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Consumer Responses to the Use of Technology-Based Self-Service:
A Self-Determination Theory Perspective

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Marketing

by

Dominique F. Braxton

Dissertation Committee:
Dean Eric Spangenberg, Co-Chair
Professor Cornelia (Connie) Pechmann, Co-Chair
Professor Tonya Williams Bradford
Dean David Sprott

2019

DEDICATION

To My Heavenly Father.

To my dear husband, James. My rock. My everything.

To my son, Barry. My joy. You are perfect in every way.

To my Mother. My counselor. My inspiration.

To my Father. My laughter. My confidence.

To my entire family. My cheerleaders.

TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

ACKNOWLEDGMENTS

I could not have and did not do this on my own.

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CURRICULUM VITAE

Dominique F. Braxton

2019	Ph.D. in Marketing, University of California, Irvine
2014 – 2019	Teaching Assistant, Ph.D. Program in Marketing, University of California, Irvine
2012 - 2014	Teaching Assistant, Ph.D. Program in Marketing, Washington State University
2009	Bachelor of Science in Business Administration – Marketing University of Nevada Las Vegas
2007	Associate of Business – Marketing College of Southern Nevada

FIELD OF STUDY

Consumer responses to engagement in technology-based self-service

PUBLICATIONS

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ABSTRACT OF THE DISSERTATION

Consumer Responses to the Use of Technology-Based Self-Service:
A Self-Determination Theory Perspective

By

Dominique F. Braxton

Doctor of Philosophy in Marketing

University of California, Irvine, 2019

Dean Eric Spangenberg, Co-Chair

Professor Cornelia (Connie) Pechmann, Co-Chair

New technologies and new ways to connect with consumers are transforming the retail industry. As digital innovation continues to alter consumer behavior, brick and mortar store environments must conform to meet the changing wants and needs of consumers. Although consumers are increasingly demanding in-store technology that supports an omnichannel shopping experience, retailers are still at varying stages of digital store transformation. In my dissertation, I aim to illuminate some of the benefits of incorporating technology-based self-service in the physical retail store and emphasize the importance of conforming to a digital retail transformation. Specifically, I explore how technology-based self-service increases consumer perceptions of control and decision comfort during the shopping experience.

Further, I examine the role of technology savviness and need for interaction to understand how individual differences concerning technology-based self-service impacts consumer perceptions of control and decision comfort. These questions address a gap in consumer behavior

research given that much of the scholarly literature on consumer use of self-service technology explores antecedents such as technology readiness and adoption or post-shopping experiences concerning POS self-service. In contrast, my dissertation addresses consequences that consumers experience after engaging in technology-based self-service for shopping task completion. In particular, I hypothesize that consumers who engage in technology-based self-service to complete mid-shopping tasks (e.g., wayfinding or ordering a product) will experience greater control and thus greater comfort in their shopping decisions.

Further, I explore consumer individual differences concerning technology savviness and need for interaction. Specifically, I hypothesize that technology savviness will moderate the relationship between technology-based self-service such that consumers who are more technology savvy will experience greater perceived control and decision comfort compared to their less tech-savvy counterparts. Further, I hypothesize that consumers with lower need for interaction will experience greater perceived control and decision comfort compared to those with higher need for interaction. My findings from six experimental studies demonstrate that technology-based self-service for mid-shopping task completion increases consumer perceptions of control and decision comfort, but only when consumers consider themselves tech savvy or have a low need for interaction.

Introduction

Every year, the Consumer Electronics Show kicks off in Las Vegas with enticing new products intended to provide consumers with smartphones, smart cars, smart homes - essentially, smart lives. At the three-day conference, members of the tech industry show off the latest innovations from self-driving vehicles to customer-facing technology, and retailers swarm the demos and booths seeking the best tools to connect with their customers. There is a growing interest in the Internet of Things (IoT), where consumers can electronically link their physical devices, vehicles, home appliances, and other items, thereby adopting the concept of a "connected life." With this comes a higher demand for technology in retail shopping experiences to integrate the physical and digital consumption worlds (Burke 2002). In fact, fifty-eight percent of consumers use technology in physical retail stores to research products and/or product information (Skrovan, 2017), and eighty-seven percent of consumers want the ability to access products and services regardless of whether they are online, in-store, or on their mobile devices (Mvix, 2015). Essentially, many consumers want an omnichannel experience, which allows them to seamlessly shop in multiple channels using technology integrated in physical retail stores (Piotrowicz and Cuthbertson 2014). The appeal of this experience is quite possibly due to an increased consumer competency when interfacing with technology and greater independence afforded by such tools (Oracle Retail, 2017).

To meet the demands of omnichannel shoppers, select retailers have responded by incorporating cutting-edge in-store technology that allows consumers to shop uninterrupted and complete shopping tasks independently. For example, the Rebecca Minkoff store located in the heart of West Hollywood, boasts an interactive video wall for shopping the latest collections, a

smart mirror to help shoppers swap sizes and get recommendations, and of course technology-based self-check-out options. However, retailers are at varying stages of digital store transformation, which transitions the store to a computer-mediated shopping environment where shoppers can use technology-based self-service options to check out, order merchandise, navigate the store, etc. without the help of an employee. Retailers often offer technology-based self-service based on the promise of improved cost efficiencies, better and more accurate service, and growing consumer preferences for independence in shopping (Parasuraman and Grewal 2000). Proponents of technology-based self-service argue that the use of self-service technology in brick and mortar stores reduces front-line staffing costs and increases efficiency by redistributing displaced workers into other service-dominant areas of the business, allowing for enhanced shopping experience. Similarly, technology-based self-service is appealing to many consumers because it will enable improved service via increased speed of delivery, reduced waiting time, convenience, enjoyment, and control. However, these responses may vary based on many consumer motivations and characteristics.

While the above observations are mostly speculative, researchers have extensively demonstrated consumer value of control in the physical retail environment. For example, consumers appreciate interpersonal control because they experience the freedom to maximize privacy and minimize excessive stimulation from unwanted social interference of others (Hui and Bateson 1991; Stokols 1976). Similarly, consumers value physical control, such as the physiological experience of being able to walk through a store, touch products, and try features without restriction. According to the 2017 TimeTrade State of Retail report, seventy-five percent of consumers still prefer to shop in physical stores to touch and feel products before buying (TimeTrade 2017). The ability to shop freely without such interference is likely to impact

2

perceived control in that consumers may feel they are better able to predict situations and outcomes of the shopping experience. (Lee and Allaway 2002) argued that consumer perceptions of control can be experienced from technology use when the condition involves the ability to determine or design a service experience such that one can better predict the self-designed service procedure and its consequences. As such, in-store technology may help consumers feel more in control of shopping tasks that can be accomplished with self-service tools because it provides a more predictable procedure and outcome, ceteris paribus.

Given today's growing digital economy, as well as the importance of perceived control in a retail context, understanding how technology use in physical retail stores can impact consumer perceptions of control is critical to theoretical development and managerial decision making in physical retail stores. With enhanced mobile technology and in-store digital features, shoppers can access online information from anywhere and have now come to expect access to technology-based self-service that provides the same elements of control as that of online shopping (Burke 2002; Piotrowicz and Cuthbertson 2014; Shankar 2011). Retailers that integrate technology into the physical store can enhance the in-store experience by blending the emotional, sensory, and cognitive benefits of offline shopping with the access, interactivity, and convenience of online channels (Alexander and Olivares Alvarado 2014).

While in-store technologies such as self-service kiosks have received much attention from large retailers like WalMart, Target and Kohl's, there remains much to understand about how and when consumer interactions with these technologies influence the shopping experience. Notably, self-service technology can impact the shopping experience during a crucial time – that is, when customers make preliminary purchase decisions. From a managerial perspective, there is value in considering the impact self-service kiosks might have on consumer's decision making

that merit the investment. From a theoretical standpoint, the ability to assume some control over tasks during a shopping experience potentially encourages the customer to evaluate the shopping task more favorably. The purpose of this dissertation is to contribute to the conversation on technology-based self-service, while theoretically and empirically establishing its role during the in-store shopping experience, rather than at the beginning (e.g., online information search) or end (e.g., POS self-service). In particular, I address the following research questions:

1. How does mid-shopping technology-based self-service impact consumer perceptions of control over shopping tasks?

2. What is the nature of the causal relationship between technology-based self-service, perceived control, and decision comfort?

3. What role do individual differences concerning technology savviness play in this relationship?

In subsequent chapters, I provide a review of the literature, distinguishing self-service technology from technology-based self-service, and highlighting motivations to engage in technology-based self-service. I continue by detailing the theoretical framework and describing my hypotheses. Then, in six experiments, I empirically demonstrate the hypothesized relationships in a combination of online and lab studies and finally discuss the theoretical and managerial implications, limitations, and future research directions.

Chapter 1: Literature Review

Self-Service Technology

The role of self-service has developed substantially from early research on customer co-production, where customers contribute to the process of service delivery, into a literature stream on technology-enabled co-production using self-service technologies. Self-service technologies are "technological interfaces that enable customers to produce a service independent of direct service employee involvement" (Meuter et al. 2000). Traditionally, self-service technology was limited to automatic teller machines, self-checkout, vending machines, gas station pay-at-the-pump systems, telephone banking, and internet transactions (Meuter et al. 2005). Brick and mortar retailers are now moving towards incorporating the internet into self-service technologies to increase the service capabilities by creating internet-enabled self-service technology like endless aisle kiosks and mobile apps (Yen 2005). Incorporating the internet broadens the capacity of the technology to include both internet-based task completion (i.e., searching and ordering products) and non-internet-based task completion (e.g., requesting information, filing a complaint). The most commonly used interfaces for internet enabled self-service technology in the physical retail store are endless aisle kiosks and mobile apps.

Endless Aisle kiosks

Endless Aisle kiosks are freestanding electronic platforms with touchscreens that allow consumers to perform internet-based shopping tasks (e.g. order products, check inventory, navigate the store etc.) without direct assistance of a retail store employee. Endless aisle kiosks support omnichannel retailing by allowing shoppers convenience and autonomy in gathering product details, pricing, inventory, identifying product location, signing up for loyalty programs, and even ordering out of stock items. For example, department stores like Macy's and Kohl's

offer endless aisle kiosks for shoppers to conduct internet-enabled technology-based self-service activities such as searching online inventory, finding additional products (e.g. sizes, colors), and ordering products to the store or their home. Similarly, endless aisle kiosks have been installed in the toy section of select WalMart stores to help customers make decisions regarding product purchases. For example, the machine will ask the user questions such as "are you looking for a gift?" or "is the recipient a boy or girl" and recommend appropriate products based on the user's input. Then the shopper can select the product from the aisle, or if it is not in stock, they look for it in the nearest store or order it from WalMart.com and have it delivered to their home. These tasks are typically completed by a frontline employee but have now been delegated to the consumer in the form of technology-based self-service.

Mobile Apps

Similar to endless aisle kiosks, mobile applications, or mobile apps, are web-based self-service technologies that shoppers can download on select mobile devices and serve to provide the same self-service as those found on endless aisle kiosks. Retailers are increasingly developing mobile apps that are integrated with a company's website to inform user purchase decisions, increase in-store attention and engagement, and allow the user to conduct e-commerce activities from wherever they are, including from inside physical retail stores (Wolfinbarger and Gilly 2001). Many mobile apps now utilize radio frequency identification (RFID) to enhance the shopping experience by allowing the shopper to independently locate products within the store and gather information about the products through online channels. iBeacon is a relatively new technology that works with mobile apps and other software to provide in-store shoppers with exclusive deals, access to mobile payment solutions, and the ability to "check in" on social media telling their friends that they are currently in a particular store. In return, data collected

from iBeacon technology allows retailers to track critical user behavior (e.g., the patterns with which shoppers move through the store) thereby obtaining valuable behavioral information that otherwise would be near impossible to obtain. These technologies offer consumers immense control when shopping in a physical retail environment by allowing the shopper to behave as she would if shopping in an online environment (e.g., comparing prices, gathering product information and peer reviews, or ordering products to be shipped to home) while reaping the benefits of in-store shopping.

Technology Based Self-Service

While self-service technology refers to the actual technological interface that enables customers to independently produce a service (Meuter et al. 2000), technology-based self-service refers to the behavior of the customer in serving oneself via technology (Dabholkar 1996). With technology-based self-service, customers seemingly become partial employees by performing tasks typically done by a person employed by the company for wages or salary. In the physical retail store, technology-based self-service can serve as an informational, transactional, or supportive tool during the shopping experience (see table 1). Informational technology-based self-service refers to the ability to gather information such as wayfinding, pricing, inventory, and product information with technologies such as interactive signage and price scanning kiosks. For example, in-store shoppers can use a kiosk or a mobile app to scan the barcode of a product and receive information such as the product's price and whether it is on sale or the store's inventory and availability in nearby stores. Similarly, interactive digital signage can provide product details without the assistance of a store employee (e.g., learning about the features and customizations of a newly released product). Transactional technology-based self-service allows the customer to engage in retail transactions such as ordering and ticketing without direct interaction with a store

employee. Shoppers often perform these services using technologies such as freestanding kiosks, vending machines, or mobile apps. Finally, supportive technology-based self-service refers to self-help capabilities of technology. For example, a shopper might use an in-store kiosk to find answers to questions (e.g., frequently asked questions page), submit a complaint, look up account information, or sign up for a loyalty program.

	Informational	Transactional	Self-help
Technology based self-service	Interactive maps, digital directories/signage, kiosks; ATM	ATM; POS systems; Vending Machines	Self-check in/out at hotels; airport ticketing
Internet enabled technology-based self-service	geolocational mapping; mobile apps; artificial intelligence	endless aisle kiosks; mobile apps;	artificial intelligence; smart mirrors;

Table 1: Functions of technology-based self-service

Motivation to Engage in Technology-Based Self-Service

Consumers are increasingly adopting mobile technologies and e-commerce platforms, and many have come to expect the ability to move seamlessly across channels for a consistent, integrated experience. In-store retail shoppers are motivated to engage in technology-based self-service for several reasons including characteristics of the technology itself (e.g., user-friendly, useful) and consumer traits (e.g., technology anxiety, need for interaction, consumer readiness). When a self-service technology is easy to use and is likely to enhance productivity when completing one's shopping task, retail shoppers are motivated to engage in technology-based self-service (Davis 1989). On the other hand, certain consumer traits such as self-efficacy, inherent novelty seeking, need for interaction, and self-consciousness, might either discourage or encourage motivation to engage in technology-based self-service (Dabholkar and Bagozzi 2002). Finally, situational influences like perceived waiting time and social anxiety act as moderating

variables that impact the extent to which the drivers mentioned above impact attitude toward technology use.

Consumer readiness, or the condition or state in which a consumer is likely to use an innovation, is an essential determinant of a shopper's likelihood of engaging in technology-based self-service (Meuter et al. 2005). These researchers conceptualize consumer readiness by role clarity, motivation, and ability. Role clarity is the consumer's knowledge and understanding of their role as a service producer in technology-based self-service, motivation is the desire to reap the benefits of engaging in technology-based self-service, and ability is the extent to which the consumer possesses the appropriate skills and confidence to complete the shopping task. Motivation concerning consumer readiness can be intrinsic, where the shopper finds feelings of accomplishment, prestige, personal growth or mere pleasure from technology-based self-service, or extrinsic, where the shopper benefits from technology-based self-service with a price discount, time savings, convenience, etc. (Dabholkar 1996).

Online shoppers tend to be goal oriented and value characteristics of the e-commerce environment that allow them to conveniently compare products, access variety, reduce interpersonal interactions with service personnel, and increase cost efficiency (Gilly and Wolfinbarger 2000). Moreover, research shows that some consumers find pleasure in technology-based consumption, including using electronic gadgets as well as shopping online and on mobile devices (Hirschman and Holbrook 1982). The novelty of using innovative technologies in the consumption environment leads to a state of complete engagement, immersion, or involvement in an activity for its own sake, such that your whole being is involved and you're using your skills to the utmost, this is called "flow"(Csikszentmihalyi 1997, 2014). When an environment provides a challenge that is balanced at or above some cognitive

9

threshold, an individual enters a state of flow where he feels active, alert, concentrated, happy, satisfied, and creative (Csikszentmihalyi and LeFevre 1989). Flow can also lead to a sense of time distortion, reduced attention to the external environment, reduced self-consciousness, and extreme gratification. Researchers have most commonly studied flow in online contexts as a cognitive state characterized by high levels of skill and control, high levels of challenge and arousal, and focused attention enhanced by interactivity and telepresence (Novak, Hoffman, and Yung 2000).

A consistent theme in the literature on consumer engagement in technology is that consumers are hedonically motivated by feelings such as fun, pleasantness, and novelty. However, the relationship between participation in technology-based self-service and positive emotion, as well as the driving factors that create this relationship, are not well understood. Researchers have put forth theoretical explanations; however, none of them seem to be fitting with consumer use of technology-based self-service. For example, (Csikszentmihalyi 2014) links consumer use of technology to a "loss of consciousness" and "extreme gratification." Similarly, (Holbrook et al. 1984) explore interactions with gaming technology and find that technology use is positively related to fun, excitement, and arousal. However, it is unlikely that retail shoppers will experience such intense emotional satisfaction from using self-service technology to complete a shopping task. Instead, I argue that retail shoppers will experience a more subtle positive emotion of comfort.

In particular, I use the three dimensions of self-determination theory to explain how consumers experience positive emotion in the form of decision comfort when they engage in technology-based self-service. I propose that technology-based self-service, as opposed to employee service options, increase shopper perceptions of control over the shopping task, and

subsequently comfort with their shopping decisions. Further, while the direct relationship

between technology-based self-service and decision comfort through perceived control informs

the marketing fields, it is often meaningful to understand boundary conditions by studying

moderating effects of external factors (Baron and Kenny 1986; James and Brett 1984).

Therefore, I expand this research model to encompass two essential consumer traits – technology

savviness and need for interaction. Specifically, I examine how one's technology savviness with

consumer-facing technologies and need for interaction with service employees individually

moderate the relationships within the core conceptual model. Fig. 1 presents the conceptualized

relationship between technology-based self-service, perceived control, and decision comfort, and

the moderating role of prior technology savviness and need for interaction.
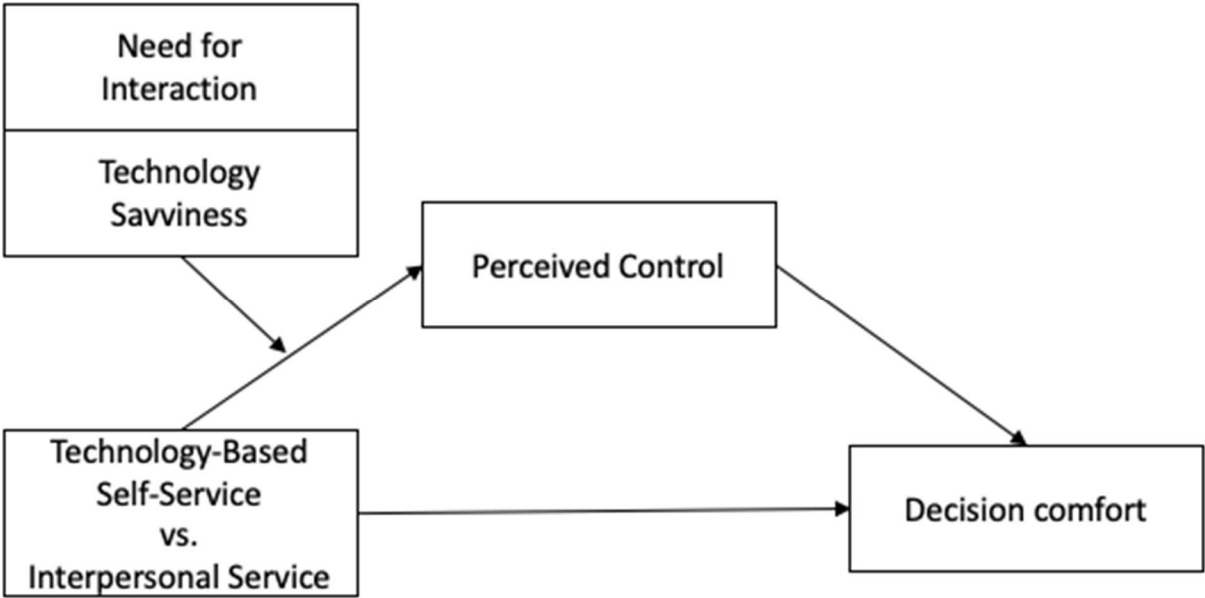
Figure 1: Conceptual Model

Chapter 2: Theoretical Development and Hypotheses

A theoretical framework that can help explain the relationship between technology-based self-service and positive emotion is self-determination theory (Ryan and Deci 2000a, b, 2001). Specifically, self-determination theory defines intrinsic and extrinsic sources of motivation concerning well-being, which lies on a continuum from amotivation to intrinsic motivation. Amotivation refers to the complete lack of action when a person believes that he or she is unable to achieve the desired outcome due to lack of perceived control or competence (Cadwallader et al. 2010). Intrinsic motivation is the highest level of motivation, where an individual participates in a specific behavior out of sheer interest or inherent pleasure or desire to know, to accomplish, or to experience stimulation. Extrinsic motivation lies in the middle of the continuum and refers to a broad array of behaviors people engage in not because of the act per se, but because they desire the outcome of the act (Ryan and Deci 2006). Conditions supporting an individual's basic psychological needs for autonomy, competence, and relatedness are argued to foster these motivations expressed in self-determined behavior, curiosity, and growth. The psychological need for relatedness refers to the human desire for a sense of belongingness, social connections, a sense of purpose or meaning, and self-concept reinforcement. The psychological need for competence is the human desire to engage in activities that exhibit one's skills or abilities. The psychological need for autonomy refers to the representation of one's true self, being in charge of one's actions, and self-definition. When these psychological needs are met, the individual is likely to experience positive emotions.

People who engage in technology-based self-service likely do so because they are extrinsically motivated to achieve some outcome. Two related outcomes shoppers expect to experience from technology-based self-service are perceived control, driven by the autonomy of

12

completing the shopping task by oneself, and cognitive stimulation, realized by the competence one displays when using such technology. For example, when engaging in technology-based self-service, the shopper can control the speed of the transaction, the order of the transaction steps, the accuracy of the inputs, and confirmation of outputs. Like the psychological need for autonomy, perceived control is an essential factor to human functioning and researchers have reliably demonstrated the positive effects on psychological well-being (Glass and Singer 1972; Langer and Rodin 1976). In general, researchers have defined control as the extent to which a person can intentionally produce desired outcomes and prevent undesired ones (Burger 1989; Collier and Sherrell 2010; Rodin 1990; Skinner, Chapman, and Baltes 1988). Control within a consumer behavior context often refers to a subjective sense control (i.e., perceived control), or the amount of control one believes they have in a situation.

