THE INFLUENCE OF MOBILE APPLICATION DESIGN FEATURES ON CONSUMERS' EMOTIONAL RESPONSE AND STICKINESS INTENTIONS

by

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(Under the Direction of Laura McAndrews)

ABSTRACT

This study investigated the effects of three types of mobile design features on a consumers' mobile app stickiness intention, as mediated by consumer's emotional response (pleasure, arousal, and dominance). The study employed a 3 (mobile design features: present/ absent) x 2 (type of scenario: hedonic vs utilitarian trips) experimental survey method in a retail mobile app setting. Three hundred and four participants were recruited though Amazon Mechanical Turk, and conditional process modeling was used to conduct hypotheses testing.

The results confirmed the influence of mobile design features on mobile app stickiness intentions, as mediated by consumers' feelings of pleasure and arousal. Specifically, consumer led interaction features and product promotion features were found to influence pleasure, arousal, and dominance whereas multimedia product viewing features were found to only influence arousal. Additionally, while consumers' state of pleasure and arousal were found to impact mobile app stickiness intentions, dominance was not a predictor of mobile app stickiness intentions despite the influence of product promotion and consumer led interaction features.

These results imply that marketers must go beyond the normal imagery and video content present to arouse consumers in relation to the mobile design features of multimedia product

viewing. In addition, it is important to understand the relationship between product promotion features and other mobile design features especially in how they relate to consumer led interaction features. Third, marketers need to focus more on consumer led interaction features as these features elicited consumers' emotional response more than other mobile design features. Finally, it is important to note the lack of support for between dominance and mobile app stickiness behavior.

INDEX WORDS: Mobile design features, Pleasure, Arousal, Dominance, Mobile app stickiness intention, Conditional process modeling

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DEDICATION

To my mommy and daddy

for their unconditional love and support

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CHAPTER 1 INTRODUCTION

Chapter 1 includes (a) background of mobile commerce and mobile apps, (b) purpose of the study, (c) significance of the study, (d) definition of key terms, and (e) organization of the study.

Background of Mobile Commerce and Mobile Apps

Mobile Commerce

Mobile commerce research first appeared in 1999 by management information systems scholars. Since then the research into mobile commerce has grown tremendously. However due to technology growth and the frame of this research, there are many definitions for mobile commerce. In early research, mobile commerce was defined as an extension of e-commerce (Ko, Kim, & Lee, 2009). It was called wireless e-commerce and was defined as a method to conduct electronic commerce through wireless terminals. This linkage to e-commerce was necessary at the time as mobile commerce was not seen as a different marketing channel but an extension of the existing channel, e-commerce (Swilley & Hofacker, 2006).

As growth in mobile commerce continued, so did the definition of mobile commerce. Many definitions in the early to mid-2000s began to reference mobile commerce with the type of device used. For instance, it was often defined as a form of monetary transaction over telecommunication or wireless networks using x device, with x being the most popular mobile device of the time such as pagers and cell phones (Swilley & Hofacker, 2006). Most definitions focused on how transactions occurred (Chong, 2013; Hew, Lee, Leong, Hew, & Ooi, 2016; Kim, Shin, & Lee, 2009; Wu & Wang, 2005); however, few definitions explored the dimensions or

benefits of mobile devices. While some researchers (Chong, Chan, & Ooi, 2012; Ngai & Gunasekaran, 2007; Swilley & Hofacker, 2006; Yadav, Sharma, & Tarhini, 2016) argue that mobile commerce should be defined in a manner that not only answers how transactions are conducted but also distinguishes the advantages to the consumer by making clear the difference between mobile commerce and e-commerce. Researchers defined mobile commerce as "the ability to offer value through virtual transactions that allow for location-specificity and time-sensitivity, as well as the ability to build personalized relationships with the customer" (Swilley & Hofacker, 2006, p. 22). In this study, mobile commerce will be defined as the ability to offer value through information and monetary transactions while creating personalized relationships with customers.

Mobile commerce has followed a path similar to e-commerce in terms of consumers' rate of adoption. However, it is vital to distinguish between the two as mobile commerce offers additional benefits, namely ubiquity and localization services (Chong et al., 2012; Faqih & Jaradat, 2015; Krotov, Junglas, & Steel, 2015; Mahatanankoon, Wen, & Lim, 2005; Zhang, Zhu, & Liu, 2012). It may be due to these distinctions that mobile web adoption is growing faster than web adoption did in the 90's. As of 2013, mobile traffic accounted for 15% of all web traffic (Mau, 2013). In the US, mobile commerce sales reached approximately 24.66 billion dollars in 2012 (Mau, 2013) and made up 11.6% of the 303 billion US e-commerce total (Meola, 2016). According to Business Insider, mobile commerce accounted for 20.6% or 79 billion dollar in e-commerce sales in 2016, and by 2020 will account for 45% or 284 billion dollars in sales (Meola, 2016; Milnes, 2016).

Mobile Application: Definition and Constructs

Mobile apps are software that performs certain tasks for users through their mobile devices (Bomhold, 2013; Islam, Islam, & Mazumder, 2010). In fact, there are three distinct kinds of apps: native apps, web apps, and hybrid apps. Native apps such as the popular gaming app, Angry Birds, are developed for a specific operating system such as iOS, operating system for iPhone. Web apps like Financial Times are websites that favor the look of native apps; these apps are accessed through the mobile browser, in which the user is then given the option of installing the app onto their device. Hybrid apps such as Banana Republic blend both the native app and web app (Budiu, 2013; Lionbridge, 2012; Skidmore, 2013). Some of the task apps provide tools and productivity (calendar, notes, flashlight, weather), shopping (retail based apps), and games and music (games, music player, radio) (Bomhold, 2013; S. J. Kim, Wang, & Malthouse, 2015).

It is predicted that the annual number of apps downloaded will reach 268 billion by 2017 (Gartner, 2013). However, it is important to note 20% of the apps downloaded are only used once, apps that are bugged (frozen upon opening or closes at random) resulted in half of consumers deleting the app (Smartbear, 2014). Despite this, mobile apps constitute more than 50% of time spent on digital media (Lipsman, 2014). Furthermore, in 2013, 56% of consumers who possessed a smartphone or tablet worldwide spent most of their time (80%) on their device within an app (Moon & Domina, 2015). Mobile app development is vital to companies as most are actively engaged in creating mobile strategies with an app as the focus. Hinchcliffe (2013) predicts mobile strategies to continue to be a challenge and for branded mobile apps to be widely adopted in years to come.

Branded mobile apps are downloadable software to a mobile device in which the brand identity is predominantly displayed usually through the combination of the name of the app and the brand logo or icon (Bellman, Potter, Treleaven-Hassard, Robinson, & Varan, 2011). Zhao and Balagué (2015) identify five types of branded apps: tool-, game-, social-, design-, and m-commerce centric. Tool centric apps are utilitarian based apps with the goal of identifying consumers' motivation and requirements in using a product or service as well as usage assistance. For example, Colgate employs a dental advisor app that includes a toothbrush timer to teach good dental hygiene skills. Game centric apps are the opposite, possessing high hedonic value such as the Johnson &Johnson Happy Nurse app, a race game in which the user is a nurse who must avoid obstacles in their way. Social centric apps are simply web 2.0 apps; these apps focus on socialization with others such as Instagram, Pinterest, and Facebook. Design centric apps focus on creation and imagination. One such example is Nike's Making of Making app which informs designers and creators about the impact of their materials. Finally, m-commerce centric apps are created with the goal of selling products. These apps utilize many features such as customization and personalization to achieve their objective. There is a plethora of m-commerce apps such as the IKEA catalog app and Macy's retail app (Zhao & Balagué, 2015). While brands tend to have more than one branded app, this study focuses strictly on mobile commerce centric apps.

Mobile commerce centric apps. In a comScore study, in October of 2015, 21% of smartphone owners had approximately three to five retail apps on their device; in April of 2016, 23% of smartphone owners had the same amount of retail apps on their device (eMarketer, 2016); in general, there is an increase in the amount of mobile retail apps consumers have on their personal devices. However, as noted by a 2012 study, less than 25% of mobile shoppers are

using mobile applications over mobile browsers (Tang, 2013). Although, 61% of those mobile shoppers have installed at least one mobile app on their smartphone and 30% have more than four apps on their phone. Retailer apps, loyalty card organizers, and coupon apps are the most prevalent types of app consumers are downloading (Tang, 2013).

Through the creation of branded apps, retailers can control the in-store experience. Store apps allow retailers to create support for each stage of the consumer decision process from need recognition through purchase to post purchase behavior (Wright, 2012). Because of increased environmental control, ability to customize videos, images, and reviews through the targeting of buying history and browsing behavior, apps have shown a higher conversion rate over desktop and mobile websites. Wright (2012) found the conversion rate for dedicated retail apps 21% higher than retailers who do not have a dedicated app. A retailer's app can provide relevant information and remove barriers creating a higher share of transactions in comparison to a mobile website. In quarter four of 2015, mobile app transaction accounted for more than half of all mobile transactions (mobile app +mobile browser) (Criteo, 2016).

Mobile shoppers between the ages of 18-34 and 65 and older are the two age segments most likely to use shopping applications (Tang, 2013) and tend to browse four times as many products. They also are 50% more likely to add a product to their basket than non-mobile app consumers (Criteo, 2016). Therefore, mobile app consumers can be said to have higher loyalty intentions as well as display a higher likelihood to purchase, in addition are more likely to purchase more per shopping trip (Criteo, 2016).

Research application of mobile apps. Early research focused on mobile commerce without making any distinction as to whether the commerce was happening through the usage of the mobile browser or the mobile app. Mobile commerce research to date has been focused on

the constructs that will influence adoption intention of mobile shopping (Ko, Kim, & Lee, 2009; Shih & Chen, 2013; Yang, Wang, & Wei, 2014), intention to purchase via mobile device (Kumar & Mukherjee, 2013; San-Martín, López-Catalán, & Ramón, 2013), and attitude (Maghnati & Ling, 2013; Yang, 2012). Many of these early studies utilized technolgoy theories, framework, and models. The technology acceptance model (TAM) was often used to analyze the main drivers and impediments that influence mobile behavioral intentions. Research also has shown the addition of technology based consumer characteristics such as technology fit, tool experience as well as insecurity and discomfort (Kumar & Mukherjee, 2013; Shih & Chen, 2013; Yang, 2012); these variables usually derived from the addition of another framework such as the technology readiness index(TRI) or task technology fit model (TTF). While both qualitative and quantitative studies have been employed to study behavioral intentions of mobile commerce, much of the research analyzed technology acceptance or purchase intention. Few studies analyzed consumer characteristics not closely tied to technology traits. Ko et al. (2009) looked at the concept of enjoyment in addition to the variables common to the extended TAM model; although enjoyment was found to influence adoption intention; no direct effect was found. Thus, much of early research into mobile commerce focused on utilitarian benefits to mobile adoption and purchase intention.

Mobile commerce is a marketing tool for fashion retailers. Through the proper and effective use of mobile commerce, retailers can advertise, promote, and sell their products through third party and retailer specific mobile apps (Kim, Ma, & Park, 2009). While the research on mobile commerce is vast, research on mobile apps is relatively rare. Even more so, research on fashion mobile apps is rare, especially when focusing on consumer behavior (Moon & Domina, 2015).

While some studies have analyzed mobile apps specifically, still the main focus has tended toward technology adoption or purchase intention (Ahuja & Khazanchi, 2016; Hew, Lee, Ooi, & Wei, 2015; Hsu & Lin, 2015; Lee, Tsao, & Chang, 2015; Maghnati & Ling, 2013). More recent studies into mobile apps are starting to focus on other areas such as engagement (Kim, Lin, & Sung, 2013), loyalty (Chang, 2015), and other behavioral intentions (Taylor & Levin, 2014) as well as hypothesizing framework geared specially towards mobile applications (Magrath & McCormick, 2013a, 2013b; Tarasewhich, 2003).

Mobile apps focus on real time customer-retailer relationships; therefore, it is a continuous challenge for companies to control how best to capture user attention. While Ho and Syu (2010) determined the motives and rewards from using mobile apps are entertainment, functionality, information, socialization, intellectual stimulation, following a trend, and learning; there is no research that has identified the features companies should focus on to enable the development of branded app strategies.

Purpose of the Study

The main purpose of this study was to determine the influence of mobile design features on consumers' mobile app stickiness intentions, as mediated by consumers' emotional response (pleasure, arousal, and dominance). This study adds to the body of knowledge in atmospherics and will help retailers in the development of mobile brand strategies through the analysis of features that enable more tailored responses to identified target markets.

Significance

While research studies on the design of web sites were prevalent, design aspects of mobile apps were rare (E. Kim et al., 2013; S. J. Kim et al., 2015) and often look at informational design content or the visual appeal overall. This study added to the literature by simulating real

life interactions with mobile design features through an experimental research setting. In addition, while the stimulus-organism-response paradigm was used often in the research of web sites, this study was one of the first to employ this framework in the mobile app setting.

Definitions of Key Operational Terms

The definitions for the key terms used throughout the text are available in this section:

Atmospherics	Conscious designing of space to create certain buyer effects, specifically, the designing of buying environments to produce specific emotional effects in the buyer that enhance purchase probability (Kotler, 1973)
S-O-R	Stimulus-Organism-Response model asserts that various stimuli will influence a consumer's cognitive and/or affective state (organism) which in turn will determine the consumer's response (Mehrabian & Russell, 1974)
High task relevant cues	Site descriptors either verbal or pictorial that appear on the screen which guide and allow the shopping goal attainment (Eroglu, Machleit, & Davis, 2003)
Low task relevant cues	Site information that is somewhat unimportant to the completion of the task (Eroglu et al., 2003)

Mobile design features	Marketing elements that constitute the visual layout of a mobile app (Magrath & McCormick, 2013b)
Multimedia product viewing	A consumer's ability to see product selections of the retailer's store via multimedia features thus creating an interactive and sensory environment (Magrath & McCormick, 2013b)
Informative content	Pure textual content consisting of readable text with the goal of informing the consumer (Magrath & McCormick, 2013b)
Product Promotion	Encompasses promotion of the retailers' products as well as price reductions designed to increase purchase intention and sales (Magrath & McCormick, 2013b)
Consumer led interaction	Allows the consumer to interact with the retailer though the use of function symbol keys such as drop-down menus or product recommendations pages (Magrath & McCormick, 2013b)
Pleasure	Evaluation of feelings ranging between depression and ecstasy (Mehrabian & Russell, 1974)
Arousal	Active response to stimulation that measures readiness (Mehrabian & Russell, 1974)

Dominance	Extent to which individual feels control over or controlled by the environment (Mehrabian & Russell, 1974)
Mobile App Stickiness	Time users spend interacting with an app and how often consumers use the app to accomplish specific tasks Racherla, Furner, and Babb (2012)

Organization of study

This dissertation is divided into four chapters. Chapter 1 introduces the study and includes background of the study, purpose and significance, definitions of key terms, and the organization of the study. Chapter 2 presents the literature review for the study and contains atmospherics, mobile design features, pleasure, arousal, and dominance (PAD), stickiness, research gap and hypotheses summary. Chapter 3 presents the theoretical framework and includes mobile design features framework, SOR paradigm, the research gap, and research hypotheses. Chapter 4 contains the methodology used for the study and includes the research design, experimental design, phase 1: pilot study, and phase 2: SOR experiment.

CHAPTER 2 LITERATURE REVIEW

Chapter 2 includes the discussion of (a) atmospherics, (b) mobile design features, (c) pleasure, arousal, and dominance (PAD), (d) stickiness, (e) research gap and hypotheses summary.

Atmospherics

One of the major determinants of the effectiveness of an online retailer are the atmospheric qualities of the medium in which consumers interact with products or services (C. Shih, 1998). Atmospherics was conceptualized by Kotler (1973) who stated that the way retailers design a specific shopping environment would greatly affect the consumers' purchasing decisions. Atmospherics has been defined as "the conscious designing of space to create certain buyer effects. More specifically, atmospherics is the effort to design buying environments to produce specific emotional effects in the buyer that enhance his purchase probability" (Kotler, 1973, p. 50). The same can be said for a retailer's mobile app as it serves as the medium through which consumers interact. It has long been supported that the environment of a traditional retailer impacts psychological and behavioral shopping outcomes. These same ideas were also tested in the online retailing context and found to show comparable results. Therefore, certain atmospheric qualities of a retailer's mobile app may also affect the likelihood of use and other behavioral outcomes (Eroglu, Machleit, & Davis, 2001).

Atmospherics can account for up to two thirds of in-store purchases, and they are one of the differentiating factors among retailers (Hausman & Siekpe, 2009). Early research into the impact of atmospherics can be credited to Mehrabian and Russell (1974)'s stimulus-organism-

response framework. Then Donovan and Rossiter (1982) took the S-O-R framework and applied it in a retail context. Their findings supported the impact of consumers' emotional states in a retail environment on approach avoidance behavior.

Julie Baker (1986) showcased a typology of store environment elements, grouping them into three categories: social factors, design factors, and ambient factors. Social factors are often the results of customer-customer interactions and contain the elements that determine other customer perceptions, OCP; notably, the perceived appearance, similarities, and behaviors of other customers (Ngo, Northey, Duffy, Thao, & Tam, 2016). It is important to note that service factors can also include service personnel. Design factors describe the visual appeal of the retail environment, focusing on layout, interior design, and color (Julie Baker, 1986) whereas the ambient factor consists of nonvisual factors that impact our subconscious, mainly smells and sounds (Julie Baker, 1986; Eroglu et al., 2001).

Bitner (1992) then examined the impact of the physical surrounding on the social elements with a focus on service organizations. She also identified three categories with slightly different grouping: ambient elements, layout and functionality elements, and signs, symbols, and artifacts. Bitner's (1992) dimensions at their roots are consistent with the three defined by Julie Baker (1986). Other atmospheric cues such as music, lighting, color, and scent have also been studied. These initial studies into atmospherics overall have determined the significant role atmospherics play in determining consumers' responses and behavior within the retail and service environment.

Application of Atmospherics in Research

Mazaheri, Richard, Laroche, and Ueltschy (2014) examined the influence of website atmospherics on three dimensions of intangibility between three different cultures. The three

atmospherics analyzed were informativeness, effectiveness, and entertainment; however, unlike other research into atmospherics these scholars utilized atmospherics as antecedents to PAD dimensions, in this research PAD dimensions is the antecedent to the atmospherics cues analyzed. Mazaheri et al. (2014) found a difference between the emotional dimensional effects (pleasure, arousal, and dominance) and the three examined cultures, Middle Eastern, North American, and Chinese. They also found that arousal had the smallest influence on consumer perceptions of a site's atmospherics; in fact, arousal was found to not be significant at all for North America's perception of arousal on effectiveness.

Hsieh, Hsieh, Chiu, and Yang (2014) used the pleasure, arousal, dominance (PAD) model to examine the influence of website atmospherics on PAD through task-relevant cues. They highly stressed the importance of dominance in their model arguing that the dimension of dominance is highly relevant for an online environment due to a consumers' ability to control the entire shopping process. Their findings support their argument for the inclusion of dominance in research applied in online settings. Hsieh et al. (2014) state that consumers who feel independent and unrestricted expressed higher intentions to purchase from a web site. Their findings also showed that all atmospheric cues measured strongly through emotions, once again furthering support for the inclusion of dominance in the usage of PAD model. Another interesting finding that resulted from the study was the suggestion that if a consumer has a higher perceived dominance then they are more likely to have a pleasurable browsing experience leading to increased purchase intention. Entertainment (low task relevant cue) was the only atmospheric cue tested to have an influence on arousal, and shows that low task relevant cues can indeed have an impact on a consumers' emotional state within the shopping process.

Atmospheric and S-O-R

Mehrabian and Russell's (1974) stimulus organism response, S-O-R, has been used in numerous studies to examine the influence of environmental cues. The SOR model indicates that various stimuli will influence a consumer's cognitive and/or affective state (organism) which in turn will determine the consumer's response. Stimuli are external cues to consumers that grab their attention. In the online retail environment, these stimuli have been defined as all the visual and audible cues that can interact with a consumer. These online stimuli can be presented in a variety of forms such as product reviews, 3D product viewing, and visual aesthetics of a site, etc. The organism reflects the cognitive and affective internal processes that intervene between the stimuli and final end behavior or response. The intervening process of cognitive and affective state are composed of the information processing portion that is most commonly referred to as the cognitive state and the affective state composed of feelings or emotions. The response portion of the SOR model has been used in many forms under the broader categories of perceptions or behavioral intentions and acquisitions of products (Benlian, 2015; Eroglu et al., 2001).

High and Low Task Relevant Cues

Eroglu, Machleit, and Davis (2000) hypothesized that the online store environment can be categorized into high and low task relevant cues. High task relevant cues were defined as the verbal or pictorial site descriptors that appear on the screen which guide and allow the shopping goal attainment. On the other hand, low task relevant cues are the site information that are somewhat unimportant to the completion of the task. High task relevant cues include the following: descriptions of the merchandise, price, terms of sale, delivery, return policies, pictures of merchandise, product reviews, navigational aids, etc. whereas low task relevant cues

are comprised of elements such as colors, borders, font, animation, sounds, music, entertainments, decorative pictures, etc. High task relevant cues are utilitarian in nature. Whereas low task relevant cues are thought of as opportunities to increase hedonic or experiential value of shopping. In an online environment, these cues are more influential as ambient and social factors are lacking, and these task relevant cues are believed to be able to trigger memory of previous shopping trips in brick and mortar stores (Eroglu et al., 2003; Koo, Cho, & Kim, 2014; Richard & Habibi, 2016).

Koo et al. (2014) examined consumers' delight as the emotional response mediating the effect of atmospheric cues on purchase intention in an online environment. They named their high task relevant cues information cues and their low task relevant cues were called visual cues. Consumer delight was described as the emotional response involving pleasure, arousal, and surprise. Koo et al. (2014) found that when consumers identify with the online stores, they form more favorable perceptions of both visual cues and information cues. Koo et al. (2014) also found visual cues to have a stronger impact on a consumer's delight; thus concluding that online stores should place more importance on improving visual cues to generate delight in consumers thus leading to increased purchase intention.

Zhang, Lu, Wang, and Wu (2015) investigated the impacts of social media environments and co-creations experience on customer participation. The social media environments were analyzed using high and low task relevant cues. The high task relevant cues were called task relevant (TR) cues and referred to the site description as well as aspects of goal attainment such as security, ease of navigation, and information fit to task. Zhang et al. (2015) named the low task relevant cues as affection relevant (AR) cues in this study, and these cues consisted of factors such as images, visual presentation, and music. These cues were considered a crucial

aspect to creating a lasting customer experience through an affective environment. They also noted that the cognitive and emotional reaction on a site could be induced by the affection relevant cues meaning the cues would in turn influence behavior. The AR cues were operationalized through perceived visual appeal and the TR cues were operationalized though perceived information fit to task. Zhang et al.'s (2015) study concluded that the TR cues to have a stronger influence on co-creation experiences in comparison to the AR cues which are in line with other studies' conclusions of a stronger significance of hard task relevant cues to low task relevant cues.

Floh and Madlberger's (2013) study focused on the role atmospheric cues have in influencing impulse buying behavior. They examined three types of atmospheric cues: e-store content, e-store navigation, and e-store design. E-store navigation is considered a high task relevant cue and e-store design is considered a low task relevant cue. Floh and Madlberger (2013) found that e-store design did indeed affect impulse buying behavior through the mediation variables of shopping enjoyment, browsing, and impulsiveness. E-store design was the strongest factor influencing impulse behavior thus indicating the importance to retailers as the site's design is easily manipulated and controlled.

Eroglu et al. (2003) tested the hypothesized high and low relevant task cues using the S-O-R framework with a fictitious T-shirt site. One site contained only high relevant task cues whereas the other site contained both high and low relevant task cues. The moderating factors of involvement and atmospheric response were included as well. The study confirmed that online store atmospherics did indeed make a difference in consumers' shopping behavior. An increase in atmospheric qualities was said to increase the level of pleasure felt by the shopper. The study

also confirmed the moderating effects of involvement and atmospheric responsiveness on the relationship between the site atmosphere (high and low task relevant cues) and emotion.

Richard and Habibi (2016) developed and tested an advanced model on consumer behavior focusing on atmospherics cues and the mediation roles of hedonism and culture. They selected two high task relevant cues (effectiveness and information content) and one low task relevant cue (entertainment), and three cultures (North American, Chinese, and Middle Eastern). They found the low task relevant cue of entertainment to be stronger for Chinese culture claiming the more context sensitive a culture is the more low task relevant cues are valued. In comparison, the high task relevant cues of effectiveness and information were stronger for North American culture then it was for Chinese culture, once again suggesting that low context sensitive cultures place more value on high task relevant cues (Richard & Habibi, 2016).

Mobile Design Features

Retailers need to optimize their apps for a seamless consumer experience, for example, eBay deleted the ads from its app to optimize the viewing interface by make it less distracting for making purchases (Mau, 2013). This is an example of how retailers can modify their atmospherics. Atmospherics in a mobile context can be better described as mobile design features. Mobile design features, in this study, are the low task marketing elements that constitute the visual layout of a mobile app.

Magrath and McCormick (2013a, 2013b) focused on developing new framework to capture the design elements of mobile apps for the fashion retail industry. They argued that the design elements that are used for e-commerce design (online sales sites) cannot be directly translated to a mobile site or app, and to assume such could cost the retailer potentially lost profit.

Magrath and McCormick (2013b) found 18 individual design elements and grouped them into 4 stimulus categories. Those categories were (a) multimedia product viewing (video, image interactivity, and graphics), (b) informative content (practical product information, practical service information, trend information, style advice, and social media), (c) product promotions (coupons, incentives, rewards, discounts, competitions, and social media promotions), and (d) consumer-led interactions (personalization, customization, and augmented reality).

Constructs of Mobile Design Features

Multimedia product viewing. Multimedia product viewing is the consumer's ability to see product selections of the retailer's store via multimedia features thus creating an interactive and sensory environment (Gulliver & Ghinea, 2010). It has been said to improve involvement as well as provide customer satisfaction, enjoyment, information and entertainment (Gulliver & Ghinea, 2010; Simmons, 2007). These features could be videos, graphics, and/ or image interactivity such as zoom or rotation (Magrath & McCormick, 2013b; McCormick & Livett, 2012).

***Video*.** Dennis, King, Kim, and Forsythe (2007) classified videos as multimedia product viewing elements when they are produced to sell and market products. Videos are important for the enhancement of the consumers' shopping experience (Kim & Lennon, 2010); they could be videos of fashion week shows or product promotion videos as well as catwalk videos that help consumers visualize what the product looks like in action. Videos are intended to enhance visualization of a product as well as to promote the product (McCormick & Livett, 2012).

Graphics. Graphics are pictures, logos, or images that are used for either marketing purposes or retailers' brand strategy (Rowley, 2004). Graphic imagery either illustrates the product (product imagery) or promotes the product (promotional imagery) (Ha, Kwon, &

Lennon, 2007). Product imagery refers to the images of products for viewing and purchasing. The images offer an accurate representation of garment appearance therefore being of high relevance for a customer (Ha et al., 2007; Ha & Lennon, 2010). For mobiles, these images are laid out as small thumbnails due to screen size limitations (Kim, Kim, & Lennon, 2006; Kim & Lennon, 2008; Santos, 2003). Because retailers are aware of the positive effects of larger pictures, the increase of mobile screen size allows for the capitalization of full screen mode. Promotional imagery while it displays products in the same manner that product imagery does differs due to its advertising purpose (Ha & Lennon, 2010). These images can also be categorized as a sales promotion tool that influences purchase intention and enjoyment (Fiore, 2002).

ITT. Interactivity uses product viewing functions such as zoom, close-up pictures, and 3D models to enhance experience. Interactivity enables both hedonic and utilitarian user experiences through the delivery of entertainment while reducing time and effort. Higher interactivity leads to increased influence to browse, attitudes, purchase intention, and other behavioral intentions. Virtual technology also belongs within the construct of interactivity (Fiore & Jin, 2003; In Shim & Lee, 2011).

