	.940	
APP1	I would spend time on this website	3.13	1.72	.879	.877	
APP2	I would wonder around on this website	3.40	1.84	.843	.906	.93
APP3	I would shop on this website	3.10	1.76	.841	.906	
AVD1	I would get out of this website	3.97	2.00	.794	.856	
AVD2	I would dislike shopping on this website	3.53	2.04	.812	.840	.90
AVD3	I would avoid exploring this website	3.39	2.06	.784	.864	

Jian Tang (jtang04@syr.edu)

Education

PhD, Information Science and Technology, Syracuse University, 2009–2014, Syracuse, USA

- Dissertation: The influences of atmospheric cues on consumer behavioral intentions: An affordance perspective
  Advisor: Dr. Ping Zhang
  Committee member: Dr. Jason Dedrick, Dr. Yang Wang, and Dr. Philip Fei Wu
  Internal reader: Dr. Yun Huang
  External reader: Dr. Dennis Galletta
  Oral defense chair: Dr. Padmal K. Vitharana

M. Phil, Information Science and Technology, Syracuse University, 2009−2013, Syracuse, USA

Bachelor of Management, Information Management and Information Systems, Renmin

University of China, 2005−2009, Beijing, China

Publications

Journal Publications

1. **Tang, J**., Zhang, P., Wu, P.P. Categorizing Consumers' Online Behavioral Responses toward Online Advertising. *Information Systems Frontiers* (Available online since Jun. 21st, 2014).

2. Zhao, Y. C., Liu, J., **Tang, J.**, & Zhu, Q. (2013). Conceptualizing Perceived Affordances in Social Media Interaction Design. *Aslib Proceedings, 65*(3), 289-303.

3. Dedrick, J., **Tang, J.**, & Kraemer, K. (2012). China's indigenous innovation policy: Impacts on multinational R&D, *IEEE Computer 45(11), 70-78.*

4. **Tang, J.** (2008). Evaluation of The Quality of Digital Information Based on FAHP Method (Chinese), *Archives Science Bulletin*, pp.76-81.

Conference Proceedings

5. **Tang, J.** & Zhang, P. (2013), Forced or Inspired: Understanding Consumers' Cognitive Appraisals and Behavioral Responses towards Online Advertising, *Proceedings of the pre-ICIS 2013 Workshop on HCI Research in MIS*, December, Milan, Italy.

6. **Tang, J.** & Zhang, P. (2013). *Consumer Behaviors in Social Shopping Sites: A Multi-Dimensional Perspective*, *Proceedings of the Seventh China Summer Workshop on Information Management* (CSWIM), June 2013, Tianjin, China.

7. **Tang, J.**, Zhang, P., & Wu, P.P. (2013). Passive or Active: Understanding Consumers' Behavioral Responses to Online Advertising, *Proceedings of 2013 Pacific Asia Conference on Information Systems (PACIS)*

8. Curty, R., & **Tang, J.** (2012). Someone's Loss might be Your Gain: A Case of

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Negative Results Publications in Science, *Proceedings of the ASIS&T 75th Annual Meeting*, October 26-23, 2012, Baltimore, USA.

9. **Tang, J.**, Zhao, Y., & Zhang, P. (2012). Moderating effects of perceived affordances on users' adaptive media use, *Proceedings of the iConference*, Feb 7-10, 2012, Toronto, Canada.

10. **Tang, J.**, Zhao, Y., & Zhang, P. (2011). Perceived Affordances of Web Advertisements: Implications for Information Artifacts Design, *Proceedings of the Fifth China Summer Workshop on Information Management* (CSWIM), June 2011, Harbin, China.

11. **Tang, J.** & Zhang, P. (2010), Media Selection Preferences of US College Students: Empirical Evidence and A Proposed Research Model, *Proceedings of China Summer Workshop on Information Management* (CSWIM), June 2010, Wuhan, China.