Research in online shopping has identified perceived control as an important indicator of the desire to shop online (Wolfinbarger and Gilly 2001). In particular, online shopping allows the shopper to manage the information search, eliminates social density and temporal restriction, and increases options, which leads to higher perceptions of control over the shopping experience. Physical retail stores can provide tool that enable choice, self-efficacy, freedom, and autonomous effort, and empowerment to increase perceptions of control (Miller 1979). In the physical retail store, shopping barriers and service provider ability can positively or negatively impact perceived control and responses to the retailer (Baker and Wakefield 2012). This finding is particularly common in marketing and consumer behavior, where perceived control is often studied as a situational state of control (e.g., control over one's experiences in specific consumption contexts). Likewise, perceptions of control in brick and mortar retail settings tend to be more situation specific (e.g., crowded environment or an incompetent service provider)

which has important implications on the valence of the customer's experience and approach-avoidance responses to the retail or service provider.

Consumer expectations for autonomy and competence from technology-based self-service are likely a direct response to the inherent qualities of self-service technology. A key characteristic of self-service technology is user-machine interactivity or a user-controlled synchronous dialogue where the user inputs a request to the machine and the system yields information in response to the user's action (Liu and Shrum 2002). For brevity, I will refer to user-machine interactivity as interactivity. Interactivity consists of three dimensions: (1) active control, (2) synchronicity, and (3) two-way communication (Liu and Shrum 2002). Active control is the voluntary and instrumental action performed by the user that directly influences the response from the machine. Two-way communication is the input/output dialogue that occurs between the user and the device, and synchronicity is the degree to which the machine's response to the user's input occurs in real-time. While self-service technologies tend to possess all three characteristics of interactivity, active control is a consumer-specific characteristic. Active control is consistent with the concept of objective control described by (Skinner 1996), or the actual control one has in a specific situation. Perceived control, however, is a more accurate predictor of subsequent emotion and behavior than objective control, since the effect of objective control will only have psychological significance if the person recognizes the gain or loss of control (Langer 1979). In other words, one must have perceived control for objective control to be meaningful.

Within the context of technology-based self-service, actual control represents the objective control the shopper has based on inputs and outputs between the shopper and the

machine. However, perceived control is more theoretically and managerially meaningful. Today, many retail shoppers use technology-based self-service and often prefer it to traditional employee dependent service ("The Connected Retailer," 2018). These shoppers are more likely to engage in technology-based self-service because the behavior offers the ability to fulfill one's sense of autonomy and competence (Leung and Matanda 2013). Consumers also appreciate online retailing for the reduced reliance on other people (Gilly and Wolfinbarger 2000). Similarly, technology-based self-service facilitates the shopping experience by increasing autonomy during the shopping journey by providing options to independently complete tasks that traditionally require the assistance of a store employee. For example, in the case of an out of stock product, to purchase the product, the shopper would generally need to ask a store employee for assistance, and the outcome of the shopping experience becomes partially dependent on the store employee's attitude and behavior. However, technology-based self-service may perceptually transport the consumer to somewhat of an e-retail shopping environment, thus creating a similar perception of freedom and control experienced when shopping online (Jiang and Benbasat 2004). Indeed, academic research has shown that consumers who use self-scanning technology appreciate the accompanying independence which has a positive effect on perceived service quality and the likelihood of long-term use (Dabholkar 1996; Dabholkar, Bobbitt, and Eun-Ju 2003). Together, this suggests that the shopper likely experiences the actual control provided by technology-based self-service as perceived control. Previously, when the customer encounters a shopping barrier, the shopper will traditionally rely on a store associate to provide assistance to help resolve the issue, thereby relinquishing some degree of control and making the shopper's perception of the experience more reliant on the store employee. However, with

technology-based self-service, the shopper can independently resolve issues, thereby redirecting control back to the shopper. Therefore, I propose:

Hypothesis 1: Technology-based self-service, compared to employee service, increases the consumer's perceived control over the shopping task.

The in-store shopping experience is most pleasant when the shopper can shop without barriers, such as difficulty finding products, sizes, or colors, out of stock merchandise, long wait times, or a lack of product information (Kerin, Jain, and Howard 1992). However, there are many instances when the shopping experience is hindered with such restrictions, leading to frustration. The need for autonomy is satisfied by an environment that promotes freedom and independence, which positively impacts happiness and psychological well-being (Deci and Ryan 2012; Javornik 2016). While it's unlikely shoppers will experience a dramatic increase in general happiness or personal well-being, it is reasonable to suspect a one might experience a more subtle positive emotion. Perceived control is an inherent quality resulting from autonomous conditions, and positively impacts well-being and tolerance of mental discomforts such as pain, frustration, distress, or anxiety (Dabholkar and Bagozzi 2002). For example, customers have developed a sense of comfort with online shopping, largely due to the ability to avoid shopping frustrations and gain independence in the shopping experience (Wolfinbarger and Gilly 2001). Further, the ability to control the flow of information with technology-based self-service allows a person to develop personally relevant mental models of the information received and enhances the fluidity with which the information is processed leading to positive affect (Meuter et al. 2000). Likewise, the freedom shoppers feel to explore (e.g., with numerous applications, menus, and search functions) when using technology-based self-service provides a sense of enjoyment

and comfort with shopping decisions (Collier and Sherrell 2010). Together, the above findings imply the subtle emotion that shoppers experience with increase perceived control from technology-based self-service may come from comfort in one's decisions.

Decision comfort is a soft positive emotion that represents the degree of psychological and physiological ease, contentment, and well-being one feels with a specific decision (Parker, Lehmann, and Xie 2016). This emotion is derived, almost exclusively, from the absolute qualities of the decision, and is most commonly experienced when situational factors mitigate feelings of anxiety, concern, or agitation in the decision-making process (Dabholkar 1996; Dabholkar and Bagozzi 2002). Thus, for decision comfort to occur, the decision evaluation need not concern optimality of choice alternatives, but may instead an assessment of the decision itself driven by affect-laden cues, such as increased perceived control. Accordingly, the independent behavior associated with technology-based self-service may increase the sense of comfort the consumer feels concerning their shopping decisions (i.e. decision comfort). Therefore, I propose:

Hypothesis 2: Technology-based self-service, compared to employee service, increases the extent to which a consumer experiences decision comfort.

Hypothesis 3: Perceived control over the shopping task mediates the relationship between technology-based self-service and decision comfort.

The role of technology savviness

The hypotheses proposed above suggest that technology-based self-service is positively related to perceived control and decision comfort; however, this may be contingent on individual

differences regarding one's perception of self-service technology. In particular, research comparing people from different parts of the world and different social classes shows us that the core concept of self-determination theory is quite complex, such that the relationship between autonomy and well-being varies drastically (Markus and Schwartz 2010). In contrast to full-service interactions, technology-based self-service typically requires more cognitive effort since consumers are not trained by the company to perform such actions and clarification is often limited to a frequently asked questions section (Simon and Usunier 2007); although with advancing technology and internet integration, this is changing rapidly. Consumers generally have positive attitudes towards technology-based self-service when the technology is easy to use, performs as expected, and is enjoyable (Dabholkar and Bagozzi 2002). Further, the ability to experience and demonstrate competence increases the extent to which one feels positive emotions about a given task (Ryan and Deci 2001). Performing a shopping task without the assistance of a store employee is likely to elicit feelings of control, or autonomy, over the shopping task. However, the shopper's ability to perform the task is a representation of his/her technology savviness or competence related to technology-based self-service platforms.

When shoppers feel that a self-service technology allows them to have greater control over the service process, they are more likely to have more favorable evaluations of the technology (Bateson 1985; Hoffman and Novak 1996). Similarly, higher self-confidence in terms of possessing the skills required to perform a task using electronic platforms should lead shoppers to indicate more positive evaluations of technology-based self-service. Further, individuals that find technology enjoyable and take pleasure in using electronic platforms tend to have more favorable evaluations towards technology-based self-service. On the contrary, shoppers who generally experience technology anxiety (Venkatesh 2000) or social anxiety in the

presence of others (Dabholkar and Bagozzi 2002) are more likely to view technology-based self-service negatively. Furthermore, customers with a higher need for interaction and concerns about security in the use of technology are less likely to use technology-based self-service (Prendergast and Marr 1994).

Technology savviness, therefore, plays a critical role in whether one agrees that a self-service technology makes a specific shopping task convenient, such that some consumers may be more sophisticated with the technology than others (Dabholkar and Bagozzi 2002). Further, consumers have different perceptions of how easy or difficult in-store technologies are to use. For example, tech-savvy consumers tend to find in-store technology more comfortable to use than technology illiterate consumers (Tyagi 2004). Further, technology-based self-service requires more effort from the consumer than full-service assistance, and consumer attitudes towards technology-based self-service are partially grounded in the level of concern one has with their ability to use the system (Reinders, Dabholkar, and Frambach 2008). According to (Ajzen 2002), one's perceived ease or difficulty of performing a specific behavior is a representation of his perceived control. Therefore, consumers who find in-store technology more comfortable to use (i.e. tech-savvy individuals) will likely experience greater perceived control with technology-based self-service than their less tech-savvy counterparts.

Hypothesis 4: Technology savviness moderates the relationship between technology-based self-service and perceived control and decision comfort, such that engagement in technology-based self-service leads to increased levels of perceived control and decision comfort for technology savvy shoppers but not for technology illiterate shoppers.

19

The Role of Need for Interaction

The third dimension of self-determination theory is the need for relatedness, which concerns one's desire to have social connections and interpersonal interactions with others. By nature, customer service tends to involve interpersonal interaction, often with a store associate. Technology-based self-service can either inhibit or enhance the service encounter depending on the level of rapport the employee has created with the customer (Giebelhausen et al. 2014). Some consumers value the social content of retail store shopping, and feel that self-service technologies dehumanizes the service interaction (Dabholkar 1996). In particular, when employees are courteous, attentive, and competent, technology creates a barrier between the customer and the employee thus reducing the satisfaction with the service encounter. On the other hand, when the employee is less courteous, attentive, and competent, technology creates a barrier that protects the consumer from the negative encounter. Similarly, when shopping in a physical retail store, customers often evaluate the quality of the shopping experience by the nature of the interaction (Dabholkar 1996).

At first glance, self-determination theory would suggest that technology-based self-service should not lead to positive emotions because it eliminates interpersonal interaction with a service employee, thereby neglecting the psychological need for relatedness. However, consumers have different tolerances for replacing people with machines, and individual differences concerning need for interaction can change the way consumers respond to technology-based self-service. For example, extraverted people tend to value social interactions and appreciate interpersonal contact with service employees compared to introverted people (Mehmetoglu 2012; Oerlemans and Bakker 2014). These consumers are more likely to have a higher need for interaction, and thus value interpersonal service over technology-based self-

service. Quite the reverse, some retail store shoppers actively try to avoid interactions with store employees and are more likely to engage in technology-based self-service because it removes the relational element of customer service. Likewise, consumers with lower need for interaction have a greater appreciation for the autonomy and convenience of technology-based self-service because it allows them to complete shopping tasks without the burden of interpersonal contact (Dabholkar and Bagozzi 2002).

Hypothesis 5: Need for interaction moderates the relationship between technology-based self-service and perceived control and decision comfort, such that engagement in technology-based self-service leads to higher levels of perceived control and decision comfort for those with lower need for interaction compared to those with higher need for interaction.

Overview of Studies

To test my hypotheses, I conducted a combination of online and lab experiments. Research on the interactivity of customer-facing technology is still in its infancy, and controlled experiments are an effective way to tease apart the individual drivers of shopper behavior and provide insight into the psychological underpinnings of the proposed effects (Kaltcheva and Weitz 2006). Therefore, approaching my research questions using experiments will help create a more robust understanding of the effects of technology-based self-service on perceived control and decision comfort. Much of the existing research on technology-based self-service explores services provided by automatic teller machines (ATM) and point of sale (POS) self-scanning units. However, many retailers are moving toward endless aisle kiosks, which is fundamentally

different from technology-based self-service provided by ATM and POS platforms for several reasons.

First, endless-aisle kiosks assist shoppers on the sales floor, where employees are typically less accessible, as opposed to the front end of the store where employees are more abundant. Further, endless aisle kiosks impact the retail experience during a critical time of the customer's journey -- that is the decision-making stage. Finally, endless-aisle kiosks provide product information that traditionally can only be provided by a store associate. This increase in available information empowers the consumer during their shopping journey and quite possibly encourages them to assume greater responsibility for the outcome. Therefore, the primary focus of this research is on customer engagement in technology-based self-service for mid-journey shopping tasks.

Chapter 3: Methodology and Results

Study 1: Technology Based Self-Service on Perceived Control and Decision Comfort

The purpose of study 1 is to explore how technology-based self-service impacts consumer perceptions of control and decision comfort. I predicted that technology-based self-service should lead shoppers to experience greater perceptions of control and decision comfort compared to those that ask a store employee to order the product for them.

Participants and method

One hundred and thirty-seven participants were recruited from Amazon Mechanical Turk (MTurk) to participate in a two-way between-subjects experiment. They were told they were participating in a study designed to understand consumer reactions to specific retail encounters.

Order Method Manipulation.

Digital store technologies for transactional support are a top priority for today's retailers. Research shows that retailers are increasingly offering technology-based self-service in their stores, and consumers likewise appreciate this evolution of the brick and mortar shopping experience. Retailers have widely used kiosks for self-service POS transactions and price checks in brick and mortar stores. However, shoppers are now finding endless-aisle kiosks across diverse retail sectors such as supermarkets and home improvement stores, which allow shoppers to conduct product comparisons, to use interactive maps, and to order products online. Therefore, in study 1, I used an endless-aisle kiosk as the focal self-service technology.

Participants were randomly assigned to one of two imaginary shopping scenarios which asked them to imagine shopping in a physical retail store and wanting to purchase an exclusive retailer branded T-shirt, but their size is out of stock. Half of the participants were assigned to a kiosk condition and given a scenario which asked them to imagine ordering the T-shirt using a

kiosk without the help of a store employee. The remaining participants were assigned to a full-service condition which asked them to imagine soliciting the help of a store employee at the customer service counter to order the T-shirt for them (see appendix for scenario details). A t-shirt was used because it tends to be a neutral item and should not present a confound concerning the emotional or cognitive nature of the shopping trip.

Measures

Following (Collier and Sherrell 2010), I used four items to measure perceived control ($\alpha = 0.91$) during the ordering process. Each item was assessed on a 7-point Likert scale (1=strongly disagree, 7=strongly agree). Decision comfort was evaluated using a 7-point Likert scale (1=strongly disagree, 7=strongly agree) with five items (e.g., I am comfortable with my decision to order the T-shirt from this store) from (Parker et al. 2016) on decision comfort ($\alpha = 0.90$). See Appendix B for a description of all measures.

Results and Discussion.

To test hypotheses 1-3, I conducted an analysis of variance with the order method (technology-based self-service vs. employee service) as the focal predictor and perceived control as the dependent variable. The main effect of order method on perceived control was significant ($F(1,135) = 101.82$, $p < 0.001$). A second analysis of variance with the order method as the focal predictor and decision comfort as the dependent variable revealed a significant main effect ($F(1,135) = 20.241$, $p < 0.001$). See table 2.

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	101.82	1,135	0.000	20.241	1,135	0.000
M (Control)	-	-	-	8.941	1,115	0.000

Table 2: Summary of ANOVA results for study 1

To test the causal relationship between order method, perceived control, and decision comfort. I used Hayes' PROCESS macro (Model 4, see Hayes (2013)) to estimate the indirect effect using bias-corrected coefficients from a series of 5,000 bootstrap samples (see (Preacher, Rucker, and Hayes 2007)). The results demonstrated a significant and positive indirect effect of order method on decision comfort through perceived control. In particular, following Hayes' analysis for mediational testing with bootstrapping, the test of the indirect effect of order method on decision comfort through perceived control supported mediation (95% CI: LL CI = 0.83, UL CI = 0.1.72). This finding supports hypothesis 3 that technology based self-service results in increased decision comfort and this relationship is mediated by perceived control. See figure 2.
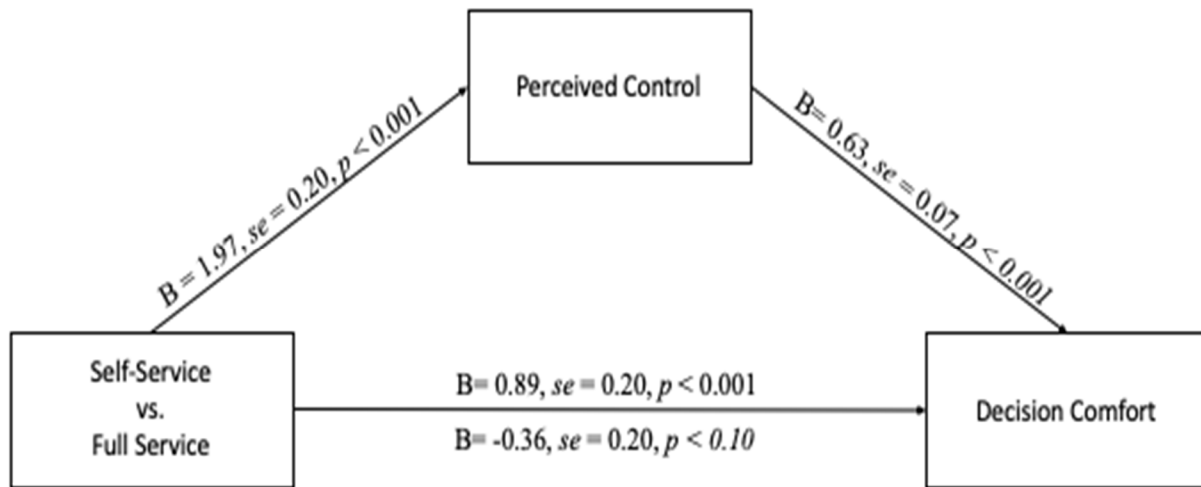
Figure 2: Mediational model in study 1
Standardized regression coefficients for the relationship between technology-based self-service and decision comfort as mediated by perceived control. The standardized regression coefficient between technology-based self-service and decision comfort controlling for perceived control is on the bottom.

Study 2: Understanding the Roles of Technology Savviness and Need for Interaction

In study 2, I investigate the roles of technology savviness and need for interaction on the causal relationship between technology-based self-service, perceived control, and decision comfort. In particular, I expect that participants who report having higher levels of technology savviness would experience greater control and decision comfort when engaging in technology-based self-service compared to those who report having lower levels of technology savviness. However, among participants with lower technology savviness, those that engage in technology-based self-service should experience lower perceived control and decision comfort than those that ask a store employee to perform the shopping task for them. Further, I expect that participants who report having lower need for interaction would experience greater control and decision comfort when engaging in technology-based self-service compared to those who report having higher need for interaction. However, among participants with higher need for interaction, those that engage in technology-based self-service should experience lower perceived control and decision comfort than those that ask a store employee to perform the shopping task for them.

Participants and Method

One hundred and sixty-one participants were recruited from Amazon's Mechanical Turk (MTurk) to participate in a 2 (technology savviness: high vs. low) x 2 (order method: kiosk vs. employee) between-subjects experiment. They were told that they were participating in a study designed to understand consumer reactions to specific retail encounters.

Technology savviness measure.

To measure technology savviness, I used an 'ease of use' scale to assess participants perceived technology savviness concerning customer-facing technology used in physical retail

stores. Participants were first asked to respond to several self-reflective questions regarding their shopping patterns and habits. Within these questions were six questions regarding self-reported tech savviness for in-store kiosks in consumer retail encounters. Tech-savviness was assessed using a 7-point Likert scale (1=strongly disagree, 7=strongly agree) with six items ($\alpha = 0.85$). Next, participants were presented with the order method manipulation.

Need for interaction measure

Need for interaction was assessed using four items measured on a 7-point Likert scale (1=strongly disagree, 7=strongly agree) adopted from (Lee and Yang 2013). Participants were first asked to respond to several self-reflective questions regarding their shopping patterns and habits. Within these questions were four questions regarding need for interaction in consumer service encounters. Next, participants were presented with the order method manipulation.

Order Method Manipulation

Participants began the study by responding to several questions which asked general questions about feeling towards in-store shopping. Within these questions were questions regarding technology savviness. Like in study 1, in study 2, I used an endless aisle kiosk as the focal self-service technology. Participants were randomly assigned to one of two imaginary shopping scenarios which asked them to imagine shopping in a physical retail store and wanting to purchase an exclusive retailer branded T-shirt, but their size is out of stock. Half of the participants were assigned to a kiosk condition and given a scenario which asked them to imagine ordering the T-shirt using a kiosk without the help of a store employee. The remaining participants were assigned to a full-service condition which asked them to imagine soliciting the help of a store employee at the customer service counter to order the T-shirt for them (see

27

appendix for scenario details). A t-shirt was used because it tends to be a neutral item and should not present a confound concerning the emotional or cognitive nature of the shopping trip.
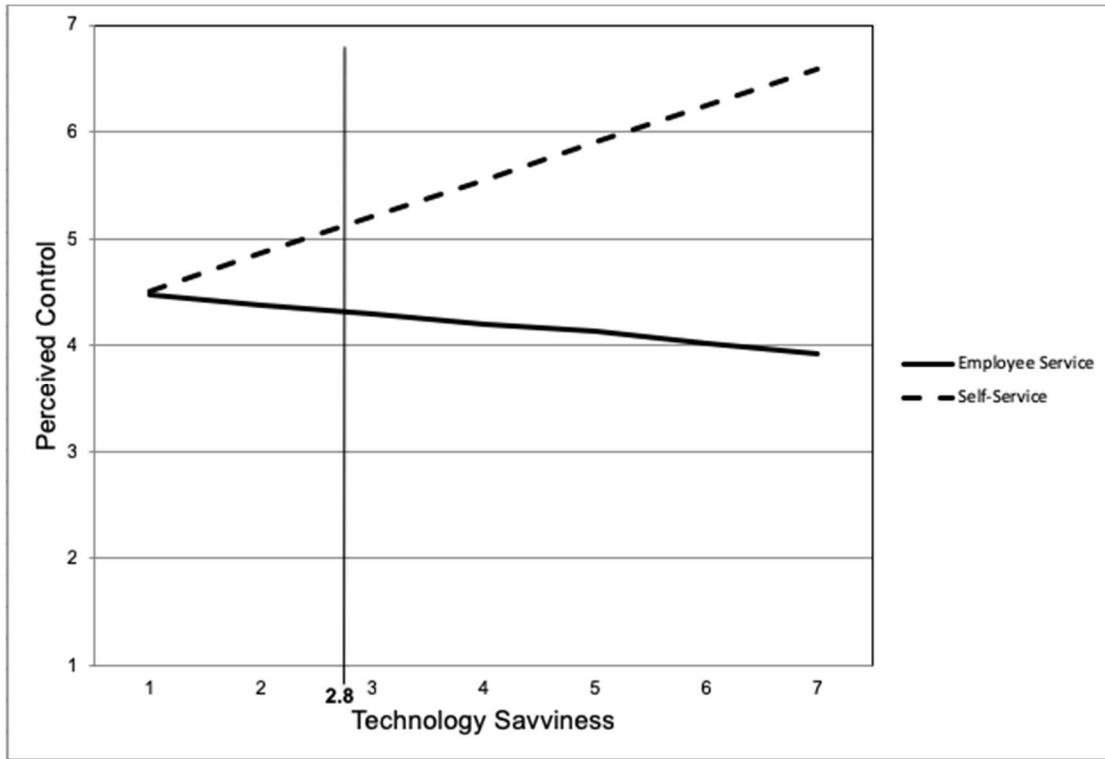
Results and Discussion.