Mobile apps that incorporate ITT elements may increase the influence on a variety of behavioral intentions such as satisfaction, trust, and purchase intention (Dennis et al., 2007; In Shim & Lee, 2011; Li, Daugherty, & Biocca, 2001). Most transactional fashion apps do have partial ITT elements incorporated into them such as 360° views, enlargement option, etc. (Shao Yeh & Li, 2009).

Informative content. Informative content is purely textual consisting of readable text with the goal of informing the consumer (Grandon & Ranganathan, 2001; McCormick & Livett,

2012). It at times can have visual aids, but its goal is to pass along information to the consumer about the product or service at hand. Informative content can include product information (McCormick & Livett, 2012), service information (Huizingh, 2000), company information, FAQs (Lohse & Spiller, 1999), and fashion information (McCormick & Livett, 2012), all of which are information based (Magrath & McCormick, 2013b). The design of information needs to be portrayed accurately as consumers may be influenced to engage with the site through browsing and/ or purchasing (Cyr, 2008; Lu & Rastrick, 2014). Because informative content is any copy found on the app with the intention of informing the consumer, it is considered a hard task relevant cue. Magrath and McCormick (2013b) hypothesize five elements of informative content: product information, service information, trend information, style advice, and social media.

Product information. The worded content that accompanies a product image informs the consumer about that product to aid understanding (Ha & Lennon, 2010; Rowley, 2009). Product related information includes color, price, care instruction, product content, and sizing availability (Kim & Lennon, 2010). This information helps to instill a sense of trust and satisfaction with the retailer; thus, product information is essential (Simmons, Thomas, & Truong, 2010). This is especially true when shopping through a mobile app as it may help to ease consumers' perception of risk (Dennis et al., 2007).

Service information. Any information used to inform consumers of retail services falls under the umbrella of service information (Rowley, 2009). This includes information related to careers, store locations, FAQs, contact info, delivery and return information as well as company policies (Lohse & Spiller, 1999; Magrath & McCormick, 2013b). In an app, this information is usually condensed and normally only includes relevant and practical information for services

associated with the app such as delivery and return information. However, it is important to note that while all the typical service information is not embedded within the app, it is usually present but will open in the mobile browser. For instance, if a consumer was interested in career opportunities, that information would open through a mobile browser instead of within the app. While this information may not be used as frequently as product information, it has been found that high quality service information will increase a consumer's sense of satisfaction (Ha & Lennon, 2010) as well as delivery and return policy information.

Trend information. Siddiqui, O'Malley, McColl, and Birtwistle (2003) believe trend information to be an expected trait of fashion retailers. Retailers inform consumers of newest trends through blogs and look books. This information not only informs but also promotes the retailers' product assortment (Dawson & Kim, 2010). Trend information has been found to induce feelings of pleasure and inspiration while adding value to the consumer's experience (McCormick & Livett, 2012; Siddiqui et al., 2003). However, while some mobile apps do have trend information on their app; Magrath and McCormick (2013b) note that this information may not be as essential for the on the go consumer.

Style advice. Style advice differs from trend information. Style advice assists and makes recommendations to consumers. Style advice aids consumers by assisting them through the discovery of new products as well as aiding in the purchase decision process (Hsiao, Lin, Wang, Lu, & Yu, 2010; Ranganathan & Ganapathy, 2002). Consumers are often offered suggestions on how to wear an item, what other items people typically purchased or browsed when viewing an item, and alternative items they may also like. This type of information often stimulates strong hedonic experiences (Jayawardhena & Wright, 2009; McCormick & Livett, 2012).

Social media. Social media content is created by either retailer, consumers, or a third party. Its sole purpose is to enhance entertainment, add value, and promotion (product or brand) (Kaplan & Haenlein, 2010; Mangold & Faulds, 2009; Shin, 2010). The content is typically spread through social media platforms and can be integrated within the app. While social media is believed to encourage consumer interaction, often it is used as a medium to inform consumers of events, news, and promotions. While web sites use social media platforms such as Twitter or Facebook, Kaplan and Haenlein (2010) found that numerous apps utilize newsletters or blogs (Keng & Ting, 2009; Magrath & McCormick, 2013b).

Product promotion. Product promotion encompasses promotion of the retailers' products as well as price markdowns to increase purchase intention and sales (Tong, Lai, & Tong, 2012). Promotions are a persuasive incentive enticing the consumer to purchase the product (Park & Lennon, 2009). Product promotions will often contain visual and textual information to create powerful persuasions. Magrath and McCormick (2013b) indicate the high relevancy of product promotion to mobile store design and merchandising. The following six product promotion techniques are held as most suitable for mobile apps: coupons, incentives, rewards, discounts, competitions, and social media promotion.

Coupons. Coupons remain one of the most popular form of sales promotion (Solomon, 2009). Consumers obtain a heightened sense of product value through the usage of promotional codes; these codes often lead to an increase in purchase intention (Park & Lennon, 2009). Some retailers' coupons not only work through the mobile app but in fact also work in stores leading to in store patronage as well as brand image congruity (Fiore & Jin, 2003; Muller, 2008).

Incentives. Incentives are a sales tactic to encourage product consumption due to a convincing motivation. Some of the more familiar incentives are buy one, get one free, buy one

get one half off, shipping discounts such as free shipping over 50 dollars. These incentives are often loyalty based encouraging consumers to buy more to receive the discount. Mobile app incentives are identical to web site incentives (Dawson & Kim, 2010; Meyer-Waarden, 2008).

Rewards. Rewards specifically refer to retailer loyalty rewards (Meyer-Waarden, 2008). In other words, the benefits of being a frequent shopper. These rewards include the sharing of discount codes, price promotions and gifts (Park & Lennon, 2009) usually distributed through a loyalty card or email list (Singh, Veron-Jackson, & Cullinane, 2008). Rewards are one type of customer retention technique as they show gratitude for consumers continued patronage (Chaffey, Ellis-Chadwick, Mayer, & Johnston, 2009). Rewards on a mobile app platform can be either mobile only discount codes or mobile exclusives. Some apps in fact offer a reward on the initial download of the app; Singh et al. (2008) suggest this act alone showcases loyalty intentions (Magrath & McCormick, 2013b).

Discounts. Discounts take a percentage off the original price of a product without the need of a coupon (Lowe, Maxwell, & Estelami, 2010). Retailers use discounts to promote sales in hopes to increase impulse purchases decisions. Other types of discount sales include clearance, seasonal, and limited time only sales (Dawson & Kim, 2010; Lowe et al., 2010). All discount sales are geared towards increasing purchases and profits. In the mobile environment, there is an additional type of discount sales referred to as a sales event. These events are usually displayed on the home screen in the form of a banner. This banner typically stays at the top of the screen regardless of where the consumer is within the mobile store. This is intentional as it aims to increase sales awareness (Magrath & McCormick, 2013b).

Competitions. Some retailers hold competitions in which consumers may enter in hopes to win the prize. Competitions are a direct and influential manner to obtain consumers' personal

information to use later for direct marketing purposes (Chaffey et al., 2009). They also generate retailer publicity while creating a buzz that drives consumer interest. Competitions may also help with the building of retailer-consumer relationships (Rowley, 2009; Solomon, 2009). However, competitions are uncommon in fashion retailer mobile apps (Magrath & McCormick, 2013b).

Social media promotion. Self-enhancement for the consumer is created through the ability to share product information and promotions with virtual friends through social media platforms (Ho & Dempsey, 2010; Jayawardhena & Wright, 2009). Many retailers incorporate social media within their page allowing consumers to voluntarily share or recommend products to their "friends". Social media promotion is a consumer centric tool that generates an increase in word of mouth intention (Ho & Dempsey, 2010; Magrath & McCormick, 2013b; Rowley, 2009; Singh et al., 2008).

Consumer led interaction. These are used to aid the consumer's experience and service but by their, the consumers', own lead. Consumer led interactions do not intentionally promote the product but instead focus on giving consumers control over their experience, therefore, creating personalized shopping experiences (Lee, Yejean Park, Kim, Kim, & Moon, 2011; Ranganathan & Ganapathy, 2002). Consumer led interaction is the consumer's personal and unique interaction with the mobile app design stimuli (Yoon, Choi, & Sohn, 2008). They are identified in an app by determining if consumers have control over how they interact with the content or how they benefit from the interactive experience with the retailer or app (Lee et al., 2011). Incorporating these elements into a mobile app can lead to an increase in customer satisfaction (Dholakia & Miao, 2009) as well as lay the building blocks to developing a consumer-retailer relationship (Feinberg & Kadam, 2002).

Relationships between the consumer and the retailer are possible via the internet, and these interactions center around quick and relevant exchange of information, perceived consumer control, and the ability to create experiences using virtual or digital imagery. Because of this Magrath and McCormick (2013b) suggest the mobile design category of consumer led interaction features are comprised of three elements: personalization, customization, and augmented reality.

Personalization. Personalization affects consumer satisfaction, loyalty, patronage intentions, and brand relationships (H. H. Chang & Wang, 2011; Kalyanaraman & Sundar, 2006; Nguyen & Mutum, 2012; Srinivasan, Andderson, & Ponnavolu, 2002). It is inarguably a vital element of site design. The retailer can provide personalized features through the personal information gathered through the consumer's interactions with the site. This allows individual personalization as well as target need based solutions (Vesanen, 2007). On mobile apps, this may be displayed through promotion targeted at what the consumer last viewed or views the most. It may also suggest products not viewed based on mobile shopping behavior (Goldman, 2010; Magrath & McCormick, 2013b).

Customization. Customization is the tailoring of settings to a consumer's desired specifications. Communication with a consumer should be determined on a product by product basis as Weathers, Sharma, and Wood (2007) found evidence for a distinction between experience goods and search goods regarding effectiveness of communication practices. Allowing consumers to have control over search good information has been shown to reduce uncertainty while increasing enjoyment. Online, this can be seen through presenting information in a non-fixed format such as the usage of hyperlinks or on an app, it allows consumers to filter product reviews by an assortment of features thus creating a form of customized information

(Manganari, Siomkos, Rigopoulou, & Vrechopoulos, 2011; Mild & Reutterer, 2003; Weathers et al., 2007). The ability to filter products on an app has been found to produce higher levels of satisfaction and trust (Shao Yeh & Li, 2009).

Augmented reality. Augmented reality overlays digital data over a live camera feed giving the appearance of the digital imagery being present in the physical world in a computer mediated environment (Li et al., 2001; Yuzhu Lu & Smith, 2008). In contradiction to virtual reality, augmented reality becomes a part of the real environment instead of creating life-like scenes (Yuzhu Lu & Smith, 2008; Shim & Lee, 2011). Augmented reality can enhance product viewing but it is an element in which the consumer controls what items to view and whether to use it at all. Mobile apps geared toward apparel and accessories have seen the use of augmented reality in glassware retailers where the consumers can digitally place the selected glasses on their face (Magrath & McCormick, 2013b). Augmented reality has also been utilized in the beauty industry as well as in the homewares market.

Mobile constructs in research

Multimedia product viewing, product promotion, and consumer led interactions can be said to be elements that make up the low task visual design. The visual design is the aesthetics of a site by using elements in terms of "balance, emotional appeal, and uniformity of the website overall graphical look" (Cyr, 2008, p. 53). Hsu (2012) found that the more effective the visual design, the easier time consumers have, therefore, improving a consumer's intention to use a site. Aesthetics had little influence on consumer's evaluation of a website (Lončaric´, Prodan, & Ribaric´, 2016).

Hasan (2016) examined the impact of website design (visual, navigation, and information design) on a consumer's perceived irritation in an online shopping environment. Ninety-three

undergraduates and graduate students at a university in the Midwest who had made a purchase online in the past year participated in a simulation experiment. A real apparel site was used to simulate the online shopping process with participants exiting out before a transaction was completed. Hasan (2016) found that visual, navigation, and information design were all significant predictors of customers' perceived irritation therefore explaining a site's undesirable visual design could produce feelings of irritation towards the site. The design features such as poor layouts, small font size, undesirable contrast of color, and inappropriate graphics should be avoided to decrease the likelihood of feelings of irritation toward a site. Hasan (2016) noted the importance of good visual design to sites that sell apparel products as it is the only way for a consumer to assess a product's look, feel, and quality.

Hasan (2016) found information design to be a significant indicator of perceived irritation; however, was not as strong of an indicator as its counterparts (visual design and navigation design). Hasan (2016) believed this could be due to the nature of the study as participants were not required to make an actual purchase in the simulation experiment. Therefore, little information seeking tendencies were required.

Research has shown that atmospherics have been analyzed from various aspects including brick and mortar and websites. Atmospherics have usually been approached from a high and low relevant task cue lens. The focus of this research is low relevant task cue, specifically mobile design features. However, it is important to contrast the low task mobile design feature elements of a mobile app with high task relevant cue. High task relevant cues focus more on utilitarian based motivation and have often been shown to influence factors such as usability, ease of use, and emotion. While high task relevant cues are important as is evident by the body of research, there is more to a mobile app than these especially when the switching

cost barrier is low. Retailers must go beyond high task relevant cues to continue to drive traffic and promote other end behavior.

Pleasure, Arousal, Dominance (PAD)

A store's environment, a website's layout, or as in the case of this study, a mobile app's design features create an atmosphere. This atmosphere generates emotional responses from the consumer. The way consumers respond will in turn affect their behavior. According to Mehrabian and Russell's (1974) S-O-R paradigm, all emotional responses elicited can be categorized into three states: arousal-non-arousal, pleasure-displeasure, and dominance-passivity (Mehrabian & Russell, 1974; Ridgway, Dawson, & Bloch, 1990).

Pleasure is the evaluation of feelings ranging between depression to ecstasy. The emotional state of pleasure consists of strong preference towards stimuli, positive reinforcement, and satisfaction. Arousal is defined as an active response to stimulation that measures readiness. Arousal can range from feelings of calm and unresponsive to high alert. Dominance is the extent to which individuals feel control over or controlled by the environment. In other words, dominance level ranges from submissiveness (controlled by the environment) to displaying complete mastery over the environment (control over) (Clark, Ezell, Clark, & Sheffield, 2009; Lutz & Kakkar, 1975; Mehrabian & Russell, 1974).

Functional features of a retail environment can create affective responses in consumers and mood and emotions are the outcome of consumer response to the stimuli (Cheng, 2009; Roy & Tai 2003). Novak, Hoffman, and Yung (2000) examined the relationship between online experiences and consumer behaviors; it was found that web site features have an impact on arousal. Wu, Lee, Fu, and Wang (2013) concluded that the layout design of a site as well as the atmosphere had a positive influence on the emotional states of arousal and pleasure. Kim and

Lennon (2013) analyzed the effect of website design on emotion as part of a larger study on website quality and reputation. They concluded that website design did in fact have a significant influence on a consumers' emotional state. Mummalaneni's (2005) investigation of web site characteristics, emotional response, and shopping behavior revealed a positive influence of web site characteristics on pleasure and arousal, in addition the research supported the notion of a consumer's emotional state influencing their shopping behavior; however only pleasure and arousal were analyzed. Therefore, based on the S-O-R paradigm and past research, it is safe to conclude that mobile design features will have similar positive influences on a consumer's emotional state in the same manner that a website has had on consumers (see Figure 2.1). Therefore, this study proposes:

H1a: Multimedia product viewing will have a significant positive affect on pleasure.

H1b: Multimedia product viewing will have a significant positive affect on arousal.

H1c: Multimedia product viewing will have a significant positive affect on dominance.

H2a: Product promotion features will have a significant positive affect on pleasure.

H2b: Product promotion features will have a significant positive affect on arousal.

H2c: Product promotion features will have a significant positive affect on dominance.

H3a: Consumer led interaction features will have a significant positive affect on pleasure.

H3b: Consumer led interaction features will have a significant positive affect on arousal.

H3c: Consumer led interaction features will have a significant positive effect on dominance.

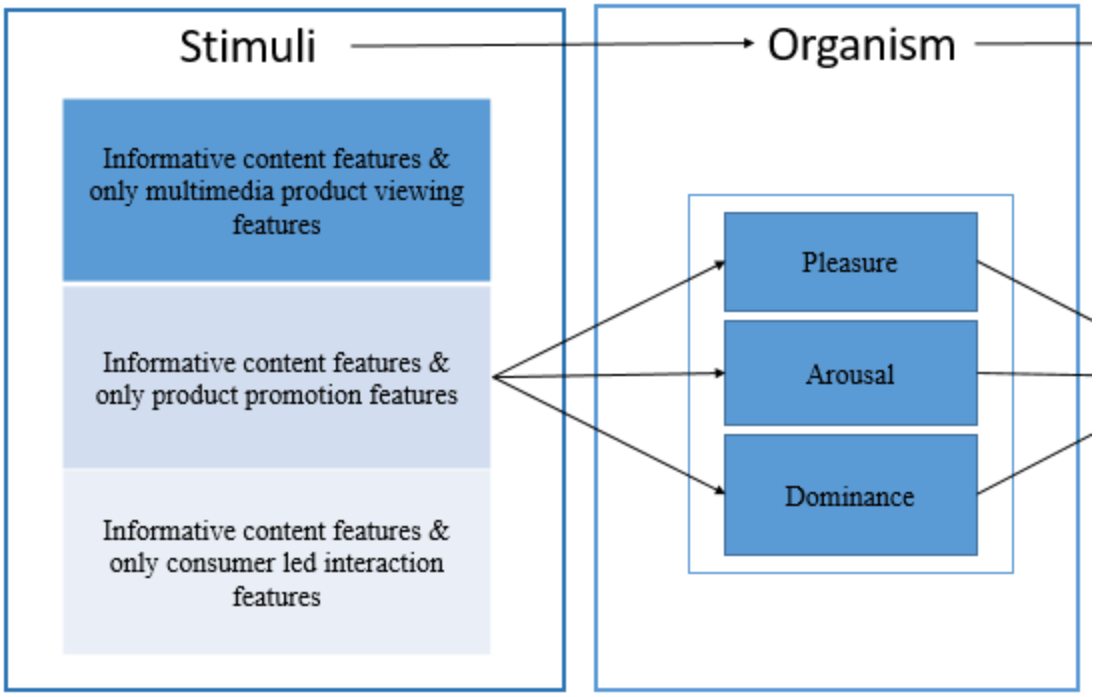


Figure 2.1 Stimuli and organism phase of model

Stickiness

Lin, Hu, Sheng, and Lee (2010) define stickiness as the length of a customer's visit whereas Xu and Liu's (2010) definition of stickiness focuses on the site's ability to attract and retain customers. On the other hand, Li, Browne, and Wetherbe (2006) define stickiness from a user's perspective as repetitive visits and usage of a preferred site because of an emotional connection. In a similar manner, Lin (2007), defined stickiness as the intention to continue browsing on a website. Website stickiness is the capability of a site to draw and retain customers. It is the culmination of all web site qualities that entice visitors to remain on one site over another (Reichheld & Schefter, 2000; Zott, Amit, & Donlevy, 2000). A site's stickiness is the inherent worth of a site resulting on users' attention on the site's content (Benlian, 2015); the goal being for browsers to spend more time, navigate more deeply into the site platform, and to make frequent returns. For this study, we adopt Racherla et al.'s (2012) definition of mobile app

stickiness. Racherla et al.'s (2012, p. 28) defined mobile app stickiness as "the time users spend interacting with an app and how often consumers use the app to accomplish specific tasks."

Stickiness increases with interactivity and if a retailer's customer base perceives value in the site, stickiness will increase. Stickiness is dependent on a variety of factors such as website quality, satisfaction, attitude towards the site, and value (Li et al., 2006; Wang, 2010). Research has also shown that stickiness is influenced by content value, context value, infrastructure value, and promotional value of an e-retail website (Beldona & Cai, 2006; Xu & Liu, 2010). In addition, if a consumer likes (emotion) a site, the intention to stick to the site increases (Hoffman & Novak, 1996).

Stickiness is one of the most important characteristics of a site as it is a vital antecedent to customer commitment, trust, and loyalty (Li et al., 2006; Wang, 2010). Stickiness has often been considered an antecedent to loyalty which directly impacts a retailer's bottom line; therefore, businesses have put much emphasis on effective site design and strategies to increase positive return behavior by improving site' stickiness (Lin et al., 2010). For consumers, stickiness is highly related to the "interestingness" of the site showing their level of satisfaction to an extent. The stickier a site is, the more satisfied a consumer appears (Novak et al., 2000). High levels of consumer stickiness are associated with attraction, conversion, and retention. All of which are desirable qualities that businesses are interested in (Agarwal & Venkatesh, 2002). If a consumer has positive emotions towards a mobile app, the more likely they are to spend more time and return more often thus increasing stickiness toward the mobile app. Therefore, this study proposes:

H5a: Pleasure will have a significant positive affect on mobile app stickiness intention.

H5b: Arousal will have a significant positive affect on mobile app stickiness intention.

H5c: Dominance will have a significant positive affect on mobile app stickiness intention.

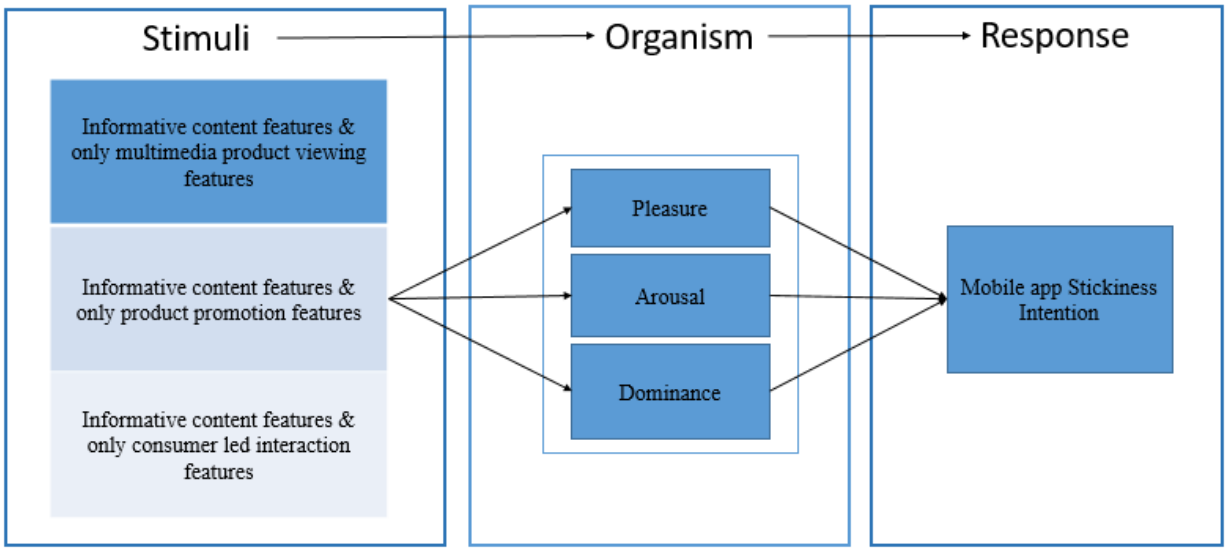


Figure 2.2 Full proposed model

CHAPTER 3 THEORETICAL FRAMEWORK

Chapter 3 includes (a) overall research gaps, (b) Magrath and McCormick (2013b) m-marketing design framework, (c) Mehrabian and Russell (1974) S-O-R paradigm, (d) proposed conceptual model, and (e) summary of research hypotheses.

Overall Research Gaps

It has long been agreed that the environment in which consumers shop will impact their purchasing decisions. Kotler (1973) coined the term atmospherics to refer to the creation of this shopping environment. Specifically, the way in which a shopping environment is created will affect both psychological and behavioral shopping outcomes. Baker (1986) created a typology of the environment forming three categories: social, design, and ambient factors. Bitner (1992) expanded Baker's (1986) work, analyzing the social elements impact the service industry. While Bitner (1992) redefined the preexisting typology; the dimensions are in line with the original and serve as another milestone into the significance atmospherics play in the shaping of consumer decision process.

The 1990s was the decade of the internet; however, by the early 2000s; it was clear that the internet would remain as a mainstay medium for shopping. Therefore, many researchers conducted numerous studies in online consumer behavior and atmospherics. It was then that Eroglu et al. (2000) applied the traditional brick and mortar atmospherics concept into the online retail setting. Eroglu et al. (2000) found the online store environment to be divided into two factors: high task relevant cues and low task relevant cues. High task relevant cues consisted of all the information and vital aspects of a shopping experience needed for a consumer to make a

purchase. On the other hand, low task relevant cues were the nonessential elements to complete a purchase such as color, graphics, and other entertainment aspects. Since then much research has been conducted to shape our understanding of how a physical and online store environment will impact all aspects of the consumer's decision process. While research into store environment is vast (Eroglu et al., 2003; Floh & Madlberger, 2013; Hsieh et al., 2014; Mazaheri et al., 2014; Richard & Habibi, 2016; Zhang et al., 2015), and much of the groundwork has been laid; there is little research into how the "atmospherics" of the mobile environment will begin to shape the mobile consumer decision process.

M-Marketing Design Framework

With the growth of the smartphone in the US still rising, it is essential for retailers to have a thriving and successful mobile channel. Because this channel unlike any of the others is ubiquitous, retail marketers have the challenge of creating a successful advantageous extension of their preexisting channels. While researchers have explored the impact of marketing, stimuli, design, information process, and emotion, in the online environment, few have analyzed the effects of the marketing design for a mobile application (app).

One of the reasons to study mobile apps is the need to understand the differences between mobile and online channels for retailers to select the best medium for their needs. This is especially true as mobile phones display challenges unrelated to desktops or laptops such as small screen size, internet data concerns, and localization features. Because of these issues in conjunction with the lack of understanding of the mobile environment, it is necessary for research to delve into the atmospherics of mobile, specifically mobile apps.

Magrath and McCormick (2013b) developed a framework to analyze the components of a mobile app for a fashion retailer. As shown in Figure 3.1, the framework consists of 4 factors:

multimedia product viewing, informative content, product promotions, and consumer-led interactions. Each factor then contains three or more elements hypothesized to belong to each factor. However, it is important to note that many of the constructs have been created with online literature due to the infancy of mobile literature (Magrath & McCormick, 2013b). This high- lights the need for research into mobile application atmospherics even more as only through research will it be made clear which factors and elements are important to mobile application marketing, and specifically which factors and elements will impact a consumer's purchase decision process the most.

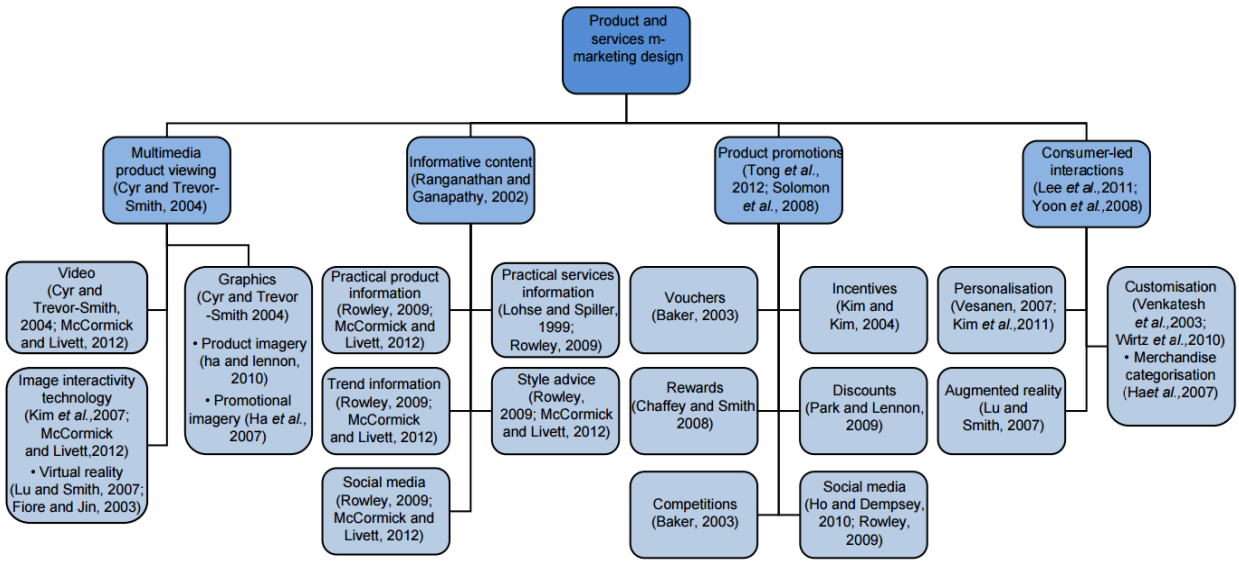


Figure 3.1 Magrath and McCormick (2013b) M-marketing design framework

S-O-R Paradigm

Mehrabian and Russell's (1974) Stimulus-Organism-Response paradigm has often been used to examine store environments. As shown in Figure 3.2, the paradigm hypothesizes that stimuli (environmental cues) will affect the organism (consumers' emotional state), which in turn affects their response (behavior). Mehrabian and Russell's (1974) study of semantic differentials concluded "human judgments of diverse samples of stimuli can be characterized in terms of three

dimensions: evaluation, activity, and potency" (p. 28). From these dimensions, they linked the appropriate emotional responses that is now referred to as PAD (pleasure, arousal, and dominance). PAD measures the affective, emotional state of consumers. Approach or avoidance is the most common hypothesized response to the SOR framework. Many take approach response as a positive outcome behavior such as purchase intention and brand loyalty and avoidance as a negative outcome behavior such as perceived irritation or switching intentions.