Research Experience

Syracuse University, NY

1. Aug. 2012–Present, *Evaluation of online advertisements*, Prof. Ping Zhang and Prof. Philip Fei Wu
   - Participate in qualitative and quantitative data analysis
   - Leading author of a conference paper and a journal paper
   - Co-work on a second journal paper

2. Nov. 2014–Present, *Emotion Map: Investigating Emotion Regulation with Mobile Apps,* Porf. Yun Huang
   - Participate in designing focus group protocol
   - Collaborate on a conference paper

3. Jan. 2013–Sep. 2014, *Motivation and Privacy Concern of Mobile-based Social Networking Apps*, Prof. Yang Wang
   - Participated in survey design and data analysis
   - Co-worked on conference publication

4. Aug. 2012–Dec. 2013, *Socially Intelligent Computing to Support Citizen Science (SOCS) (NSF Funded)*, Prof. Kevin Crowston, Prof. Nathan Prestopnik, and Prof. Jun Wang
   - Co-work on a journal paper
   - Designed experiment protocol and collected data

5. Jan. 2013–Jun. 2013, *Visual Interaction in Online Settings (VISIOS) (NSF funded)*, Prof. Jennifer Stromer-Galley
   - Participated in experiment design
   - Conducted experiments in lab setting

6. Sep. 2010–Dec.2011, Research practicum, *Motivational Supports and Information Needs of Young Innovators*, Prof. Ruth Small
   - Reviewed literature about motivations and information needs of young innovators
   - Drafted a survey for children who have been successful innovators

7. Sep. 2009–May. 2011, Research assistant, *China Information Industry Policies*, Prof. Jason Dedrick

- Co-authored a journal publication
- Studied the development of R&D activities in China
- Collected data about the development of information industry and analyzed IT policies in China

8. Sep. 2009–May. 2010, Research practicum, *Identifying US College Students' Social Needs and Means,* Prof. Ping Zhang
   - Participated in research design, focus group study, data collection and data analysis
   - Co-authored a paper based on the focus group data

Teaching Experience

Syracuse University, NY

1. Aug. 2014–Dec. 2014 Teaching Assistant: IST 654 Information Systems Analysis, Prof. Ping Zhang (Graduate)
2. Jan. 2014–May. 2014 Teaching Assistant: *IST 400/600: Introduction to Scripting Foundation (Python)*, Prof. Paul Morarescu (Graduate & Undergraduate)
3. Aug. 2013−Dec. 2013 Teaching Assistant: *IST 718 Advanced Analytics in Big Data*, Prof. Paul Morarescu (Graduate)
4. Jan. 2011−May, 2011 Teaching Assistant: *IST 444 Information Reporting and Presentation*, Prof. Susan Bonzi (Undergradute)
5. Jan. 2010−May, 2011 Teaching Assistant: *IST 755 Strategic Management of Information Resources*, Prof. Jason Dedrick (Master program capstone course)
6. Sep. 2010−Dec. 2010 Teaching Assistant, *IST 359 Introduction to Information Management Systems*, Prof. Bei Yu (Undergraduate)
7. Jan.2010−May. 2010 Teaching Assistant, *IST 668 Literacy through School Libraries,* Prof. Renee F. Hill (Graduate)
8. Sep. 2009−Dec.2009 Teaching Assistant: *IST 676 Digital Libraries* (Online)*,* Prof. Jill Hurst-Wahl (Graduate)

Awards
- 2009−2014, Tuition Scholarships from the School of Information Studies, Syracuse University, NY
- 2009−2013, Graduate Scholarship from China Scholarship Council, Beijing
- 2009, Graduate with honors, Renmin University of China, Beijing
- 2006−2007, 2007−2008 Fellowship for Excellent Student of Renmin University of China, Beijing
- 2008, third-class winner, Technology Innovation Competition of Renmin University of China, Beijing

Academic Services
- Managing Editor, 2011−Jun. 2013, *AIS Transactions on Human-Computer Interaction*

- Program committee:
  International Conference on Electronic Commerce (2014)
  SIGHCI Pre-ICIS HCI/MIS Workshop (2012, 2013)

- Reviewer:
  Electronic Commerce Research and Applications (2014)

International Journal of Information Systems and Management (2014)
SIGHCI Pre-ICIS HCI/MIS Workshop (2012, 2013)
AMCIS, SIGHCI sponsored Interface Design, Evaluation, and Impact mini-track (2013)
iConference (2011, 2012, 2013)

- Doctoral Student Representative, 2010-2011, Doctoral Program Committee, School of Information Studies, Syracuse University
- Doctoral Student Representative, 2009-2010, Faculty Meeting Committee, School of Information Studies, Syracuse University