To test hypothesis 4, I conducted an analysis of variance with order method (kiosk vs. employee) as the focal predictor, technology savviness as a covariate, and perceived control as the dependent variable. The main effect of order method on perceived control was not significant ($F(1, 157) = 0.219$ p $= 0.641$), the main effect of technology savviness on perceived control was not significant ($F(1, 157) = 2.376$ p $= 0.125$), however the interaction between order method and technology savviness on perceived control was significant ($F(1,157) = 6.910$, p < 0.01). I conducted a secondary analysis of variance with order method (kiosk vs. employee) as the focal predictor, technology savviness as a covariate, and decision comfort as the dependent variable. The main effect of order method on decision comfort was not significant ($F(1, 157) = 0.191$ p $= 0.663$), the main effect of technology savviness on decision comfort was not significant ($F(1, 157) = 16.874$, p $< .001$), and the interaction between order method and technology savviness on decision comfort was not significant ($F(1,157) = 1.484$, p $= 0.225$). This unexpected finding is quite possibly due to an experimental design issue. Specifically, decision comfort was measured as one's level of comfort with the decision to shop in the given store. However, the experimental manipulation concerns a specific shopping task, rather than the entire trip. Therefore, in subsequent studies, decision comfort is measured with regard to one's level of comfort with the decision to engage in the shopping task. See table 3.
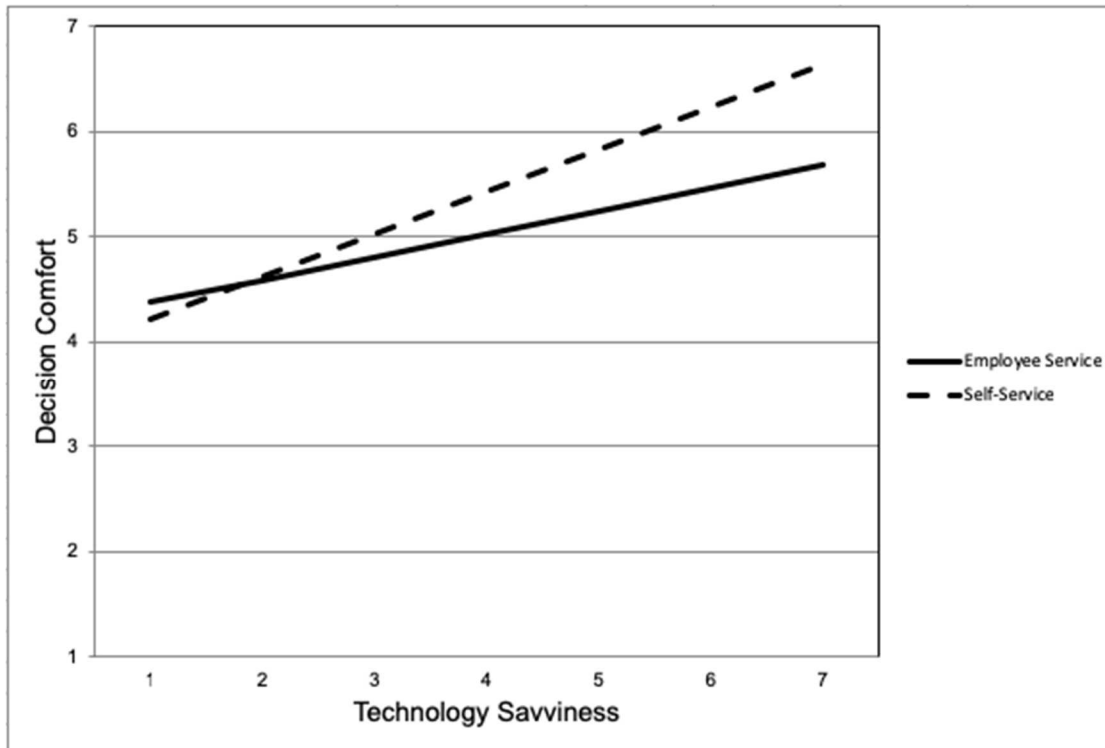
	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	0.219	1,157	0.641	0.191	1,157	0.663
M (Control)	-	-	-	2.117	1,116	0.007
W (Tech-Savvy)	2.376	1,157	0.125	16.874	1,157	0.000
Order Method x Tech-Savvy	6.91	1,157	0.009	1.484	1,157	0.225

Table 3: Summary of ANOVA results for study 2

Since the moderator (technology savviness) was continuous, I used the Johnson-Neyman technique (Bauer and Curran 2005; Hayes 2013; Hayes and Matthes 2009) to look for the turning points for where exactly, in the absolute value of the moderator, the effect of the order method turns from non-significant to significant on perceived control. The results indicated that technology savviness at a value of 2.8 on a 7-point scale is the turning point from non-significance to significance for the effect of order method on perceived control. The use of technology-based self-service (vs. employee assistance) to order an out of stock product is associated with significantly greater levels of perceived control for values of technology savviness above 2.8. See figures 3a and 3b.

Figure 3a: Study 2 – Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of technology savviness

Figure 3b: Study 2 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of technology savviness

Finally, to test for moderated mediation, I used the PROCESS macro (Model 8, see (Hayes 2013)) to estimate the conditional indirect effect. I estimated the bias-corrected coefficients from a series of 5,000 bootstrap samples (see (Preacher et al. 2007)). The test of the conditional indirect effect of order method by technology savviness on decision comfort through perceived control (95% CI: LL CI = 0.04, UL CI = 0.47), thus providing partial support for my hypothesis 4. In particular, compared to those that ask a store employee for help, shoppers who use technology-based self-service to complete a shopping task experience increased perceived control. However, the interaction between technology-based self-service and technology savviness on decision comfort was not significant. This unexpected finding is quite possibly due to an experimental design issue. Specifically, decision comfort was measured as one's level of comfort with the decision to shop in the given store. However, the experimental manipulation concerns a specific shopping task, rather than the entire trip. Therefore, in subsequent studies, decision comfort is measured with regard to one's level of comfort with the decision to engage in the shopping task.

In addition, I conducted an analysis of variance with order method (kiosk vs. employee) as the focal predictor, need for interaction as a covariate, and perceived control as the dependent variable. The main effect of order method on perceived control was significant ($F(1, 157) = 50.83$ $p < 0.001$), the main effect of need for interaction on perceived control was also significant ($F(1, 157) = 11.61$, $p = 0.001$), and the interaction between order method and need for interaction on perceived control was significant ($F(1,157) = 14.45$, $p < 0.001$). I conducted a secondary analysis of variance with order method (kiosk vs. employee) as the focal predictor, need for interaction as a covariate, and decision comfort as the dependent variable. The main effect of order method on decision comfort was significant ($F(1, 157) = 14.38$ $p < 0.001$), the main effect

of need for interaction on decision comfort was also significant (F(1, 157) = 3.85, p = 0.05), and the interaction between order method and need for interaction on decision comfort was significant (F(1,157) = 9.58, p < 0.01). See table 4.
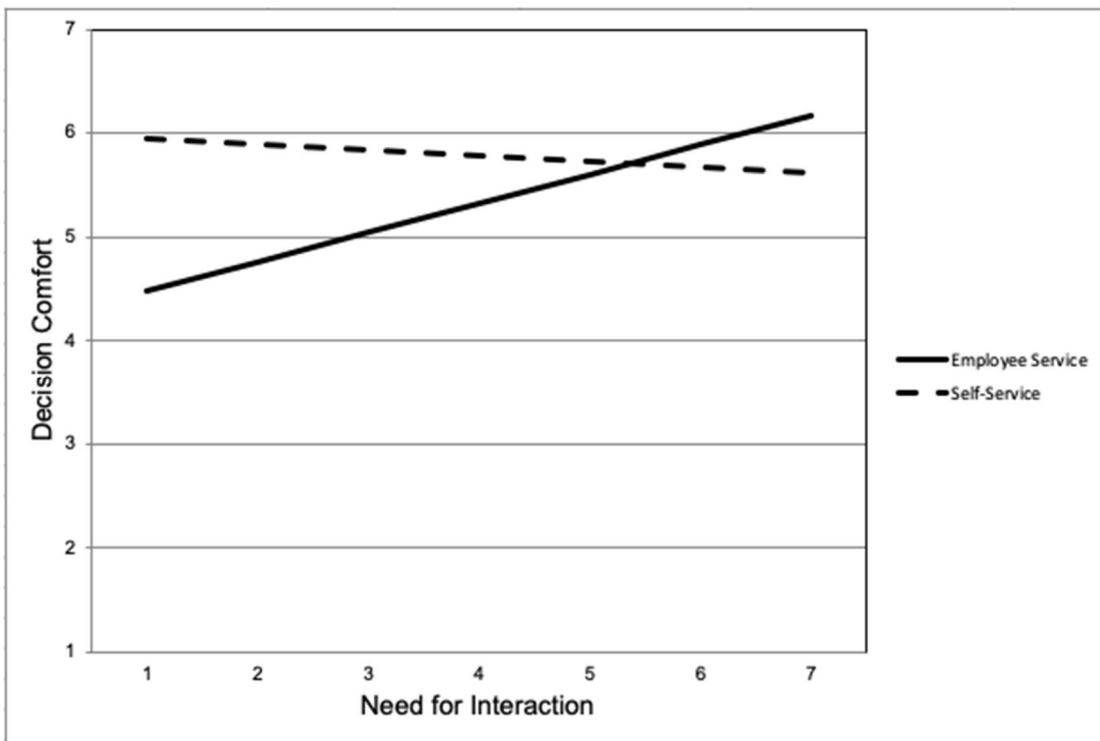
	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	50.83	1,157	0.000	14.38	1,157	0.663
M (Control)	-	-	-	6.47	1,136	0.000
W (NFI)	11.61	1,157	0.001	3.85	1,157	0.004
Order Method x NFI	14.45	1,157	0.000	9.58	1,157	0.004

Table 4: Summary of ANOVA results for study 2

Since the moderator (need for interaction) was continuous, I used the Johnson-Neyman technique (Bauer and Curran 2005; Hayes 2013; Hayes and Matthes 2009) to look for the turning points for where exactly, in the absolute value of the moderator, the effect of the order method turns from non-significant to significant on perceived control. The results indicated that need for interaction at a value of 6.4 on a 7-point scale is the turning point from non-significance to significance for the effect of order method on perceived control. Therefore, the use of technology-based self-service (vs. employee assistance) to order an out of stock product is associated with significantly greater levels of perceived control for values of need for interaction above 6.4. See figures 4a and 4b.
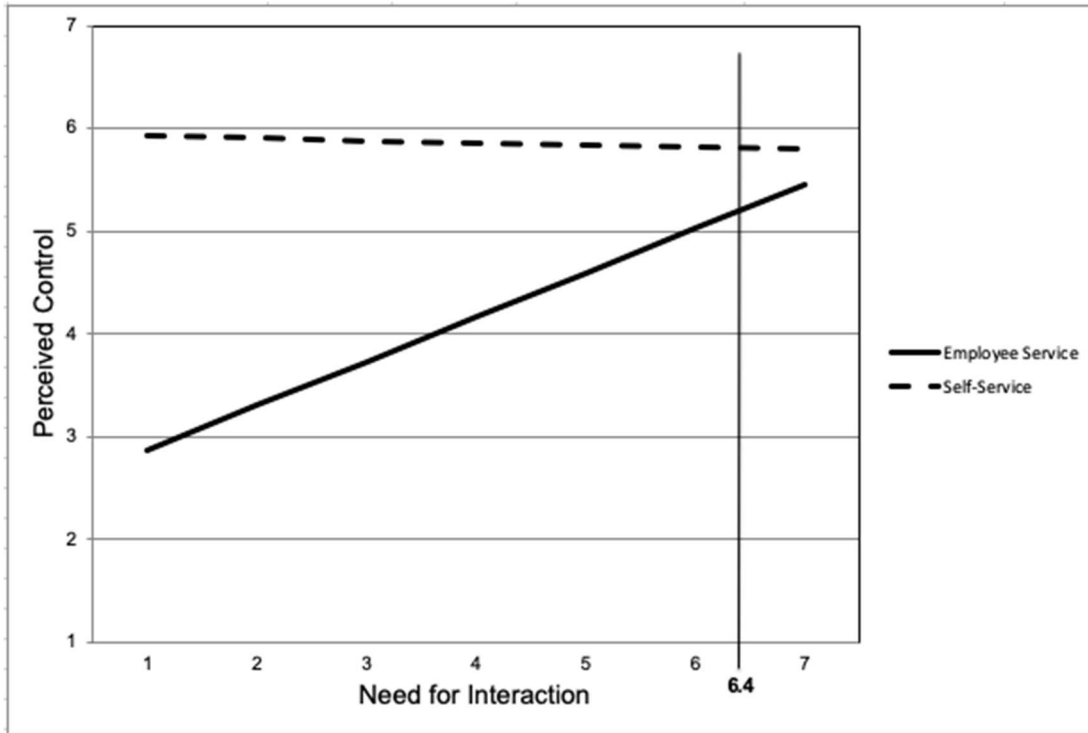
Figure 4a: Study 2 - Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of need for interaction

Figure 4b: Study 2 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of need for interaction

Finally, to test for moderated mediation, I used the PROCESS macro (Model 8, see (Hayes 2013)) to estimate the conditional indirect effect. I estimated the bias-corrected coefficients from a series of 5,000 bootstrap samples (see (Preacher et al. 2007)). The test of the conditional indirect effect of order method by need for interaction on decision comfort through perceived control (95% CI: LL CI = -0.43, UL CI = -0.12), thus providing support for hypothesis 5. In particular, compared to those that ask a store employee for help, shoppers who use technology-based self-service to complete a shopping task experience increased perceived control. Further, the interaction between technology-based self-service and need for interaction on decision comfort was significant, indicating that those with lower levels of need for interaction are more likely to experience increased perceived control and decision comfort when engaging in technology-based self-service compared to those with higher levels of need for interaction.

Study 3: Does the Shopping Task Matter?

The purpose of study 3 is to show that the relationships proposed are not merely transactional such that consumers should experience greater perceived control and decision comfort regardless of the type of technology-based self-service (e.g., transactional, informational, or self-help). It is arguable that the effects observed are the result of a shopper completing a shopping transaction, which would demonstrate a more objective form of autonomy and cognitive ability, thereby leading to positive emotion. However, I argue that consumers experience perceived control and decision comfort due to the affective outcome of performing the task rather than the outcome of a transaction. To illustrate, I will test my hypotheses using a different service context that does not necessarily indicate a completed transaction. Aside from running into out of stock issues, another common mid-shopping barrier

is misplaced items. For example, a shopper may find a product in a random location and want to find the item's rightful place, perhaps for a different size or color. In this scenario, the shopper would typically either walk around the store to try to gauge where the item might be shelved or ask a store associate to guide them to the product.

Some retailers have implemented interactive maps as a technology-based self-service allowing the shopper to complete such a task independently. Therefore, study 3 will adopt the procedure of study 1, while changing the context from ordering an out of stock product to identifying the location of a misplaced item. The manipulation intentionally does not specify whether or not the shopper was able to locate the product to increase the validity of the argument. Study 3 will also explore the moderating role of technology savviness, by measuring whether shoppers who report greater technology savviness concerning retail shopping technology will experience perceived control and decision comfort differently than their less tech-savvy counterparts.

Participants and procedure

One hundred and sixty participants were recruited from Amazon's Mechanical Turk (MTurk). They were told they were participating in a study designed to understand consumer reactions to specific retail encounters. All participants were first asked to respond to several self-reflective questions regarding their shopping patterns and habits. Within these questions were six questions regarding self-reported tech savviness with customer facing technology in retail stores. Next, participants were presented with one of two shopping scenarios which asked to imagine shopping in a physical retail store and wanting to identify the location of a misplaced item. Half of the participants were assigned to a kiosk condition and given a scenario which asked them to imagine using an interactive map on a self-service kiosk to scan the product and receive

directions to the product's rightful location. The remaining participants were assigned to a store employee condition and asked to imagine asking a store employee at a customer service counter to tell you where you can find the T-shirt's rightful location.

Measures

The items used to measure perceived control were the same as those used in study 1. However, decision comfort was measured with regard to the shopping task rather than the shopping trip (see Appendix B). Technology savviness was assessed using a 7-point Likert scale (1=strongly disagree, 7=strongly agree) with six items. Need for interaction was assessed using a 7-point Likert scale (1=strongly disagree, 7=strongly agree) with four items.
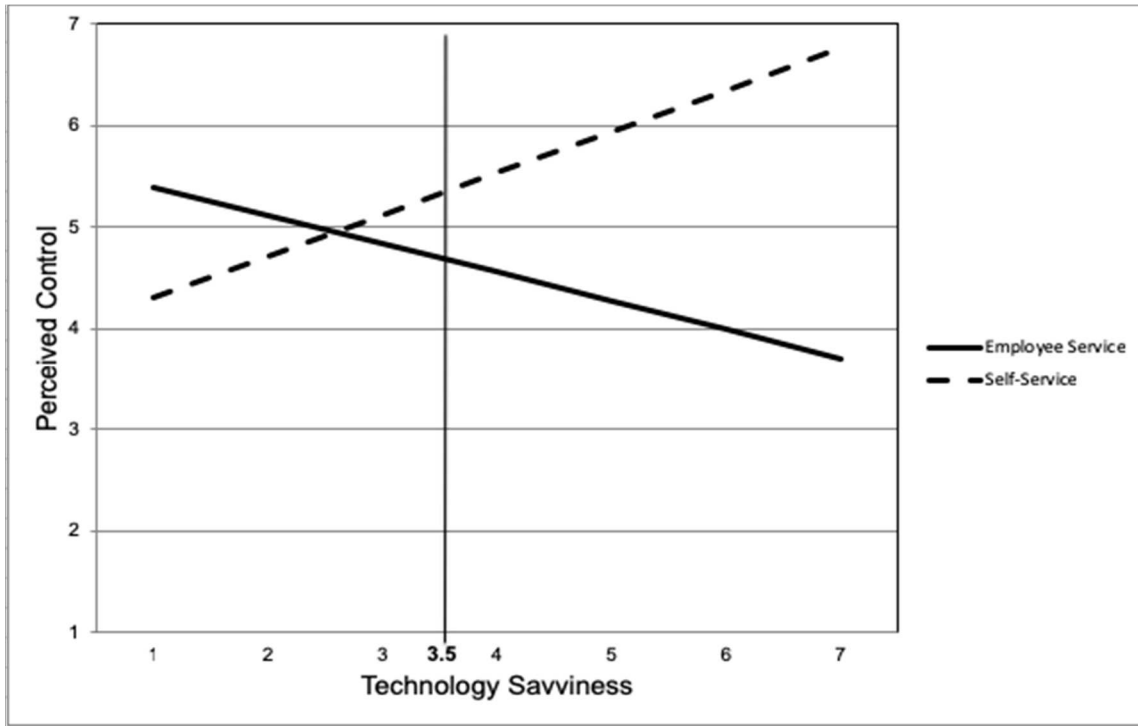
Results and discussion

To test hypotheses 4 and 5 in a different context, I conducted an analysis of variance with wayfinding method (self-service map vs. employee guidance) as the focal predictor, technology savviness as a covariate, and perceived control as the dependent variable. The main effect of wayfinding method on perceived control was significant ($F(1, 155) = 2.868$ $p < 0.10$), the main effect of technology savviness on perceived control was not significant ($F(1, 155) = 0.351$ $p = 0.554$), however the interaction between wayfinding method and technology savviness on perceived control was significant ($F(1,155) = 10.399$, $p < 0.01$). I conducted a secondary analysis of variance with wayfinding method (kiosk vs. employee) as the focal predictor, technology savviness as a covariate, and decision comfort as the dependent variable. The main effect of wayfinding method on decision comfort was significant ($F(1, 155) = 4.155$ $p < 0.05$), the main effect of technology savviness on decision comfort was not significant ($F(1, 155) = 1.844$ $p = 0.176$), however the interaction between wayfinding method and technology savviness on decision comfort was significant ($F(1,155) = 6.006$, $p < 0.05$). See table 5.
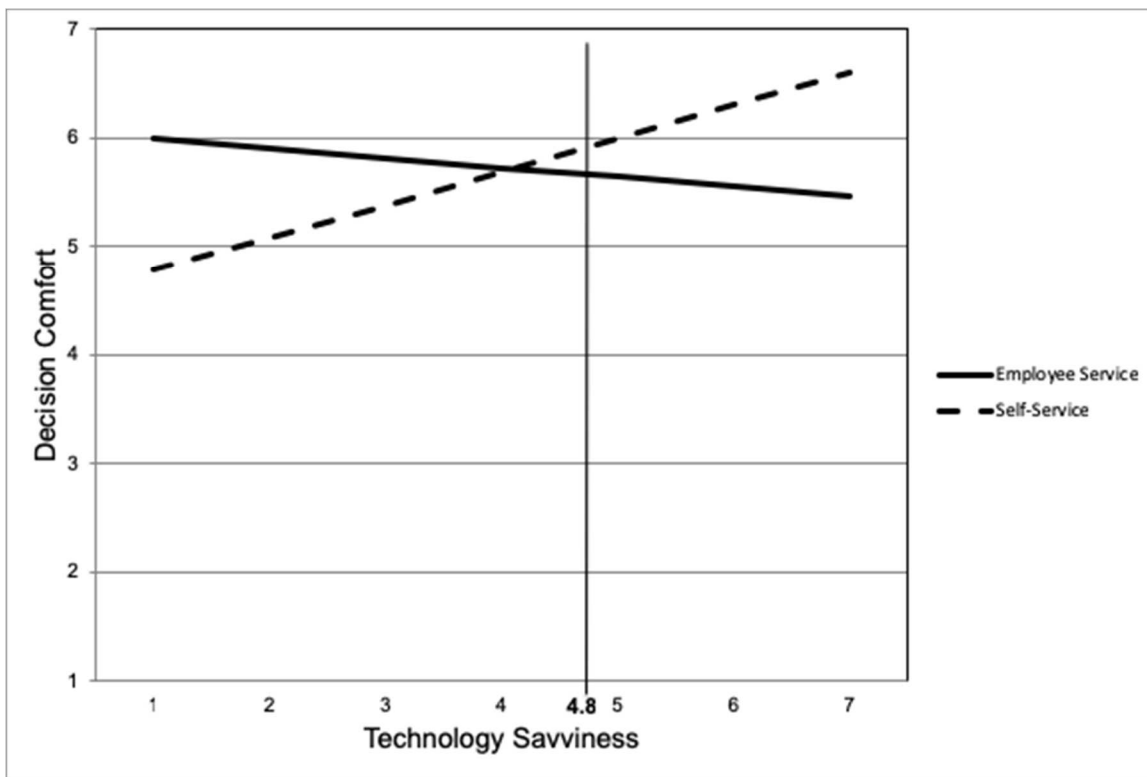
	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	2.868	1,155	0.092	4.155	1,155	0.043
M (Control)	-	-	-			
W (Tech-Savvy)	0.351	1,155	0.554	1.844	1,155	0.176
Order Method x Tech-Savvy	10.399	1,155	0.002	6.006	1,155	0.015

Table 5: Summary of ANOVA results for study 3

Since the moderator (technology savviness) was continuous, I used the Johnson-Neyman technique (Bauer and Curran 2005; Hayes 2013; Hayes and Matthes 2009) to look for the turning points for where exactly, in the absolute value of the moderator, the effect of wayfinding method turns from non-significant to significant on both perceived control and decision comfort. The results indicated that technology savviness at a value of 3.5 on a 7-point scale is the turning point from non-significance to significance for the effect of wayfinding method on perceived control. The use of a self-service kiosk to locate a misplaced item is associated with significantly greater levels of perceived control for values of technology savviness above 3.5. Further, the results indicated that technology savviness at a value of 4.8 on a 7-point scale is the turning point from non-significance to significance for the effect of wayfinding method on decision comfort. The use of a self-service kiosk to locate a misplaced item is associated with significantly greater levels of decision comfort for values of technology savviness above 4.8. See figures 5a and 5b.