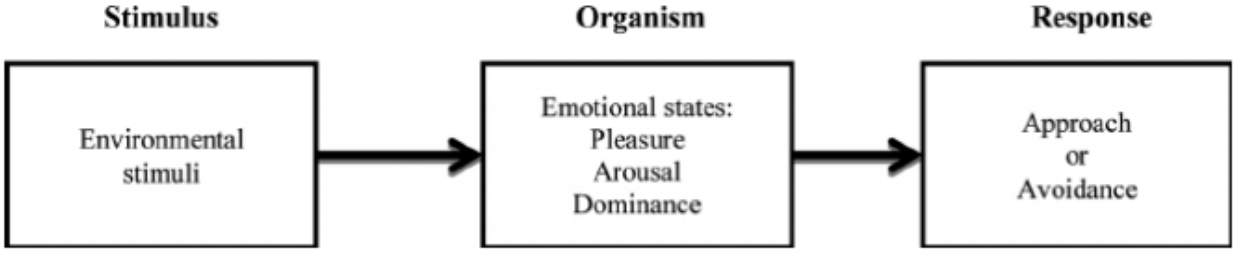


Figure 3.2 Mehrabian and Russell (1974) S-O-R framework

Proposed Conceptual Model

Based on Eroglu et al.'s (2001) study of atmospherics in conjunction with the proposed mobile marketing framework of Magrath and McCormick (2013b), it is proposed that mobile application design features will influence consumers' emotional state and in turn affect their mobile app stickiness intention, see Figure 3.3. This study proposed an experimental design using the S-O-R paradigm. Stimuli will be created isolating each of the low task relevant mobile application features (multimedia product viewing features, product promotion features, and consumer led interaction features) and all high task relevant cues (informative content mobile application design features). These stimuli were hypothesized to affect a consumer's state of pleasure, arousal, and dominance with the mobile app and will then affect their stickiness intention toward the mobile app. This study sought to fill the gap in research on the differences between the online environment and the mobile app environment and their influence on consumers' decision process. Also, this study examined the importance of design features that have been deemed not necessary to make a purchase on consumer behavioral intention.

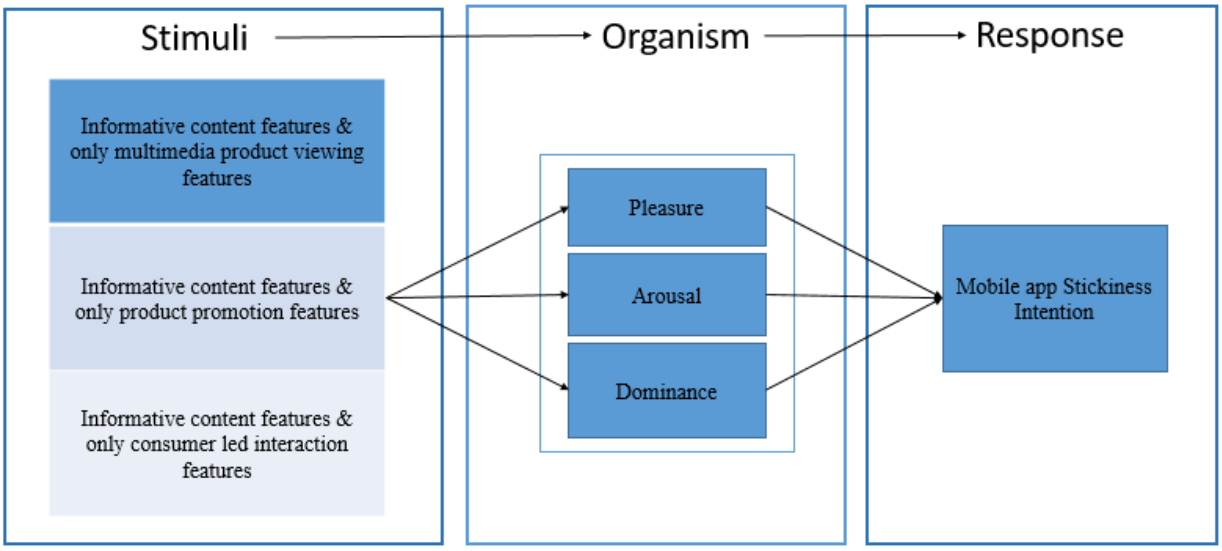


Figure 3.3 Proposed Conceptual Model

Summary of Research Hypotheses

Through the literature review, the following 4 hypotheses were framed in this study.

Figure 3.4 and Table 3.1 display the conceptual model and research hypotheses:

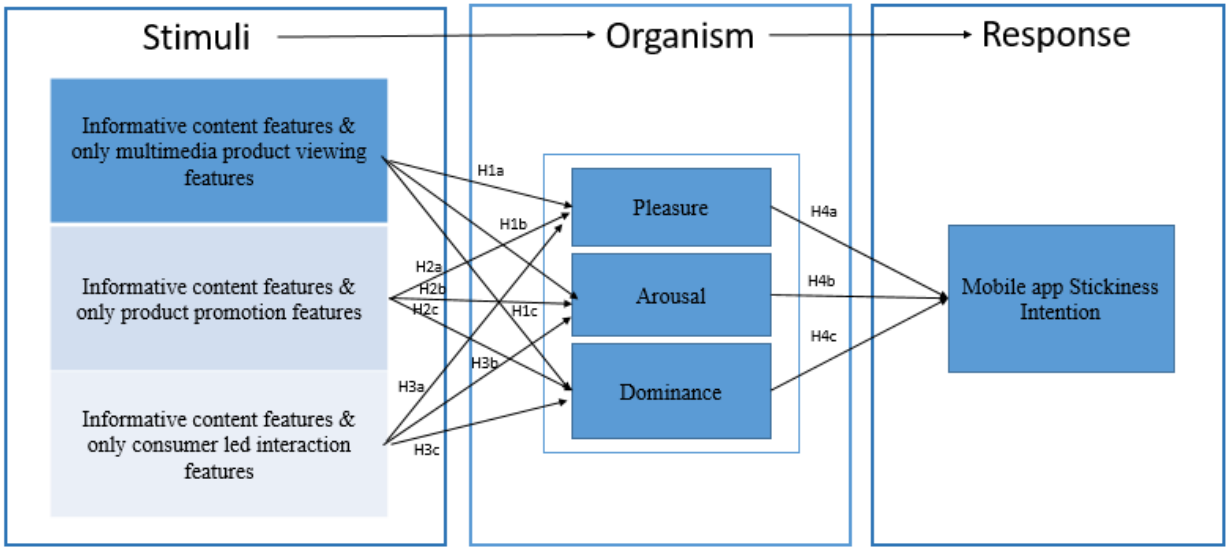


Figure3.4 Full conceptual model with hypotheses

Table 3.1
Summary of Hypotheses

H1a	Multimedia product viewing features will have a significant positive affect on pleasure.
H1b	Multimedia product viewing features will have a significant positive affect on arousal.
H1c	Multimedia product viewing features will have a significant positive affect on dominance.
H2a	Product promotion features will have a significant positive affect on pleasure.
H2b	Product promotion features will have a significant positive affect on arousal.
H2c	Product promotion features will have a significant positive affect on dominance.
H3a	Consumer led interactions features will have a significant positive affect on pleasure.
H3b	Consumer led interactions features will have a significant positive affect on arousal.
H3c	Consumer led interactions features will have a significant positive affect on dominance.
H4a	Pleasure will have a significant positive affect on mobile app stickiness intention.
H4b	Arousal will have a significant positive affect on mobile app stickiness intention.
H4c	Dominance will have a significant affect on mobile app stickiness intention.

CHAPTER 4 METHODS

This chapter includes (a) research design, (b) experimental design, (c) phase 1: pilot study, and (d) phase 2: SOR experiment.

Research Design

The main purpose of this study was to examine the impact of several types of mobile design features (e.g., multimedia product viewing features, product promotion features, and consumer led interaction features) on consumer's behavioral intentions mediated through a consumer's emotional response (pleasure, arousal, and dominance). The research model is presented in Figure 3. In this model, three stimuli are presented to capture mobile design features, each of the three design features with the respected high task relevant cues. A consumers' emotional response (PAD) was the mediator, and mobile app stickiness was the dependent variable. The conceptual model was tested using an experimental design survey method in a mobile application setting. Past research into store environments used experimental design to simulate real life experiences, and this study recreated a real life mobile shopping experience. In addition, the usage of the S-O-R paradigm itself was experimental in nature. Experimental design has high internal validity due to low self-reporting as participants were responding to stimuli mechanisms. However as experimental design creates artificial situations, generalizability was limited due to lower external validity.

Experimental design

As shown in table 4.1, this study employed a 3 (mobile design feature: present/ absent) x 2 (type of scenario: hedonic vs utilitarian shopping trips) experimental design. Participants were

exposed to one of two types of scenarios; therefore, the experiment was manipulated between subjects with each participant viewing only one type of scenario. Each participant was given either a hedonic or utilitarian scenario that simulated a real-life shopping situation in which the participants decided which stimuli, app screen, they would spend the most time interacting with and use most often to accomplish the task (stickiness). For the participant to make a valid choice within each scenario, each participant was exposed to all mobile design features; therefore, mobile design features are a replication factor. Thus, a total of 6 stimuli were created so that each participant saw all three mobile design features in the assigned scenario type, hedonic or utilitarian. To create product variance, 6 products were chosen for each stimulus. Having multiple products in the experimental design helped to reduce between product variance to random error, which in turn strengthened reliability.

Table 4.1 Experimental Design Layout

Scenario type	Mobile Design Features Present		
Hedonic	Multimedia Product Viewing & Informative Content Features Present; Hedonic Shopping Prompt	Product Promotion & Informative Content Features Present; Hedonic Shopping Prompt	Consumer led Interaction & Informative Content Features Present; Hedonic Shopping Prompt
Utilitarian	Multimedia Product Viewing & Informative Content Features Present; Utilitarian Shopping Prompt	Product Promotion & Informative Content Features Present; Utilitarian Shopping Prompt	Consumer led Interaction & Informative Content Features Present; Utilitarian Shopping Prompt

There were two phases of this study. The first phase described the pilot study methods utilized to select mobile design features for stimuli development. The second phase described the methods employed on the main SOR experiment.

Phase 1: Pilot Study for Selection of Mobile Design Features

The purpose of this study was to investigate mobile design features and to see their influence on consumers' emotional response and behavior. Therefore, this study required the need for mobile design features to be selected due to the vast number of features currently present in the design of mobile applications. The selection of mobile design features took a two-step approach.

First, a pilot study was conducted to generate and understand the feasibility of the stimuli being developed for the main study. Pilot studies can be quantitative or qualitative in nature. In fact, researchers often use "qualitative data collection and analysis on a relatively unexplored topic, using the results to design a subsequent quantitative phase of the study" (Tashakkori & Teddlie, 1998, p. 47). Since mobile app research along with low task design features are still a relatively new area of research, a qualitative pilot study was proposed. An in-depth interview was conducted to address the features to be used in a large-scale questionnaire survey (Van Teijlingen & Hundley, 2010).

Qualitative interviews were used as the researcher sought to gain in-depth knowledge from participants about their experiences with mobile shopping apps. In order to create a complete picture of the experiences of the participants, open-ended interview were necessary so that participants could share their depth of knowledge on the topic (deMarrais, 2004). In-depth semi structured qualitative interviews were employed. The researcher was interested in how consumers navigated apps, their behaviors while on an app, how consumers responded to certain features within an app, and their likes and dislikes of an app and its features.

Therefore, in-depth qualitative interviews were collected to determine what mobile design features as well as which high task cues should be selected for stimuli development. The

researcher interviewed seven students and recorded their mobile screen session during the interview. The aim of the interview was to shed some insight into the following stimuli development research questions:

RQ1: To explore mobile applications and features that drive consumer purchases on mobile devices and to understand the typical behavior of the mobile shopper their mobile shopping process.

RQ2: To explore the mobile application design features that aid in consumer shopping process and identify mobile application design features most prevalent in mobile shopping.

Case selection for pilot study

The sample for the pilot study was purposive in nature. Critical case purposive sampling was used as the sample size was small, seven, and the researcher selected participants aware of the phenomena, shopping on mobile apps (Etikan, Musa, & Alkassim, 2016). Critical case purposive sampling is a form of intensity sampling as it seeks to find information rich cases. Thus, intensity sampling seeks individuals who are well informed with the phenomena of interest (Roulston & Martinez, 2015). The pilot study utilized millennial students as the sample. Millennials or Generation Y, individuals born between the years of 1981 and 2004, are the first generation to grow up with technology, and thus are up to date and comfortable with technology and its various uses. This is especially true in the case of smartphones as their usage of smartphones out rank any other generation (Donnelly & Scaff; "Millennials", 2014). Therefore, using millennials as the sample generated an accurate and knowledgeable representation of design features in mobile apps.

Data collection for pilot study

The researcher utilized a phenomenological in-depth qualitative interview. Qualitative interviews are necessary when the goal is for the participant to construct a complete picture of their experiences. This is only possible through in depth qualitative interviews that aim to shed light on each person's view of the phenomena (deMarrais, 2004). Seven participants were interviewed. Each interview lasted no longer than 50 minutes. Before the start of the interview session, each participant was provided a consent letter to be read and signed. Upon signing, the researcher initiated the start of the interview by checking audio as well as the recording device used to capture their mobile screen. The participants also had access to a phone charger to ensure the battery life of their mobile throughout the session. At that time, the researcher reminded participants about the voluntary nature of the study and their ability to not answer a question or stop at any time for any reason. The researcher initiated the interview with the questions as framed in table 4.2. With the completion of the interview, participants put their email and mailing addresses on a slip of paper and inserted them into a box for purpose of a raffle. Two ten-dollar VISA gift cards were used as an incentive for participation although per Georgia law, participation was not necessary for entrance into the raffle. However, only the participants who went through with the interview signed their name on the initial recruitment list.

Table 4.2
Interview Research Concepts and Questions

Central concepts of user-oriented design and research questions	Questions to address each concept
RQ1: To explore mobile application and features that drive consumer purchases on mobile devices and to understand the typical behavior of the mobile shopper during their mobile shopping process	

Mobile App Usage	Tell me about the apps you use most. What needs are the apps satisfying for you? When do you use the apps most? What type of apps do you prefer? What do you expect that app to be able to do? Show me how you navigate within the app? Can you show me the types of app you use to purchase/ shop from? Can you show me the types of fashion apps you use to browse/ aid in purchase decision/ purchase? Take me to your favorite app for shopping. Let's act as if you're looking for a new white blouse/ shirt. Talk me through your shopping process.
Type of Shopper (grouping)	How often do you shop/ browse stores? How long do you typically shop for? What type of products are you usually looking at? Tell me about your most recent shopping experience. Did you end up making a purchase or were you just window shopping? Where do you shop most often? Brick and Mortar? Online? Mobile? What brands do you shop for? On mobile apps?
RQ2: To explore the mobile application design features that aid in consumer shopping process and identify mobile application design features most prevalent in mobile shopping	
Multimedia product viewing	What type of imagery are you looking within the mobile app? Do you view/ expect to view pictures from a multitude of views? Do you watch videos of how the garment/ product look, works, or operate? How often do the apps you interact with have features such as 3D virtual models, "try-On" technology?
Informative content	What type of product information do you find most often when using your app to shop? Do you look for information about retail services within the app? How do you find out about trend information/ style advice within the app? Do you see this type of information often in your shopping apps? Do you look for connections to social media? How often do you use social media with a shopping app? Do you read customer reviews?
Product Promotion	Tell me about a time when you used a sales promotion or when a sales promotion was offered to you while shopping. When shopping within an app how often are, you exposed to coupon, incentives, rewards, or discounts? Do you ever see competitions for grand prizes within your mobile app? Do you share social promotions during your shopping within the mobile app via social media?
Consumer Led Interactions	Within the apps, you frequent most for shopping; do they recommend products you like? Tell me how you feel about that. Does the app allow you to tailor the settings to find the product you're looking for better? What about augmented reality…does any of the apps you use let you try on products on your actual self?

Data interpretations of pilot study

Upon completion of participant interviews and observation, the recorded audio data were downloaded and transcribed through Transcribe.Wreally and exported into Microsoft Word. In adherence to the IRB protocol, all subjects and identity linkage were coded. All names were changed to pseudonyms. Once transcriptions were complete; the researcher double checked the transcription; in addition, any written notes that were not audio recoded from the researcher were added. During this process, the researcher pieced together concepts as well as double check transcripts, requiring the researcher to be fully engaged with the data.

The researcher extracted emerging themes and concepts from the coded and interpreted transcripts. The McCracken's guide (1988) was used allowing a detailed analysis where the researcher is fully immersed and can put together and break apart the data, finding details and moving to general observations. Creswell's (2007) analysis spiral or cyclical process was also used. This process codes and classifies concepts, identifies themes and sub themes through a clustering method in which data is brought together to be pulled apart and brought together in different groupings. The spiral process starts with raw data moving towards themes to only narrow itself down into the most basic themes to represent the data. This method of theme development resulted in numerous more detailed sub themes under the main themes (Creswell, 2007). The goal was to create a prototype of mobile design features for stimuli development.

Pilot analysis and stimuli development

Sample characteristics. After receiving Institutional Review Board approval, a total of twelve participants were recruited through in class recruitment process. The recruitment took place during a fashion merchandising class; however, all students were not fashion majors. The class was selected for convenience; however, intensity sampling does strive to find individuals

who are well informed with the phenomena. In this case, the phenomena of shopping using a mobile app may be best understood by students who have already expressed an interest in fashion. Seven students of the possible twelve participated in the interview process. Table 4.3 illustrates the demographic characteristics of the case study participants. All participants attended a college in the southeast US and expressed a heightened interest in fashion. Participants belonged to the millennial generation and all showed evidence of their smartphones being an essential part of their daily lives specifically through the usage of social media. Shopping purchasing tendencies in the sample ranged from every other week to 4 times a year; however, all participants mentioned browsing on a weekly basis.

Table 4.3 Demographic characteristics of participants

Participant[1]	Age	Ethnicity	Major	Year in School	Frequency of Online Shopping	Type of Smartphone
Rose	21	White	Fashion Merchandising	Senior	2-3times/month.	iPhone 6s
Dawn	21	White	Advertising	Senior	5times/wk.	iPhone 6s
Sonia	22	White	Fashion Merchandising	Senior	2-3times/day.	iPhone
Jasmine		African American	Fashion Merchandising		Less than 1 time/wk.	Droid
Crystal		Asian		Senior	2-3times/wk.	iPhone
Lisa	20	Korean American	Fashion Merchandising and Marketing	Junior	3times/ wk.	iPhone 6
Ginger	22	White	Fashion Merchandising	Senior	2-3times/wk.	iPhone 7+

Note. [1] All participants' names are pseudonyms

Theme interpretation for research question one. Research question one sought to understand the typical behavior of the mobile shopper as well as the drivers of purchase behavior through the features on a mobile app. Upon interpretation of the interview data, two main themes were developed for research question one: shopping habits and purpose of search. In the first theme, shopping habits, participants discussed their normal behavior on their mobile phone

to include typical daily interactions with their device. For the second theme, purpose of search, participants expressed the differences in their behavior based on the nature of their search. In other words, participants shared their experience of how they shopped on a mobile app for a need based purchase versus a "window" shopping purchase.

Shopping habits. Through the exploration of participants' typical routine in relation to their mobile usage, the results of the analysis revealed participants need to use their phone throughout their day to distract themselves as well as to see what everyone in their social circle is doing. In exploring shopping habits, it became clear early in the interview process that many millennials frequented mobile apps specifically social media and retail apps as a way to keep boredom at bay as well as to stay current with what was new in their favorite stores.

> **Sonia:** Um, definitely before I go to sleep, when I wake up, um…in between classes…sometimes in class, haha, uh… just whenever I'm bored

> **Dawn:** Snapchat and Instagram…those are like my go to, and probably like when I'm bored I use Facebook…just scrolling through

> **Rose**: I actually have like a um, folder on my phone that's just labeled shopping for my store apps and stuff…so occasionally I'll actually you know whenever I want to see if you know one of my favorite shops has anything new. I'll just get on the app and look at it and stuff.

Purpose of search. Participants utilized numerous retail apps to shop.; however, they frequented a particular retail app dependent on the reason they were shopping. For instance,

Sonia noted that the placement of her retail apps on her phone were dependent on how often she shopped those apps as well as by average price of the garments.

> **Sonia**: Yeah, these I use more frequently and then these I don't use as frequently or like maybe I don't need to use these as frequently because they're bad for my bank account.

When the researcher asked the participant to walk them through their shopping process given the need to find a specific garment, many participants went to an app they were most familiar with as well as one that they would typically purchase from in comparison to some of the apps they frequented to stay "in the know".

> **Sonia**: I love nasty gal so that's where I would go to probably…I can go here and see what type of dresses…so for wedding maybe I want a black dress so you just scroll through, click on this, heart it where it would save it to my things, or I could just buy it.

In addition, when given a specific item to look for participants immediately begin their shopping process by narrowing down the search as well as by frequenting product reviews or suggested items.

> **Dawn**: So I typically um, if I want a white blouse, I'm usually like…I like to know visually what it looks like on a person

In comparison when Dawn showed interest in a new trend of black crop tops, she spoke of gaining inspiration as well as spending numerous hours just browsing to see the many variation retailers offered of this trend with no real intentions to actually make a purchase.

> **Dawn**: what looks really cute with the stuff that I have, and I try to get inspiration…is it something I really want, what did these girls do with it….it could be anywhere from like 30minutes to 3 hours…if I have absolutely nothing going on.

Theme interpretation for research question two. Upon interpretation of the interview data, three main themes were developed for research questions two (explore the mobile application design features that aid in consumer shopping process and identify mobile application design features most prevalent in mobile shopping): picture and videos, promos, and suggestions. These themes aligned with the mobile design features described previously. The first theme, pictures and videos, aligned with the mobile design feature multimedia product viewing. In this theme, participants discussed their views and experiences with product images and videos as well as their wishes for more features such as these. The second theme, promos, aligned with the mobile design feature product promotion. Participants discussed their experiences with using features such as promo codes, discounts, and love of free shipping. The third theme, suggestions, paired with the mobile design feature consumer led interactions. Participants shared their views toward suggested items and product reviews. Because the themes that emerged during the interpretation of the data aligned so closely with the framework defined by Magrath and McCormick (2013b) and to aid in understanding, the themes are discussed using the mobile design features: multimedia product viewing, product promotions, and consumer led

interactions. These findings helped to shape the understanding of the design aspect of current retail mobile apps.

Multimedia product viewing. Through the exploration of mobile apps' multimedia product viewing, the results of the analysis revealed two features most present in multimedia product viewing: multiple pictures and videos. The participants described their shopping experiences in the need to see multiple images of products and their mixed emotions on the display of video showcasing the product. In exploring multimedia product viewing, it became clear that multiple images had a strong connection to a consumer's browsing behavior.

Crystal: The first thing I do is look at the multiple views.

Sonia: I look at the different pictures and the close-ups of it, what they paired it with sometimes.

Almost all the retail brands mentioned had apps displaying products with multiple views. These views most often involved the participant swiping to the right and was denoted by the presence of an ellipses, showing how many images there were. Some retailer apps such as Nordstrom, Urban Outfitters, and H&M displayed their images by the next view being partly visible. When the number of images displayed was mentioned, Sonia stated "I think it has 3 or 4. Probably at the minimum 3, most 4 or 5 sometimes." Apps that displayed only one or two images were frowned upon as participants voiced their concern over lack of views to be able to gauge what the product looked like from all possible angles, citing it as very important because they were not able to hold the physical garment.

Rose: I hate it, for instance, I love Topshop, but they only give you 1 picture. I guess it just depends on the app.

Sonia: I probably won't buy anything from there because you want to see what the whole thing looks like.

The importance of multiple images was stressed repeatedly. Dawn told a story of getting scammed on Cyber Monday when attempting to purchase boots. Since then she has become very wary and untrusting of retailers. Due to this, she relies on several features to discern the trustworthiness of retailers and their products.

Dawn: I think it's very important I like to be able to see front, back. Um, I think it's really cool that they moved to like 360 view and stuff. Um, that's really cool when companies do that and your kind of able to scroll around and see, but I'm definitely a person where I take it into consideration, like some dresses they have a cute front but the back maybe go down too low. …I'm like well it might go too low for how short I am.

One of the components that arose was the usage of videos to aid in showcasing products. Many participants were indifferent to whether they were present; however, they noted that when they did see a video option they almost always viewed them. When asked what retailers they were familiar with who had video options, it was surprising to find out most of the apps that participants frequented did not have video features, apart

from the mobile retailer, ASOS. Two of the participants noted the importance of videos to help see how the garment flowed on a human form.

> **Sonia**: They have like little videos where you can watch them walk…but if I can't tell if a garment is like tight fitting or loose or exactly how the material is going to look, then it helps because you can see how it flows when you're walking in it.

> **Crystal**: I much prefer the video cause it's like moving, and with the picture you don't know if the model has to sit, stand in an awkward position to make sure the garment looks well…so seeing the video is a lot more ensuring.

Product promotions. Participants utilized numerous forms of promotions; however, they never went searching for them purposely. This could be due to the placement of the promotional material as most participants made remarks of a top banner showing the sales information or pasted in large font on the home screen of the mobile app. Others noted belonging to a loyalty program or signing up for notifications and receiving promotional material through email.

Upon receipt of promotional material, many would begin to browse to see what they would find. Dawn expressed that she is constantly browsing for dresses for formals and parties to attend. While she plans to wear the garments more than once, she always looks for a new dress to wear for the big events. Due to this need, when she stumbles upon a sale, she takes her time to maximize her saving and suit her needs.

Dawn: Recently when I bought my formal dresses from Tibi, it was 50% off your entire order…So I ended up ordering like I think 4 dresses after that. I was like 50% of each dress would be like 12 dollars or something. I can't remember what it was; I used that, that was a big thing…I took advantage of that.

Consumer-led interactions. Participants were split in their view of consumer led interactions. The two most commonly mentioned features were suggested items and product reviews. The suggested items displayed on retail apps were usually of the same style and price point; however, they showcased assorted colors and brands. At times, the retail apps would split these items into 'consumer has recently viewed' or 'other consumers had viewed' and 'you might also like' sections. Half of the participants were indifferent towards suggested items stating they made no difference to them and they never looked at them. While others viewed them in order to pass the time.

Rose: I'll look at them…but I don't want to get distracted so I look at a garment and I'll go back to that page…but if it is something that I'm kind of on the edge about and um then I'll look at the related stuff and see maybe if they suggest something that is similar to this and maybe I'll like it better. Sometimes I do find things…it depends on the price…usually the same price which I don't like cause usually I'm like dang that's a really cute jacket but that is way too expensive. Related products are basically the same price just a different designer and in just a different color so I'm like no that doesn't help me there.

Crystal: Once I browse through pretty much all of my options, I go to the 'you might also like' cause then they'll throw in some color, and then I'll get sidetracked to those, and then I'll like go through those.