Figure 5a: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of technology savviness

Figure 5b: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of technology savviness
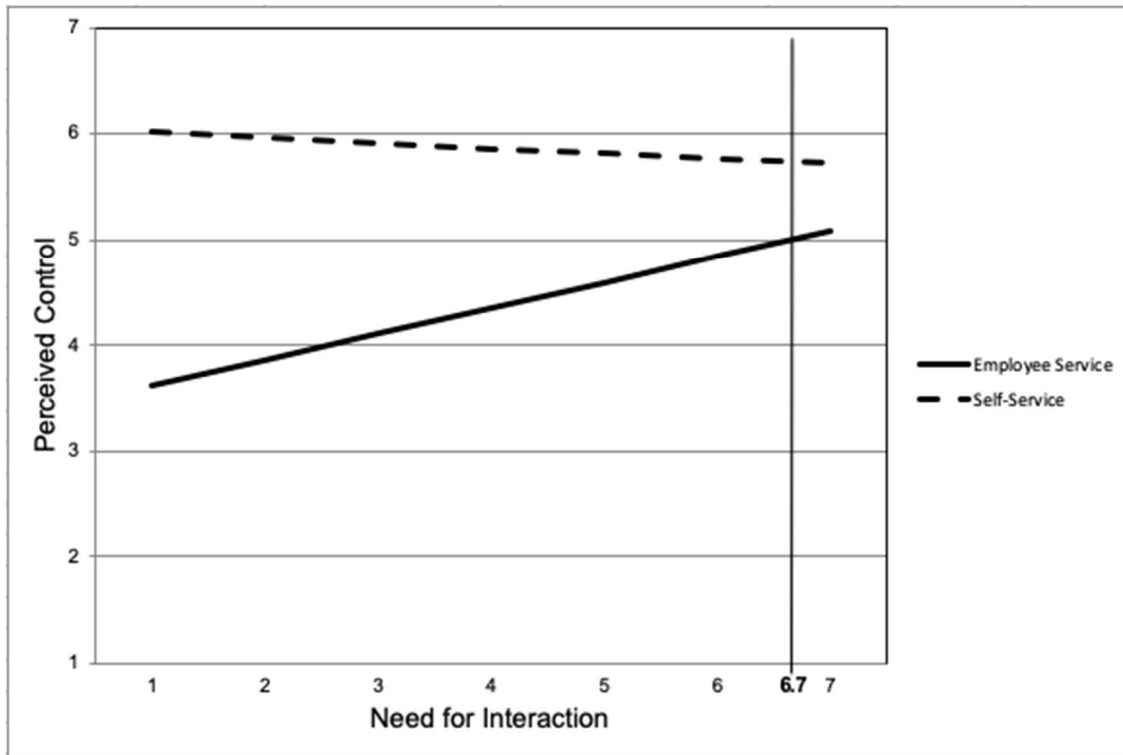
Finally, to test for moderated mediation, I used the PROCESS macro (Model 8, see Hayes (2013)) to estimate the conditional indirect effect. I estimated the bias-corrected coefficients from a series of 5,000 bootstrap samples (see Preacher, Rucker, and Hayes (2007)). The test of the conditional indirect effect of wayfinding method by technology savviness on decision comfort through perceived control as significant (95% CI: LL CI = 0.04, UL CI = 0.32), thus supporting hypothesis 4 that compared to those that ask a store employee for help, shoppers who use technology-based self-service to complete a shopping task experience increased decision comfort and this relationship is mediated by perceived control.

In addition, I conducted an analysis of variance with wayfinding method (self-service map vs. employee guidance) as the focal predictor, need for interaction as a covariate, and perceived control as the dependent variable. The main effect of wayfinding method on perceived control was significant ($F(1, 155) = 25.97$ $p < 0.001$), the main effect of need for interaction on perceived control was not significant ($F(1, 155) = 2.42$, $p = 0.122$), however the interaction between wayfinding method and need for interaction on perceived control was significant ($F(1,155) = 5.30$, $p < 0.023$). I conducted a secondary analysis of variance with wayfinding method (self-service map vs. employee guidance) as the focal predictor, need for interaction as a covariate, and decision comfort as the dependent variable. The main effect of wayfinding method on decision comfort was significant ($F(1, 155) = 8.21$, $p < 0.01$), the main effect of need for interaction on decision comfort was not significant ($F(1, 155) = 1.012$, $p = 0.316$), and the interaction between order method and need for interaction on decision comfort was significant ($F(1,155) = 5.08$, $p < 0.05$). See table 6.
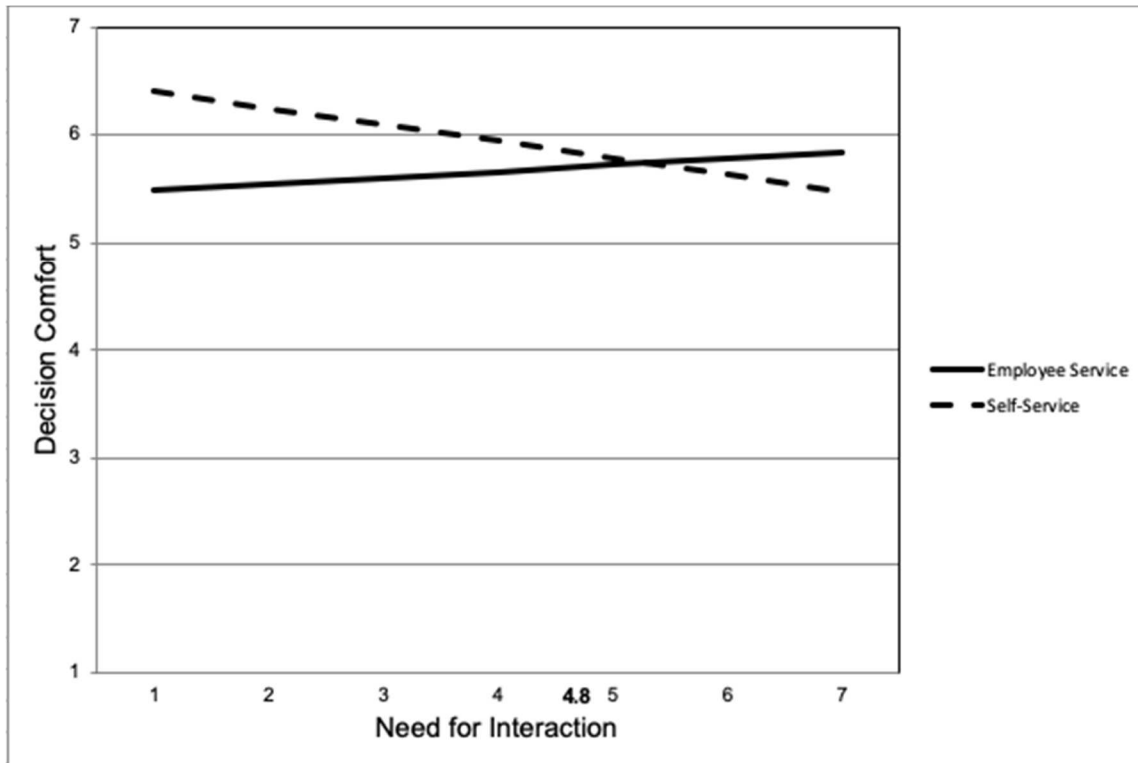
	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	25.97	1,155	0.000	8.21	1,155	0.005
M (Control)	-	-	-			
W (NFI)	2.42	1,155	0.122	1.01	1,155	0.316
Order Method x NFI	5.3	1,155	0.023	5.08	1,155	0.026

Table 6: Summary of ANOVA results for study 3

Since the moderator (need for interaction) was continuous, I used the Johnson-Neyman technique (Bauer and Curran 2005; Hayes 2013; Hayes and Matthes 2009) to look for the turning point for where exactly, in the absolute value of the moderator, the effect of the wayfinding method turns from non-significant to significant on perceived control. The results indicated that need for interaction at a value of 6.7 on a 7-point scale is the turning point from non-significance to significance for the effect of wayfinding method on perceived control. Therefore, the use of technology-based self-service (vs. employee assistance) to locate a misplaced product is associated with significantly greater levels of perceived control for values of need for interaction above 6.7. See figures 6a and 6b.

Figure 6a: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of need for interaction

Figure 6b: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of need for interaction

Finally, to test for moderated mediation, I used the PROCESS macro (Model 8, see (Hayes 2013)) to estimate the conditional indirect effect. I estimated the bias-corrected coefficients from a series of 5,000 bootstrap samples (see (Preacher et al. 2007)). The test of the conditional indirect effect of wayfinding method by need for interaction on decision comfort through perceived control (95% CI: LL CI = -0.15, UL CI = -0.01), thus providing support for hypothesis 5. In particular, compared to those that ask a store employee for help, shoppers who use technology-based self-service to complete a shopping task experience increased perceived control. Further, the interaction between technology-based self-service and need for interaction on decision comfort was significant, indicating that those with lower levels of need for interaction are more likely to experience increased perceived control and decision comfort when engaging in technology-based self-service compared to those with higher levels of need for interaction.

Study 4: The Case of the Mobile App

The purpose of study 4 is two-fold. First, retailers use different types of self-service technology to help facilitate the in-store shopping experience. Therefore, to show that this effect is not technology specific, but instead self-service specific, I used a different self-service technology - a mobile app. In addition to the increased use of self-service kiosks as a mid-shopping resource in physical retail stores, mobile apps are increasingly being used to drive consumer engagement using "StoreMode" technology. In particular, StoreMode is a feature of a mobile app that leverages the phone's location technology to provide relevant information based on where the customer is in a specific store (e.g., ordering capabilities, interactive maps, list creation, inventory information, digital coupons, etc.)

Secondly, the moderator, technology savviness, used in previous studies was measured using a multi-item scale which introduces the possibility that the actual moderator may not be the moderator but some other variable with which the measure correlates. Unless the moderator is a manipulated variable, we do not know whether it is a true moderator or just a proxy moderator. Therefore, in study 4, rather than measuring the moderator, I manipulate the moderator. The subject pool from which I recruited participants for study 4 is a class of undergraduate college students, who tend to have higher levels of technology savviness as a product of the age in which they've grown up. Therefore, to manipulate technology savviness, I used a scenario describing the shopping experience in third-person. Neuroimaging research finds that perspective taking increases self-based processing of others, such that perspective taking leads to greater overlap between self and others (Ames et al. 2008; Davis et al. 1996). As such, participants were given an imaginary scenario about a customer's shopping experience and asked to indicate how they think the shopper would have felt in this scenario.

Participants and Method

Two hundred and seven participants were recruited from MTurk to participate in a study regarding consumer perceptions of in-store shopping experiences. Participants were randomly assigned to one of two conditions featuring a shopping scenario regarding a customer interested in purchasing an out of stock product. In one condition, participants read a description of the customer, which presented him as technology illiterate. Those in the other condition read a description of the customer which presented him as being technology savvy. Next, participants were given with one of two shopping scenarios which asked them to imagine the customer just described was shopping in a physical retail store and wanted to purchase a shirt that was not in stock in his size. Half of the participants were assigned to a mobile app condition and given a

scenario which asked them to imagine the customer used a mobile app to place the order for the shirt whereas the remaining participants were asked to imagine he asked a store employee to place the order for him.

Results and discussion

To test hypothesis 4, I conducted an analysis of variance with the order method (mobile app vs. employee) and technology savviness as the focal predictors and perceived control as the dependent variable. The main effect of order method on perceived control was significant (F(1, 195) = 94.06 p < 0.001), the main effect of technology savviness on perceived control was significant (F(1, 195) = 23.528 p < 0.001), and the interaction between order method and technology savviness on perceived control was significant (F(1,195) = 62.146, p < 0.001). I conducted a secondary analysis of variance with the order method (mobile app vs. employee) and technology savviness as the focal predictors and decision comfort as the dependent variable. The main effect of order method on decision comfort was not significant (F(1, 195) = 1.34 p = 0.249), the main effect of technology savviness on decision comfort was significant (F(1, 195) = 51.61 p < 0.001), and the interaction between order method and technology savviness on decision comfort was significant (F(1,195) = 44.02, p < 0.001). See table 7.

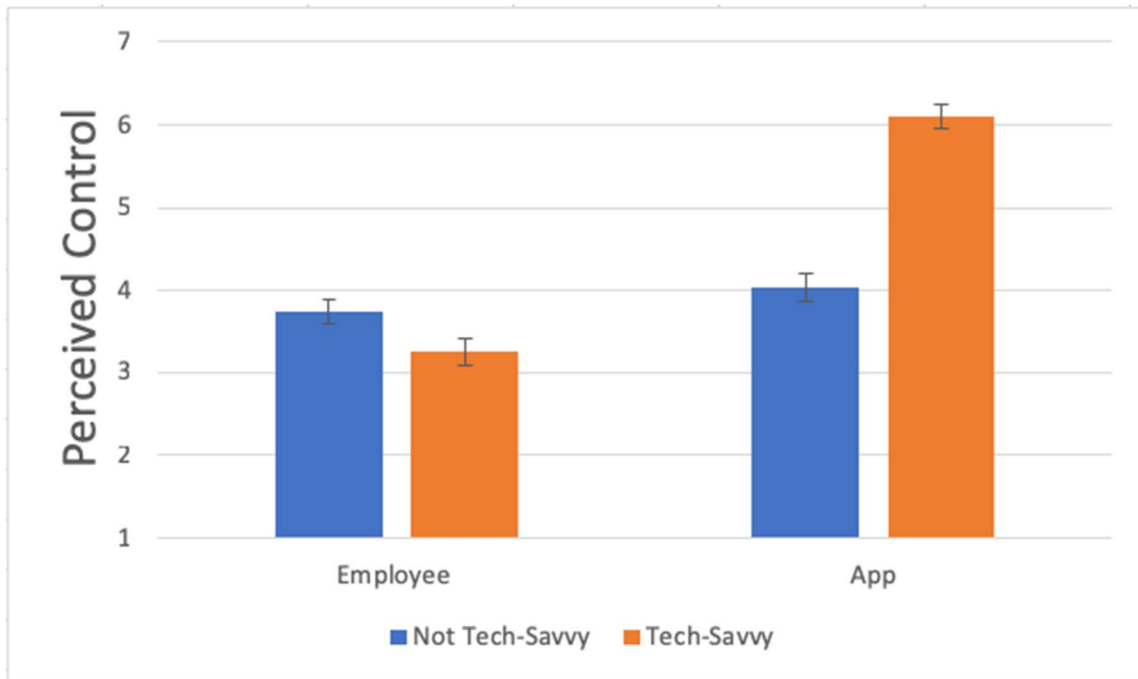|	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	94.058	1,195	0.000	1.337	1,195	0.249
M (Control)	-	-	-			
W (Tech-Savvy)	23.528	1,195	0.000	51.611	1,195	0.000
Order Method x Tech-Savvy	62.146	1,195	0.000	52.408	1,195	0.000

Table 7: Summary of ANOVA results for study 4

To probe the interactions, I conducted a pairwise comparisons analysis and found that among those in the high tech-savvy condition, participants who were randomly assigned to the mobile app condition reported greater perceptions of control compared to those in the employee assistance condition (M_{TBSS}= 6.12; M_{EMP}=3.25, $p < 0.001$). However, among those in the low tech-savvy condition, participants who were randomly assigned to the mobile app condition reported similar perceptions of control compared to those in the employee assistance condition (M_{TBSS}= 4.04; M_{EMP}=3.75, $p = 0.202$). Further, I conducted a second pairwise comparisons analysis and found that among those in the high tech-savvy condition, participants who were randomly assigned to the mobile app condition reported greater decision comfort compared to those in the employee assistance condition (M_{TBSS}= 5.95; M_{EMP}=4.74, $p < 0.001$). However, among those in the low tech-savvy condition, participants who were randomly assigned to the mobile app condition reported lower levels of decision comfort compared to those in the employee assistance condition (M_{TBSS}= 3.80; M_{EMP}=4.65, $p < 0.001$), indicating a crossover effect. Interestingly, this suggests that low tech-savvy consumers experience greater perceived control and decision comfort when they work with a store employee to complete shopping tasks, whereas high tech-savvy consumers experience greater perceived control and decision comfort when they engage in technology-based self-service. See figures 7a and 7b.
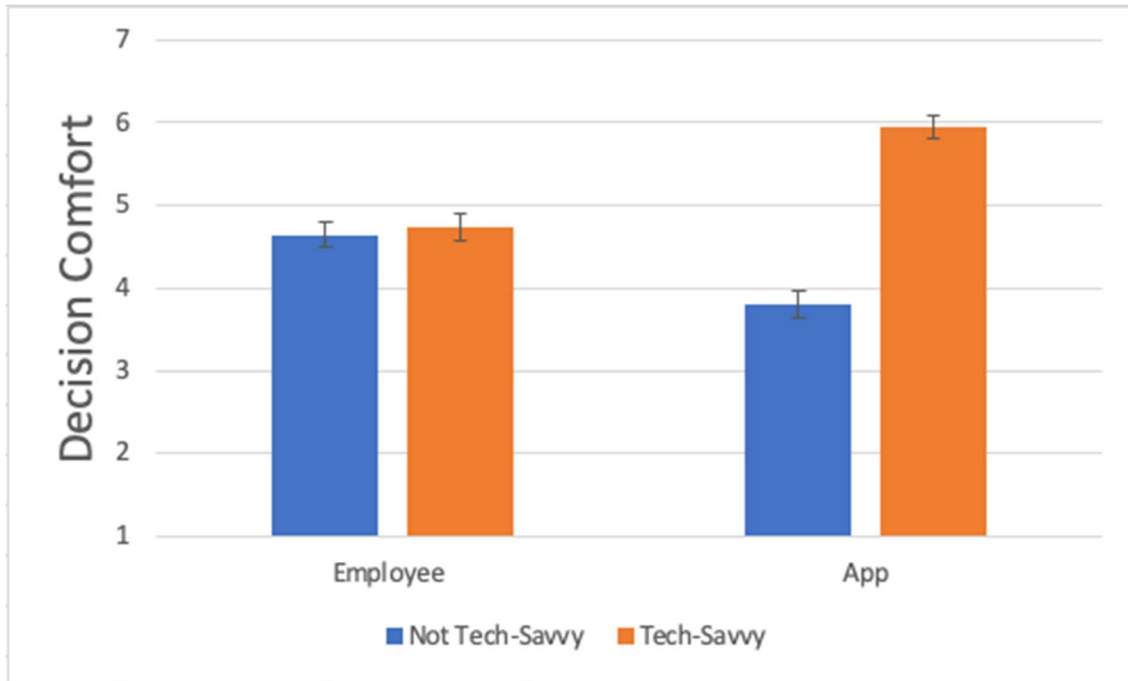
Figure 7a: Study 4 – bar graph; technology-based self-service on decision comfort by technology savviness

Figure 7b: Study 4 – bar graph; technology-based self-service on perceived control by technology savviness

Finally, to test for moderated mediation, I used the PROCESS macro (Model 8, see Hayes (2013)) to estimate the conditional indirect effect. I estimated the bias-corrected coefficients from a series of 5,000 bootstrap samples (see Preacher, Rucker, and Hayes (2007)). The test of the conditional indirect effect of wayfinding method by technology savviness on decision comfort through perceived control was significant (95% CI: LL CI = 0.96, UL CI = 1.90). Compared to those that ask a store employee for help, shoppers who use technology-based self-service to complete a shopping task experience increased decision comfort and this relationship is mediated by perceived control for those that consider themselves tech-savvy. However, the effect is reversed for those that do not consider themselves tech savvy such that shoppers who ask a store employee to help experience greater decision comfort and this relationship is mediated by perceived control.

Study 5: Manipulating Technology Savviness in the Lab

The purpose of study 5 is to manipulate technology savviness in a lab setting. Unless the moderator is a manipulated variable, we do not know whether it is a true moderator or just a proxy moderator. Therefore, in study 5 I manipulate the moderator. Further, this study is conducted in a lab setting, which allows for a more realistic manipulation and increases the validity, generalizability, and applicability of the findings (Morales, Amir, and Lee 2017).

Participants and procedure

One hundred and forty-four students were recruited from a large southwestern university to participate in a study regarding consumer perceptions of in-store shopping experiences. Upon entering the lab, participants were asked to take a seat at one of fourteen cubicles equipped with a single computer. During the experiment, participants were randomly assigned to one of two

conditions featuring a shopping scenario regarding a customer interested in purchasing an out of stock product. In one condition, participants read a description of the customer which presented him as technology illiterate, whereas those in the other condition read a description of the customer which presented him as being technology savvy. Next, participants were given one of two shopping scenarios which asked them to imagine the customer just described was shopping in a physical retail store and wanted to purchase a shirt that was not in stock in his size. Half of the participants were assigned to a mobile app condition and given a scenario which asked them to imagine the customer used a mobile app to place the order for the shirt whereas the remaining participants were asked to imagine he asked a store employee to place the order for him.

Results and discussion

The results of a 2 (order method: app vs. employee) x 2 (technology savvy: Not tech-savvy vs. tech savvy) analysis of variance showed a showed a significant main effect of order method on perceived control ($F(1,140) = 34.51$, $p < 0.001$), a significant main effect of technology savviness on perceived control ($F(1,140) = 5.37$, $p < 0.05$), and a significant interaction effect between order method and technology savviness on perceived control ($F(1,140) = 28.67$, $p < 0.001$). Further, in a second analysis of variance the main effect of order method on decision comfort was not significant ($F(1,140) = 0.66$, $p = 0.419$, however, the main effect of technology savviness on decision comfort was significant ($F(1,140) = 18.59$, $p < 0.001$) and the interaction effect between order method and technology savviness on decision comfort was significant ($F(1,140) = 15.70$, $p < 0.001$). See table 8.