All participants expressed their love for and the importance of reviews. Many noted how the retail apps varied on the amount of information posted in reviews. For instance, Rent the Runway and ModCloth were praised for extremely detailed reviews and their ability to allow consumers to post self-portraits wearing the clothes.

Jasmine: Modcloth does it better cause sometimes the review features the customer wearing it themselves. They have very thorough reviews; the fit, if it's true to size, what was wrong with it…and that's important to me.

Rose: I really like how they give the renter access to type in there and give a review…you can say however much you want to say.

Participants were not very pleased when some of their favorite apps like ASOS did not put reviews on product pages and expressed that at times this made them switch apps especially if it was a product that they were unsure about.

Sonia: I'll look at their reviews too. ASOS doesn't give reviews which is sometimes annoying.

Customer reviews also appeared to be vital in the formation of the decision whether to purchase a garment. Participants indicated that when shopping online, these reviews provided necessary information on how the garment wore, how the material felt, and if the money was worth it.

Sonia: I definitely like to look at customer reviews and see how it worked for them.

Crystal: I love them. If a single review says the product is not worth it, I'll move on. I won't even give it a chance.

Stimuli development process. Through the exploration of participants' mobile shopping experiences, many types of retailers were mentioned from department stores such as Nordstrom and Bloomingdales to specialty retailers such as Urban Outfitters and H& M to pure play, online presence only, retailers like ASOS. Using the information gleaned from interview data and exploration of suggested retail apps, stimuli were developed to mimic shopping experiences detailed by the participants. The retail apps and design elements used are shown in table 4.4.

ASOS and Nordstrom were used to create the multimedia product viewing stimuli. ASOS was the only app mentioned that had videos of models displaying the products; therefore, the video icon image was utilized to stimulate this feature. In addition, all apps had the ability to show multiple images of a product. Many participants stated that retail apps had at least three views. All apps showcased the multiple images of a product by swiping left or right on the image usually denoted by the presence of an ellipse at the bottom of the product image. Images from Nordstrom were utilized as the additional images were half displayed opaquely next to the

image urging consumers to swipe right. In addition, the ellipses from ASOS were also utilized to make this feature more evident.

Numerous retailers were utilized to create the product promotion stimuli. This was mainly due to the nature of product promotion as not all retailers have all promotions at the same time; therefore, the retailers used were chosen from the apps participants mentioned in the pilot study as well as retailers who had a current ongoing product promotion at the time of the stimuli creation. Product images and other informative content from Anthropologie, Shopbop and Nordstrom were utilized. Incentive elements utilized were pulled from Anthropologie and Bloomingdales. Bloomingdales was also utilized for reward elements specifically loyalty sign in. Anthropologie and Shopbop were also used to display discount elements through the usage of their clearance section. Many apps used a share option to promote social media promotion; however, Anthropologie had the clearest icon to showcase this element.

ASOS, Rent the Runway, and Nordstrom were chosen to create the stimuli for consumer led interactions. Nordstrom was used for hard task relevant cues as well as product reviews to display customization elements. Images from Rent the Runway and ASOS were used for product selection. In addition, elements from both were manipulated for the creation of "people who viewed this also viewed" and "you may also like" element.

In addition, to the selected mobile design feature (multimedia product viewing, product promotion, and consumer led interactions) all stimuli also showed hard task relevant cues. Through the interview process, hard task relevant cues were aligned with the mobile design feature of informative content. Informative content is textual in nature and includes information consumers need to make an informed purchase such a price, color options, and size.

Table 4.4

Mobile Design Features and Retail Apps Manipulated

Design elements used	Retail apps manipulated
MDF1: Multimedia Product Viewing	
Videos	ASOS; Nordstrom
Graphics	
MDF2: Product Promotion	
Coupons	H&M; Shopbop; Nordstrom; Bloomingdales; Anthropologie
Incentives	
Rewards	
Discounts	
Social media promotion	
MDF3: Consumer Led interaction	
Personalization	ASOS; Rent the Runway; Nordstrom
Customization	

*MDF=mobile design feature

Stimuli check

The findings from the qualitative pilot test were used to create 6-fictional mobile app screens for stimuli development. From the recorded mobile screen interview sessions, the researcher generated a list of the mobile design features and categorized them per the defined factors (multimedia product viewing features, product promotion features, and consumer led interaction features) described previously. Next convenience sampling was used to recruit students from a campus wide listserv to determine the realistic value of the mobile app and

whether it resembles a mobile app that they would use to shop. Convenience sampling was appropriate here as this portion of the research was a pilot study, and convenience sampling was not used in the main study.

Each participant saw all six developed stimuli. For realism value, participants were asked to indicate their level of agreement with three statements specifying how realistic the fictional app stimuli are to mobile apps they have experienced on a 7-point Likert scale. For shopping intentions, participants were asked to indicate their level of agreement with three items specifying their intention to visit or frequent mobile app such as the stimuli on a 7-point Likert scale. In addition, an open-ended question was presented at the end for suggestions on how to make the app more realistic or highly preferred as a mobile app to visit. Demographic questions were also presented. A panel of experts were also consulted to determine the realistic value of the stimuli.

Six stimuli were developed using a fictional mobile shopping app as the basis. The six stimuli were as follows: (1) high task relevant cues and only multimedia product viewing features for both hedonic and utilitarian experiential prompts, (2) high task relevant cues and only product promotion features for both hedonic and utilitarian experiential prompts, and (3) high task relevant cues and only consumer led interaction features for both hedonic and utilitarian experiential prompts. Three mobile design features were presented for each scenario resulting in six stimuli total. Upon completion of developing the stimuli, a stimuli check was performed.

Phase 2: SOR Experiment

The second phase of the study encompassed the main stimulus-organism-response experiment. This section contained stimuli development, instrument development, sample selection, data collection procedure, and data analysis.

Stimuli development

The development of the stimuli followed a multi-step approach: creation of the written scenario and choosing appropriate products for each scenario. These were then combined with the mobile app simulations developed in phase one of the study.

Stimuli scenarios

The findings from research question one revealed that participants' interactions with mobile shopping apps differed greatly based on the purpose of their search. Participants who were looking for something particular often had a prescribed method to find the garment they sought. In comparison when participants were "just browsing" through mobile apps, they tended to browse for longer periods of time as well as to interact with more features and to dig deeper into the product offerings. Therefore, to accurately capture a consumer's potential shopping process, two types of scenarios were presented: hedonic and utilitarian. The reasons for selecting these two types of scenarios are discussed below.

Hedonic-utilitarian shopping values. The driving motivator for shopping tends to vary from the need to find a specific product to time consumption and social outings. Often the way researchers tend to categorize these needs is based on hedonic or utilitarian shopping motivations (Hirschman & Holbrook, 1982). Utilitarian motivation is defined as task oriented behavior with benefits achieved through efficiency and task completion in the shopping process (Babin, William, & Mitch, 1994; Batra & Ahtola, 1991). In comparison, hedonic motivation is

characterized by consumption behaviors steeped in positive emotion such as happiness, fantasy, and enjoyment. Utilitarian motivation is often explained as a critical, rational, and goal oriented process (Batra & Ahtola, 1991; Hirschman & Holbrook, 1982). Utilitarian motivation is relevant for task specific use of the shopping process such as price comparisons (Hoffman & Novak, 1996). On the other hand, the emotional and experiential nature of shopping is the main benefit of hedonic motivation. Consumers who love shopping due to the experiential value of the process have been deemed a crucial element of shopping especially online shopping (Babin et al., 1994; Hoffman & Novak, 1996). Because all consumers experience both types of shopping motivations, it was necessary to present scenarios based on each.

Product selection for written scenarios. Due to the nature of the experiment, six products were chosen to correspond with the six stimuli to be featured, three mobile design features from the hedonic perspective and three mobile design features from the utilitarian perspective. In July of 2014, seven out of 10 US adults made clothing purchases online (Staff, 2014). However, in terms of shopping through smartphones or tablets, digital content such as movies, music, and e-books were much more prevalent. In addition, females were more likely to purchase clothing and accessories whereas males were more likely to purchase digital content (Staff, 2014). As of August 2016; the top three product categories purchased by consumers in the US online were fashion, technology, and culture (videogames, books, and DVDs) (Staff, 2016). In fact, fashion is the most commonly purchased e-commerce category in nine of the 15 markets analyzed in a study by Marketing Chart Staff (Staff, 2016). These nine countries were: The United States, France, Belgium, Germany, the Netherlands, Hong Kong, Singapore, Australia, and India. Therefore, between the years of 2014 and 2016, the trend toward the online consumption of fashion products has remained relatively the same. Thus, to create realistic

scenarios for stimuli development, six products from the fashion product categories, three hedonic products and three utilitarian products were chosen. Utilitarian products can be described as helpful, functional, and practical; in contrast, hedonic products are classified as fun, exciting, and enjoyable. It is important to note that the distinction is not limited to just product types, but also is applicable to attributes (Lu, Liu, & Fang, 2016). The three hedonic products chosen for this study were bathing suits, high heels, and a summer dress, and the three utilitarian products chosen for this were jeans, sandals, and a dress for a formal wedding

Written scenarios. Before the participants could view the stimuli, they were given the following prompt: "Before looking at the following mobile screens, please read the following scenarios, taking about two minutes to really get into the mood of the situation. After reading the prompt, participants were then provided with one of two scenarios, hedonic or utilitarian. Participants were also instructed further about the nature of the screen to be viewed, the survey stated before each stimulus, "The following images show the way a product is displayed on a typical retail app. Please note that you will not be able to interact with the image through linking to other pages, swiping left or right, etc. Upon visual inspection of the app's page, please answer the questions following each image."

> **Hedonic**: You are on your way to New York City for the weekend, but your flight has been delayed yet again. You suddenly find yourself with a bunch of down time and begin to get a little bored. You decide to shop online through some of your favorite mobile apps to pass the time.

Utilitarian: One of your longtime friends is getting married in Key West this June. The wedding weekend is full of events before the actual wedding itself on Saturday night. After looking at your closet and the weather for that weekend, you realize you need a dress to wear for the formal event. In addition, you could really use a new pair of sandals and some jeans for going out at night.

Mobile app simulation

All stimuli were developed using screen shots of retail mobile apps and were manipulated using Photoshop. The usage of Photoshop allowed realistic creation of fictitious mobile screens in the same dimensions of the screen of an iPhone 6splus, one of the largest screen sizes at 5.5 inches. Each stimulus was a composite of two or more retail mobile apps. Six stimuli were created, three representing hedonic shopping experiences and three representing utilitarian shopping experiences. Each set of stimuli was composed of two screen shots as seen in Figure 4.1- Figure 4.6.

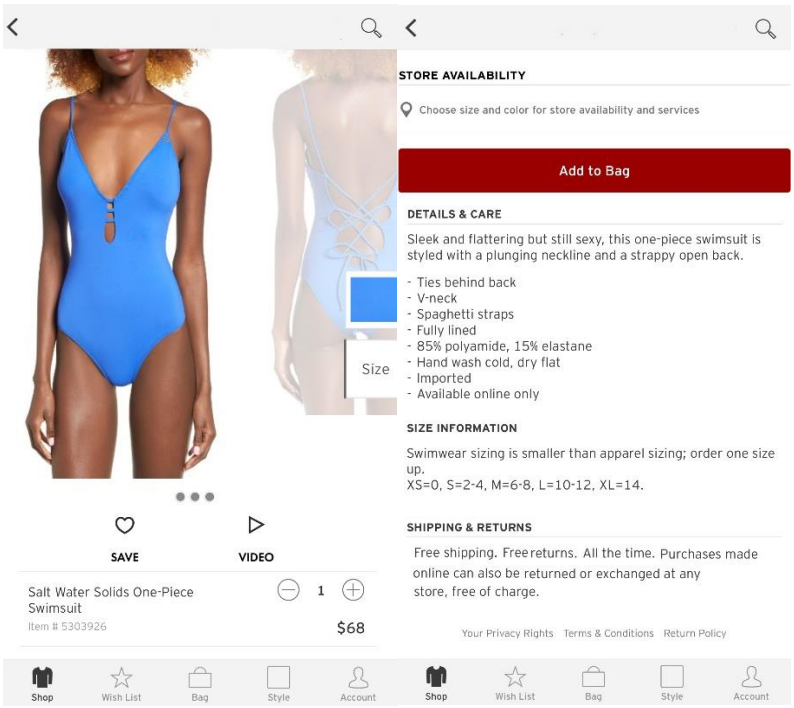


Figure 4.1 Hedonic Multimedia product viewing stimuli

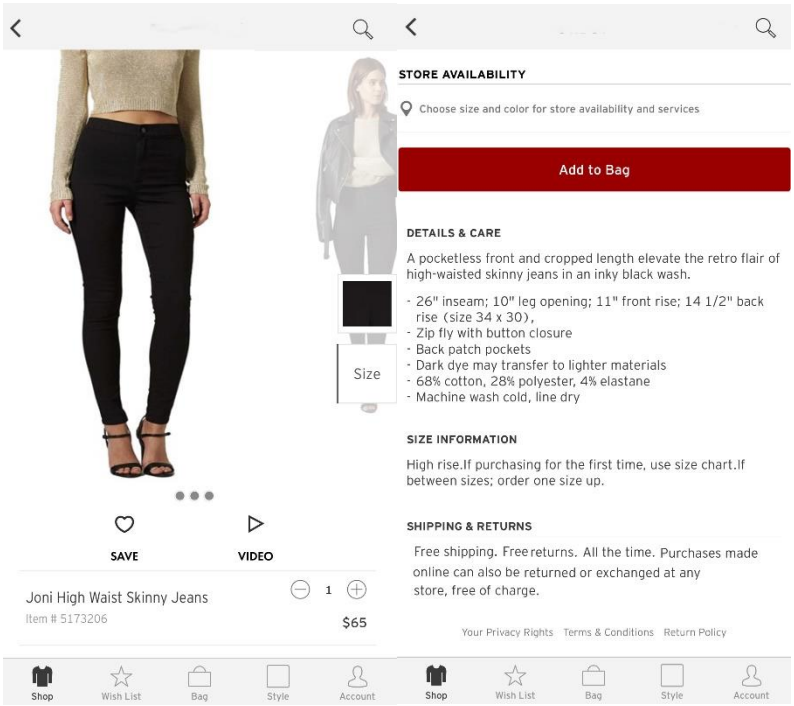


Figure 4.2 Utilitarian multimedia product viewing stimuli

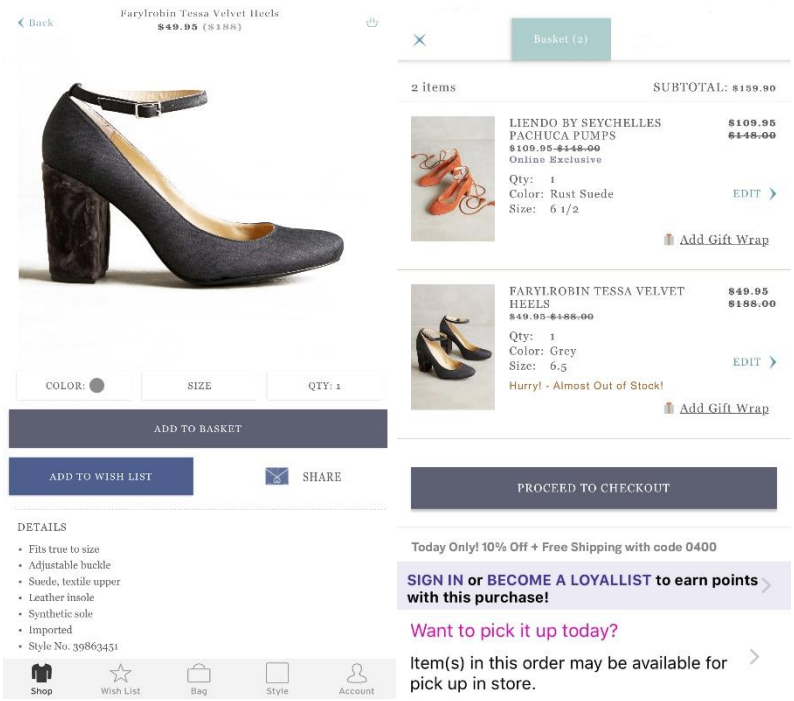


Figure 4.3 Hedonic product promotion stimuli

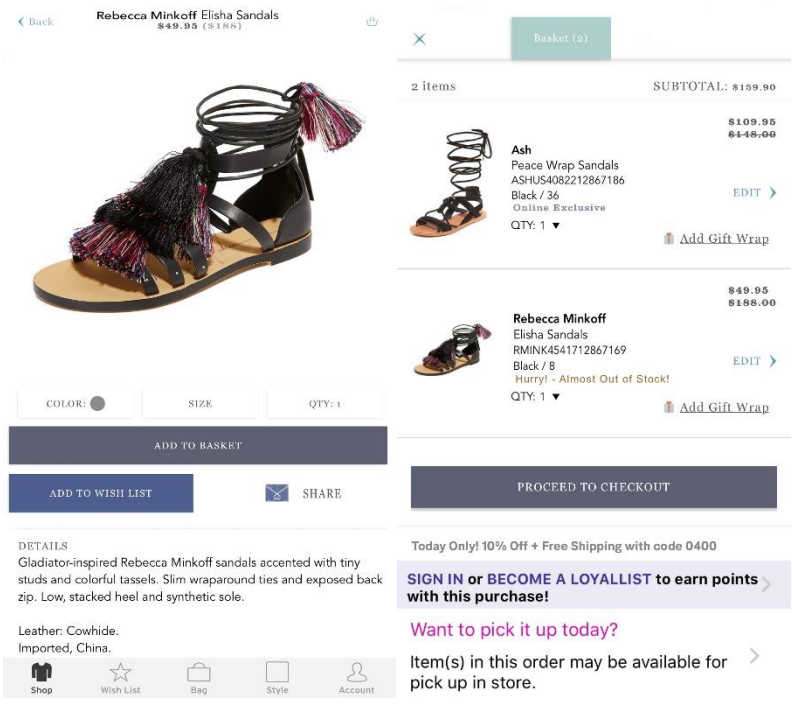


Figure 4.4 Utilitarian product promotion stimuli

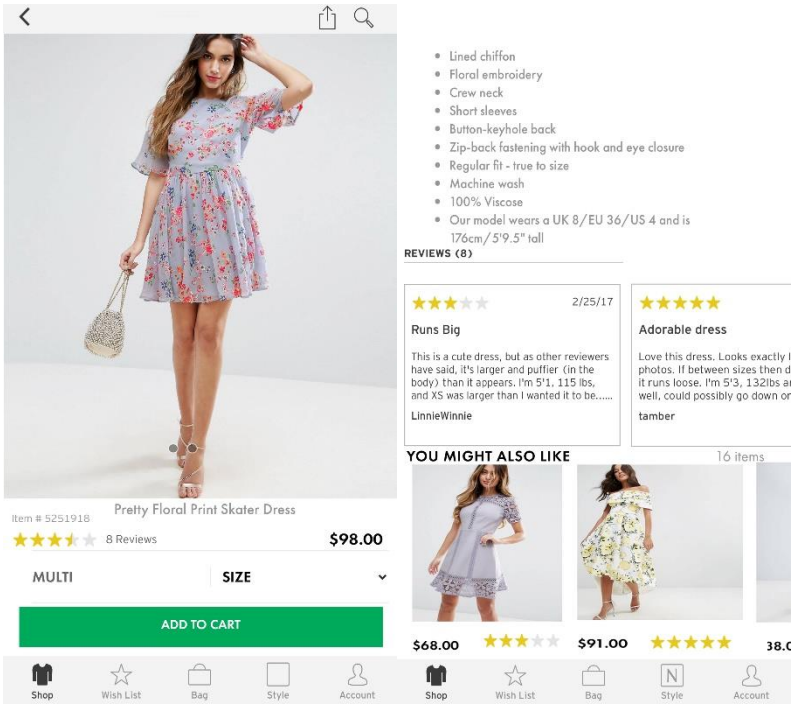


Figure 4.5 Hedonic consumer led interaction stimuli

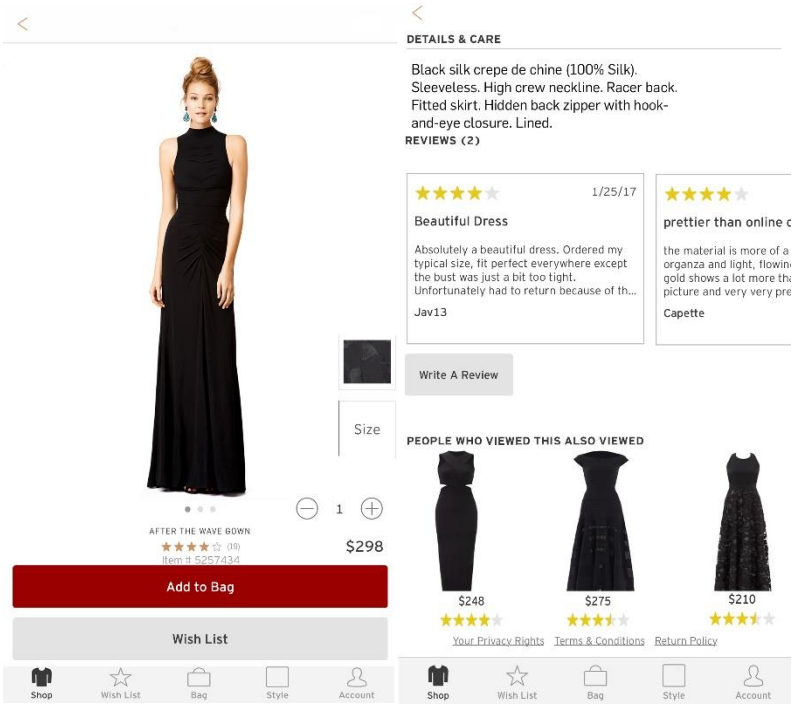


Figure 4.6 Utilitarian consumer led interaction stimuli

Instrument development

The survey had four sections: stimuli, organism, response, and demographics. In the first section, stimuli, the researcher presented participants with one of two scenarios, hedonic or utilitarian, in which they were given a shopping related task. The participants then viewed three stimuli, each isolating one type of mobile design feature. The next section, organism, consisted of questions pertaining to their emotional response. The PAD paradigm was used to measure emotion. All items measuring PAD were adapted from Mehrabian and Russell (1974). Pleasure, arousal, and dominance was measured with six items each on a 7-point semantic differential scale. The third section, response, contained items measuring mobile app stickiness. Mobile app stickiness was measured with four items adapted from Benlian (2015). The items were measured on a 7-point Likert scale from strongly agree to strongly disagree. Demographic items were presented. All constructs, items, and reliability's can be found in Table 4.5.

Table 4.5
Survey Constructs, Item Sources, and study's Cronbach alphas

Constructs	Measurement Items	Source & Reliability
Pleasure	Y1- After viewing this app, I felt: Unhappy/ Happy Y2- After viewing this app, I felt: Annoyed/ Pleased Y3- After viewing this app, I felt: Unsatisfied/ Satisfied Y4- After viewing this app, I felt: Despairing/ Hopeful Y5- After viewing this app, I felt: Melancholic/ Contented Y6- After viewing this app, I felt: Bored/ Relax	Mehrabian & Russell, 1974 Cronbach α = .93
Arousal	Y7- After viewing this app, I felt: Relaxed/ Stimulated Y8- After viewing this app, I felt: Calm/ Excited Y9- After viewing this app, I felt: Unaroused/ Aroused Y10- After viewing this app, I felt: Sleepy/ Wide-Awake Y11- After viewing this app, I felt: Sluggish/ Frenzied Y12- After viewing this app, I felt: Dull/Jittery	Mehrabian & Russell, 1974 Cronbach α = .90
Dominance	Y13- After viewing this app, I felt: Controlled/ Controlling Y14 - After viewing this app, I felt: Influenced/ Influential Y15- After viewing this app, I felt: Cared-for/ In control Y16- After viewing this app, I felt: Awed/ Important Y17- After viewing this app, I felt: Submissive/ Dominant Y18- After viewing this app, I felt: Guided/ Autonomous	Mehrabian & Russell, 1974 Cronbach α = .91
Mobile App Stickiness	Y19- It would be highly likely that I would return to this app to shop again for fashion products. Y20- I would continue to shop for other fashion products on this app. Y21- I intend to spend more time shopping for fashion products on this app. Y22- I would visit this app again the next time I shop for fashion products.	Benlian, 2015 Cronbach α = .87-.94

Sample selection and data collection procedure

Upon approval from Institutional Review Board (IRB), Amazon Mechanical Turk (MTurk), an online marketplace for work, recruited survey participants for the main study. The structured questionnaire guided respondents through one scenario either hedonic or utilitarian at random and all three mobile design features as well as the PAD and behavioral intention questions and ending with demographic questions. The respondents for the study were women between the ages of 18 and 36. No other limiting sample criteria were required.

Data analysis

Data for this study were collected from Qualtrics. It was then downloaded and imported to SPSS where the data was cleaned, checked for normality, and missing data was handled through multiple imputations. Descriptive and inferential analyses were conducted on the study data. Descriptive statistics were used to analyze demographic variables such as age and ethnicity. Inferential statistics were used to determine the reliability of scales and to test hypotheses through conditional process analysis.

To test the study's conceptual model containing mediators, conditional process modeling was used. Process modeling is carried out when the goal of the research is to understand, explore, and estimate the path that the casual variables affect through one or more intermediary variables. It has been used often in psychology based research as it explains the predictors and mediators responsible for influencing certain effects simultaneously (Hayes & Scharkow, 2013; Hayes & Preacher, 2013). Conditional process modeling is used when the goal is believed to be reliant on additional variables. Conditional process modeling estimated direct and indirect paths through the variable conveyed effects and models the size of those effects. Therefore, conditional process modeling can be thought of as a combination of the conceptual and analytical ideas of mediation and moderation analysis (Hayes & Preacher, 2013).

Conditional process modeling is more appropriate for this study over SEM as this study is experimental in nature. In addition, Kalyanaraman and Sundar (2006) utilized conditional process modeling as the analysis method in their study on web portal customization and its effects on users (Hayes & Preacher, 2014). Kalyanaraman and Sundar's (2006) study design is similar to the current study design as both utilize experimental design aspects to understand the nature of a technology based platform with multiple independent variables. Experimental design

research on average does not yield large sample sizes. Therefore, due to the nature of SEM practices of utilizing the normal distribution to derive p-values, path coefficients are more likely to have little in error in smaller sample sizes. In comparison, the PROCESS tool used in conditional process modeling makes use of the t distribution in OLS (ordinary least square) regression for the derivation of p-values for regression coefficients (Hayes, 2013). While the distinction is minor for large sample sizes, it does pose a factor for smaller sample sizes. Therefore, conditional process modeling is the best statistical method to analyze the effect of mobile design features.

CHAPTER 5 RESULTS

This chapter includes (a) phase 1: stimuli development analysis; (b) phase 2: SOR experiment analysis.

Phase 1: Stimuli Development Analysis

Sample Descrption

Prior to testing the full SOR experiment, the stimuli material created based on the three mobile design features were subjected to a manipulation check. Two aspects of the stimuli were checked for successful manipulation: (a) realism and (b) shopping intention.

For this study, 271 participants were recruited for this phase of the study using a campus wide listserv from a U.S. southeast university. Each participant saw all six stimuli and responded to six items (three for realism and three for shopping intention) following each stimuli. The demographic makeup of the participants can be viewed in Table 5.1. The participants were all female with 84.5 percent using a mobile device that operated on the apple operating system in comparison to 15.1 percent of the participants utilizing an android operating system. The participants were majority white/ Caucasian at 68.6 percent; the remaining participants identified as black/ African American (11.1%), Asian (9.2%), multi-racial (4.8%), and Hispanic (4.1%). The educational makeup of the participants were seniors (49.8%) and graduate students (46.1%). Over half (58.4%) of the participants were between 18-23 years old.

Table 5.1

Demographic Characteristics of Stimuli Check

Variable	Levels	Frequency	%
Gender	Female	271	100
Operating System	Apple	229	84.5
	Android	41	15.1
	No response	1	0.4
Race/ Ethnicity	White/ Caucasian	186	68.6
	Black/ African American	30	11.1
	American Indian or Alaska Native	1	0.4
	Asian	25	9.2
	Hispanic	11	4.1
	Multi-racial	13	4.8
	Other	5	1.8
Education	Freshman	1	0.4
	Sophomore	1	0.4
	Junior	6	2.2
	Senior	135	49.8
	Graduate	125	46.1
	No response	3	1.1
Age	18-23	158	58.4
	24-29	73	27.0
	30-36	40	14.7

Note. Number of participants (n) =271

Stimuli Check Analysis

In order to check if the created stimuli were similar to actual mobile app pages, participants were asked on a 7-point Likert scale (1=strongly disagree and 7=strongly agree) to indicate if each stimuli they saw was "realistic," "life like," and " similar to an app [I] have used before." To check if the stimuli yielded positive reactions toward shopping intentions, participants were asked on a 7-point Likert scale (1= strongly disagree and 7= strongly agree) to

indicate after viewing each stimuli if they "would frequent," "intent to shop," and "predict use to continue."

As shown in Table 5.2 the mean score of realism in multimedia product viewing, product promotion, and consumer led interactions was 5.699, 5.780, and 5.808 resperctively. This result suggested that the participants perceived the three stimuli as highly realistic to understand multimedia product viewing, product promotion, and consumer led interactions. In Table 5.3, the mean score of shopping intentions of the stimuli are presented. The shopping intention of the stimuli for multimedia product viewing, product promotion, and consumer led interactions were 4.928, 5.098, and 5.184 respectivly. This suggests that the participants also perceived these stimuli had the features (multimedia product viewing, product promotion, and consumer led interactions) that would make the intention to shop highly likely.

Table 5.2
Realism of Stimuli

	Mean	Standard Deviation
Multimedia product viewing	5.699	1.008
Product promotion	5.780	0.965
Consumer led interactions	5.808	0.969

Table 5.3
Shopping Intentions of Stimuli

	Mean	Standard Deviation
Multimedia product viewing	4.928	1.412
Product promotion	5.098	1.440
Consumer led interactions	5.184	1.410

Phases 2: SOR Experiment Analysis

Sample Description

Following the completion of the stimuli check, 304 participants were recruited for the SOR experimental study, using Amazon Mechnical Turk. Participants responses were downloaded from Qualtrics and exported to IBM SPSS, where the data were cleaned for further analysis.

Descriptive analysis of the data were conducted to understand the demographic characterisitcs of the sample as shown in Table 5.4. The sample was 100 percent female. In addition, 134 participants' (44.1%) mobile phone utilized the apple operating system and 163 participants' (53.6%) mobile phone utilized the android operating system. The majority of the participants were white/ Caucasian (73.4%), and 8.9 percent identified themselves as Black/ African American, 0.3 percent as American Indian or Alaska Native, 5.9 percent as Asian, 0.3percent as Native Hawaiian or Pacific Islander, 4.6 percent as Hispanic, 3.9 percent as Multi-racial,and 0.3 percent as other while 7 pariticpants chose not to respond. In addition, less than 10 percent of the respondents had a high school degree or less with 31.9 percent of the participants holding a 4 year degree and 29.3 percent of the participants had some college experience or were currently enrolled. More than half (68.1%) of the participants reported incomes less than $60,000. All participants belong to the millenial generation, reporting ages between 18-36. Forty six participants were between the ages of 18-23 (15.1%), 113 participants were between the ages of 24-29 (37.1%), and 127 participants were in their 30's (41.8%). Also, 5.9% of the participants chose not to report their exact age but did confirm belonging to the age group in the consent form.

Table 5.4

Demographic Characteristics of Study 2: SOR Experiment

Variable	Levels	Frequency	%
Gender	Female	304	100
	Male	0	0
Operating System	Apple	134	44.1
	Android	163	53.6
	No response	7	2.3
Race/ Ethnicity	White/ Caucasian	223	73.4
	Black/ African American	27	8.9
	American Indian or Alaska Native	1	0.3
	Asian	18	5.9
	Native Hawaiian or Pacific Islander	1	0.3
	Hispanic	14	4.6
	Multi-racial	12	3.9
	Other	1	0.3
	No response	7	2.3
Education	less than high school	2	0.7
	High school graduate	26	8.6
	Some college/ Currently enrolled	89	29.3
	2-year degree	33	10.9
	4-year degree	97	31.9
	Professional degree	43	14.1
	Doctorate	6	2.0
	No response	8	2.6
Income	less than $10,000- $29.999	106	34.9
	$30,000 - $59,999	101	33.2
	$60,000 - $89,999	53	17.2
	$90,000 - more than $150,000	37	12.2
	No response	7	2.3
Age	18-23	46	15.1
	24-29	113	37.1
	30-36	127	41.8
	No response	18	5.9

Note. Number of participants (n) =304

Scale reliability

Cronbach's α was used to assess the internal reliability of the measures. All items measuring PAD (pleasure, arousal, and dominance) were adapted from Mehrabian and Russell (1974). Pleasure, arousal, and dominance was measured with six items each on a 7-point semantic differential scale. The reliability of scales measuring pleasure, arousal, and dominance were acceptable with coefficient alphas reported as 0.974, 0.858, and 0.795 accordingly. Four items measuring mobile app stickiness were adapted from Benlian (2015). These items were measured on a 7-point Likert scale. The reliability of scales for mobile app stickiness generated an acceptable coefficient alpha of 0.969. Table 5.5 below shows the reliability of scales.

Table 5.5
Reliability of Scales

Scale	No. of Items	Reliability (Cronbach's α)
Pleasure	6	0.947
Arousal	6	0.858
Dominance	6	0.795
Mobile App Stickiness	4	0.969

Hypothesis testing and analysis

To test the study's conceptual model containing multiple mediators, conditional process analysis with bootstrapped confidence intervals were used. Each participant viewed three mobile design features' stimuli and answered the corresponding items following each stimuli; therefore, particpants completed three separate experiments. Thus the potential N of the SOR experiment was 912 cases. However after cleaning the data and using multiple imputations to deal with missing data, N resulted in 903 cases. Table 5.6 shows the breakdown of cases per mobile design feature. The responses to pleasure, arousal, dominance, and mobile app stickiness were

averaged to obtain one score for each construct for each participant, after checking reliabilities of the scales.

Table 5.6
Number of cases per mobile design feature

Mobile Design Features	N
Multimedia product viewing	304
Product promotion features	301
Consumer led interactions	298
Total	903

Conditional Process Modeling

Hayes' (2014) process modeling allows x to be multicategorical by relying "on the fact that mean differences can be estimated with a linear model by representing groups with a set of k-1 variables, where k is the number of groups" (p. 455). This allows a mathematical model identical to ANOVA but also allows the reproduction of k groups means on the mediator and the dependent variable. Therefore, the model, parameter estimates, and model fit statistics keep the information about how the groups differ from one another.

This is possible through the coding of the multicategorical variable. Therefore dummy coding was used to indicate the type of mobile design feature viewed, (1) multimedia product viewing, (2) product promotion, (3) consumer led interactions. K- 1 groups were created with Di set to 1 if a case is in the selected group, and 0 otherwise. One group received no coding, all k-1 dummy variables are set to 0 in that group. This group becomes the reference group in analysis hence parameters are quantified relative to their reference group. However due to the study design, no true control group was created in efforts of keeping stimuli as realistic as possible; therefore, the analysis was ran three times, alternating reference groups.

Hypotheses 1-6 were tested simultaneoulsy with mediators operating in parallel using process macro for SPSS. Hayes (2014) Model 4 was identified as appropriate for the purpose of this study as Model 4 is the only mediation model available at this time that allows for multicategorical independent variables. This model was run three time with a different mobile design feature held as the reference group. The conceptual and statistical diagram of model 4 can be seen below in Figure 5.1 and Figure 5.2.

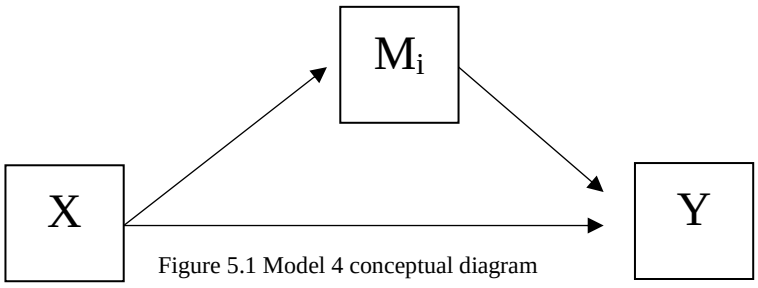


Figure 5.1 Model 4 conceptual diagram

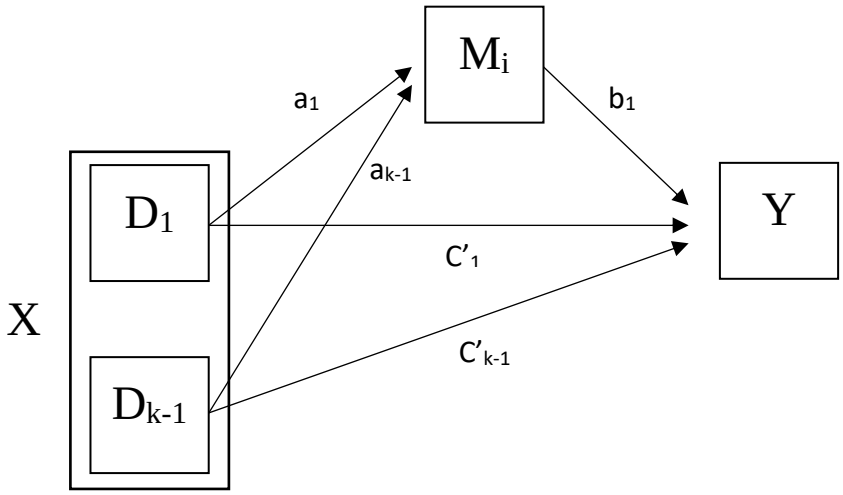


Figure 5.2 Model 4 statistical diagram

Multimedia product viewing as the reference group

Table 5.7 shows the results of the hypotheses tests when multimedia product viewing was held as the reference group. Hypotheses 2a, 2b, and 2c proposed the product promotion features will have a significant positive affect on pleasure, arousal, and dominance accordingly. The analysis results did not support a statistical influence from product promotion to any of the dimensions of PAD (unstandardized β= -.05, p=.657; unstandardized β= .096, p=.318; unstandardized β= .023, p=.755). Therefore hypotheses 2a, 2b, and 2c were not supported when multimedia product viewing was held as the reference group.

Hypotheses 3a, 3b, and 3c proposed the consumer led interactions would have a significant positive affect on pleasure, arousal, and dominance. The analysis results did not support a statistical influence from consumer led interactions to pleasure (unstandardized β= .197, p=.081). Therefore hypothesis 3a was not supported when multimedia product viewing was held as the reference group. Howerver the results did show a statistically significant influence from consumer led interactions to arousal (unstandardized β= .344, p<.001). Thus, holding all other factors constant, every unit change in consumer led interactions will result in a 0.344 unit change in arousal in the same direction. Therefore, hypothesis 3b was supported when multimedia product viewing was held as the reference group. The results also showed a statistically significant influence from consumer led interactions to dominance (unstandardized β= .179, p=.024). Thus, holding all other factors constant, every unit change in consumer led interactions will result in a 0.179 unit change in dominance in the same direction. Therefore, hypothesis 3c was supported when multimedia product viewing was held as the reference group.

Hypotheses 4a, 4b, and 4c proposed that pleasure, arousal, and dominance would have a positive significant effect on mobile app stickiness. The PROCESS results supported a

statistically significant influence of pleasure on mobile app stickiness (unstandardized β= .747, p<.001). Consequently, holding all other factors constant, every unit change in pleasure will result in a .747 unit change in mobile app stickiness in the same direction. In addition the results also showed a statistically signficiant influence of arousal on mobile app stickiness (unstandardized β= .130, p=.005). Hence if all other factors are held constant every unit change in arousal will result in a .130 unit change in mobile app stickiness in the same direction. Thus, hypothesis 4a and 4b are supported when multimedia product viewing is held as the reference group. However, analysis results did not support a statistical influence from dominance to mobile app stickiness (unstandardized β= -.04, p=.305). Therefore hypothesis 4c was not supported when multimedia product viewing was held as the reference group.

Product promotion features as the reference group

Table 5.8 shows the results of the hypotheses tests when product promotion features was held as the reference group. Hypotheses 1a, 1b, and 1c proposed multimedia product viewing features will have a significant positive effect on pleasure, arousal, and dominance accordingly. The analysis results did not support a statistical influence from multimedia product viewing features to any PAD dimensions (unstandardized β= .051, p=.660; unstandardized β= -.010, p=.323; unstandardized β= -.020, p=.763). Therefore hypotheses 1a, 1b, and 1c are not supported when product promotion features were held as the reference group.

Hypotheses 3a, 3b, and 3c proposed the consumer led interactions will have a significant positive effect on pleasure, arousal, and dominance. The analysis results supported a statistical significant influence from consumer led interactions to pleasure (unstandardized β= .248, p=.033). Thus when all other factors are held constant, every unit change in consumer led interactions will result in a .248 unit change in pleasure in the same direction. Therefore

hypothesis 3a was supported when product promotion features was held as the reference group. In addition, the results did show a statistically significant influence from consumer led interactions to arousal (unstandardized β= .247, p=.012). Thus, holding all other factors constant, every unit change in consumer led interactions will result in a 0.012 unit change in arousal in the same direction. Therefore, hypothesis 3b was supported when product promotion features was held as the reference group. The results also showed a statistically significant influence from consumer led interactions to dominance (unstandardized β= .155, p=.048). Thus, holding all other factors constant, every unit change in consumer led interactions will result in a 0.155 unit change in dominance in the same direction. Therefore, hypothesis 3c was supported when product promotion features was held as the reference group.

Hypotheses 4a, 4b, and 4c proposed that pleasure, arousal, and dominace would have a positive significant effect on mobile app stickiness. The PROCESS results supported a statitsically significant influence of pleasure on mobile app stickiness (unstandardized β= .747, p<.001). Consequently, holding all other factors constant, every unit change in pleasure will result in a .747 unit change in mobile app stickiness in the same direction. In addition the results also showed a statistically signficiant influence of arousal on mobile app stickiness (unstandardized β= .130, p=.005). Hence if all other factors are held constant every unit change in arousal will result in a .130 unit change in mobile app stickiness in the same direction. Thus, hypothesis 4a and 4b are supported when product promotion features is held as the reference group. However, analysis results did not support a statistical influence from dominance to mobile app stickiness (unstandardized β= -.04, p=.305). Therefore hypothesis 4c was not supported when product promotion features was held as the reference group.

Consumer led interactions as the reference group

Table 5.9 shows the results of the hypotheses tests when consumer led interaction features was held as the reference group. Hypotheses 1a, 1b, and 1c proposed multimedia product viewing features will have a significant positive affect on pleasure, arousal, and dominance accordingly. The analysis results did not support a statistical influence from multimedia product viewing features to pleasure and dominance (unstandardized β= -.200, p=.088; unstandardized β= -.180, p=.222). Therefore hypotheses 1a and 1c are not supported when consumer led interactions are held as the reference group. However, PROCESS showed a statistically significant influence between multimedia product viewing features and arousal (unstandardized β= -.034, p<.001). So when all other factors are held constant for every unit change in multimedia product viewing features will result in a -.034 unit change in arousal in the same direction. Therefore hypotheses 1b is supported when consumer led interaction features were held as the reference group.

Hypotheses 2a, 2b, and 2c proposed that product promotion features will have a significant positive affect on pleasure, arousal, and dominance. The analysis results supported a statistical signigicant influence from product promotion features to pleasure (unstandardized β= -.250, p=.033). Thus when all other factors are held constant, every unit change in product promotion features will result in a -.250 unit change in pleasure in the same direction. Therefore hypothesis 2a was supported when consumer led interaction features was held as the reference group. In addition, the results did show a statistically significant influence from product promotion features to arousal (unstandardized β= -.250, p=.012). Thus, holding all other factors constant, every unit change in product promotion features will result in a 0.012 unit change in arousal in the same direction. Therefore, hypothesis 2b was supported when consumer led

interaction features was held as the reference group. The results also showed a statistically significant influence from product promotion features to dominance (unstandardized β= -.160, p=.048). Thus, holding all other factors constant, every unit change in product promotion features will result in a -.160 unit change in dominance in the same direction. Therefore, hypothesis 2c was supported when consumer lead interaction features was held as the reference group.

Hypotheses 4a, 4b, and 4c proposed that pleasure, arousal, and dominace would have a positive significant effect on mobile app stickiness. The PROCESS results supported a statitsically significant influence of pleasure on mobile app stickiness (unstandardized β= .747, p<.001). Consequently, holding all other factors constant, every unit change in pleasure will result in a .747 unit change in mobile app stickiness in the same direction. In addition the results also showed a statistically significant influence of arousal on mobile app stickiness (unstandardized β= .130, p=.005). Hence if all other factors are held constant every unit change in arousal will result in a .130 unit change in mobile app stickiness in the same direction. Thus, hypothesis 4a and 4b are supported when consumer led interaction features is held as the reference group. However, analysis results did not support a statistical influence from dominance to mobile app stickiness (unstandardized β= -.04, p=.305). Therefore hypothesis 4c was not supported when consumer led interaction features was held as the reference group.

Table 5.7

Direct and conditional effects of mobile design features (MDF), pleasure(P), arousal (A), and dominance (D) on mobile app stickiness (MAS)

	Independent variable	Dependent Variable	β*	S.E.	t	*p*	*LLCI*[a]	*ULCI*[b]	R^2(sig)
Ref group	MMV	P	4.866	0.075	64.670	<.001	4.719	5.014	.006(.088)
Ref group	MMV	A	3.753	0.065	57.793	< .001	3.626	3.881	.014 (.001)
Ref group	MMV	D	4.307	0.052	82.521	<.001	4.204	4.409	.007(.056)
H2a	PPF	P	-0.051	0.114	-0.445	0.657	-0.274	0.173	.006 (.088)
H2b	PPF	A	0.096	0.096	0.999	0.318	-0.093	0.285	.014 (.001)
H2c	PPF	D	0.023	0.075	0.312	0.755	-0.125	0.172	.007 (.056)
H3a	CLI	P	0.197	0.113	1.745	0.081	-0.025	0.419	.006 (.088)
H3b	CLI	A	0.344	0.096	3.567	<.001	0.155	0.533	.014 (.001)
H3c	CLI	D	0.179	0.079	2.267	0.024	0.024	0.334	.007 (.056)
H4a	P	MAS	0.747	0.038	19.617	<.001	0.672	0.822	.469(.000)
H4b	A	MAS	0.130	0.047	2.799	0.005	0.039	0.221	.469(.000)
H3c	D	MAS	-0.043	0.012	-1.026	0.305	-0.125	0.039	.469(.000)

Note. β* Represents unstandardized regression coefficient. LLCI[a]: Lower level confidence interval. ULCI[b]: Upper level confidence interval.

MDF= multimedia product viewing (MMV), product promotion features (PPF), and consumer led interaction (CLI)

Note. Multimedia product viewing is held as the reference group.

Table 5.8

Direct and conditional effects of mobile design features (MDF), pleasure(P), arousal (A), and dominance (D) on mobile app stickiness (MAS)

	Independent variable	Dependent Variable	β*	S.E.	t	*p*	*LLCI*[a]	*ULCI*[b]	R^2(sig)
Ref group	PPF	P	4.816	0.082	59.045	<.001	4.656	4.978	.006(.078)
Ref group	PPF	A	3.849	0.069	55.844	<.001	3.714	3.985	.014(.001)
Ref group	PPF	D	4.330	0.055	78.386	<.001	4.222	4.438	.007(.046)
H1a	MMV	P	0.051	0.115	0.440	0.660	-0.175	0.276	.006(.078)
H1b	MMV	A	-0.096	0.097	-0.988	0.323	-0.287	0.095	.014(.001)
H1c	MMV	D	-0.024	0.078	-0.302	0.763	-0.177	0.129	.007(.046)
H3a	CLI	P	0.248	0.116	2.141	0.033	0.021	0.475	.006(.078)
H3b	CLI	A	0.247	0.098	2.531	0.012	0.056	0.439	.014(.001)
H3c	CLI	D	0.155	0.078	1.985	0.048	0.002	0.309	.007(.046)
H4a	P	MAS	0.747	0.035	21.366	<.001	0.674	0.816	.469(<.001)
H4b	A	MAS	0.130	0.043	3.049	0.002	0.046	0.214	.469(<.001
H3c	D	MAS	-0.043	0.048	-0.910	0.363	-0.136	0.050	.469(<.001)

Note. β* Represents unstandardized regression coefficient. LLCI[a]: Lower level confidence interval. ULCI[b]: Upper level confidence interval.

MDF= multimedia product viewing (MMV), product promotion features (PPF), and consumer led interaction (CLI)

Note. Product promotion features held as the reference group.

Table 5.9

Direct and conditional effects of mobile design features (MDF), pleasure(P), arousal (A), and dominance (D) on mobile app stickiness (MAS)

	Independent variable	Dependent Variable	β*	S.E.	t	*p*	*LLCI*[a]	*ULCI*[b]	R^2(sig)
Ref group	CLI	P	5.063	0.082	61.77	<.001	4.902	5.224	.006(.078)
Ref group	CLI	A	4.097	0.069	59.136	<.001	3.961	4.233	.014(.001)
Ref group	CLI	D	4.486	0.056	80.794	<.001	4.377	4.594	.007(.046)
H1a	MMV	P	-0.197	0.115	-1.708	0.088	-0.423	0.029	.006(.045)
H1b	MMV	A	-0.344	0.098	-0.3523	<.001	-0.535	-0.152	.014(0.001)
H1c	MMV	D	-0.179	0.078	-2.291	0.222	-0.332	-0.026	.007(.046)
H2a	PPF	P	-0.248	0.116	-2.141	0.033	-0.475	-0.021	.006(.045)
H2b	PPF	A	-0.247	0.098	-2.531	0.012	-0.439	-0.056	.014(.001)
H2c	PPF	D	-0.155	0.078	-1.985	0.048	-0.309	-0.002	.007(.046)
H4a	P	MAS	0.747	0.035	21.366	<.001	0.678	0.816	.469(<.001)
H4b	A	MAS	0.130	0.043	3.049	0.002	0.046	0.214	.469(<.001)
H3c	D	MAS	-0.043	0.047	-0.910	0.363	-0.136	0.050	.469(<.001)

Note. β* Represents unstandardized regression coefficient. LLCI[a]: Lower level confidence interval. ULCI[b]: Upper level confidence interval.

MDF= multimedia product viewing (MMV), product promotion features (PPF), and consumer led interaction (CLI)

Note. Consumer led interactions held as the reference group.

Post Hoc

The mediating effects of PAD on the relationship between mobile design features and mobile app stickiness were tested post hoc. To determine if PAD indeed acted as a mediator between mobile design features and stickiness behavior, asymmetric bootstrap confidence interval were examined. The relative indirect effect is determined to be statistically different from zero if the bootstrapped confidence interval does not contain zero (Hayes, 2014). All paths from mobile design features to mobile stickiness as mediated by PAD were ran three times, each time controlling for a different mobile design feature. Multimedia product viewing features (relative to consumer led interaction features) indirectly influenced stickiness intention through arousal (95% CI= -0.097 - -0.012); in additon, product promotion features also was found to indirectly influence mobile app stickiness intention through pleasure (95% CI= -0.362 - -0.002) and arousal (95%CI= -0.08- -0.006) relative to consumer led interaction features, table 5.10 and 5.11.

Table 5.10
Conditional indirect effect of multimedia product viewing (MMV), mediated by pleasure (P) arousal (A) and dominance (D) on mobile app stickiness (MAS)

Mediator	Effect*	*Boot SE*[a]	*LLCI*[b]	*ULCI*[c]
P	-0.147	0.084	-0.318	0.170
A	-0.045	0.021	-0.097	-0.012
D	0.008	0.009	-0.004	0.0335

Note. *'Effect' is the total effect of MMV on MAS through the mediating variable, a Represents Bootstrapped Standard error, b Represents Bootstrapped Lower Limit of the confidence interval, c Represents Bootstrapped Upper Limit of confidence interval.

Note. Consumer led interaction held as the reference group.

Table 5.11

Conditional indirect effect of product promotion features (PPF), mediated by pleasure (P) arousal (A) and dominance (D) on mobile app stickiness (MAS)

Mediator	Effect*	*Boot SE*[a]	*LLCI*[b]	*ULCI*[c]
P	-0.185	0.090	-0.362	-0.002
A	-0.032	0.018	-0.080	-0.006
D	0.007	0.008	-0.004	0.031

Note. *'Effect' is the total effect of PPF on MAS through the mediating variable, a Represents Bootstrapped Standard error, b Represents Bootstrapped Lower Limit of the confidence interval, c Represents Bootstrapped Upper Limit of confidence interval.

Note. Consumer led interaction is held as the reference group.

As shown in table 5.12, consumer led interaction features (relative to multimedia product viewing features) indirectly influenced mobile app stickiness intention through arousal (95% CI= 0.012 – 0.098). Consumer led interaction features were also found to influence stickiness through pleasure (95% CI= 0.012 – 0.361) and arousal (95% CI= 0.006 – 0.082) relative to product promotion features, see table 5.13.

Table 5.12

Conditional indirect effect of consumer led interaction (CLI), mediated by pleasure (P) arousal (A) and dominance (D) on mobile app stickiness (MAS)

Mediator	Effect*	*Boot SE*[a]	*LLCI*[b]	*ULCI*[c]
P	0.147	0.084	-0.016	0.3068
A	0.045	0.021	0.012	0.098
D	-0.008	0.009	-0.002	0.000

Note. *'Effect' is the total effect of CLI on MAS through the mediating variable, a Represents Bootstrapped Standard error, b Represents Bootstrapped Lower Limit of the confidence interval, c Represents Bootstrapped Upper Limit of confidence interval.

Note. Multimedia product viewing is held as the reference group.

Table 5.13

Conditional indirect effect of consumer led interaction (CLI), mediated by pleasure (P) arousal (A) and dominance (D) on mobile app stickiness (MAS)

Mediator	Effect*	*Boot SE*[a]	*LLCI*[b]	*ULCI*[c]
P	0.185	0.089	0.012	0.361
A	0.032	0.018	0.006	0.082
D	-0.007	0.008	-0.030	0.004

Note. *'Effect' is the total effect of CLI on MAS through the mediating variable, a Represents Bootstrapped Standard error, b Represents Bootstrapped Lower Limit of the confidence interval, c Represents Bootstrapped Upper Limit of confidence interval.

Note. Product promotion features held as the reference group.

Overall summary of hypothoses testing

Figure 5.3, 5.4, and 5.5 shows the conceptual model of mobile design feature with corresponding path coefficient and significance relative to the corresponding reference group. In addition, Table 5.14 shows the summary of the research hypotheses test accounting for each reference group. Out of the four main hypotheses, none were statistically supported for each reference group. However, consumer led interactions were statistically supported the most within each reference group. In addition it is important to note that regardless of which mobile design feature was held constant, dominance was not found to be a significant predictor of mobile app stickiness despite being statisically influenced by product promotion features when consumer led interactions were held as the reference group and by consumer led interactions when both multimedia product viewing and product promotion features were held as the reference group.