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	34.513	1,140	0.000	0.658	1,140	0.419
M (Control)	-	-	-			
W (Tech-Savvy)	5.375	1,140	0.022	18.593	1,140	0.000
Order Method x Tech-Savvy	28.671	1,140	0.000	15.697	1,140	0.000

Table 8: Summary of ANOVA results for study 5

To probe the interactions, I conducted pairwise comparisons and found that among those in the tech-savvy condition, participants who received the mobile app prompt reported significantly higher perceived control compared to those that received the employee assistance prompt (M_{TBSS}=5.84; M_{EMP}=3.57, $p < 0.001$). However, among those in the tech illiterate condition, participants who received the mobile app prompt reported similar levels of perceived control compared to those who received the employee assistance prompt (M_{TBSS}=4.29; M_{EMP}=4.18, $p < 0.714$). Interestingly, among those in the tech-savvy condition, participants who received the mobile app prompt reported significantly higher decision comfort compared to those who received the employee assistance prompt (M_{TBSS}=5.39; M_{EMP}=4.86, $p < 0.01$). However, among those in the tech illiterate condition, participants who received the mobile app prompt reported significantly lower levels of decision comfort compared to those who received the employee assistance prompt (M_{TBSS}=4.00; M_{EMP}=4.80, $p < 0.05$), again indicating a crossover effect. Interestingly, this suggests that low tech-savvy consumers experience greater perceived control and decision comfort when they work with a store employee to complete shopping tasks, whereas high tech-savvy consumers experience greater perceived control and decision comfort when they engage in technology-based self-service. See figures 8a and 8b.
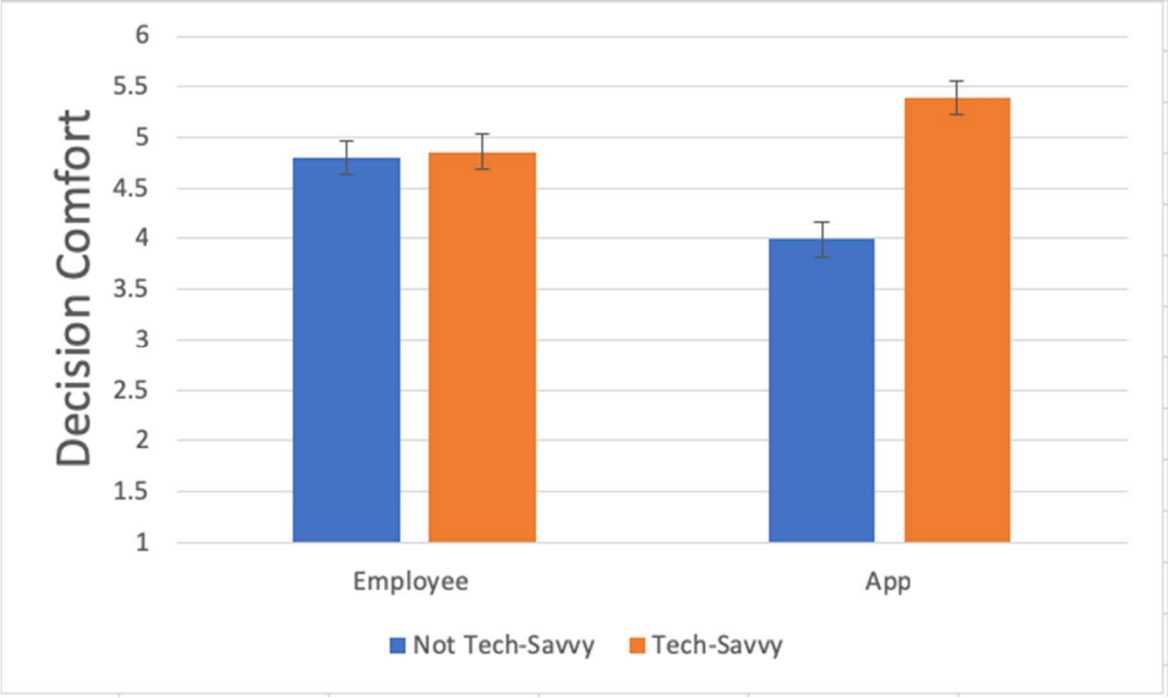
Figure 8a: Study 5 bar graph; technology-based self-service on decision comfort by technology savviness
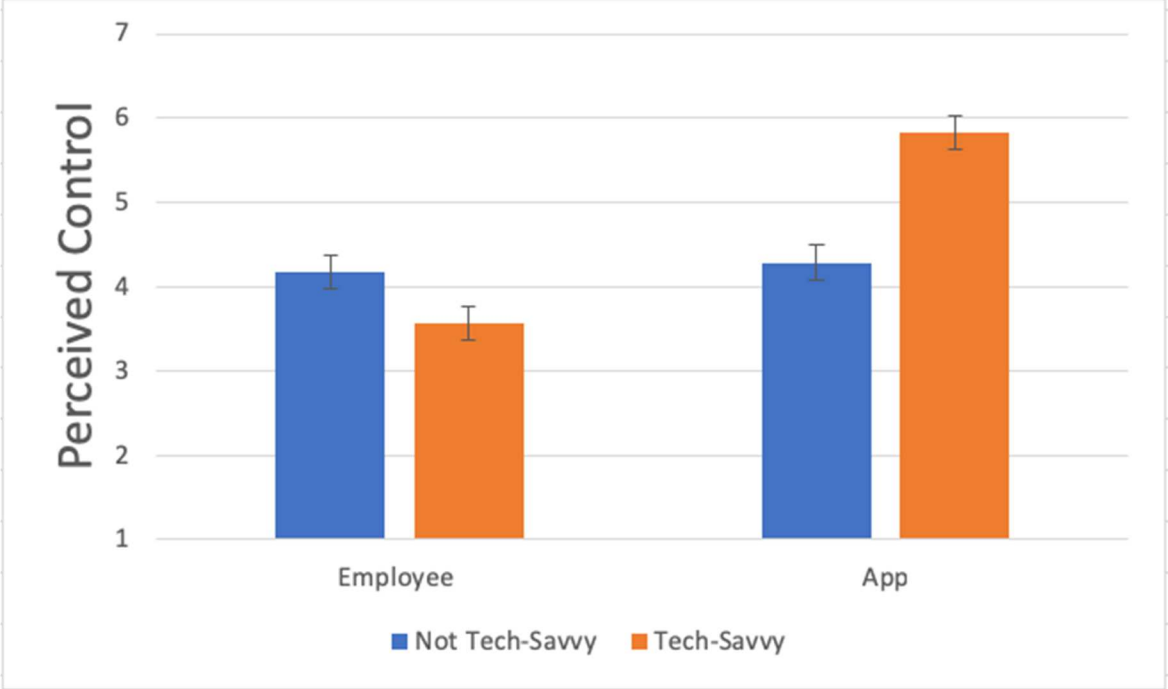
Figure 8b: Study 5 bar graph; technology-based self-service on perceived control by technology savviness in study 5

Finally, to test for moderated mediation, I used the PROCESS macro (Model 8, see Hayes (2013)) to estimate the conditional indirect effect. I estimated the bias-corrected coefficients from a series of 5,000 bootstrap samples (see Preacher, Rucker, and Hayes (2007)). The test of the conditional indirect effect of order method by technology savviness on decision comfort through perceived control (95% CI: LL CI = 0.22, UL CI = 0.97), thus supporting hypothesis 4 that compared to those that ask a store employee for help, shoppers who use technology-based self-service to complete a shopping task experience increased decision comfort and this relationship is mediated by perceived control.

These findings indicate that shopper engagement in technology-based self-service leads to increased perceptions of control, but only among those that view themselves as technology savvy. On the other hand, independently performing shopping tasks leads to decreased decision comfort, but only among those that do not see themselves as particularly technology savvy. In other words, when a shopper is tech-savvy, they feel greater control when using a mobile app, but equally comfortable regardless of what method they use to place the order. However, when a shopper is not very technology savvy, they do not feel particularly in control regardless of whether the task is performed independently or by someone else, but they do feel significantly more comfortable with their decisions when the task is performed by someone else. Therefore, to maximize the shopping experience, retailers should take care to understand their target audience before transitioning to forced technology use.

Study 6: A Quasi-Field Study

The purpose of study 6 is to replicate the findings in a lab setting. A lab environment allows for a more realistic manipulation of the independent variables, which increases the validity, generalizability, and applicability of the findings in experimental research (Morales,

Amir, & Lee, 2017). Further, an experiment conducted in a lab environment reduces some level of experimental noise and allows the effect of the independent variable on the dependent variables to be measured more accurately. Based on the primary goal of this research to show that technology-based self-service positively influences decision comfort through perceived control, this study will use an iPad kiosk in a laboratory setting. Rather than asking participants to imagine a shopping encounter, the use of actual physical products representing the independent variable can have more realistic impact on participants responses to a hypothetical shopping task.

Design and Procedure

Upon entering the lab, participants were asked to take a seat at any computer. In the first part of the experiment, participants were presented with a shopping scenario which asked them to imagine they were shopping for a T-shirt, and their size was out of stock. From here, participants were randomly assigned to one of the two experimental conditions, either ordering their size by asking a store employee or engaging in technology-based self-service by using a kiosk. Those in the store employee condition were asked to proceed to a podium where a confederate placed the order for them. Upon arrival, the confederate asked them to choose a t-shirt from a selection of six shirts, then asked for their size. After the participant chose a t-shirt and size, the confederate asked for personal information to order the shirt. Participants were instructed to provide their real names to be entered into a drawing and a fake email, address, and phone number to protect privacy. Those in the kiosk condition were asked to proceed to an iPad where they placed their order. Upon arrival to the kiosk, participants were to click a button that says, "shop now," and choose a t-shirt and size. Then participants were instructed via written instructions next to the kiosk to enter their real names to be entered into a drawing and a fake

email, address, and phone number to ensure privacy. See Appendix A for experimental details. As a reward for participation, all participants were entered into a drawing to win the T-shirt they chose. After completing the purchase, participants were asked to return to their seats to respond to a set of questions measuring their perception of control over the shopping task and the extent to which they felt comfortable with their decision to shop in this store.
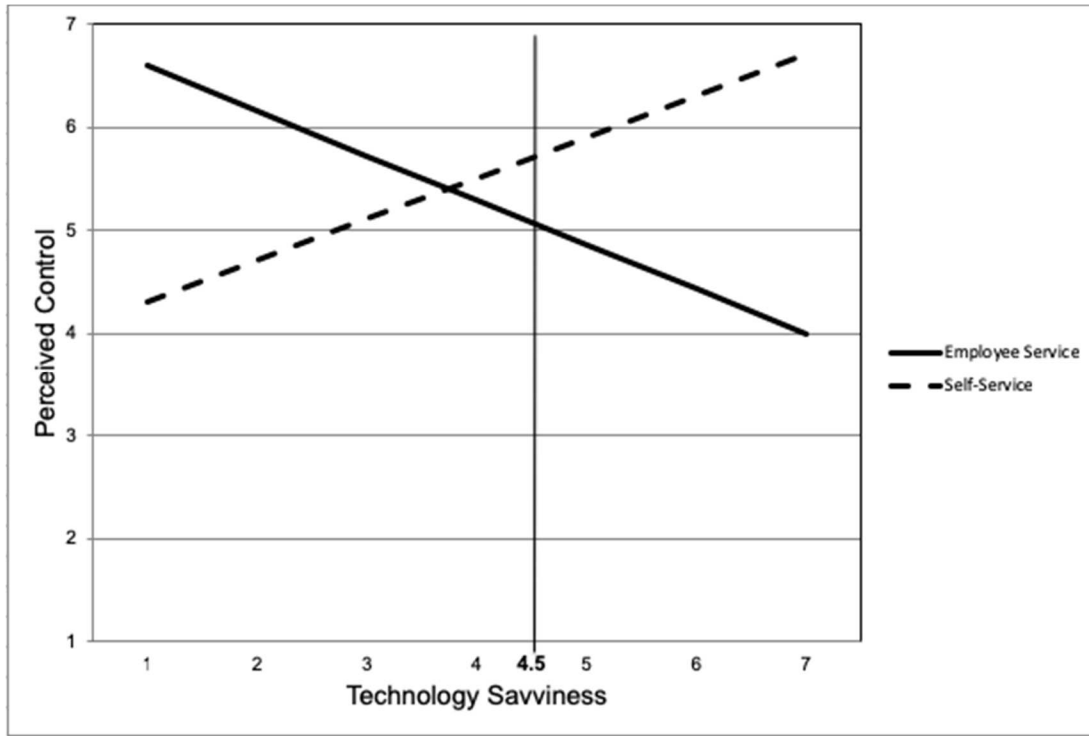
Results and discussion

To test my hypothesis 4, I conducted an analysis of variance with order method (kiosk vs. employee) as the focal predictor, technology savviness as a covariate, and perceived control as the dependent variable. The main effect of order method on perceived control was significant ($F(1, 50) = 3.736$ p <0.10), the main effect of technology savviness on perceived control was not significant ($F(1, 50) = 0.009$ p $= 0.923$), however the interaction between order method and technology savviness on perceived control was significant ($F(1,50) = 5.907$, p < 0.05). I conducted a second analysis of variance with order method (kiosk vs. employee) as the focal predictor, technology savviness as a covariate, and decision comfort as the dependent variable. The main effect of order method on decision comfort was not significant ($F(1, 50) = 0.147$ p $= 0.703$), the main effect of technology savviness on decision comfort was not significant ($F(1, 50) = 0.420$, p < 0.520), and the interaction between order method and technology savviness on decision comfort was not significant ($F(1,50) = 0.002$, p $= 0.964$). This unexpected finding is quite possibly due to an experimental design issue. Specifically, participants in both conditions were in the same room, however they were unaware of the task that those in the opposite condition were engaging in. That is, those using technology-based self-service did not know what the participants who were working with the confederate were doing, and vis versa. This

uncertainty may have led the decision comfort construct to be confounded. In future studies, I plan to address this by conducting the experiment for each condition at different times.
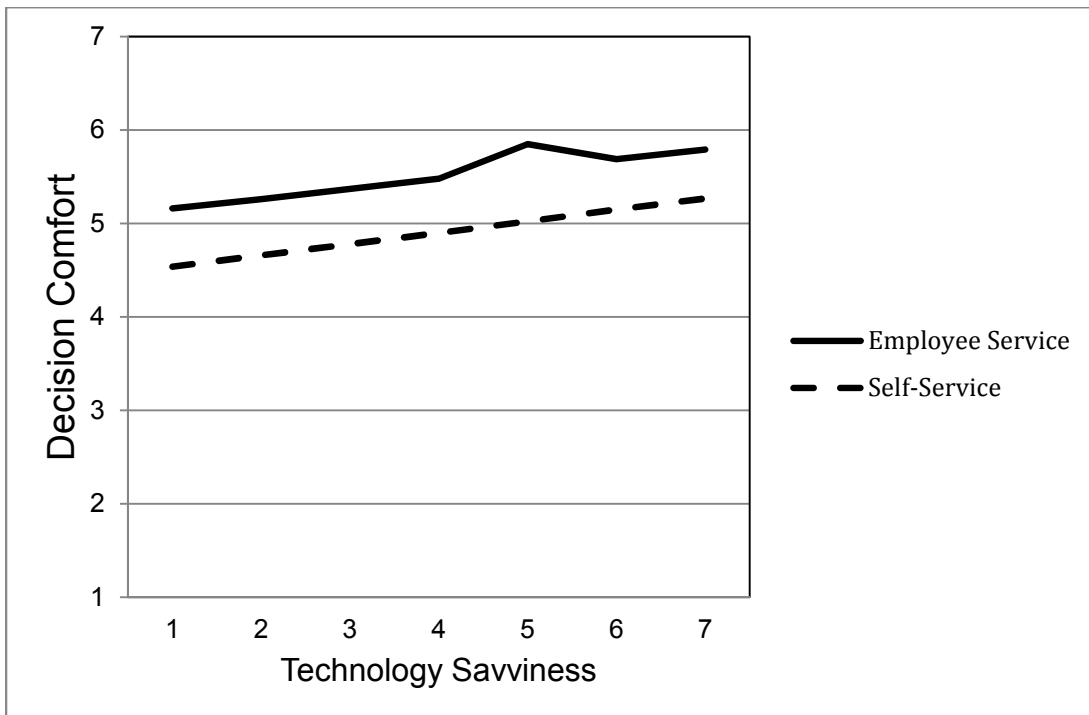
	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	3.736	1,50	0.059	0.147	1,50	0.703
M (Control)	-	-	-			
W (Tech-Savvy)	0.009	1,50	0.923	0.53	1,50	0.520
Order Method x Tech-Savvy	5.907	1,50	0.019	0.002	1,50	0.964

Table 9: Summary of ANOVA results for study 6

Since the moderator (technology savviness) was continuous, I used the Johnson-Neyman technique (Bauer & Curran, 2005; Hayes, 2013; Hayes & Matthes, 2009) to look for the turning points for where exactly, in the absolute value of the moderator, the effect of the order method turns from non-significant to significant on perceived control. The results indicated that technology savviness at a value of 4.5 on a 7-point scale is the turning point from non-significance to significance for the effect of order method on perceived control. The use of technology-based self-service (vs. employee assistance) to order an out of stock product is associated with significantly greater levels of perceived control for values of technology savviness above 4.5. See figures 9a and 9b.

Figure 9a: Study 6 – Floodlight graph; the effect of technology-based self-service versus employee service on perceived control at different levels of technology savviness

Figure 9b: Study 6 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of technology savviness

Finally, to test for moderated mediation, I used the PROCESS macro (Model 8, see Hayes (2013)) to estimate the conditional indirect effect. I estimated the bias-corrected coefficients from a series of 5,000 bootstrap samples (see Preacher, Rucker, and Hayes (2007)). The test of the conditional indirect effect of order method by technology savviness on decision comfort through perceived control (95% CI: LL CI = 0.07, UL CI = 1.27), thus supporting my hypothesis 4 that compared to those that ask a store employee for help, shoppers who use technology-based self-service to complete a shopping task experience increased perceived control. However, the interaction between technology-based self-service and technology savviness on decision comfort was not significant. To address these unexpected findings in future studies, I plan to conduct the experiment for each condition at different times so that participants in neither condition comes in contact with the participants in the other condition during the experiment.

Chapter 4: Discussion, Implications, and Future Research Directions

General Discussion

Over the last few decades, customers have developed a sense of comfort with online shopping, largely due to the independence experienced in an e-commerce environment (Wolfinbarger and Gilly 2001). Online stores offer consumers considerable autonomy by providing the opportunity to customize the shopping experience with tasks such as specifying features, selecting a preferred method of delivery, limiting exposure to advertising and product information, accessing consumer reviews, and even specifying pricing such as with "name your own price" tools. Further, the rise of powerful search engines, price comparison tools, mobile apps, and peer-to-peer communication vehicles allow the consumer to personalize the shopping experience and facilitate decision making (Shankar et al. 2011). When retailers integrate such technology into the physical retail store, consumers may experience similar psychological responses.

Technology-based self-service is becoming a common practice in retailing, restaurants, and other service-oriented companies. Consumer-facing technologies in physical retail stores are becoming increasingly prevalent, especially considering the consumer expectation for an omnichannel shopping experience. While researchers have explored consumer behavior questions about attractive characteristics of technology-based self-service and motivations to use them, there is a lack of scholarly literature to understand consumer responses to the use of such retailing tools. Therefore, in my dissertation, I sought to begin the conversation about how consumers respond after using such devices and the impact on the shopping experience. In particular, I conducted a combination of six lab and online experiments to answer questions

about consumer perceptions of control and decision comfort and to explore the role of technology savviness.

In study 1, I demonstrate a causal relationship between technology-based self-service, perceived control, and decision comfort. Specifically, consumers who engage in technology-based self-service experience greater perceived control over the shopping task, which leads to greater decision comfort. In study 2, I explored the role of technology savviness and found that the causal relationship between technology-based self-service and perceived control is stronger for those that self-report as being tech savvy vs. those that report being less tech-savvy. In study 3, I sought to add robustness to my research by replicating my findings with a non-transactional task (i.e., locating a misplaced product) and found that the conceptual model is still supported. In study 4, I wanted to further strengthen my arguments by changing the technology-based self-service platform and found that the results remain constant across platforms. In study 5, I manipulated technology savviness using a third person scenario to demonstrate a true moderator rather than a proxy. Finally, in study 6, I created a more realistic setting by having participants physically place an order with a confederate employee or engage in technology-based self-service to place the order.

One contribution of this research is the bridging of self-determination theory, a theory of human motivation, and response to technology-based self-service. Currently, research on technology-based self-service uses technology specific theories to understand human interaction with consumer-facing technology. However, I look at consumer responses to technology-based self-service using a more macro level theory concerning people's inherent growth tendencies and innate psychological needs. In particular, rather than using a robust theory of flow where consumers experience extreme psychological bliss, I looked at a more subtle positive emotion,

decision comfort, that results from the autonomy provided by technology-based self-service. When retail shoppers fulfill needs for autonomy from the perceived control afforded by engagement with a technology-based self-service, they will experience a soft positive emotion in the form of decision comfort.

Further, this perspective allowed me to uncover technology savviness as a moderator, which, unlike demographic variables, is a malleable individual difference that retailers can enhance through consumer education. Consumers who are savvy with in-store customer-facing technology are more likely to experience greater perceived control and decision comfort when engaging a technology-based self-service compared to those that are less tech-savvy. In general, my dissertation adds to the conversation on consumer engagement with in-store technology and provides empirical evidence of consumer responses to technology-based self-service.

Managerial Implications

While my dissertation narrowly explores the retail industry, which widely offers technology-based self-service options, the findings here may be generalizable to many industries with technology-based self-service. For example, the current research would be applicable and useful to managers of companies that offer self-ordering at restaurants, self-check-in at hotels, self-ticketing at the airport, and self-service financial tools. This research might be particularly useful for service industries known to contribute to consumer frustration like the airline industry, which is notoriously known for low customer satisfaction ratings (Morgan, 2018). In particular, when the consumer can skip the face-face service and demonstrate autonomy and competence by engaging in technology-based self-service, they are more likely to experience perceived control and decision comfort. The same applies to other industries such as government agencies, utility

companies, healthcare, and industries where consumers typically expect a mediocre, or negative, experience. In other words, technology-based self-service could turn an inherently negative consumption experience into a positive one.

Another managerial implication relates to targeting and segmenting. In my research, I found that consumers who have higher levels of technology savviness, experience greater perceived control and decision comfort when using technology-based self-service compared to those that ask a store employee to assist with shopping tasks. Companies offering technology-based self-service should understand their customer's level of technology savviness when making decisions about incorporating such tools in their stores. Further, because tech savviness is a malleable characteristic, firms might consider offering consumer education (e.g., How-To classes) concerning consumer engagement with technology-based self-service. Overall, firms need to be up to date with technology-based self-service and should closely understand their customers to build a strategy around using such tools.

When customers perform shopping tasks for themselves, they experience greater perceived control over the process and the outcome, which reduces frustration (Collier & Sherrell, 2010). Similarly, greater perceived control over a decision to enter, and stay in a consumption situation, increase the pleasantness of the entire experience (Raymond R. Burke, 2002). Store attitude is often influenced by the shopper's cognitive and emotional responses to the environmental elements that facilitate or hinder browsing and decision-making processes such as self-service kiosks (Johnson, Bruner II, and Kumar 2006; Liu and Shrum 2002; Mollen and Wilson 2010). By allowing shoppers control over shopping tasks and facilitating the product acquisition process, technology-based self-service may positively impact the cognitive and

emotional aspects of the shopping experience, and lead to a more positive attitude towards the store.

Intentions to shop in a retail store are a function of several environmental cues such as ambient conditions, social factors, and store design. Such environmental cues influence time and effort expended shopping in a retail store and the psychological costs of mental stress or emotional labor during the shopping experience, with lower costs, resulting in higher patronage intentions (Barone et al. 2017). Technology-based self-service makes up part of the retail store's design, which may positively impact perceived control and decision comfort by reducing the psychological costs of the shopping experience. Further, elements of a retail store that decrease shopper search time and improve processing efficiency, such as independence in shopping, provide physical cues about the retailer and encourage store loyalty (Agarwal and Karahanna 2000). Therefore, the use of a self-service kiosk to complete a shopping task should increase the likelihood that a consumer will shop in that particular retail store in the future and exhibit loyalty intentions. Consumers are motivated to talk to others about a consumption experience by five primary benefits, including impression management, emotion regulation, information acquisition, social bonding, and persuasion (Ryan & Deci, 2000). Talking to others about a shopping experience involving the use of self-service kiosks can be driven by impression management, such that the shopper is impressed with the novelty of the experience and feels compelled to tell others as a means of self-enhancement. Similarly, innovative self-service tools, such as endless aisle kiosks and mobile apps, require some degree of skill and shoppers might be inclined to share their experience using this technology to increase perceptions of their shopping and technological expertise (Parker et al., 2016).

Limitations and Future Research Directions

Three limitations of my research should be acknowledged as potential future research directions. The current research explores perceived control experienced from technology-based self-service in a positive light. Although not hypothesized, my data indicated that consumers who are low tech-savvy feel a reduced sense of decision comfort although they feel greater control. Therefore, several questions come to mind. Is it always beneficial for the customer to feel in control? For example, when perusing a service or product with which they are unfamiliar, is control a good thing or a bad thing? Under what circumstances is increased control a negative thing? Further, are there specific industries where consumers desire for full service (e.g., luxury goods) where increased autonomy could be a negative thing? Also, it is possible that consumers with specific traits, such as self-efficacy, social anxiety, and self-consciousness, may have an aversion to control, preferring instead to be guided. In particular, I suspect that the increase in perceived control can have negative implications in a consumer environment when these consumer traits are salient. Since perceived control makes a shopping outcome more attributable to the consumer's behavior, self-conscious emotions such as self-efficacy, self-monitoring behavior, and social anxiety might make the consumer more apprehensive towards perceived control, and more likely to prefer the help of a store employee. Future research should explore the dark side of technology-based self-service and increased control to develop a more robust understanding of the boundary conditions that diminish the benefits of giving consumers control over their consumption experiences.

Second, like a vast majority of self-service technology research, this research focuses primarily on cognitive and affective components of technology-based self-service. However, there is a physical component, as well. Specifically, the touch characteristic of endless aisle

kiosks and mobile apps may have important implications for consumer behavior. Research finds that touch-based consumer interfaces such as tablets, mobile phones, and even in-store kiosks, can increase perceived psychological ownership, which boosts the endowment effect (Morales et al. 2017). Within the context of touch in physical retail stores, consumers may label products more valuable when they use a touchscreen self-service kiosk rather than asking a store associate for assistance or even using a non-touchscreen self-service kiosk. Physical touch may translate into a higher likelihood of purchasing from the retail store rather than another online platform that charges a slightly lower price. Future research should, therefore, isolate the effects of touch when using touchscreen technology-based self-service, and how it might impact psychological ownership and endowment, and consequently, product value and willingness to pay.

Finally, the studies presented here are all within a retail context. However, service industries are also using technology in their business models to assist consumers. The current research heavily relies on perceived control as an explanation for the observed effects. However, feelings of empowerment often complement perceived control and can lead customers to make more effective changes to their lifestyle that work best for their personal needs. An industry that is now experimenting with self-service ordering is fast food. For example, fast food restaurants like McDonald's have recently begun implementing self-ordering kiosks in some of their restaurants. Industry practitioners appreciate self-ordering technology because it has been shown to increase check sizes, decrease wait times, enhance order accuracy, and save money on labor. While these are all critical variables for the manager's bottom line, it is crucial that we understand the underlying mechanisms that lead to these outcomes to ensure efficient use of these technologies. For example, the feeling of control and empowerment that accompanies self-service may impact the choices customers make in ordering food. In particular, perceived control

increases a sense of self-efficacy and encourages goal attainment and analytical thinking (Hayes, 2013). Further, empowered customers may be more apt to make choices that encourage a healthier lifestyle (Preacher et al. 2007).

On the other hand, a desire to adhere to social norms often influences food choice, and people tend to eat less when in the presence of others compared to when alone (Voss, Spangenberg, and Grohmann 2003). Therefore, ordering using technology-based self-service (in private) compared to ordering with the cashier may negatively influence the healthiness or amount of food people order. Further, research suggests that the size of others (i.e., obese vs. thin) impacts the amount of food people order, such that people eat less food when in the presence of an obese person vs. a thin person (Preacher et al., 2007). Just as consumers use body type of other customers as an anchor for food consumption, there may also be a link between the physical makeup of the kiosk (i.e., big and round vs. long and thin) and food consumption. Future research should explore whether and how the option to independently order with a kiosk will affect food choice, and whether the shape of the machine impacts this relationship.

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APPENDICES

Appendix A: Experimental design manipulations

<u>Study 1 & 2</u>

Subjects will be asked to imagine the following shopping scenario:

"Imagine you are shopping in a physical retail store, and you would really like to purchase a specific T-shirt that is exclusive to this retailer, but your size is not in stock."

Next subjects will be randomly assigned to one of the two purchase method scenarios. After reading the scenarios, all subjects will be asked to answer a few questions with regard to their shopping experience.

Self-service kiosk condition:

"Near the aisle you are standing in, there is a kiosk where you can independently look up inventory, locate items in the store, and place online orders without the assistance of a store employee."

Screen 2

"Now, imagine you decide to use the kiosk to order the T-shirt in your size at the advertised price of $29.99. Using the barcode scanner on the kiosk, you first need to scan the barcode of the T-shirt you are looking for and then you will need to touch the screen to input the size you would like. The kiosk then prompts you to enter your personal information, so you will touch the keyboard on the screen to enter your name, shipping address, and phone number. Next, you will need to choose whether you prefer to ship the T-shirt to your home or the store, and the speed of shipping you would like. Finally, you will need to enter your payment method into the machine,

which will then print out a receipt. You are finished with your transaction, which took about 5

minutes.”

Store Employee Condition:

“Near the aisle you are standing in, there is a customer service counter where you can ask a

store employee to look up inventory, help you locate items in the store, or place an online order

for you.”

“Now, imagine you decide ask the store employee order the T-shirt in your size at the advertised

price of $29.99. You cannot see the computer screen, but the employee will enter all the

information you provide. The store associate scans the barcode of the T-shirt you are looking for

and asks you what size you would like, and she enters your size into the order system. Then the

store employee asks for your name, shipping address, and phone number, and whether you

prefer to ship the T-shirt to your home or the store, and the speed of shipping you would like. As

you answer her questions, she is entering the information into the order system for you. Finally,

the store employee asks for you to pay for the T-shirt, then hands you a receipt. You are finished

with your transaction, which took about 5 minutes.”

Dependent Measure:
Perceived control
Decision Comfort

Study 3

Kiosk Condition

Imagine you are shopping in a physical retail store, and you've found a T-shirt in the wrong place that you would really like to purchase but it is not your size.

Near the aisle you are standing in, there is a kiosk where you can independently locate items in the store, look up inventory, and/or place online orders without the assistance of a store employee.

Now, imagine you decide to use the kiosk's interactive store layout map to identify the proper location of this T-shirt so you can find one in your size.

Using the barcode scanner on the kiosk, you scan the tag of the T-shirt you are looking for and then use a touchscreen monitor to press the interactive map button and find out where the t-shirts are located.

The kiosk then displays a map identifying your current location and the proper location of the product along with detailed directions and an isle number where the T-shirts should be located.

Employee Condition

Imagine you are shopping in a physical retail store, and you've found a T-shirt in the wrong place that you would really like to purchase but it is not your size.

Near the aisle you are standing in, there is a customer service counter and an employee whom you can ask to help you locate items in the store, look up inventory, and/or place an order for you.

Now, imagine you decide to ask the store employee to help you identify the proper location of this T-shirt so that you can find one in your size.

You proceed to the customer service counter and ask the employee where the t-shirts are located.

You then proceed to follow the employee through the store as he/she guides you toward the location where the T-shirts should be located.

Study 4

All participants will be asked to imagine the following shopping scenario:

Imagine today is Wednesday and Mr. Customer is shopping in a physical retail store for a shirt to wear to an event on Saturday. After some searching, Mr. Customer finally finds the perfect shirt, but his size is not in stock and the shirt is exclusive to this retailer.

Next participants will be randomly assigned to one of the two purchase method scenarios. After reading the scenarios, all participants will be asked to answer a few questions with regard to their shopping experience.

Tech Savvy manipulation:

Mr. Customer is very tech-savvy and finds in-store technology such as mobile apps very convenient and easy to use. He enjoys experimenting with new technologies and adapts well to them. He prefers using self-service technology and can figure out how to use such systems without little or no help from others.

Not Tech Savvy Manipulation

Mr. Customer is not at all tech-savvy and finds in-store technology such as mobile apps very inconvenient and difficult to use. He does not enjoy experimenting with new technologies and does not adapt well to them. He avoids self-service technology and requires significant help from others to learn to use such systems.

Mobile App Condition

Now, imagine Mr. Customer wants to order the shirt in his size at the advertised price of $29.99 and will use the store's mobile app to place the order by himself as this is the only option available.

By using the mobile app, Mr. Customer can see all the information that he inputs and will rely only on himself to enter the correct information.

After downloading the app, he must scan the barcode of the shirt using his smartphone's camera and a photo of the shirt comes up. Then he must select his preferred size and color, add it to his virtual shopping cart, and begin the checkout process.

During checkout, he must enter his personal information including his name, shipping address, phone number, and email address and select the free 2-day shipping option, so the item should arrive on time.

Finally, Mr. Customer must enter his credit card information and checkout. Mr. Customer is now finished with his transaction.

Employee Condition

Now, imagine Mr. Customer wants to order the shirt in his size at the advertised price of $29.99 and will ask a store employee to place the order for him as this is the only option available.

He cannot see the computer screen or the information that the employee inputs, so he will have to rely on the employee to enter the correct information.

The employee will first need to scan the barcode of the shirt he is looking for and ask him what size and color he wants to order. Then the employee will enter the information into the order system.

Before checking out, Mr. Customer must verbally give the employee his personal information including his name, shipping address, phone number, and email address, and ask the employee to select the free 2-day shipping option so the item should arrive on time.

Finally, the employee asks Mr. Customer to pay for the product and once he enters his credit card the employee takes care of the rest. The employee is now finished with the transaction.

Dependent Measure:
Perceived control
Decision Comfort

Study 6:

Kiosk use condition:

Imagine you are shopping in a physical retail store, and you would really like to purchase a specific T-shirt that is exclusive to this retailer, but your size is not in stock.

Near the aisle you are standing in, there is a kiosk where you can independently look up inventory, locate items in the store, and place online orders without the assistance of a store employee.

Now, we will simulate a real-world experience using the kiosk to order the T-shirt in your size. Please read the following instructions, then proceed to the self-service iPad kiosk to place your order.

IMPORTANT INSTRUCTIONS:

1. Please go to the iPad on the counter in the back of the room.

2. When you arrive at the iPad, choose the app that says T-shirts store.

3. Choose a T-shirt that you would like and place an order for the shirt. If there is information already in the checkout page, please delete it and replace it with your own.

3. When placing your order, please use your real name in order to be entered into the drawing.

4. Use a fake email address, phone number, and address.

5. You may use the credit card next to the iPad to place your order.

6. You will get a message that says the card is declined. Then please proceed back to your seat to finish the survey.

Once completed, you may click the apple home button (circle button on the right side of the iPad) and return to your seat to finish the survey.

Note: **This is a fictitious store and you will not receive merchandise.**

Store employee condition:

Imagine you are shopping in a physical retail store, and you would really like to purchase a specific T-shirt that is exclusive to this retailer, but your size is not in stock.

Near the aisle you are standing in, there is a customer service counter where you can ask a store employee to look up inventory, help you locate items in the store, or place an online order for you.

Now, we will simulate asking a store employee to order the T-shirt in your size. Please read the following instructions, then proceed to the counter to place your order.

IMPORTANT INSTRUCTIONS:

1. Please take the paper credit card and proceed to the store employee (experimenter) to help you place your order.

2. When you arrive at the counter, the store employee will ask you to choose a T-shirt and size that you would like to place an order for.

3. Then you will be asked to provide your personal information, which she will enter into the computer for you.

4. Please use your real name to be entered into the drawing.

5. Please use a fake email, address, and phone number.

6. Use the credit card by your computer for payment information.

Once completed, you may return to your seat to finish the survey.

Note: **This is a fictitious store and you will not receive merchandise.**

Dependent variables:
Perceived control
Decision comfort

Appendix B: Scale Items

Perceived control (Collier and Sherrell, JAMS 2010) – Study 1 & Studies 2-6

1. I feel in control using this ordering process.

2. This ordering process lets the customer be in charge.

3. While placing my order I feel decisive.

4. This process gives me more control over placing my order.

Perceived control (Collier and Sherrell, JAMS 2010) – Study 3

1. I felt in control over the process of locating this T-shirt.

2. This method of locating an item lets the customer be in charge.

3. While looking for the T-shirt, I felt decisive.

4. This process gives me control over locating an item in the store.

Decision comfort (Parker et al., 2016) – Study 2

1. I am comfortable with the decision to shop in this store.

2. I feel good about the decision to shop in this store.

3. I am experiencing negative emotions about the decision to shop in this store. (R)

4. Whether or not it is "the best choice," I am okay with the decision to shop in this store.

5. Although I don't know if this decision is the best, I feel perfectly comfortable with choice I made.

Decision comfort (Parker et al., 2016) – Study 1 & Studies 2-6

1. I am comfortable with the decision to engage in this shopping task.

2. I feel good about the decision to engage in this shopping task.

3. I am experiencing negative emotions about the decision to engage in this shopping task.

   (R)

4. Whether or not it is "the best choice," I am okay with the decision to engage in this shopping task.

5. Although I don't know if this decision is the best, I feel perfectly comfortable with choice I made.

Ease of Use (Dabholkar, 1996)

Using an in-store kiosk for transactions other than simple price check would be

1. Complicated (R)

2. Confusing (R)

3. Effortful (R)

4. Easy

5. Time-consuming (R)

6. Effortless

Need for Interaction (Yen 2005)

1. Human contact in providing services makes the process enjoyable for the consumer.

2. I like interacting with the person who provides the service.

3. Personal attention by the service employee is not very important to me.

4. It bothers me to use a machine when I could talk to a person instead. (R)

TABLES

	Informational	Transactional	Self-help
Technology based self-service	Interactive maps, digital directories/signage, kiosks; ATM	ATM; POS systems; Vending Machines	Self-check in/out at hotels; airport ticketing
Internet enabled technology-based self-service	geolocational mapping; mobile apps; artificial intelligence	endless aisle kiosks; mobile apps;	artificial intelligence; smart mirrors;

Table 1: Functions of technology-based self-service

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	101.82	1,135	0.000	20.241	1,135	0.000
M (Control)	-	-	-	8.941	1,115	0.000

Table 2: Summary of ANOVA results for study 1

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	0.219	1,157	0.641	0.191	1,157	0.663
M (Control)	-	-	-	2.117	1,116	0.007
W (Tech-Savvy)	2.376	1,157	0.125	16.874	1,157	0.000
Order Method x Tech-Savvy	6.91	1,157	0.009	1.484	1,157	0.225

Table 3: Summary of ANOVA results for study 2

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	50.83	1,157	0.000	14.38	1,157	0.663
M (Control)	-	-	-	6.47	1,136	0.000
W (NFI)	11.61	1,157	0.001	3.85	1,157	0.004
Order Method x NFI	14.45	1,157	0.000	9.58	1,157	0.004

Table 4: Summary of ANOVA results for study 2

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	2.868	1,155	0.092	4.155	1,155	0.043
M (Control)	-	-	-			
W (Tech-Savvy)	0.351	1,155	0.554	1.844	1,155	0.176
Order Method x Tech-Savvy	10.399	1,155	0.002	6.006	1,155	0.015

Table 5: Summary of ANOVA results for study 3

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	25.97	1,155	0.000	8.21	1,155	0.005
M (Control)	-	-	-			
W (NFI)	2.42	1,155	0.122	1.01	1,155	0.316
Order Method x NFI	5.3	1,155	0.023	5.08	1,155	0.026

Table 6: Summary of ANOVA results for study 3

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	94.058	1,195	0.000	1.337	1,195	0.249
M (Control)	-	-	-			
W (Tech-Savvy)	23.528	1,195	0.000	51.611	1,195	0.000
Order Method x Tech-Savvy	62.146	1,195	0.000	52.408	1,195	0.000

Table 7: Summary of ANOVA results for study 4

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	34.513	1,140	0.000	0.658	1,140	0.419
M (Control)	-	-	-			
W (Tech-Savvy)	5.375	1,140	0.022	18.593	1,140	0.000
Order Method x Tech-Savvy	28.671	1,140	0.000	15.697	1,140	0.000

Table 8: Summary of ANOVA results for study 5

	Perceived Control			Decision Comfort		
	F	df	sig.	F	df	sig.
X (Order Method)	3.736	1,50	0.059	0.147	1,50	0.703
M (Control)	-	-	-			
W (Tech-Savvy)	0.009	1,50	0.923	0.53	1,50	0.520
Order Method x Tech-Savvy	5.907	1,50	0.019	0.002	1,50	0.964