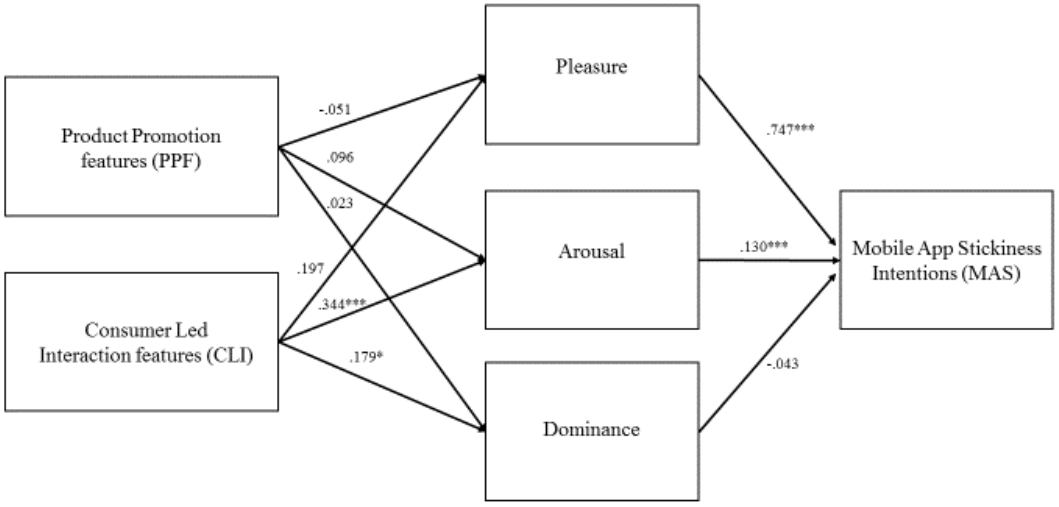


Figure 5.3 Mobile design features conceptual model with MMV as reference group

Note. *** is significant at p < .001; ** is significant at *p* < .01; * is significant at p < .05

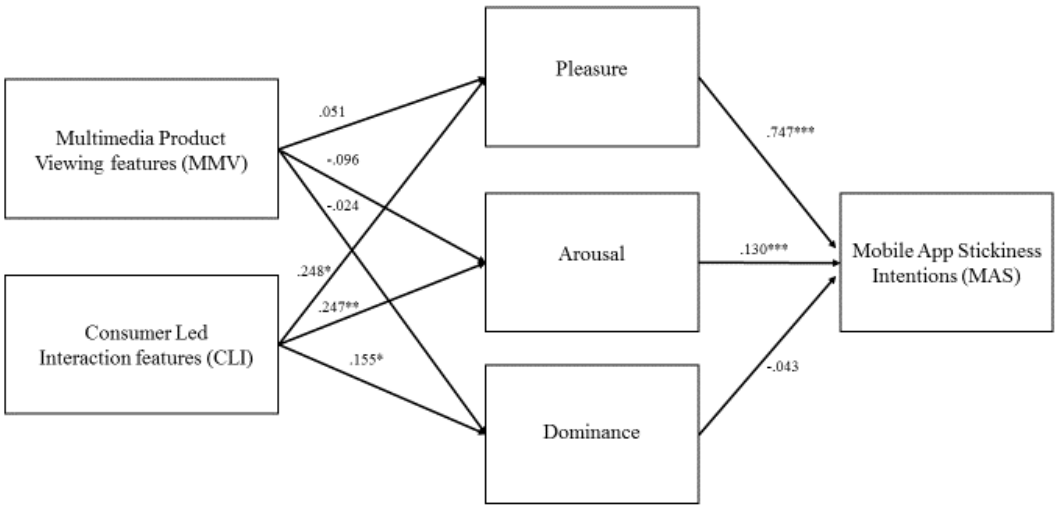


Figure 5.4 Mobile design features conceptual model with PPF as reference group

Note. *** is significant at p < .001; ** is significant at *p* < .01; * is significant at p < .05

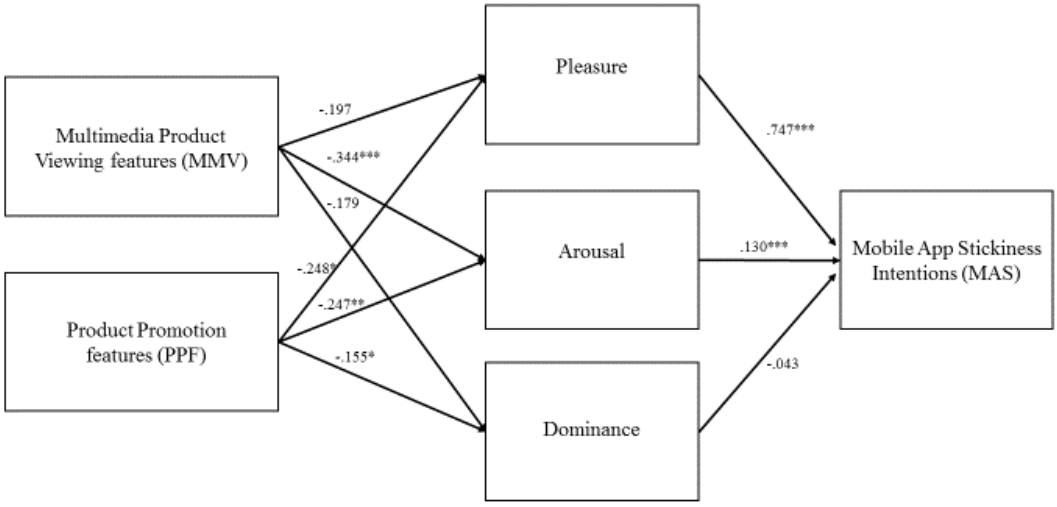


Figure 5.5 Mobile design features conceptual model with CLI as reference group

Note. *** is significant at p < .001; ** is significant at *p* < .01; * is significant at p < .05

Table 5.14

Supported hypotheses relative to reference group

		Reference Group		
		MMV	PPF	CLI
H1a	Multimedia product viewing features will have a significant positive affect on pleasure.	C	NS	NS
H1b	Multimedia product viewing features will have a significant positive affect on arousal.	C	NS	S
H1c	Multimedia product viewing features will have a significant positive affect on dominance.	C	NS	NS
H2a	Product promotion features will have a significant positive affect on pleasure.	NS	C	S
H2b	Product promotion features will have a significant positive affect on arousal.	NS	C	S
H2c	Product promotion features will have a significant positive affect on dominance.	NS	C	S
H3a	Consumer led interactions features will have a significant positive affect on pleasure.	NS	S	C
H3b	Consumer led interactions features will have a significant positive affect on arousal.	S	S	C
H3c	Consumer led interactions features will have a significant positive affect on dominance.	S	S	C
H4a	Pleasure will have a significant positive affect on mobile app stickiness intention.	S	S	S
H4b	Arousal will have a significant positive affect on mobile app stickiness intention.	S	S	S
H4c	Dominance will have a significant affect on mobile app stickiness intention.	NS	NS	NS

Note. S: Significant; NS: Not Significant; C: Constant

Chapter 6 Discussion

Chapter 6 contains the following sections: (a) summary of the study, (b) contributions and implications, and (c) limitations and scope of future research.

Summary of Study

Mobile commerce is projected to be a 200 billion plus dollar industry by 2020 (Meola, 2016; Milnes, 2016). This future growth can be attributed to a number of distinctive factors such as ubiquity and localization services (Chong et al., 2012; Faqih & Jaradat, 2015; Krotov, Junglas, & Steel, 2015; Mahatanankoon, Wen, & Lim, 2005; Zhang, Zhu, & Liu, 2012), and the growth of mobile adoption, specifically mobile apps (Gartner, 2013; Lipsman, 2014; Moon & Domina, 2015). The creation of branded apps allows retailers to control the store expereince and create content for every phase of the consumer decision process. In addition apps have a higher conversion rate over desktops and mobile websites (Wright, 2012); hence, strengthening the need for retailers to engage in app strategies and development. However, the multitude of branded apps available in the market has generated the need for retailers to set their experience apart from their competitors. Thus to create mobile app strategies to effectively engage consumers, it is important to understand how added features will incentivize stickiness behavior.

This research was designed to investigate how the atmospheric environment created by a retailers' branded app would shape mobile app stickiness behavior. Following early research into atmospherics as well as low and high task relevant cues (Baker, 1986; Bitner, 1992; Eroglu et al., 2000; Kotler 1973), this research investigated the impact low task relevant cues has on stickiness behavior. Utilizing the framework of Magarth and McCormick (2013b), this research

specifically analyzed the relationships between three mobile design features, multimedia viewing features, product promotion features, and consumer led interaction features and stickiness behavior. Mehrabian and Russell's (1974) SOR framework has long established a method of examining store environment, and its application to this research allowed the investigation of the effect consumers' emotions have on stickiness behavior when presented with a mobile design feature through the creation of effective stimuli.

Therefore the study sought to examine the influence of mobile design features on a consumer's mobile app stickiness, as mediated by consumers' emotional responses (pleasure, arousal, and dominance). The study hypothesized four main hypotheses as follows:

Hypothesis 1: Multimedia product viewing features will have a significant positive affect on (a) pleasure, (b) arousal, and (c) dominance.

Hypothesis 2: Product promotion features will have a signficant postive affect on (a) pleasure, (b) arousal, and (c) dominance.

Hypothesis 3: Consumer led interaction features will have a significant positve affect on (a) pleasure, (b) arousal, and (c) dominance.

Hypothesis 4: Pleasure (a), arousal (b), and dominance (c) will have a significant postive affect of mobile app stickiness intention.

To test the above hypotheses, the study conducted an online experimental survey adapting existing scales for pleasure, arousal, dominance, and mobile app stickiness. Using Amazon Mturk to generate female millenial participants, each respondent was presented with three mobile design features stimuli and the corresponding measurement items. Three hundred and four respondents were collected generating 903 usable cases.

First, the study found consumers who viewed multimedia product viewing features to be more likley to express feelings of arousal realtive to consumers who viewed consumer led interaction features. It is also important to note that arousal did mediate the relationship between multimedia product viewing features and mobile app stickiness intention. This implies that multimedia product viewing features have to go beyond the normal three or five images and must include new innovative methods to viewing products in order to arouse consumers to spend time on an app.

Second the study's results found consumers who viewed product promotion features relative to those who viewed consumer led interaction features evoked feelings of arousal, pleasure, and dominance. However only pleasure and arousal mediated the relationship beteween product promotion features and mobile app stickiness. This implies that consumers place high value on promotional features such as discounts, loyalty accounts, and other savings offerings in comparison to product reviews and suggested items. Although consumers felt they had control over the promotions they viewed and used, these feeling of control were not enough to make them spend time on the app.

Third, consumer led interaction features overall influenced consumers' emotional responses more than any other mobile design feature. Consumer led interaction features relative to product promotion features were more likely to express feelings of pleasure, arousal, and dominance, and pleasure and arousal helped to mediate the relationship to mobile app stickiness. In addition, consumer led interaction features relative to consumers who viewed multimedia product viewing features evoked feeling of arousal and pleasure; however only arousal acted as a mediator between consumer led interaction features and mobile app stickiness intentions.

Fourth, it is important to note that regardless of some mobile design features having an impact on dominance, dominance did not have a significant influence on stickiness behavior. On the other hand, pleasure and arousal were both significant contributors of mobile app stickiness intentions. This implies that for mobile design features to influence stickiness intention, it is important for apps to focus on features that drive arousal and pleasure. This also suggests that dominance may only influence stickiness behavior in the prescence of hard task relevant cues.

Overall these results are important as they suggest the impact that low task relevant cues, the design of an app, have on consumers' intention to stay on an app longer and return more often. Additionally, the findings imply that retailers can benefit from increased inclusion of consumer led interaction features in app development as these fetaures overall had the most significant pathways to stickiness intentions. The findings also show that retail and app developers need to find new innovative methods of showcasing products for consumers to express feelings of arousal and pleasure in their time spent on an app. In addition, these results support the notion that a retailer must have more than the expected offerings of an app for a consumer to deem the app worthy of their time spent. This is important as much research has shown the limited time in which consumers make the decision to keep or delete an app.

Contributions and Implications

This study makes several important contributions to the body of knowledge of atmospheric research and retail mobile app development. This section discusses the study's contributions and implications from the persepctive of theory development and apparel digital marketing departments.

Theorectical implications

First, the theories used for this study are from the fields of pyschology, marketing, and retailing. The findings of this study have implications to theory as the findings went against previous literature. Prior literature in pyschology, marketing, and retail has predominately focused on the adoption, usage, and purchase intentions related to mobile commerce though the examination of techology based theories and framework. In addition, very few of these prior studies examined mobile applications specifically with many not distinguishing between commerce occuring on a mobile site versus a mobile app.

This study examined the phenomena of mobile apps though the usage of marketing and pyschology theories not centered on technology adoption and usage but instead on design elements and the SOR paradigm. While the prior studies on technology adoption and acceptance are vital to understanding the mobile commerce realm, this study took the next step in research to examine the mobile app environment in relation to visual design aspects. This study was able to simulate a mobile shopping experience of a branded fashion app by testing the relationship between mobile design features, emotion, and stickiness intention. While not all mobile design features examined had an impact on stickiness intention as mediated by consumers' emotional response, this study did emphasize the importance of design on consumer stickiness intention. Other variables not captured in this study along with other mobile design features may be better able to explain a consumer's mobile app stickiness intention. Therefore the findings encourage new opportunities and avenues of research to understand how mobile design features can be implemented effectively to impact consumers emotional response and stickiness intentions.

Second, the findings of this study were aligned with previous literature on atmospherics. This study investigated low task relevant cues, mobile design features, by breaking mobile

design features down into smaller grouping features created of design elements as suggested by Magarth and McCormick (2013b); the findings found consumer led interaction features and product promotion features to have a positive relationship with pleasure, arousal, and dominance; whereas, multimedia product viewing features only had positive relationship with arousal. Therefore, multimedia product viewing features, product promotion features, and consumer led interactions need to be effectively implemented within a retailer's mobile app to influence consumers' emotional response and stickiness intention. Although previous literature has examined the low task relevant cues of store atmospherics, these cues were grouped together in large categories usually termed visual cues (Koo et al, 2014), affection relevant cues (Zhang et al, 2015), and store design (Floh and Madlberger, 2013). Thus while their findings did show influence on behavior, one was not able to attribute it to a specific marketing element as most of the time the low task relevant cues were operationalized as overall visual appeal. The current study's findings also supported previous literature which states the more effective the visual design, the more likely consumers will have a positive usage intention (Hsu, 2012). Hence the more effective a retailer's mobile design features are, the more emotion they will exude, therefore, improving a consumer mobile app stickiness intention.

This study added to the breadth of research showing the vital need for effective usage of mobile design features (multimedia product viewing features, product promotion features, and consumer led interaction features) to impact consumers' emotional response and stickiness behavior. Magarth and McCormick's (2013b) m-marketing design framework evaluated the design aspects of website layout and design suggesting the examination of these elements in a mobile app context to distinguish what elements are important in the mobile environment. Additionally, early researchers in atmospeherics evaluated store environments through the usage

of Mehrabian and Russell's (1974) S-O-R pardigm suggesting the best way to examine a consumer's response to an environement. However, a discussion of the influence of a mobile app's environment is lacking within the body of knowledge on atmospherics. This study theorectically supports the influence of mobile design features on emotional response (the organism) and stickiness intention (the response).

Third, the findings of this study also revealed results mixed with prior literature in regards to the relationship between mobile design features and the dimensions of emotions (pleasure, arousal, and dominance). Hsieh, Hsieh, Chiu, and Yang (2014) stressed the importance of the emotional elements of dominance in online shopping environment as the consumer is able to exhibit a heightened sense of control over the shopping process, and their findings supported the inclusion of dominance in online settings. However, this study also employed shopping in an online setting (mobile apps) but failed to support the inclusion of dominance in mobile app settings. This implies that consumers' views of mobile design features may enhance feelings of dominance however it does not lead to stickiness intention. On the other hand, the study's findings did show that mobile design features especially consumer led interaction features would have a positive influence on pleasure and arousal in turn leading to a significant influence on mobile app stickiness intentions. This is in line with previous literature that found features of a retail environment to influence consumers mood and emotions (Cheng, 2009; Roy and Tai, 2003; Novak, Hoffman, and Yung, 2000; Wu, Lee, Fu, and Wang, 2013). Thus marketers should focus their mobile app strategies to enhance features that lead to feelings of arousal and pleasure as these two emotions were found to influence mobile app stickiness intention.

Industry implication

First, the findings can be applied to industry by incorporating purposeful interactvity into the retail app; in addition, these findings support the importance of creating additional design factors to complement product viewing options. Multimedia product viewing features were not a significant predictor of pleasure or dominance regardless of the mobile design feature held constant. Thus, hypotheses 1a and 1c were not supported. This could be due to the lack of interactivity in the stimuli. Feelings of dominance are rooted in the ability to have control over the environment; however, the stimuli developed in this study were stationary. Therefore, consumers were not given any ability to display elements of control on how many images they viewed or whether or not to view a video, or leave that product offering completely. In addition, pleasure consists of feelings of strong preference towards a stimuli. In the case of multimedia product viewing, the choice of product could have been a deterent to whether or not the respondent displayed preference, and without any additonal offering, pleasure potentially was not as strong as other emotional responses.

However multimedia product viewing was a significant predictor of arousal only when consumer led interaction features was held as the reference group. Thus, hypothesis 1b was partially supported. Therefore, consumers who viewed an app's multimedia viewing features (multiple product images and videos) generated a stronger influence on arousal when controlled for consumer led interaction features only. Arosual is an active response to a stimuli measuring a consumers readiness. Through the displaying of product images and video contents, consumers' readiness about the shopping process could be heightened thus preparing one to spend more time on the app or to come back more frequently based on their experience.

Second, industry leaders can apply these findings by understanding the impact of product promotion in conjunction with consumer generated reviews and high quality product viewing options. Product promotion features were not a signficant predictor of any emotional response in consumers relative to viewing multimedia product viewing features. This could be because consumers deem product promotion features as irrelevant unless they also are able to view the product. On the other hand when consumer led interactions were held as the reference group, product promotion features were held as a significant predictor of pleasure, arousal, and dominance. Thus hypothesis 2a,2b, and 2c were partially supported. This could be due to the elements that compose consumer led interaction features specifically product reviews and suggested items; thus, product promotions had more weight to garnering emotional response relative to consumer led interaction features potentially because they are only considered once the consumer has formed a decision toward a 'product suggestion' or purchase; in comparison, product promotion features may be necessary to form an opinion toward a product thus generating an emotional response. Therefore consumers who viewed an app's product promotions features (coupons, incentives, rewards, discounts, and social media promos) would yield an increase in their feelings of pleasure, arousal, and dominance when controlled for consumer led interactions (product reviews and suggested items), but product promotion features did not have an impact on emotion when controlled for multimedia viewing features (multiple images and videos).

Third, the findings can be used by apparel digital marketing departments to understand the importance of customized information and user generated content to promote product offerings. Consumer led interaction features were an overall significant predictor of both arousal and dominance, but was only a predictor of pleasure when controlled for product promotion

features. Thus hypothesis 3a was partially supported, and hypotheses 3b and 3c were supported. Hence when a consumer viewed an app's consumer led interaction features their feelings of pleasure were heightened only when controlled for product promotion features, but heightened feelings of arousal and dominance were present regardless of the control group. Consumer led interaction features had the most significant relationship with a consumer's emotional response. In addition, consumer led interaction features are the only mobile design feature that utilized consumer generated content through the creation of product review. Consumer led interaction features also utilize tailored consumer data through "product suggestions". This could explain why consumers showed the most emotional response for consumer led interaction features over other categories of mobile design features as well as were strong predictors of stickiness intentions. This implies that marketers need to enhance and create tailored experiences to garner positive emotional response and stickiness behavior to increase customer base toward a retail app.

Fourth, these findings can be applied by industry through the application of creating mobile design features that elicit strong feelings of pleasure and arousal when viewed. The emotional response of pleasure and arousal were found to be significant predictors as well as mediators of mobile app stickiness whereas dominance was not found to be a predicotor. Thus consumers with heightened feelings of pleasure and arousal from a mobile app's design features are more likley to have increased mobile app stickiness intentions. These findings are in line with prior literature suggesting that low task relevant cues are more likely to enhance feelings of pleasure and arousal when implemented correctly while only hard task relevant cues can enhance a consumer's dominance. Thus marketers should focus on design elements that will foster

feelings of pleasure and arousal as opposed to control as these are the most likely to lead to stickiness behavior.

Overall, the findings of this study confirmed the importance atmospherics have on a store environment as it relates to behavioral intentions. In particular this study shows mobile design features impact on consumers' emotional response and its influence on mobile app stickiness intention. Thus consumers experience emotions (pleasure, arousal, and dominance) differently and held varying degrees of mobile app stickiness intentions for the different types of mobile design features, multimedia product viewing, product promotions, and consumer led interactions. Accordingly, this implies that marketers must be intentional in their selection and usage of mobile design features to increase mobile app stickiness intentions. Marketers need to understand which mobile design features best generates positive emotions in their target market and how it relates to consumers' intention to stay on an app longer and return to the app more often (mobile app stickiness intention).

Limitations and Scope of Future Research

As with all research, this study has limitations which can lead to future research opportunities. First, the study's sample was comprised of female millenials. Although millenials are the driving group of mobile app usage and females are still the predominant shoppers, their usage limits the generalizability of this study. Future research could look to expand the generational group of the study and/ or include males in the participants pool. This would yield interesting results of whether mobile design features influence is affected by gender or generation.

Second, while this study utilized photoshop to create realistic app screens, the app screens themselved acted as screenshots of a mobile shopping experience. This limited the depth

of the findings as interactive apps are more realistic and would more likely yield different results. Future research should create a functioning app or an exisitng app to replicate the study's design. In addition, the stimuli created were a composite of multiple brands yielding fictitous images devoid of branding. While this research did not look at the impact of brand image or congruity, future research could incoporate these factors to either act as control over consumer emotional response or as predictor of mobile app stickiness.

Third, this research viewed three mobile design featues as a whole. Future research could look at each individual mobile design feature and the elements that constitue them to determine which elements are the contributing factors to mobile app stickiness. This could be valuable to enhance and tailor consumer experience. In addition to note, this study did not utilize a control group. As the scope of this research aimed to generate mobile experience that were as real as possible thus the usage of a hard task relevent cue control group would have generated a mobile app screen with block of text devoid of color, graphics, and layout. Future research should aim to remedy this issue by creating a control group which either has only hard task relevant cues or encompasses all elements of mobile design featues.

Fourth, this study limited the research setting to a branded mobile fashion apparel retailer. Consumers response may vary according to their involvement or familiarity with apparel products as well as with shopping for apparel through a mobile app. Future research should look to expand the products used as a stimuli. In addition, future research could use other types of apps such as wholesale or third party retailers to garner a more complete view of the the impact of mobile design features on retail apps and stickiness behavior.

Fifth, this study used qualitative methods only in preparation of stimuli development. Therefore, future research should take a qualitative approach to understanding the dynamic

between consumers' emotional response and mobile design features. Specifically qualitative research may be able to shed some light on questions unanswered from a quantitative viewpoint such as the reason multimedia product viewing features did not influence a consumer's emotional response. In addition, research into mobile app design features and mobile atmospherics is new; therefore, much emphasis should be placed on understanding the reasons consumers interact with their mobile app.

REFERENCES

Agarwal, R., & Venkatesh, V. (2002). Assessing a firm's Web presence: A heuristic evaluation procedure for the measurement of usability. *Information Systems Research, 13*(2), 168-186.

Ahuja, V., & Khazanchi, D. (2016). Creation of a Conceptual Model for Adoption of Mobile Apps for Shopping from E-Commerce Sites–An Indian Context. *Procedia Computer Science, 91*, 609-616. doi:10.1016/j.procs.2016.07.152

Babin, B. J., William, R. D., & Mitch, G. (1994). Work and/ or fun: measuring hedonic and utilitarian shopping value. *Journal of Consumer Research, 20*(4), 644-656.

Baker, J. (1986). The role of the environment in marketing services: The consumer perspective. *The services challenge: Integrating for competitive advantage, 1*(1), 79-84.

Batra, R., & Ahtola, O. T. (1991). Measuring the hedonic and utilitarian sources of customer attitudes. *Marketing Letters, 12*(2), 159-170.

Beldona, S., & Cai, L. A. (2006). *An exploratory evaluation of rural tourism websites.* Paper presented at the Journal of Convention & Event Tourism.

Bellman, S., Potter, R. F., Treleaven-Hassard, S., Robinson, J. A., & Varan, D. (2011). The effectiveness of branded mobile phone apps. *Journal of Interactive Marketing, 25*(4), 191-200.

Benlian, A. (2015). Web Personalization Cues and Their Differential Effects on User Assessments of Website Value. *Journal of Management Information Systems, 32*(1), 225-260. doi:10.1080/07421222.2015.1029394

Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *The Journal of Marketing*, 57-71.

Bomhold, C. R. (2013). Educational use of smart phone technology: A survey of mobile phone application use by undergraduate university students. *Program, 47*(4), 424-436.

Budiu, R. (2013). Mobile: Native apps, web apps, and hybrid apps. *Nielsen Norman Group*, 49-53.

Chaffey, D., Ellis-Chadwick, F., Mayer, R., & Johnston, K. (2009). *Internet marketing: strategy, implementation and practice*: Pearson Education.

Chang, C.-C. (2015). Exploring mobile application customer loyalty: The moderating effect of use contexts. *Telecommunications Policy, 39*(8), 678-690.

Chang, H. H., & Wang, H.-W. (2011). The moderating effect of customer perceived value on online shopping behaviour. *Online Information Review, 35*(3), 333-359.

Chong, A. Y.-L. (2013). Predicting m-commerce adoption determinants: A neural network approach. *EXPERT SYSTEMS WITH APPLICATIONS, 40*(2), 523-530.

Chong, A. Y.-L., Chan, F. T., & Ooi, K.-B. (2012). Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia. *Decision Support Systems, 53*(1), 34-43.

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.

Creswell, J. W. (2007). Qualitative inquiry & research design: choosing among five approaches. Sage Publications. *Thousand Oaks, CA*.

Criteo. (2016). Leading mobile retailers dominate-and the gap is growing Q4 2015. *State of Mobile Commerce.* Retrieved from http://www.criteo.com/media/3750/criteo-state-of-mobile-commerce-report-q4-2015.pdf

Cyr, D. (2008). Modeling web site design across cultures: relationships to trust, satisfaction, and e-loyalty. *Journal of Management Information Systems, 24*(4), 47-72.

Dawson, S., & Kim, M. (2010). Cues on apparel web sites that trigger impulse purchases. *Journal of Fashion Marketing and Management: An International Journal, 14*(2), 230-246.

deMarrais, K. (2004). Qualitative interview studies: Learning through experience. *Foundations for research: Methods of inquiry in education and the social sciences, 1*(1), 51-68.

Dennis, C., King, T., Kim, J., & Forsythe, S. (2007). Hedonic usage of product virtualization technologies in online apparel shopping. *International Journal of Retail & Distribution Management, 35*(6), 502-514.

Dholakia, R. R., & Miao, Z. (2009). How does it influence customer satisfaction and behavioral intentions? *International Journal of Retail & Distribution Management, 37*(10), 821-838. doi:10.1108]09590550910988011

Donnelly, C., & Scaff, R. Who are the millennial shoppers? and what do they really want? *Outlook.* Retrieved from https://www.accenture.com/us-en/insight-outlook-who-are-millennial-shoppers-what-do-they-really-want-retail

Donovan, R. J., & Rossiter, J. R. (1982). Store Atmosphere: An Environmental Psychology Approach. *Journal of Retailing, 58*(1), 34.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1-4.

eMarketer. (2016). Shoppers Are Downloading More Mobile Retail Apps. *Retail and eCommerce*. Retrieved from https://www.emarketer.com/Article/Shoppers-Downloading-More-Mobile-Retail-Apps/1014041

Eroglu, S., Machleit, K., & Davis, L. (2000). Online retail atmospherics: Empirical tests of a cue typology. *Retailing*, 144-150.

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*, 177-184. doi:10.1016/S0148-2963(99)00087-9

Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2003). Empirical testing of a model of online store atmospherics and shopper responses. *Pyschology and Marketing, 20*(2), 139-150.

Faqih, K. M., & Jaradat, M.-I. R. M. (2015). Assessing the moderating effect of gender differences and individualism-collectivism at individual-level on the adoption of mobile commerce technology: TAM3 perspective. *Journal of Retailing and Consumer Services, 22*, 37-52.

Feinberg, R., & Kadam, R. (2002). E-CRM Web service attributes as determinants of customer satisfaction with retail Web sites. *INTERNATIONAL JOURNAL OF SERVICE INDUSTRY MANAGEMENT, 13*(5), 432-451.

Fiore, A. M. (2002). Effects of experiential pleasure from a catalogue environment on approach responses toward fashion apparel. *Journal of Fashion Marketing and Management: An International Journal, 6*(2), 122-133.

Fiore, A. M., & Jin, H. J. (2003). Influence of image interactivity on approach responses towards an online retailer. *Internet Research, 13*(1), 38-48.

Floh, A., & Madlberger, M. (2013). The role of atmospheric cues in online impulse-buying behavior. *Electronic Commerce Research and Applications, 12*(6), 425-439.

Gartner. (2013). Gartner says mobile app stores will see annual downloads reach 102 billion in 2013 [Press release]. Retrieved from http://www.gartner.com/newsroom/id/2592315

Goldman, S. M. (2010). Transformers. *Journal of Consumer Marketing, 27*(5), 469-473.

Grandon, E., & Ranganathan, C. (2001). The impact of content and design of web sites on online sales. *AMCIS 2001 Proceedings*, 179.

Gulliver, S. R., & Ghinea, G. (2010). Cognitive style and personality: impact on multimedia perception. *Online Information Review, 34*(1), 39-58.

Ha, Y., Kwon, W.-S., & Lennon, S. J. (2007). Online visual merchandising (VMD) of apparel web sites. *Journal of Fashion Marketing and Management: An International Journal, 11*(4), 477-493.

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.

Hasan, B. (2016). Full length article: Perceived irritation in online shopping: The impact of website design characteristics. *Computers in Human Behavior, 54*, 224-230. doi:10.1016/j.chb.2015.07.056

Hausman, A. V., & Siekpe, J. S. (2009). The effect of web interface features on consumer online purchase intentions. *Journal of Business Research, 62*, 5-13. doi:10.1016/j.jbusres.2008.01.018

Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable.*British Journal of Mathematical and Statistical Psychology*, *67*(3), 451-470.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*: Guilford Press.

Hayes, A. F., & Preacher, K. J. (2013). Conditional process modeling: Using structural equation modeling to examine contingent causal processes. *Structural equation modeling: A second course, 2*, 217-264.

Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of tests of indirect effects in statistical mediation analysis.Does method really matter?PsychologicalScience,24,1918–1927. doi:10.1177/0956797613480187

Hew, J.-J., Lee, V.-H., Leong, L.-Y., Hew, T.-S., & Ooi, K.-B. (2016). The dawning of mobile tourism: what contributes to its system success? *International Journal of Mobile Communications, 14*(2), 170-201.

Hew, J.-J., Lee, V.-H., Ooi, K.-B., & Wei, J. (2015). What catalyses mobile apps usage intention: an empirical analysis. *Industrial Management & Data Systems, 115*(7), 1269-1291.

Hinchcliffe, D. (2013). 2013 predicitons for enterprise social media. *Social Enterprise*. Retrieved from http://www.zdnet.com/article/2013-predictions-for-enterprise-social-media/

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: emerging concepts, methods and propositions. *Journal of Marketing, 46*(2), 92-101.

Ho, H.-Y., & Syu, L.-Y. (2010). *Uses and gratifications of mobile application users.* Paper presented at the Electronics and Information Engineering (ICEIE), 2010 International Conference On.

Ho, J. Y., & Dempsey, M. (2010). Viral marketing: Motivations to forward online content. *Journal of Business Research, 63*(9), 1000-1006.

Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: conceptual foundations. *Journal of Marketing, 60*(3), 50-68.

Hsiao, K. L., Lin, J. C. C., Wang, X. Y., Lu, H. P., & Yu, H. J. (2010). Antecedents and consequences of trust in online product recommendations An empirical study in social shopping. *Online Information Review, 34*(6), 935-953.

Hsieh, J.-K., Hsieh, Y.-C., Chiu, H.-C., & Yang, Y.-R. (2014). Customer response to web site atmospherics: Task-relevant cues, situational involvement and PAD. *Journal of Interactive Marketing, 28*(3), 225-236. doi:10.1016/j.intmar.2014.03.001

Hsu, C.-L., & Lin, J. C.-C. (2015). What drives purchase intention for paid mobile apps?–An expectation confirmation model with perceived value. *Electronic Commerce Research and Applications, 14*(1), 46-57.

Hsu, C. C. (2012). Comparison of general differences in young people's blog interface preferences and design. *Displays, 33*(3), 119-128.

Huizingh, E. K. R. E. (2000). The content and design of web sites: an empirical study. *Information & Management, 37*, 123-134. doi:10.1016/S0378-7206(99)00044-0

In Shim, S., & Lee, Y. (2011). Consumer's perceived risk reduction by 3D virtual model. *International Journal of Retail & Distribution Management, 39*(12), 945-959.

Islam, R., Islam, R., & Mazumder, T. (2010). Mobile application and its global impact. *International Journal of Engineering & Technology (IJEST), 10*(6), 72-78.

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.

Kalyanaraman, S., & Sundar, S. S. (2006). The psychological appeal of personalized content in web portals: does customization affect attitudes and behavior? *Journal of Communication, 56*(1), 110-132.

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons, 53*, 59-68. doi:10.1016/j.bushor.2009.09.003

Keng, C. J., & Ting, H. Y. (2009). The acceptance of blogs: using a customer experiential value perspective. *Internet Research, 19*(5), 479-495.

Kim, E., Lin, J.-S., & Sung, Y. (2013). To App or Not to App: Engaging Consumers via Branded Mobile Apps. *Journal of Interactive Advertising, 13*(1), 53. doi:10.1080/15252019.2013.782780

Kim, G., Shin, B., & Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal, 19*(3), 283-311.

Kim, H., & Lennon, S. J. (2010). E-atmosphere, emotional, cognitive, and behavioral responses. *Journal of Fashion Marketing & Management, 14*(3), 412-428. doi:10.1108/13612021011061861

Kim, J., & Lennon, S. J. (2013). Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention: Based on the stimulus-organism-response model. *Journal of Research in Interactive Marketing, 7*(1), 33-56.

Kim, J., Ma, Y. J., & Park, J. (2009). Are US consumers ready to adopt mobile technology for fashion goods? An integrated theoretical approach. *Journal of Fashion Marketing & Management, 13*(2), 1361-2026.

Kim, M., Kim, J.-H., & Lennon, S. J. (2006). Online service attributes available on apparel retail web sites: an ES-QUAL approach. *Managing Service Quality: An International Journal, 16*(1), 51-77.

Kim, M., & Lennon, S. (2008). The effects of visual and verbal information on attitudes and purchase intentions in internet shopping. *Psychology & Marketing, 25*(2), 146-178.

Kim, S. J., Wang, R. J.-H., & Malthouse, E. C. (2015). The effects of adopting and using a brand's mobile application on customers' subsequent purchase behavior. *Journal of Interactive Marketing, 31*, 28-41.

Ko, E., Kim, E. Y., & Lee, E. K. (2009). Modeling consumer adoption of mobile shopping for fashion products in Korea. *Psychology & Marketing, 26*(7), 669-687.

Koo, W., Cho, E., & Kim, Y.-K. (2014). Actual and ideal self-congruity affecting consumers' emotional and behavioral responses toward an online store. *Computers in Human Behavior, 36*, 147-153.

Kotler, P. (1973). Atmospherics as a marketing tool. *Journal of Retailing, 49*(4), 48-64.

Krotov, V., Junglas, I., & Steel, D. (2015). The mobile agility framework: an exploratory study of mobile technology enhancing organizational agility. *Journal of theoretical and applied electronic commerce research, 10*(3), 1-7.

Kumar, A., & Mukherjee, A. (2013). Shop while you talk: determinants of purchase intentions through a mobile device. *International Journal of Mobile Marketing, 8*(1), 23-37.

Lee, C.-Y., Tsao, C.-H., & Chang, W.-C. (2015). The relationship between attitude toward using and customer satisfaction with mobile application services. *Journal of Enterprise Information Management, 28*(5), 680-697. doi:10.1108/JEIM-07-2014-0077

Lee, D., Yejean Park, J., Kim, J., Kim, J., & Moon, J. (2011). Understanding music sharing behaviour on social network services. *Online Information Review, 35*(5), 716-733.

Li, D., Browne, G. J., & Wetherbe, J. C. (2006). Why do internet users stick with a specific web site? A relationship perspective. *International Journal of Electronic Commerce, 10*(4), 105-141.

Li, H., Daugherty, T., & Biocca, F. (2001). Characteristics of virtual experience in electronic commerce: A protocol analysis. *Journal of Interactive Marketing, 15*(3), 13-30.

Lin, J. C.-C. (2007). Online stickiness: its antecedents and effect on purchasing intention. *Behaviour & Information Technology, 26*(6), 507-516. doi:10.1080/01449290600740843

Lin, L., Hu, P. J.-H., Sheng, O. R. L., & Lee, J. (2010). Is stickiness profitable for electronic retailers? *Communications of the ACM, 53*(3), 132-136.

Lionbridge. (2012). Mobile web apps vs. mobile native apps: how to make the right choice. Retrieved from http://www.lionbridge.com/files/2012/11/Lionbridge-WP_MobileApps2.pdf

Lipsman, A. (2014). Major mobile milestones in may: apps now drive half of all time spent on digital. *Insights*. Retrieved from https://www.comscore.com/Insights/Blog/Major-Mobile-Milestones-in-May-Apps-Now-Drive-Half-of-All-Time-Spent-on-Digital

Lohse, G. L., & Spiller, P. (1999). Internet retail store design: How the user interface influences traffic and sales. *Journal of Computer-Mediated Communication, 5*(2).

Lončaric´, D., Prodan, M. P., & Ribaric´, I. (2016). The influence of a visitor's perceptions of a museum's website design on behavioural intentions. *Ekonomski Vjesnik, 29*(1), 65-79.

Lowe, B., Maxwell, S., & Estelami, H. (2010). Consumer perceptions of extra free product promotions and discounts: the moderating role of perceived performance risk. *Journal of Product & Brand Management, 19*(7), 496-503.

Lu, J., Liu, Z., & Fang, Z. (2016). Hedonic products for you, utilitarian products for me. *Judgment & Decision Making, 11*(4), 332.

Lu, Y., & Rastrick, K. (2014). Impacts of Website Design on the Adoption Intention of Mobile Commerce: Gender as a Moderator. *New Zealand Journal of Applied Business Research (NZJABR), 12*(2), 51-68.

Lu, Y., & Smith, S. (2008). *Augmented reality e-commerce: how the technology benefits people's lives*: INTECH Open Access Publisher.

Lutz, R. J., & Kakkar, P. (1975). The psychological situation as a determinant of consumer behavior. *NA-Advances in Consumer Research Volume 02*.

Maghnati, F., & Ling, K. C. (2013). Exploring the Relationship between Experiential Value and Usage Attitude towards Mobile Apps among the Smartphone Users. *International Journal of Business & Management, 8*(4), 1-9.

Magrath, V., & McCormick, H. (2013a). Branding design elements of mobile fashion retail apps. *Journal of Fashion Marketing & Management, 17*(1), 98-114. doi:10.1108/13612021311305164

Magrath, V., & McCormick, H. (2013b). Marketing design elements of mobile fashion retail apps. *Journal of Fashion Marketing & Management, 17*(1), 115-134. doi:10.1108/13612021311305173

Mahatanankoon, P., Wen, H. J., & Lim, B. (2005). Consumer-based m-commerce: exploring consumer perception of mobile applications. *Computer Standards & Interfaces, 27*(4), 347-357.

Manganari, E. E., Siomkos, G. J., Rigopoulou, I. D., & Vrechopoulos, A. P. (2011). Virtual store layout effects on consumer behaviour: applying an environmental psychology approach in the online travel industry. *Internet Research, 21*(3), 326-346.

Mangold, W. G., & Faulds, D. J. (2009). Social media: The new hybrid element of the promotion mix. *Business Horizons, 52*, 357-365. doi:10.1016/j.bushor.2009.03.002

Mau, D. (2013). How retailers are using mobile to fuel your shopping addiction. Retrieved from Tech website: http://fashionista.com/2013/08/how-retailers-are-using-mobile-to-fuel-your-shopping-addiction/

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.

McCormick, H., & Livett, C. (2012). Analysing the influence of the presentation of fashion garments on young consumers' online behaviour. *Journal of Fashion Marketing & Management, 16*(1), 21-41. doi:10.1108/13612021211203014

McCracken, G. (1988). *The long interview* (Vol. 13): Sage.

Mehrabian, A., & Russell, J. A. (1974). *An Approach to Environmental Psychology*. Cambridge, M.A.

Meola, A. (2016). The rise of m-commerce: mobile shopping stats & trends. Retrieved from http://www.businessinsider.com/mobile-commerce-shopping-trends-stats-2016-10

Meyer-Waarden, L. (2008). The influence of loyalty programme membership on customer purchase behaviour. *European Journal of Marketing, 42*(1/2), 87-114.

Mild, A., & Reutterer, T. (2003). An improved collaborative filtering approach for predicting cross-category purchases based on binary market basket data. *Journal of Retailing and Consumer Services, 10*(3), 123-133.

Millennials: Technology=social connection. (2014). *Insights.* Retrieved from http://www.nielsen.com/us/en/insights/news/2014/millennials-technology-social-connection.html

Milnes, H. (2016). Where mobile commerce is going in 2016. Retrieved from http://digiday.com/brands/mobile-commerce-going-2016/

Moon, E., & Domina, T. (2015). Willingness to use Fashion Mobile Applications to Purchase Fashion Products: A comparison between the United States and South Korea. *Journal of Textile & Apparel Technology & Management (JTATM), 9*(3), 1-15.

Moustakas, C. (1994). *Phenomenological research methods*: Sage.

Muller, B. (2008). Consistency between brand image and website image: Does it matter? *International Journal of Internet Marketing and Advertising, 4*(4), 350-361.

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.

Ngai, E. W., & Gunasekaran, A. (2007). A review for mobile commerce research and applications. *Decision Support Systems, 43*(1), 3-15.

Ngo, L. V., Northey, G., Duffy, S., Thao, H. T. P., & Tam, L. T. H. (2016). Perceptions of others, mindfulness, and brand experience in retail service setting. *Journal of Retailing and Consumer Services, 33*, 43-52. doi:10.1016/j.jretconser.2016.07.003

Nguyen, B., & Mutum, D. S. (2012). A review of customer relationship management: successes, advances, pitfalls and futures. *Business Process Management Journal, 18*(3), 400-419.

Novak, T. P., Hoffman, D. L., & Yung, Y.-F. (2000). Measuring the customer experience in online environments: A structural modeling approach. *Marketing science, 19*(1), 22-42.

Park, M., & Lennon, S. J. (2009). Brand name and promotion in online shopping contexts. *Journal of Fashion Marketing & Management, 13*(2), 149-160.

Racherla, P., Furner, C., & Babb, J. (2012). Conceptualizing the implications of mobile app usage and stickiness: A research agenda. *Available at SSRN 2187056*.

Ranganathan, C., & Ganapathy, S. (2002). Key dimensions of business-to-consumer web sites. *Information & Management, 39*(6), 457-465.

Reichheld, F. F., & Schefter, P. (2000). E-loyalty: your secret weapon on the web. *Harvard Business Review, 87*(4), 105-113.

Richard, M.-O., & Habibi, M. R. (2016). Advanced modeling of online consumer behavior: The moderating roles of hedonism and culture. *Journal of Business Research, 69*(3), 1103-1119.

Ridgway, N. M., Dawson, S. A., & Bloch, P. H. (1990). Pleasure and arousal in the marketplace: Interpersonal differences in approach-avoidance responses. *Marketing Letters, 1*(2), 139-147.

Roulston, K., & Martinez, B. (2015). 3 Recruitment and Sampling in Consumer Research. *Qualitative Research Methods in Consumer Psychology: Ethnography and Culture, 2*, 33.

Rowley, J. (2009). Online branding strategies of UK fashion retailers. *Internet Research, 19*(3), 348-369.

San-Martín, S., López-Catalán, B., & Ramón, M. A. (2013). Mobile shoppers: types, drivers, and impediments. *Journal of organizational computing and electronic commerce, 23*(4), 350-371.

Santos, J. (2003). E-service quality: a model of virtual service quality dimensions. *Managing Service Quality: An International Journal, 13*(3), 233-246.

Shao Yeh, Y., & Li, Y.-M. (2009). Building trust in m-commerce: contributions from quality and satisfaction. *Online Information Review, 33*(6), 1066-1086.

Shih, C. (1998). *Telepresence and bricolage: a conceptual model of consumer experiences in virtual environments.* Paper presented at the 1998 Winter Society for Consumer Psychology Conference Proceedings.

Shih, Y.-Y., & Chen, C.-Y. (2013). The study of behaavioral intention for mobile commerce: via integrated model of TAM and TTF. *Quality & Quantity, 47*(2), 1009-1020.

Shim, S. I., & Lee, Y. (2011). Consumer's perceived risk reduction by 3D virtual model. *International Journal of Retail & Distribution Management, 39*(12), 945-959.

Shin, D. H. (2010). Analysis of online social networks: a cross-national study. *Online Information Review, 34*(3), 473-495.

Siddiqui, N., O'Malley, A., McColl, J., & Birtwistle, G. (2003). Retailer and consumer perceptions of online fashion retailers: Web site design issues. *Journal of Fashion Marketing & Management, 7*(4), 345-355.

Simmons, G., Thomas, B., & Truong, Y. (2010). Managing i-branding to create brand equity. *European Journal of Marketing, 44*(9-10), 1260-1285.

Simmons, G. J. (2007). "i-Branding": developing the internet as a branding tool. *Marketing Intelligence & Planning, 25*(6), 544-562.

Singh, T., Veron-Jackson, L., & Cullinane, J. (2008). Blogging: A new play in your marketing game plan. *Business Horizons, 51*(4), 281-292.

Skidmore, S. (2013). Native, HTML5 or hybrid? Retrieved from https://www.apperian.com/mam-blog/enterprise-mobile-apps-native-html5-hybrid/

Smartbear. (2014). The state of Mobile Retrieved from http://www2.smartbear.com/rs/smartbear/images/smartbear-2014-software-industry-survey-testing.pdf

Solomon, M. R. (2009). *Marketing: Real people, real decisions*: Pearson Education.

Srinivasan, S. S., Andderson, R., & Ponnavolu, K. (2002). Customer loyalty in e-commerce: an exploration of its antecedents and consequences. *Journal of Retailing, 78*(1), 41-50.

Staff, M. (2014). Americans' most popular online and mobile purchases. Retrieved from http://www.marketingcharts.com/online/americans-most-popular-online-and-mobile-purchases-44246/

Staff, M. (2016). Which categories are most popular with online shoppers across the world? Retrieved from http://www.marketingcharts.com/online/which-categories-are-most-popular-with-online-shoppers-across-the-world-69989/

Swilley, E., & Hofacker, C. F. (2006). Defining mobile commerce in a marketing context. *International Journal of Mobile Marketing, 1*(2).

Tang, H. (2013). Should retailers invest in mobile shopping apps?, 5. Retrieved from Consumer Insights for Digital Marketers website: https://blog.compete.com/2013/07/10/retailers-invest-mobile-shopping-app/

Tarasewhich. (2003). Designing Mobile Commerce Applications. *Communications of the ACM, 46*(2), 57-60.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches* (Vol. 46): Sage.

Taylor, D. G., & Levin, M. (2014). Predicting mobile app usage for purchasing and information-sharing. *International Journal of Retail & Distribution Management, 42*(8), 759-774. doi:10.1108/ijrdm-11-2012-0108

Tong, D. Y. K., Lai, K. P., & Tong, X. F. (2012). Ladies' purchase intention during retail shoes sales promotions. *International Journal of Retail & Distribution Management, 40*(2), 90.

Van Manen, M. (2016). *Researching lived experience: Human science for an action sensitive pedagogy*: Routledge.

Van Teijlingen, E. R., & Hundley, V. (2010). The importance of pilot studies. *Social Research Update, 35*, 49-59.

Vesanen, J. (2007). What is personalization? A conceptual framework. *European Journal of Marketing, 41*(5/6), 409-418.

Wang, E. S.-T. (2010). Impact of multiple perceived value on consumers' brand preference and purchase intention: a case of snack foods. *Journal of food products marketing, 16*(4), 386-397.

Weathers, D., Sharma, S., & Wood, S. L. (2007). Effects of online communication practices on consumer perceptions of performance uncertainty for search and experience goods. *Journal of Retailing, 83*, 393-401. doi:10.1016/j.jretai.2007.03.009

Wright, M. (2012). The influence of mobile: how consumer behavior evolved. *Inside FMM: A curated project of Macala Wright 2008-2012*. Retrieved from Mobile website: http://insidefmm.com/2012/08/the-influence-of-mobile-how-consumer-behavior-evolved/

Wu, J.-H., & Wang, S.-C. (2005). What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model. *Information & Management, 42*(5), 719-729.

Wu, W.-Y., Lee, C.-L., Fu, C.-S., & Wang, H.-C. (2013). How can online store layout design and atmosphere influence consumer shopping intention on a website? *International Journal of Retail & Distribution Management, 42*(1), 4-24.

Xu, J., & Liu, Z. (2010). *Study of online stickiness: its antecedents and effect on repurchase intention.* Paper presented at the e-Education, e-Business, e-Management, and e-Learning, 2010. IC4E'10. International Conference on.

Yadav, R., Sharma, S. K., & Tarhini, A. (2016). A multi-analytical approach to understand and predict the mobile commerce adoption. *Journal of Enterprise Information Management, 29*(2), 222-237.

Yang, K. (2012). Consumer technology traits in determining mobile shopping adoption: An application of the extended theory of planned behavior. *Journal of Retailing and Consumer Services, 19*(5), 484-491.

Yang, S., Wang, Y., & Wei, J. (2014). Integration and consistency between web and mobile services. *Industrial Management & Data Systems, 114*(8), 1246-1269. doi:10.1108/IMDS-06-2014-0167

Yoon, D., Choi, S. M., & Sohn, D. (2008). Building customer relationships in an electronic age: The role of interactivity of E-commerce Web sites. *Psychology & Marketing, 25*(7), 602-618.

Zhang, H., Lu, Y., Wang, B., & Wu, S. (2015). The impacts of technological environments and co-creation experiences on customer participation. *Information & Management, 52*(4), 468-482.

Zhang, L., Zhu, J., & Liu, Q. (2012). A meta-analysis of mobile commerce adoption and the moderating effect of culture. *Computers in Human Behavior, 28*(5), 1902-1911.

Zhao, Z., & Balagué, C. (2015). Designing branded mobile apps: Fundamentals and recommendations. *Business Horizons, 58*(3), 305-315.

Zott, C., Amit, R., & Donlevy, J. (2000). Strategies for value creation in e-commerce:: best practice in Europe. *European Management Journal, 18*(5), 463-475.

Appendix A

Institutional Review Board Approval for Pilot Study

Institutional Review Board-Pilot Study Approval

Phone 706-542-3199

Office of the Vice President for Research
Institutional Review Board

APPROVAL OF PROTOCOL

January 23, 2017

Dear Laura McAndrews:

On 1/23/2017, the IRB reviewed the following submission:

Type of Review:	Initial Study- Exempt 2
Title of Study:	Stimuli Development of Mobile Application Design Features
Investigator:	Laura McAndrews
IRB ID:	STUDY00004403
Funding:	None
Documents Reviewed:	Consent Document, Recruitment Material, Interview Instrument

The IRB approved the protocol from 1/23/2017 to 1/22/2022.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Sincerely,

Dr. Gerald E. Crites, MD, MEd
University of Georgia
Institutional Review Board Chairperson

APPENDIX B

RECRUITMENT MATERIAL AND CONSENT FORMS FOR PILOT STUDY

RECRUIMENT SCRIPT

Hi! My name is Briana Martinez and I am a PhD candidate here in TXMI under the direction of Dr. Laura McAndrews. I am currently working on developing some stimuli for my dissertation research on the design features of mobile apps. I would like to conduct interview with millennial students who use their mobile phone to shop.

It doesn't matter whether or not you have made a purchase on your mobile phone. It only matters that you use mobile apps to aid in the shopping process. To be able to participate in the 50 minute interviews, you need to be over the age of 18, own a smartphone, and have used mobile apps in the shopping process. In addition, there will be a raffle of two 10-dollar visa gift card. While your participation in the interview is not necessary to enter, I do hope you all help me out with your participation.

So, if you are interested, please leave your email and mailing addresses on this paper here, that I will pass around. I will then enter you into the drawing and contact you by weeks end to set up an interview time that will work best for you schedule. If you have any additional questions, please contact me at brianam@uga.edu. Thank you so much for your help!

Consent Letter

Date:

Dear Prospective Participant:

I am a graduate student under the direction of Dr. Laura McAndrews in the department of Textiles, Merchandising, and International Trade at the University of Georgia. I invite you to participate in a research study entitled "Stimuli Development of Mobile Design Features." To be applicable for participation you simply need to be 18 years of age or older, own a smartphone, and have experience with shopping on a mobile app. The purpose of this study is to design several stimuli emphasizing the mobile design features most applicable to todays' mobile app.

Your participation will involve an in-depth interview pertaining your mobile app usage, the type of shopper you are, and the mobile design features you are most familiar with. This research will be undertaken as an interview which should take no more than 50 minutes of your time. The interview consists of 2 main parts: exploration of mobile app usage and mobile shopper behavior and mobile design features used to aid in shopping process. Participation in this interview has no direct benefits; however, your participation in this interview can aid the understanding of the influence of mobile design features on the shopping process. No foreseen risk is seen in this research; however, if at any time during this survey you feel any discomfort, you can stop participation in the survey. There is a 10-dollar visa gift card raffle incentive for your participation in this study; however, participation is not required to enter the raffle. If you should win the raffle, your gift card will be mailed to you at the address provided in your raffle entry.

The data collected about the participants will be anonymous as names will not be collected for the interview. The interview will be audio recorded in order to be transcribed but no identifying information will be recorded. The audio recordings will be deleted at the completion of the study. The mobile screen of your phone will be video recorded with permission and will cease as any time you feel uncomfortable. The video recording will only be of your mobile screen. The mobile recorded sessions are to be used as a visual aid in stimuli development. The results of the research study may be published, but your name or any identifying information will not be used. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. Your decision about participation will have no bearing on your grades or class standing.

The main researcher conducting this study is Dr. Laura McAndrews, a professor at the University of Georgia. Please ask any questions you may have at this time. If you have questions later, you may contact Dr. McAndrews at lauraemc@uga.edu or me at brianam@uga.edu. If you have any questions or concerns regarding your rights as a research

participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

By reading and signing this letter, you are agreeing to participate in the above described research project. Thank you for your consideration! A copy of this letter will be provided, please keep for your records.

Sincerely,

Briana Martinez XX_____

APPENDIX C INTERVIEW INSTRUMENT

INTERVIEW PROTOCOL

Interview Protocol.	Participant is given consent letter to read and sign. A copy of consent letter is given to participant for their records. Participant battery life on mobile device is checked; a charger is provided for use if needed. Video recording of phone is checked at this time to ensure accurate lightening. Audio check follows.
Warm Up Questions/ Equipment Testing Questions	Tell me about yourself. Describe yourself for me.

Participant is to be informed that the Interview will begin now.

Central concepts of user-oriented design and research questions	**Questions to address each concept**
RQ1: To explore mobile application and features that drive consumer purchases on mobile devices and to understand the typical behavior of the mobile shopper during their mobile shopping process	
Mobile App Usage	Tell me about the apps you use most. What needs are the apps satisfying for you? When do you use the apps most? What type of apps do you prefer? What do you expect that app to be able to do? Show me how you navigate within the app? Can you show me the types of app you use to purchase/ shop from? Can you show me the types of fashion apps you use to browse/ aid in purchase decision/ purchase? Take me to your favorite app for shopping. Let's act as if you're looking for a new white blouse/ shirt. Talk me through your shopping process.