Table 9: Summary of ANOVA results for study 6

FIGURES
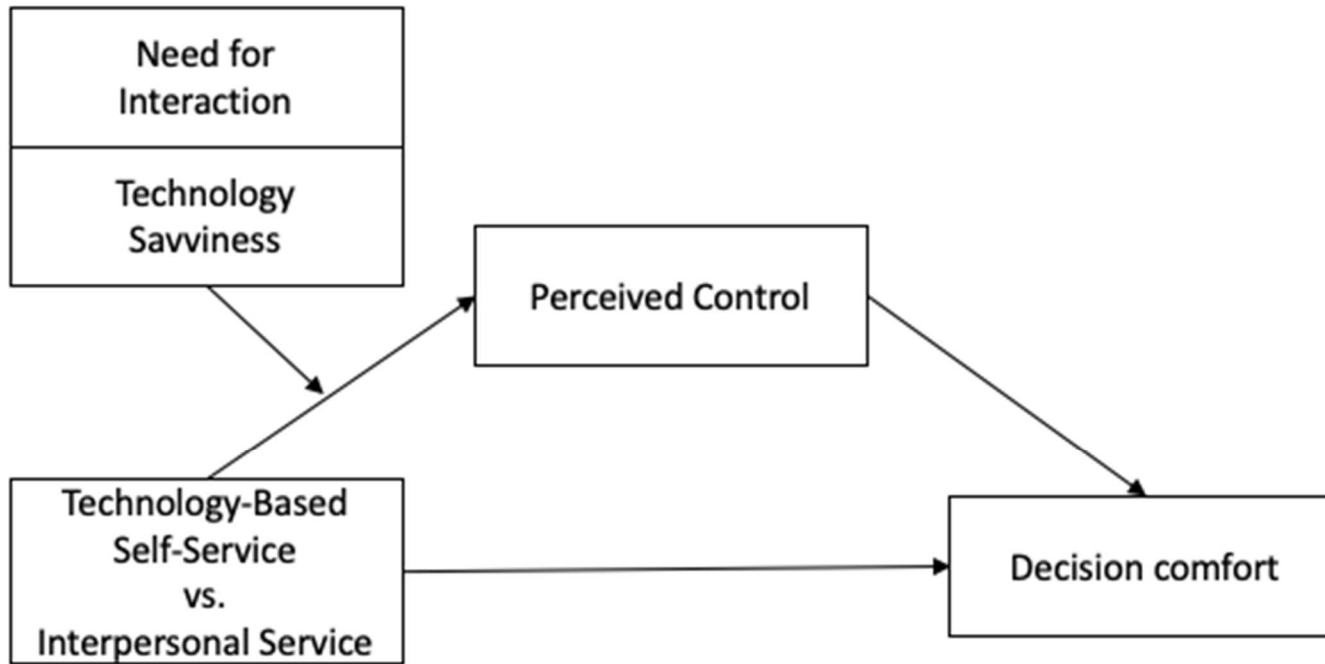
Figure 1: Conceptual Model
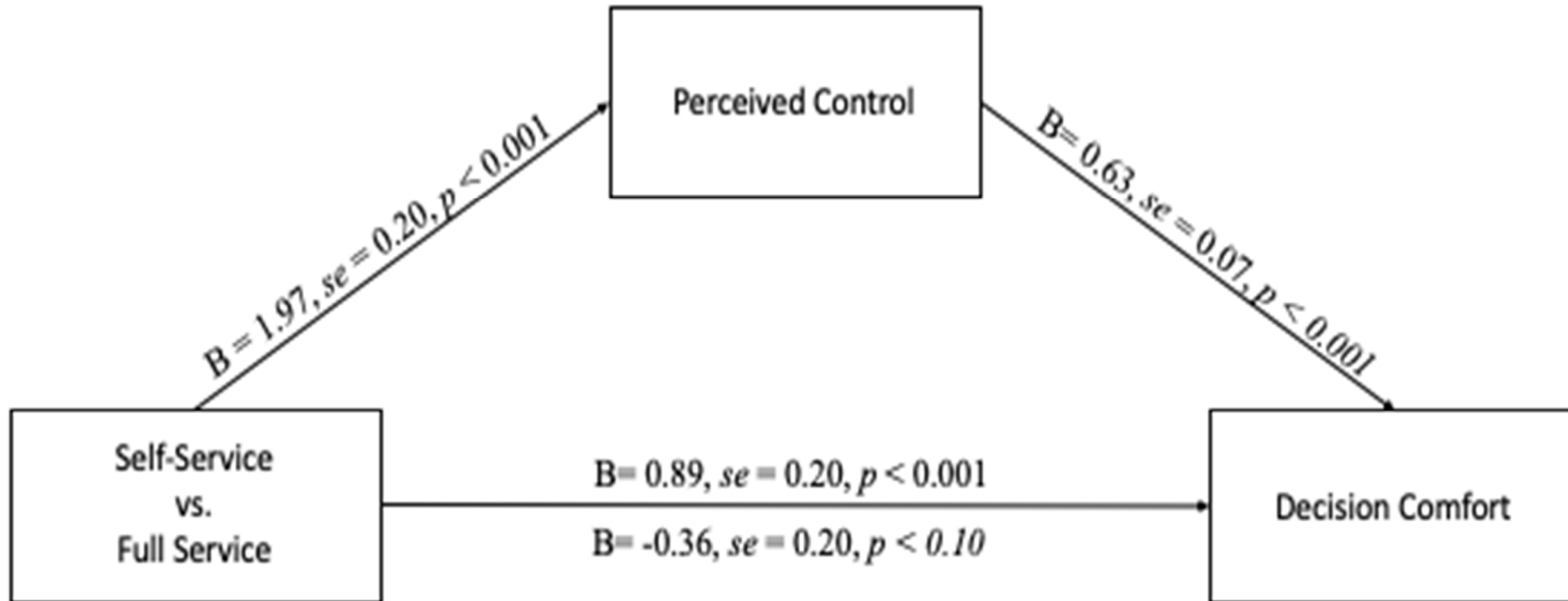
Figure 2: Mediational model in study 1
Standardized regression coefficients for the relationship between technology-based self-service and decision comfort as mediated by perceived control. The standardized regression coefficient between technology-based self-service and decision comfort controlling for perceived control is on the bottom.
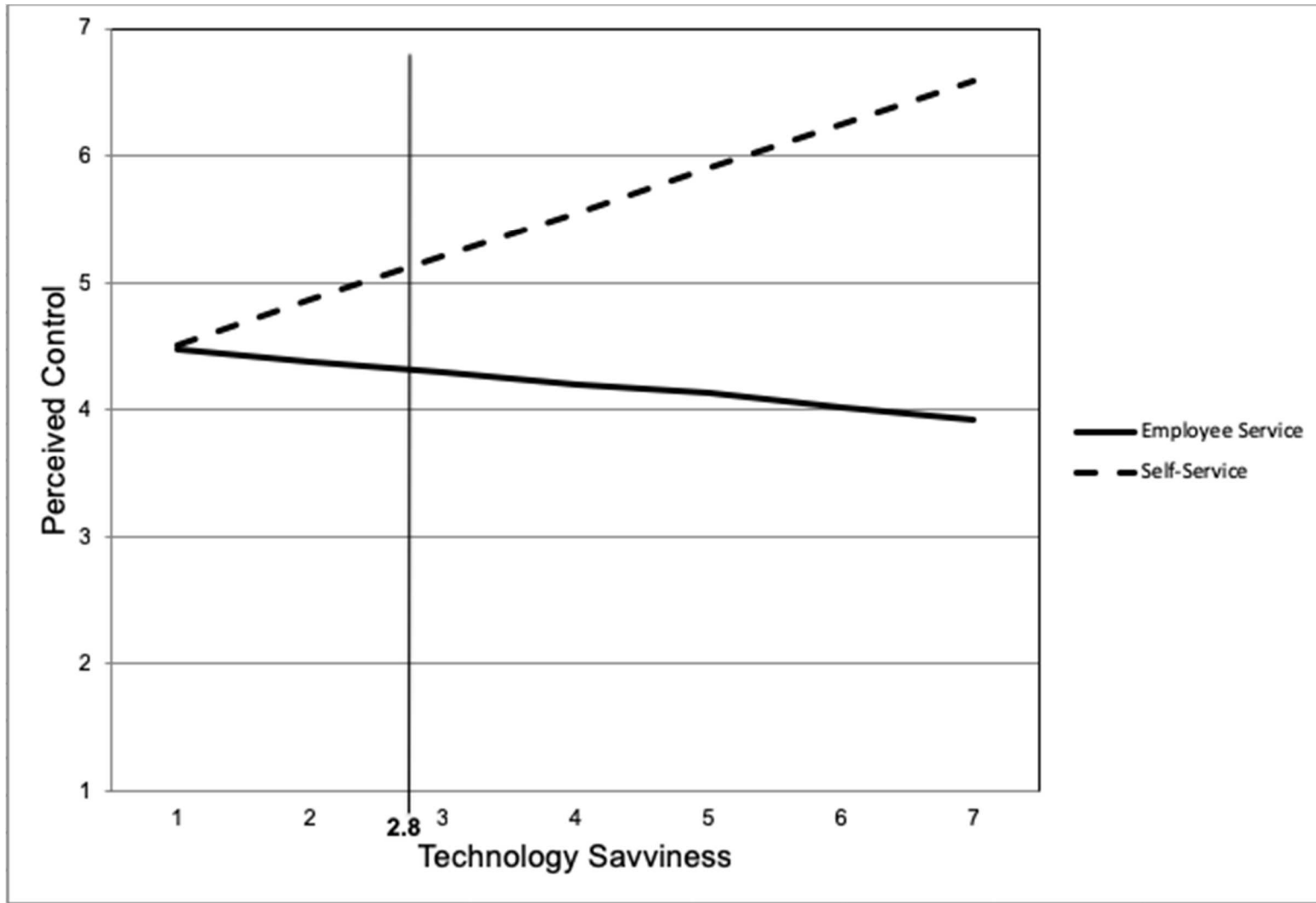
Figure 3a: Study 2 – Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of technology savviness
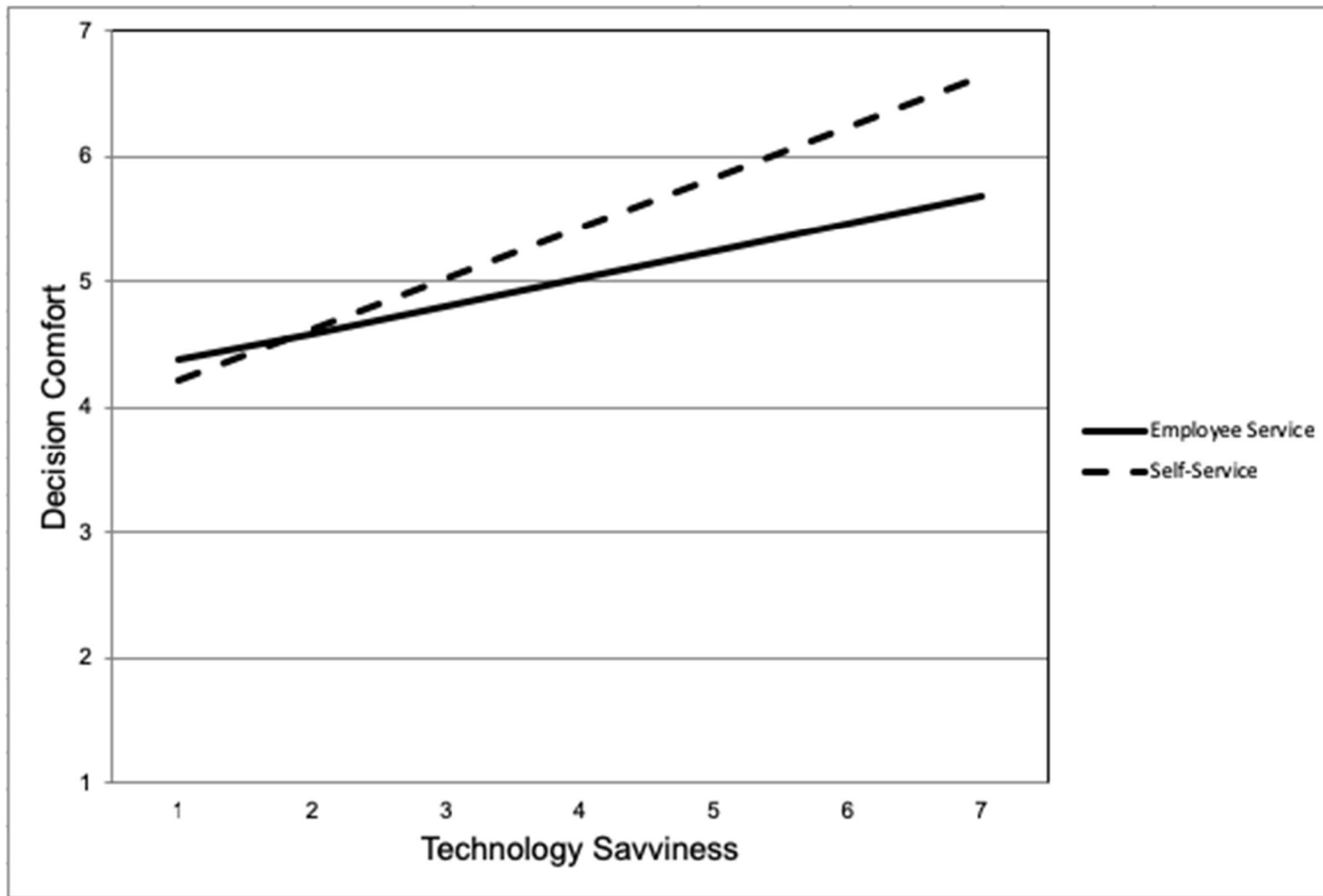
Figure 3b: Study 2 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of technology savviness
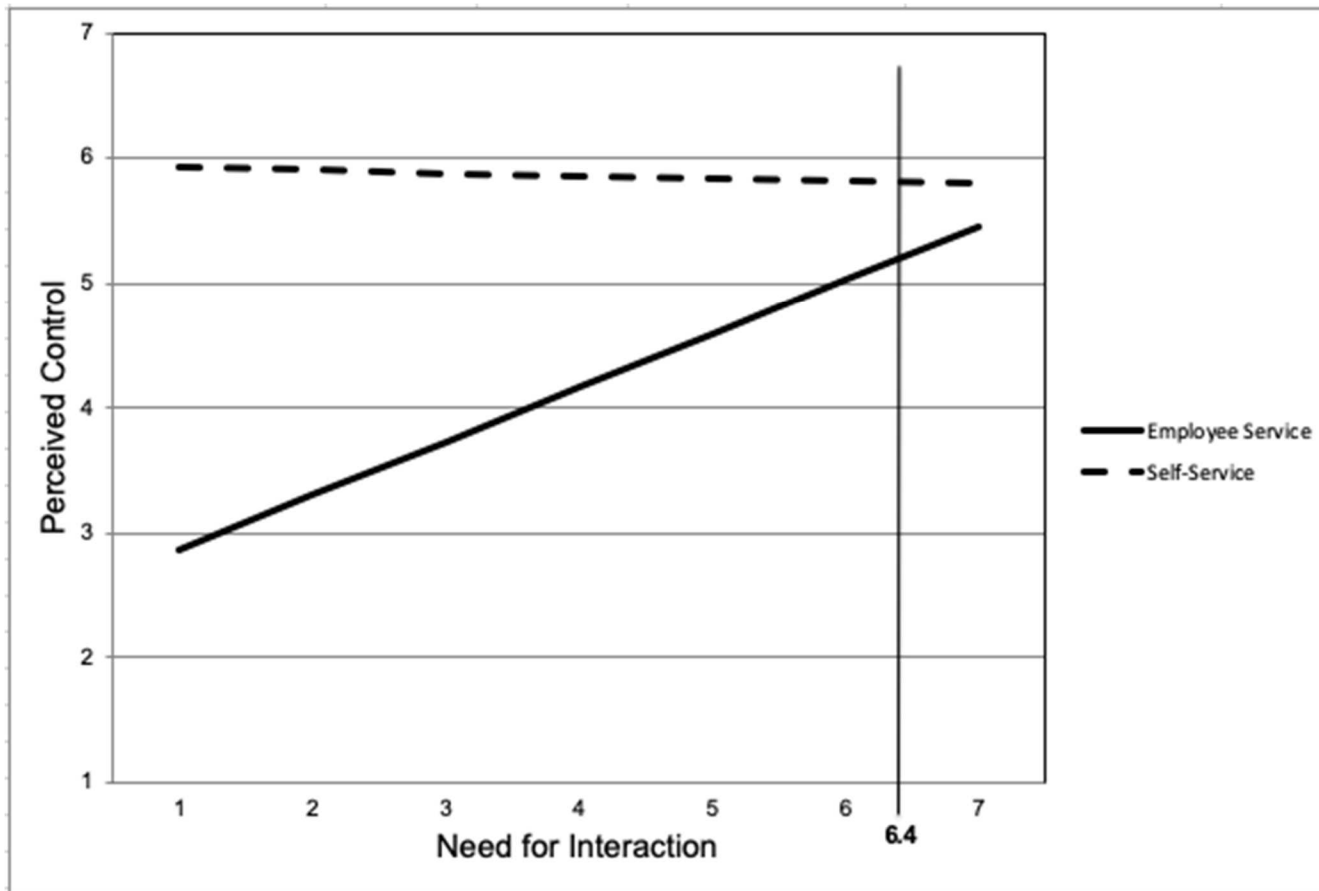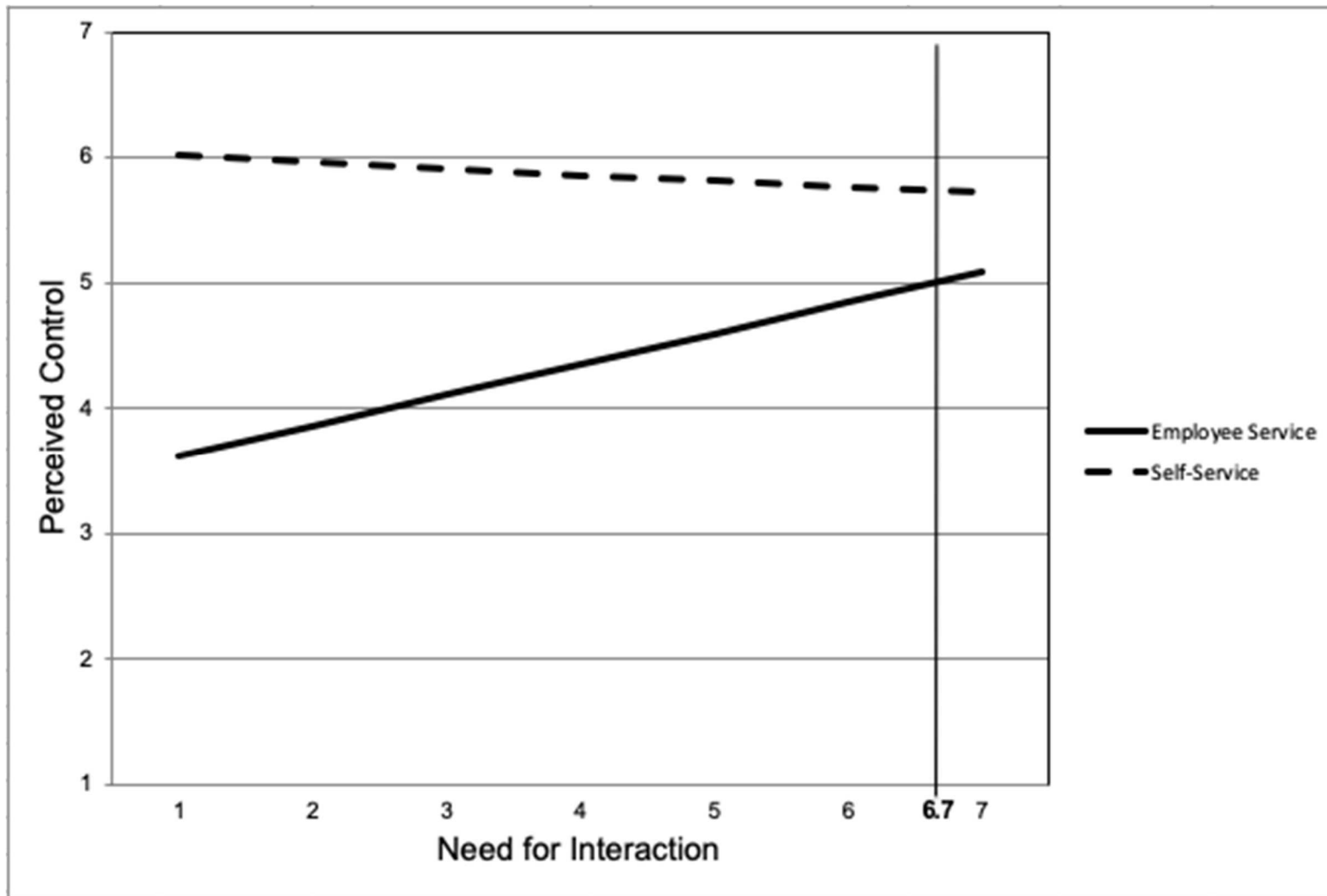
Figure 4a: Study 2 - Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of need for interaction
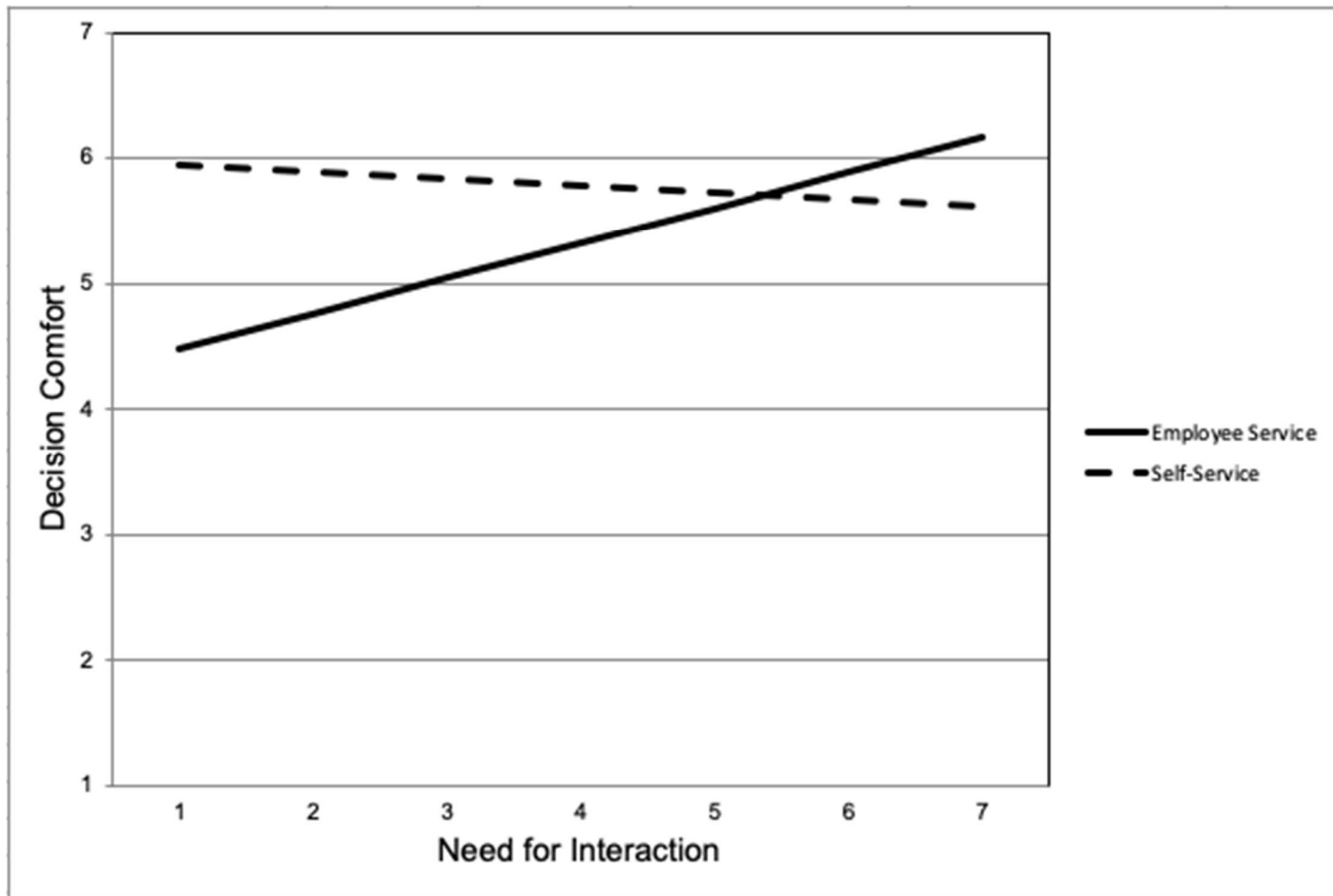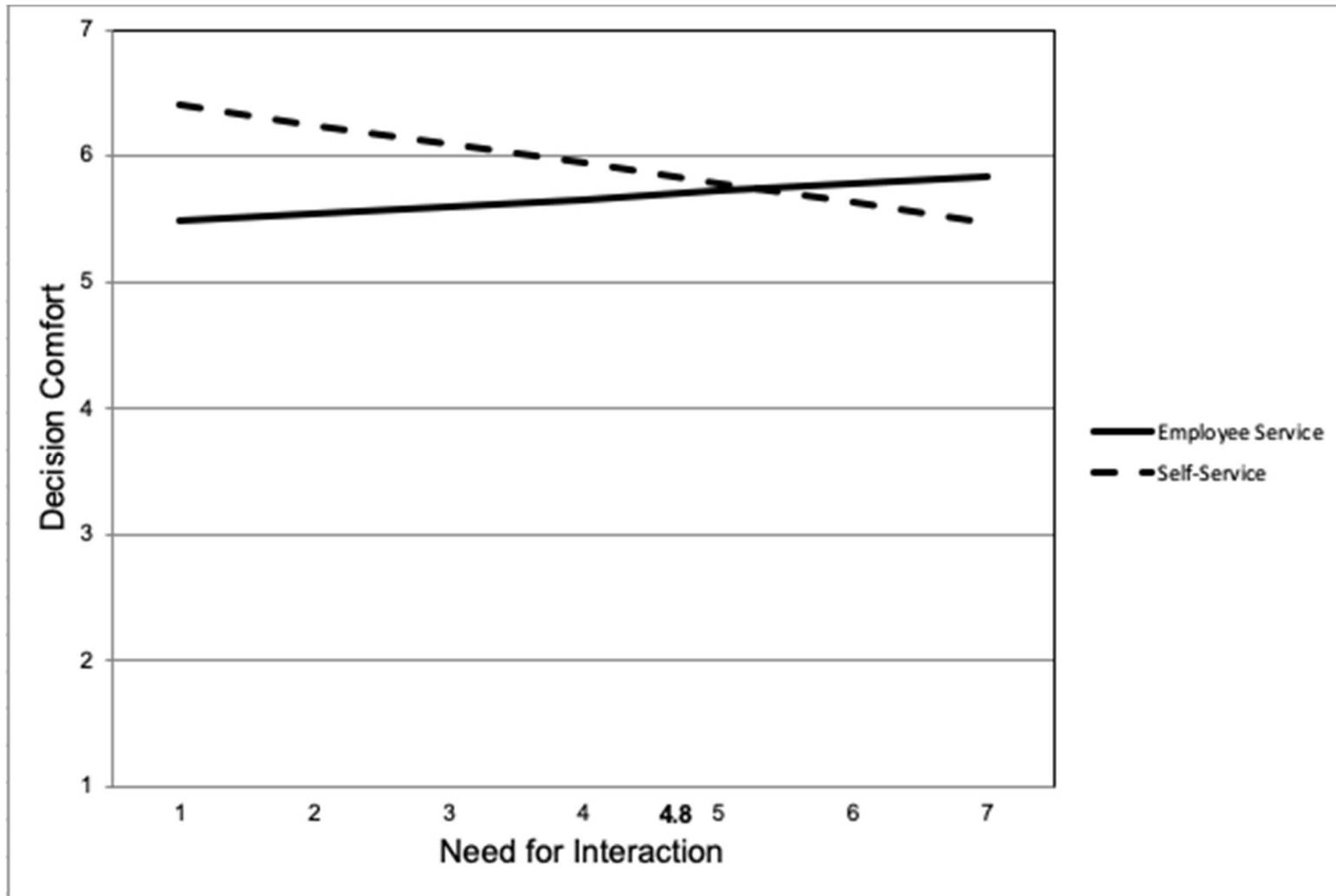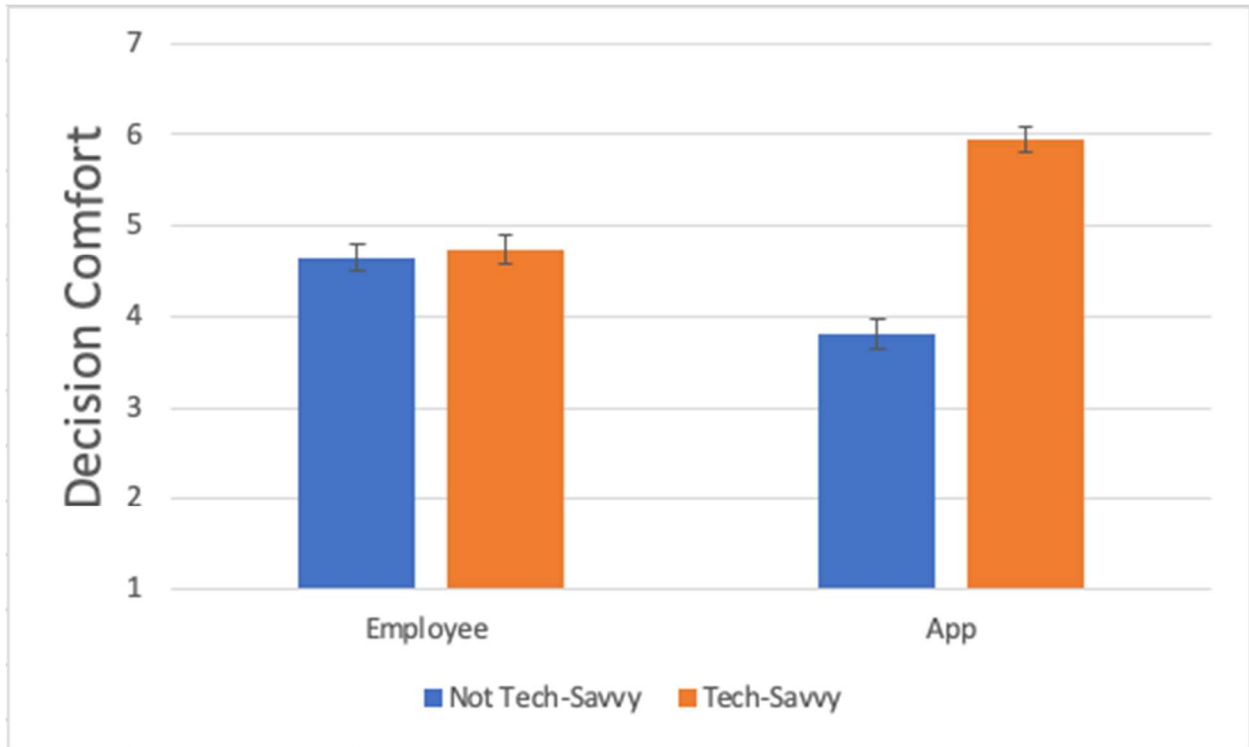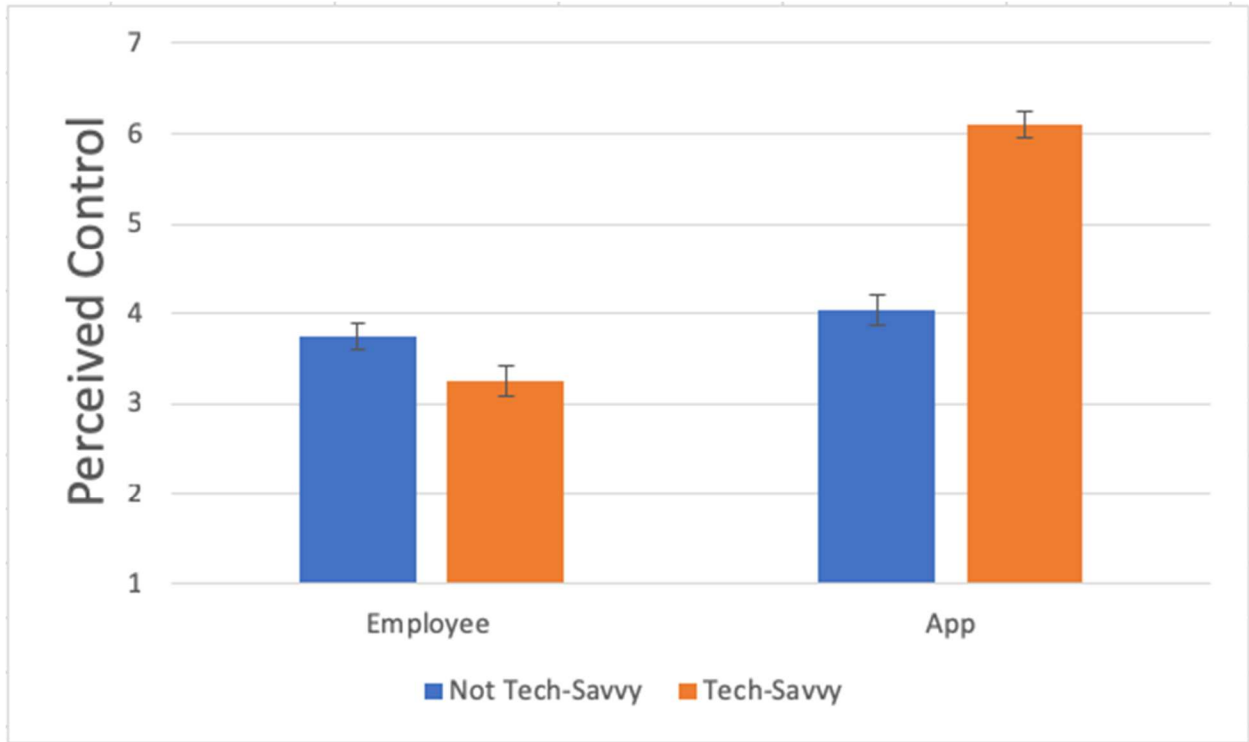
Figure 4b: Study 2 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of need for interaction
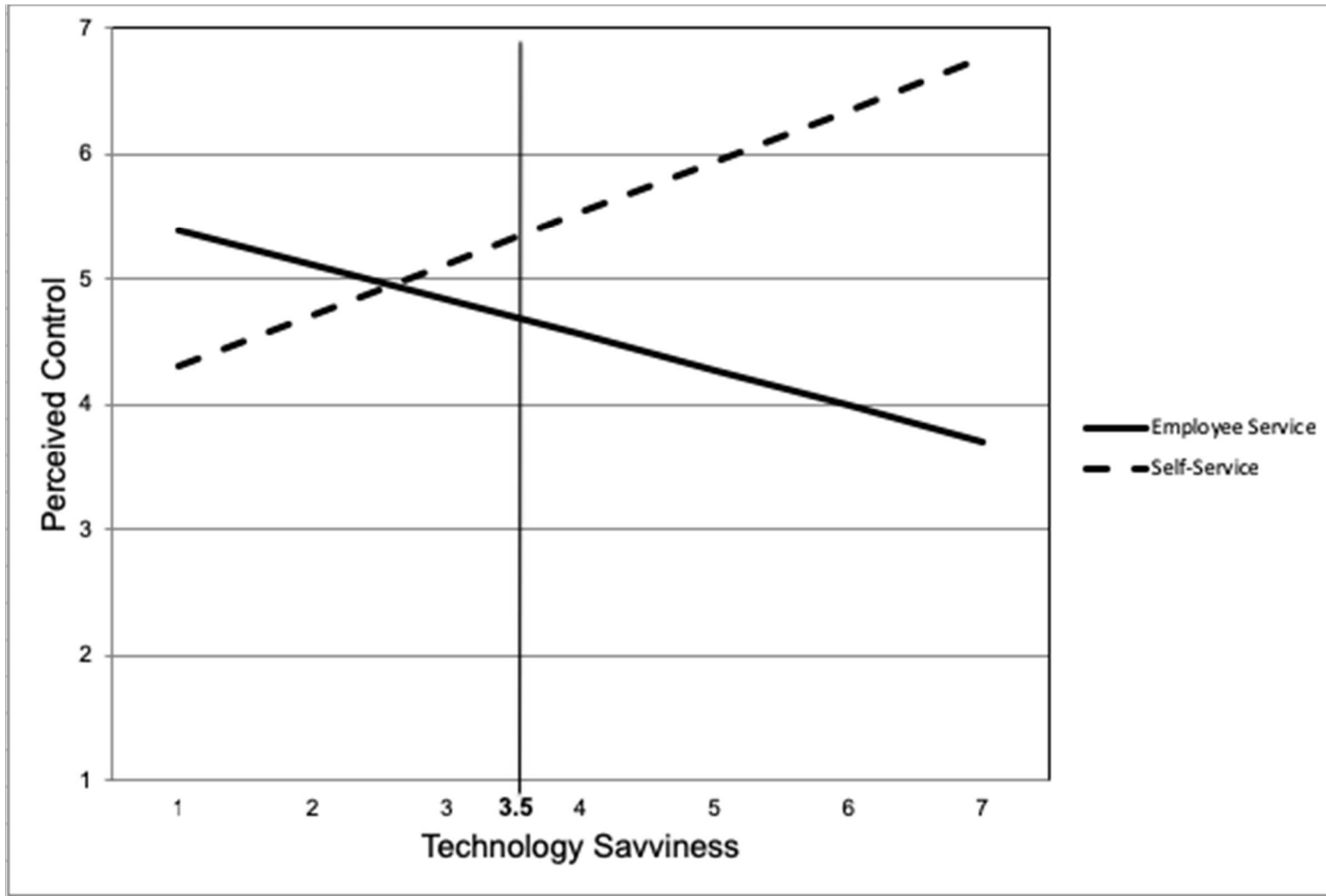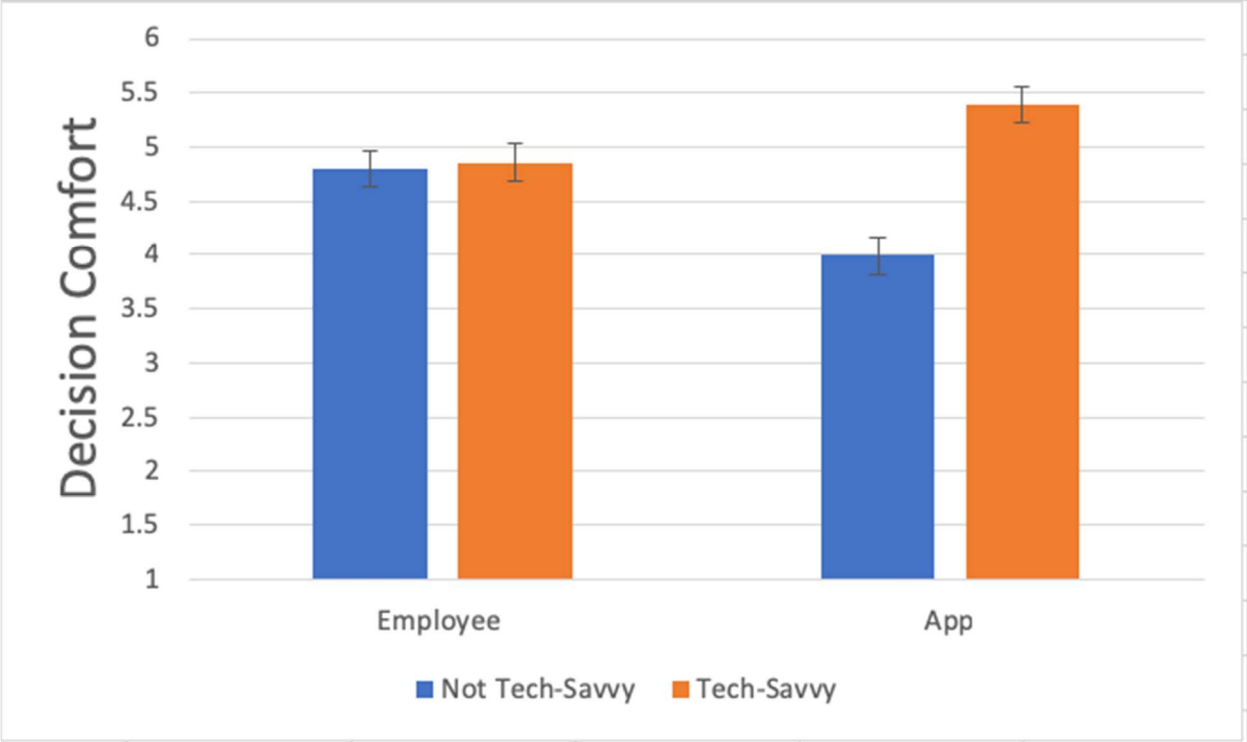
Figure 5a: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of technology savviness
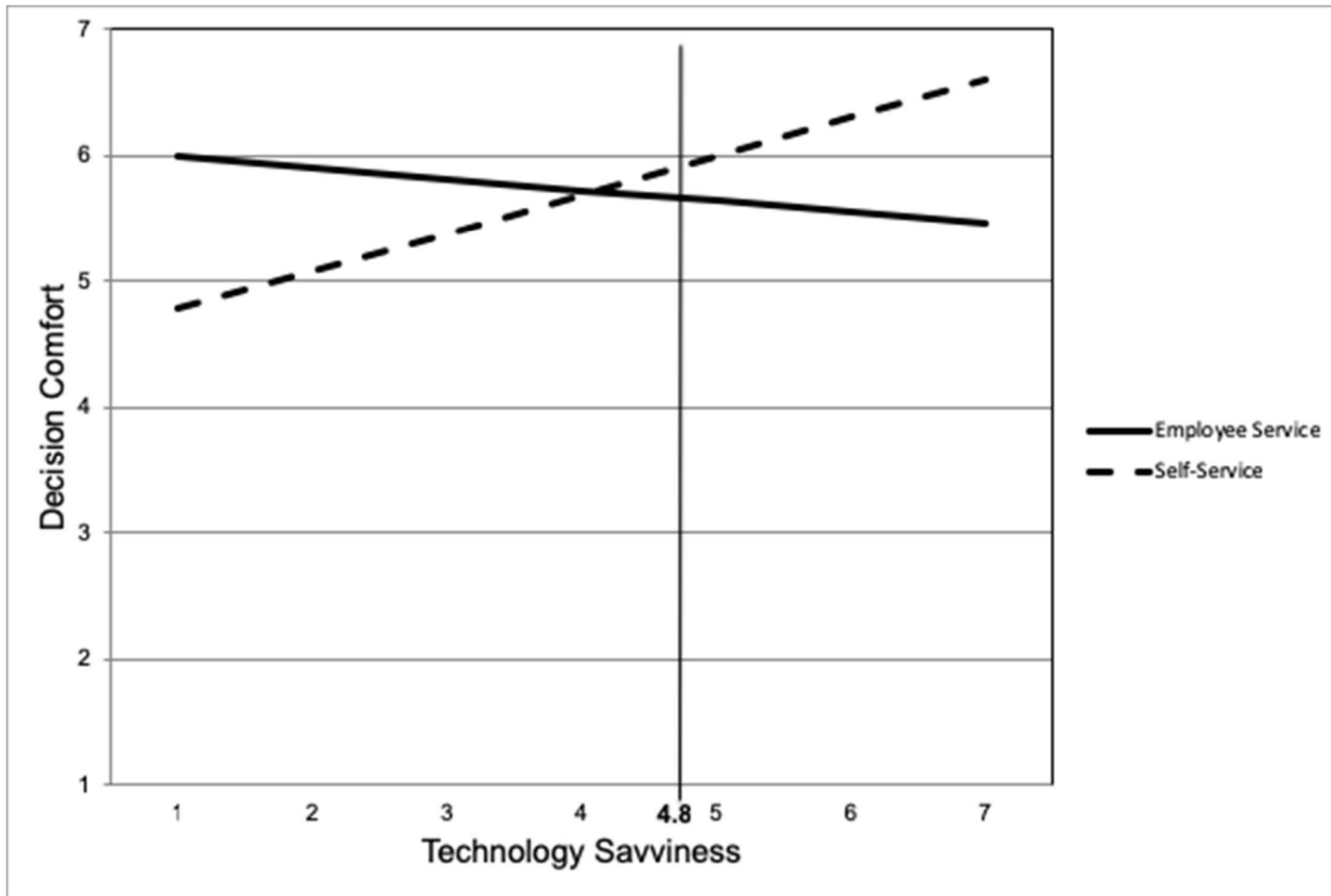
Figure 5b: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of technology savviness