Type of Shopper (grouping)	How often do you shop/ browse stores? How long do you typically shop for? What type of products are you usually looking at? Tell me about your most recent shopping experience. Did you end up making a purchase or were you just window shopping? Where do you shop most often? Brick and Mortar? Online? Mobile? What brands do you shop for? On mobile apps?
RQ2: To explore the mobile application design features that aid in consumer shopping process and identify mobile application design features most prevalent in mobile shopping	
Multimedia product viewing	What type of imagery are you looking within the mobile app? Do you view/ expect to view pictures from a multitude of views? Do you watch videos of how the garment/ product looks, works, or operate? How often do the apps you interact with have features such as 3D virtual models, "try-On" technology?
Informative content	What type of product information do you find most often when using your app to shop? Do you look for information about retail services within the app? How do you find out about trend information/ style advice within the app? Do you see this type of information often in your shopping apps? Do you look for connections to social media? How often do you use social media with a shopping app? Do you read customer reviews?
Product Promotion	Tell me about a time when you used a sales promotion or when a sales promotion was offered to you while shopping. When shopping within an app how often are you exposed to coupon, incentives, rewards, or discounts? Do you ever see competitions for grand prizes within your mobile app? Do you share social promotions during your shopping within the mobile app via social media?
Consumer Led Interactions	Within the apps you frequent most for shopping, do they recommend products you like? Tell me how you feel about that. Does the app allow you to tailor the settings to find the product you're looking for better? What about augmented reality…does any of the apps you use let you try on products on your actual self?

APPENDIX D

IRB APPROVAL FOR STIMULI CHECK

Phone 706-542-3199

The University of Georgia

Office of the Vice President for Research
Institutional Review Board

APPROVAL OF PROTOCOL

April 11, 2017

Dear Laura McAndrews:

On 4/11/2017, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Stimuli Check
Investigator:	Laura McAndrews
IRB ID:	STUDY00004683
Funding:	None
Grant ID:	None

The IRB approved the protocol from 4/11/2017.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Sincerely,

Dr. Gerald E. Crites, MD, MEd
University of Georgia
Institutional Review Board Chairperson

310 East Campus Rd, Tucker Hall Room 212 • Athens, Georgia 30602
An Equal Opportunity/Affirmative Action Institution

APPENDIX E

IRB APPROVAL FOR SOR EXPERIMENT

Phone 706-542-3199

The University of Georgia

Office of the Vice President for Research
Institutional Review Board

APPROVAL OF PROTOCOL

April 11, 2017

Dear Laura McAndrews:

On 4/11/2017, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	The influence of mobile application design features on consumers emotional response and stickiness intentions
Investigator:	Laura McAndrews
IRB ID:	STUDY00004684
Funding:	None
Grant ID:	None

The IRB approved the protocol from 4/11/2017.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Sincerely,

Dr. Gerald E. Crites, MD, MEd
University of Georgia
Institutional Review Board Chairperson

APPENDIX F

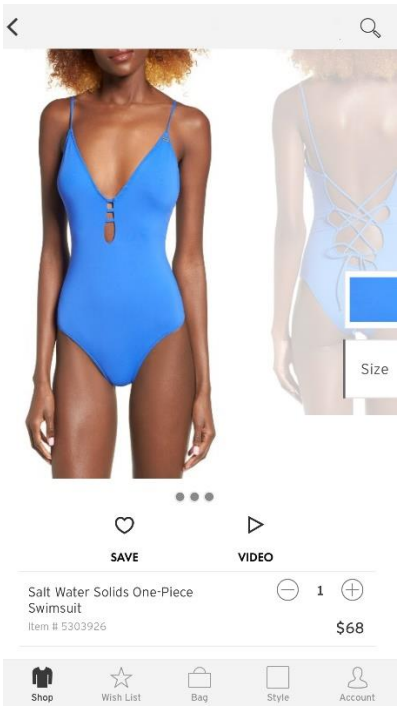
SURVEY INSTRUMENTS

SURVERY FOR HEDONIC EXPERIENCE

Before looking at the following mobile screens, please read the following scenarios, taking about two minutes to really get into the mood of the situation.

You are on your way to New York City for the weekend, but your fight has been delayed yet again. You suddenly find yourself with a bunch of down time and begin to get a little bored. You decide to shop online through some of your favorite mobile apps to pass the time.

The following images show the way a product is displayed on a typical retail app. Please note that you will not be able to interact with the image through linking to other pages, swiping left or right, etc. Upon visual inspection of the app's page, please answer the questions following each image.



STORE AVAILABILITY

Choose size and color for store availability and services

Add to Bag

DETAILS & CARE

Sleek and flattering but still sexy, this one-piece swimsuit is styled with a plunging neckline and a strappy open back.

- Ties behind back
- V-neck
- Spaghetti straps
- Fully lined
- 85% polyamide, 15% elastane
- Hand wash cold, dry flat
- Imported
- Available online only

SIZE INFORMATION

Swimwear sizing is smaller than apparel sizing; order one size up.
XS=0, S=2-4, M=6-8, L=10-12, XL=14.

SHIPPING & RETURNS

Free shipping. Free returns. All the time. Purchases made online can also be returned or exchanged at any store, free of charge.

Your Privacy Rights Terms & Conditions Return Policy

Shop Wish List Bag Style Account

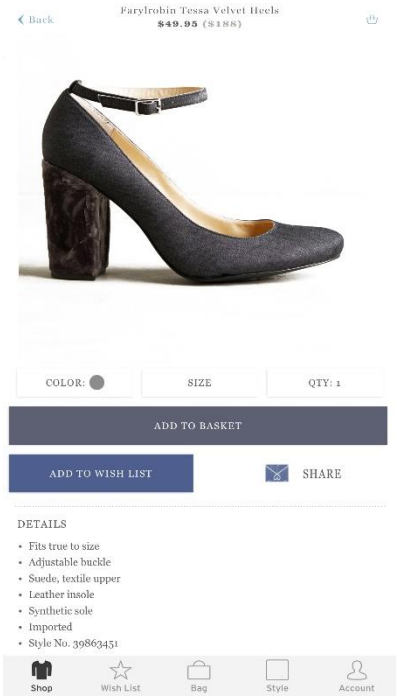
Rate your feelings in the situation with the adjective pairs below. Some of the pairs might seem unusual, but you'll probably feel more one way than the other. So, for each pair, mark the circle close to the adjective which you believe to describe your feelings better. The more appropriate that adjective seems, the closer you put your mark.

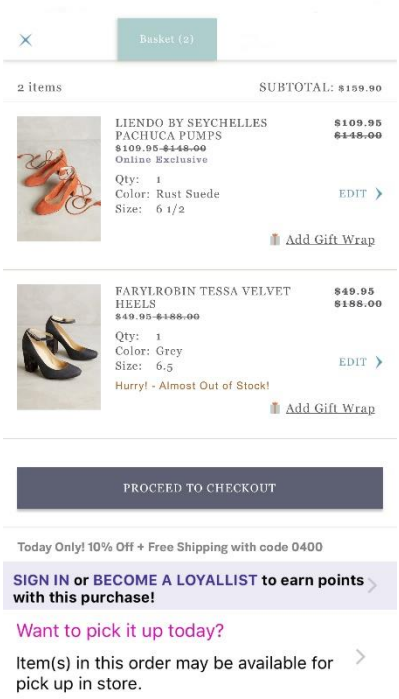
After viewing this app, I felt:						
Unhappy ○	○	○	○	○	○	Happy ○
Annoyed ○	○	○	○	○	○	Pleased ○
Unsatisfied ○	○	○	○	○	○	Satisfied ○
Despairing ○	○	○	○	○	○	Hopeful ○
Melancholic ○	○	○	○	○	○	Contented ○
Bored ○	○	○	○	○	○	Relax ○
Relaxed ○	○	○	○	○	○	Stimulated ○
Calm ○	○	○	○	○	○	Excited ○
Unaroused ○	○	○	○	○	○	Aroused ○
Sleepy ○	○	○	○	○	○	Wide-Awake ○
Sluggish ○	○	○	○	○	○	Frenzied ○
Dull ○	○	○	○	○	○	Jittery
Controlled	○	○	○	○	○	Controlling
Influenced	○	○	○	○	○	Influential
Cared for	○	○	○	○	○	In control
Awed	○	○	○	○	○	Important
Submissive	○	○	○	○	○	Dominant
Guided ○	○	○	○	○	○	Autonomous

Please describe your intention to use a mobile shopping app like this in the future by indicating your level of agreement with the following statements from strongly disagree to strongly agree.

After viewing this one fashion product, ____.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
It would be highly likely that I would return to this app to shop again for fashion products.	○	○	○	○	○	○	○
I would continue to shop for other fashion products on this app.	○	○	○	○	○	○	○
I intend to spend more time shopping for fashion products on this app.	○	○	○	○	○	○	○
I would visit this app again the next time I shop for fashion products.	○	○	○	○	○	○	○




Basket (2)
2 items
SUBTOTAL: $159.90
LIENDO BY SEYCHELLES PACHUCA PUMPS
$109.95-$148.00
Online Exclusive
$109.95
$148.00
Qty: 1
Color: Rust Suede
Size: 6 1/2
EDIT
Add Gift Wrap
FARYLROBIN TESSA VELVET HEELS
$49.95-$188.00
$49.95
$188.00
Qty: 1
Color: Grey
Size: 6.5
EDIT
Hurry! - Almost Out of Stock!
Add Gift Wrap
PROCEED TO CHECKOUT
Today Only! 10% Off + Free Shipping with code 0400
SIGN IN or BECOME A LOYALLIST to earn points with this purchase!
Want to pick it up today?
Item(s) in this order may be available for pick up in store.

Rate your feelings in the situation with the adjective pairs below. Some of the pairs might seem unusual, but you'll probably feel more one way than the other. So, for each pair, mark the circle close to the adjective which you believe to describe your feelings better. The more appropriate that adjective seems, the closer you put your mark.

After viewing this app, I felt:						
Unhappy ○	○	○	○	○	○	Happy ○
Annoyed ○	○	○	○	○	○	Pleased ○
Unsatisfied ○	○	○	○	○	○	Satisfied ○
Despairing ○	○	○	○	○	○	Hopeful ○
Melancholic ○	○	○	○	○	○	Contented ○
Bored ○	○	○	○	○	○	Relax ○
Relaxed ○	○	○	○	○	○	Stimulated ○
Calm ○	○	○	○	○	○	Excited ○
Unaroused ○	○	○	○	○	○	Aroused ○
Sleepy ○	○	○	○	○	○	Wide-Awake ○
Sluggish ○	○	○	○	○	○	Frenzied ○
Dull ○	○	○	○	○	○	Jittery
Controlled	○	○	○	○	○	Controlling
Influenced	○	○	○	○	○	Influential
Cared for	○	○	○	○	○	In control
Awed	○	○	○	○	○	Important
Submissive	○	○	○	○	○	Dominant
Guided ○	○	○	○	○	○	Autonomous

Please describe your intention to use a mobile shopping app like this in the future by indicating your level of agreement with the following statements from strongly disagree to strongly agree.

After viewing this one fashion product, ____.

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It would be highly likely that I would return to this app to shop again for fashion products.	○	○	○	○	○	○	○
I would continue to shop for other fashion products on this app.	○	○	○	○	○	○	○
I intend to spend more time shopping for fashion products on this app.	○	○	○	○	○	○	○
I would visit this app again the next time I shop for fashion products.	○	○	○	○	○	○	○

Item # 5251918

Pretty Floral Print Skater Dress

8 Reviews

$98.00

MULTI

SIZE

ADD TO CART

Shop | Wish List | Bag | Style | Account

- Lined chiffon
- Floral embroidery
- Crew neck
- Short sleeves
- Button-keyhole back
- Zip-back fastening with hook and eye closure
- Regular fit - true to size
- Machine wash
- 100% Viscose
- Our model wears a UK 8/EU 36/US 4 and is 176cm/5'9.5" tall

REVIEWS (8)

2/25/17

Runs Big

This is a cute dress, but as other reviewers have said, it's larger and puffier (in the body) than it appears. I'm 5'1, 115 lbs, and XS was larger than I wanted it to be.....

LinnieWinnie

Adorable dress

Love this dress. Looks exactly l photos. If between sizes then d it runs loose. I'm 5'3, 132lbs a well, could possibly go down or

tamber

YOU MIGHT ALSO LIKE

16 items

$68.00

$91.00

38.0

Shop | Wish List | Bag | Style | Account

Rate your feelings in the situation with the adjective pairs below. Some of the pairs might seem unusual, but you'll probably feel more one way than the other. So, for each pair, mark the circle close to the adjective which you believe to describe your feelings better. The more appropriate that adjective seems, the closer you put your mark.

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Despairing ○	○	○	○	○	○	Hopeful ○
Melancholic ○	○	○	○	○	○	Contented ○
Bored ○	○	○	○	○	○	Relax ○
Relaxed ○	○	○	○	○	○	Stimulated ○
Calm ○	○	○	○	○	○	Excited ○
Unaroused ○	○	○	○	○	○	Aroused ○
Sleepy ○	○	○	○	○	○	Wide-Awake ○
Sluggish ○	○	○	○	○	○	Frenzied ○
Dull ○	○	○	○	○	○	Jittery
Controlled	○	○	○	○	○	Controlling
Influenced	○	○	○	○	○	Influential
Cared for	○	○	○	○	○	In control
Awed	○	○	○	○	○	Important
Submissive	○	○	○	○	○	Dominant
Guided ○	○	○	○	○	○	Autonomous

Please describe your intention to use a mobile shopping app like this in the future by indicating your level of agreement with the following statements from strongly disagree to strongly agree.

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It would be highly likely that I would return to this app to shop again for fashion products.	○	○	○	○	○	○	○
I would continue to shop for other fashion products on this app.	○	○	○	○	○	○	○
I intend to spend more time shopping for fashion products on this app.	○	○	○	○	○	○	○
I would visit this app again the next time I shop for fashion products.	○	○	○	○	○	○	○

Please indicate the operating system of your smartphone.

- Apple
- Android

What is your age? _____

Please identify to which ethnic group you belong to.

- White/ Caucasian
- Black/ African-American
- Hispanic
- Multi-racial
- Asian
- Native Hawaiian or Pacific Islander
- American Indian or Alaska Native
- Other _____

Please indicate your highest level of education completed.

- Less than high school
- High school graduate
- Some college/ currently enrolled
- 2-year degree
- 4-year degree
- Professional degree
- Doctorate

Please indicate your annual household income.

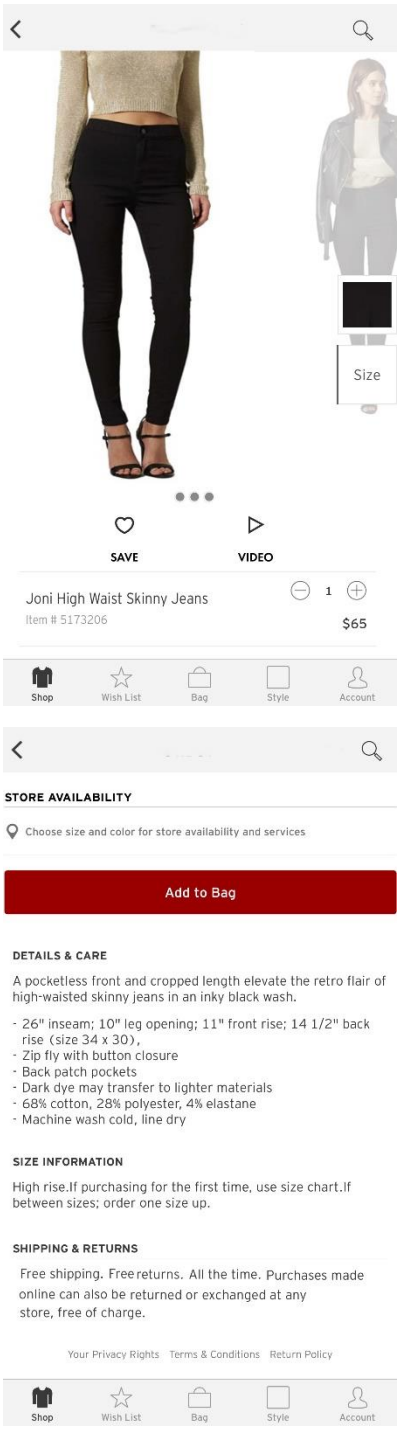
- Less than $10,000
- $10,000-$19,999
- $20,000- $29,999
- $30,000-$39,999
- $40,000-$49,000
- $50,000- $59,999
- $60,000-$69,999
- $70,000-$79,999
- $80,000- $89,999
- $90,000- $99,999
- $100,000- $149,999
- More than $150,000

SURVERY FOR UTILITARIAN EXPERIENCE

Before looking at the following mobile screens, please read the following scenarios, taking about two minutes to really get into the mood of the situation.

One of your longtime friends is getting married in Key West this June. The wedding weekend is full of events before the actual wedding itself on Saturday night. After looking at your closet and the weather for that weekend, you realize you need a dress to wear for the formal event. In addition, you could really use a new pair of sandals and some jeans for going out at night.

The following images show the way a product is displayed on a typical retail app. Please note that you will not be able to interact with the image through linking to other pages, swiping left or right, etc. Upon visual inspection of the app's page, please answer the questions following each image.


Size
SAVE
VIDEO
Joni High Waist Skinny Jeans
Item # 5173206
1
$65
Shop
Wish List
Bag
Style
Account
STORE AVAILABILITY
Choose size and color for store availability and services
Add to Bag
DETAILS & CARE
A pocketless front and cropped length elevate the retro flair of high-waisted skinny jeans in an inky black wash.
- 26" inseam; 10" leg opening; 11" front rise; 14 1/2" back rise (size 34 x 30),
- Zip fly with button closure
- Back patch pockets
- Dark dye may transfer to lighter materials
- 68% cotton, 28% polyester, 4% elastane
- Machine wash cold, line dry
SIZE INFORMATION
High rise.If purchasing for the first time, use size chart.If between sizes; order one size up.
SHIPPING & RETURNS
Free shipping. Free returns. All the time. Purchases made online can also be returned or exchanged at any store, free of charge.
Your Privacy Rights
Terms & Conditions
Return Policy
Shop
Wish List
Bag
Style
Account

Rate your feelings in the situation with the adjective pairs below. Some of the pairs might seem unusual, but you'll probably feel more one way than the other. So, for each pair, mark the circle close to the adjective which you believe to describe your feelings better. The more appropriate that adjective seems, the closer you put your mark.

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Despairing ○	○	○	○	○	○	Hopeful ○
Melancholic ○	○	○	○	○	○	Contented ○
Bored ○	○	○	○	○	○	Relax ○
Relaxed ○	○	○	○	○	○	Stimulated ○
Calm ○	○	○	○	○	○	Excited ○
Unaroused ○	○	○	○	○	○	Aroused ○
Sleepy ○	○	○	○	○	○	Wide-Awake ○
Sluggish ○	○	○	○	○	○	Frenzied ○
Dull ○	○	○	○	○	○	Jittery
Controlled	○	○	○	○	○	Controlling
Influenced	○	○	○	○	○	Influential
Cared for	○	○	○	○	○	In control
Awed	○	○	○	○	○	Important
Submissive	○	○	○	○	○	Dominant
Guided ○	○	○	○	○	○	Autonomous

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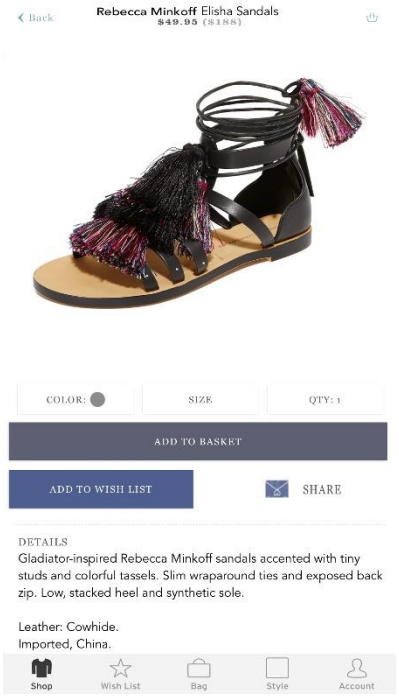
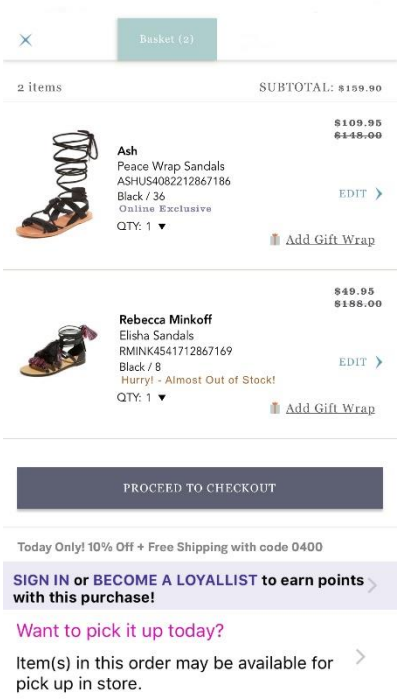
I would visit this app again the next time I shop for fashion products.	○	○	○	○	○	○	○




Basket (2)
2 items
SUBTOTAL: $159.90
$109.95
$148.00
Ash
Peace Wrap Sandals
ASHUS4082212867186
Black / 36
Online Exclusive
QTY: 1
EDIT
Add Gift Wrap
$49.95
$188.00
Rebecca Minkoff
Elisha Sandals
RMINK4541712867169
Black / 8
Hurry! - Almost Out of Stock!
QTY: 1
EDIT
Add Gift Wrap
PROCEED TO CHECKOUT
Today Only! 10% Off + Free Shipping with code 0400
SIGN IN or BECOME A LOYALLIST to earn points with this purchase!
Want to pick it up today?
Item(s) in this order may be available for pick up in store.

Rate your feelings in the situation with the adjective pairs below. Some of the pairs might seem unusual, but you'll probably feel more one way than the other. So, for each pair, mark the circle close to the adjective which you believe to describe your feelings better. The more appropriate that adjective seems, the closer you put your mark.

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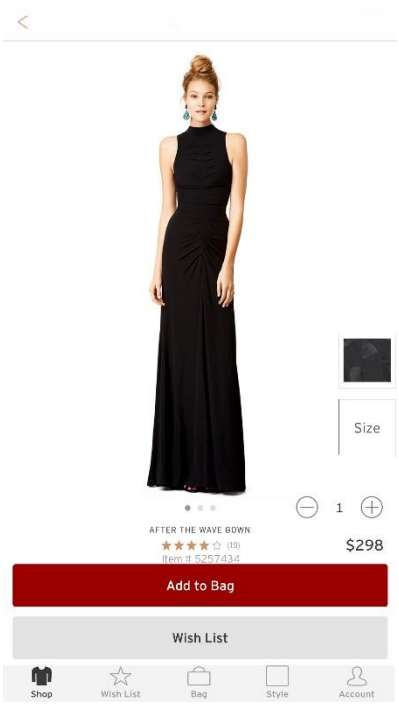
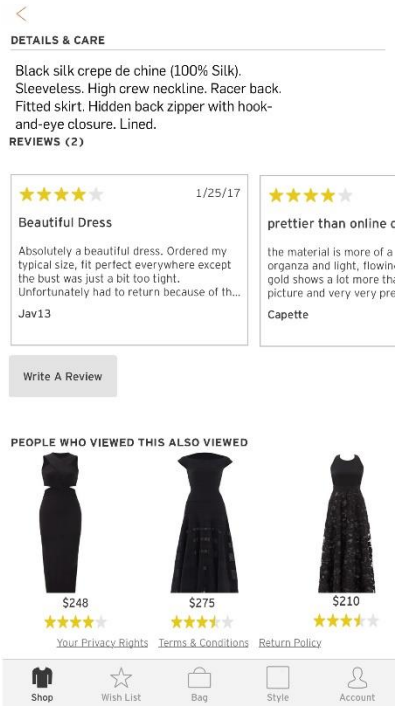
Unsatisfied ○	○	○	○	○	○	Satisfied ○
Despairing ○	○	○	○	○	○	Hopeful ○
Melancholic ○	○	○	○	○	○	Contented ○
Bored ○	○	○	○	○	○	Relax ○
Relaxed ○	○	○	○	○	○	Stimulated ○
Calm ○	○	○	○	○	○	Excited ○
Unaroused ○	○	○	○	○	○	Aroused ○
Sleepy ○	○	○	○	○	○	Wide-Awake ○
Sluggish ○	○	○	○	○	○	Frenzied ○
Dull ○	○	○	○	○	○	Jittery
Controlled	○	○	○	○	○	Controlling
Influenced	○	○	○	○	○	Influential
Cared for	○	○	○	○	○	In control
Awed	○	○	○	○	○	Important
Submissive	○	○	○	○	○	Dominant
Guided ○	○	○	○	○	○	Autonomous

Please describe your intention to use a mobile shopping app like this in the future by indicating your level of agreement with the following statements from strongly disagree to strongly agree.

After viewing this one fashion product, ____.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
It would be highly likely that I would return to this app to shop again for fashion products.	○	○	○	○	○	○	○
I would continue to shop for other fashion products on this app.	○	○	○	○	○	○	○
I intend to spend more time shopping for fashion products on this app.	○	○	○	○	○	○	○
I would visit this app again the next time I shop for fashion products.	○	○	○	○	○	○	○




DETAILS & CARE
Black silk crepe de chine (100% Silk).
Sleeveless. High crew neckline. Racer back.
Fitted skirt. Hidden back zipper with hook-
and-eye closure. Lined.
REVIEWS (2)
1/25/17
Beautiful Dress
Absolutely a beautiful dress. Ordered my
typical size, fit perfect everywhere except
the bust was just a bit too tight.
Unfortunately had to return because of th...
Jav13
prettier than online
the material is more of a
organza and light, flowin
gold shows a lot more th
picture and very very pre
Capette
Write A Review
PEOPLE WHO VIEWED THIS ALSO VIEWED
$248
$275
$210
Your Privacy Rights
Terms & Conditions
Return Policy
Shop
Wish List
Bag
Style
Account

Rate your feelings in the situation with the adjective pairs below. Some of the pairs might seem unusual, but you'll probably feel more one way than the other. So, for each pair, mark the circle close to the adjective which you believe to describe your feelings better. The more appropriate that adjective seems, the closer you put your mark.

After viewing this app, I felt:						
Unhappy ○	○	○	○	○	○	Happy ○
Annoyed ○	○	○	○	○	○	Pleased ○
Unsatisfied ○	○	○	○	○	○	Satisfied ○
Despairing ○	○	○	○	○	○	Hopeful ○
Melancholic ○	○	○	○	○	○	Contented ○
Bored ○	○	○	○	○	○	Relax ○
Relaxed ○	○	○	○	○	○	Stimulated ○
Calm ○	○	○	○	○	○	Excited ○
Unaroused ○	○	○	○	○	○	Aroused ○
Sleepy ○	○	○	○	○	○	Wide-Awake ○
Sluggish ○	○	○	○	○	○	Frenzied ○
Dull ○	○	○	○	○	○	Jittery
Controlled	○	○	○	○	○	Controlling
Influenced	○	○	○	○	○	Influential
Cared for	○	○	○	○	○	In control
Awed	○	○	○	○	○	Important
Submissive	○	○	○	○	○	Dominant
Guided ○	○	○	○	○	○	Autonomous

Please describe your intention to use a mobile shopping app like this in the future by indicating your level of agreement with the following statements from strongly disagree to strongly agree.

After viewing this one fashion product, ____.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
It would be highly likely that I would return to this app to shop again for fashion products.	○	○	○	○	○	○	○
I would continue to shop for other fashion products on this app.	○	○	○	○	○	○	○
I intend to spend more time shopping for fashion products on this app.	○	○	○	○	○	○	○
I would visit this app again the next time I shop for fashion products.	○	○	○	○	○	○	○

Please indicate the operating system of your smartphone.

- o Apple
- o Android

What is your age? _____

Please identify to which ethnic group you belong to.

- o White/ Caucasian
- o Black/ African-American
- o Hispanic
- o Multi-racial
- o Asian
- o Native Hawaiian or Pacific Islander
- o American Indian or Alaska Native
- o Other _____

Please indicate your highest level of education completed.

- Less than high school
- High school graduate
- Some college/ currently enrolled
- 2-year degree
- 4-year degree
- Professional degree
- Doctorate

Please indicate your annual household income.

- Less than $10,000
- $10,000-$19,999
- $20,000- $29,999
- $30,000-$39,999
- $40,000-$49,000
- $50,000- $59,999
- $60,000-$69,999
- $70,000-$79,999
- $80,000- $89,999
- $90,000- $99,999
- $100,000- $149,999
- More than $150,000