Figure 6a: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on perceived control at different levels of need for interaction

Figure 6b: Study 3 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of need for interaction

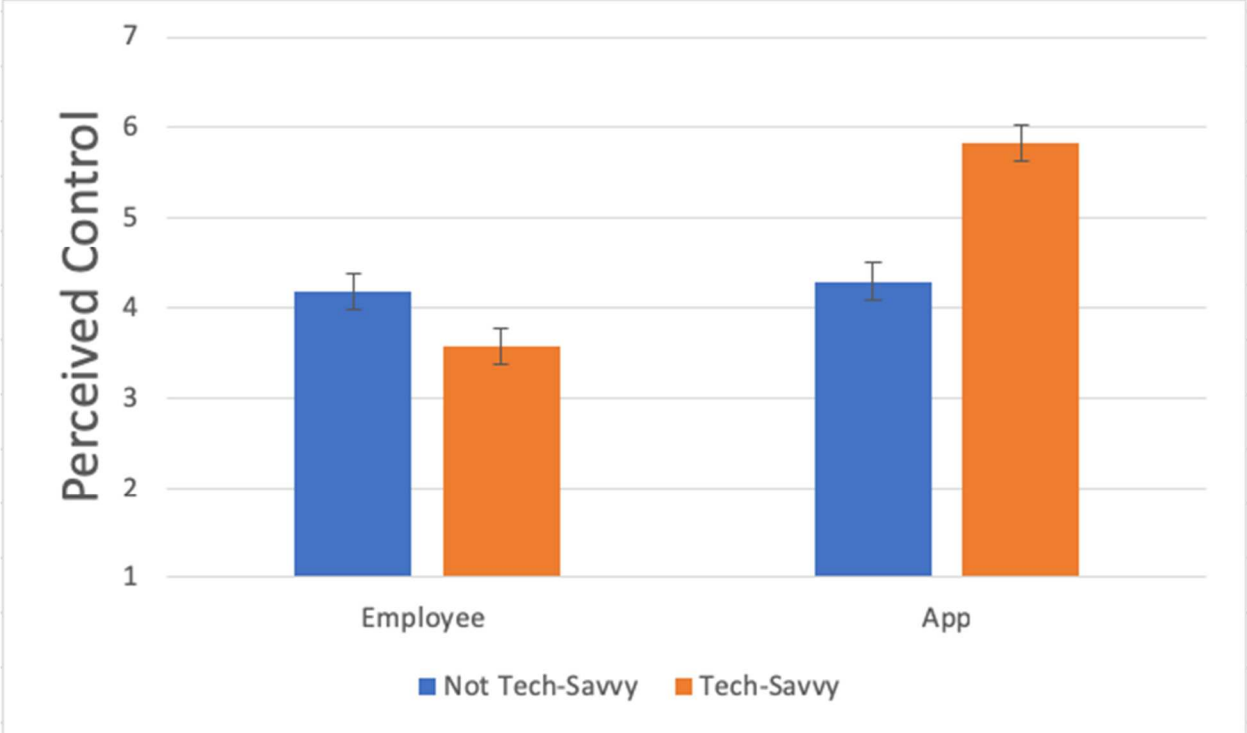**Figure 7a: Study 4 – bar graph; technology-based self-service on decision comfort by technology savviness**
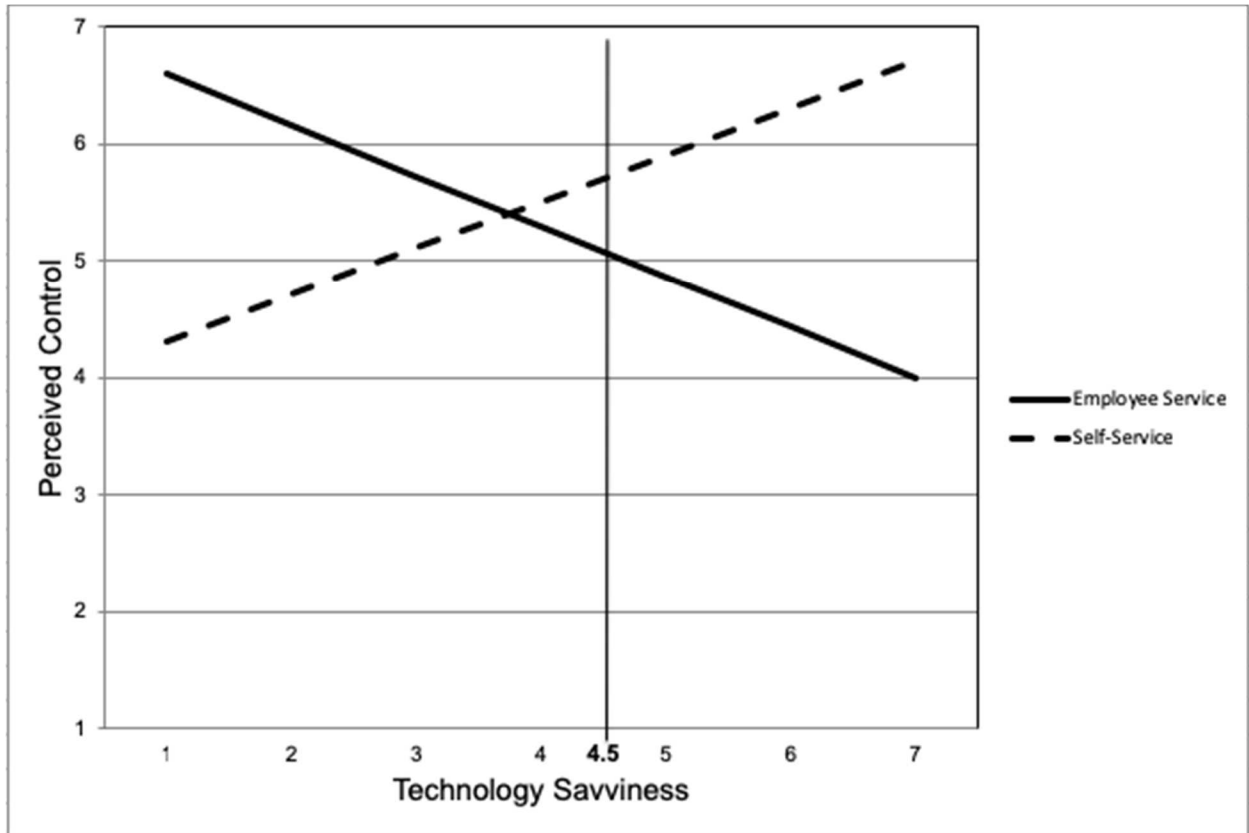
Figure 7b: Study 4 – bar graph; technology-based self-service on perceived control by technology savviness
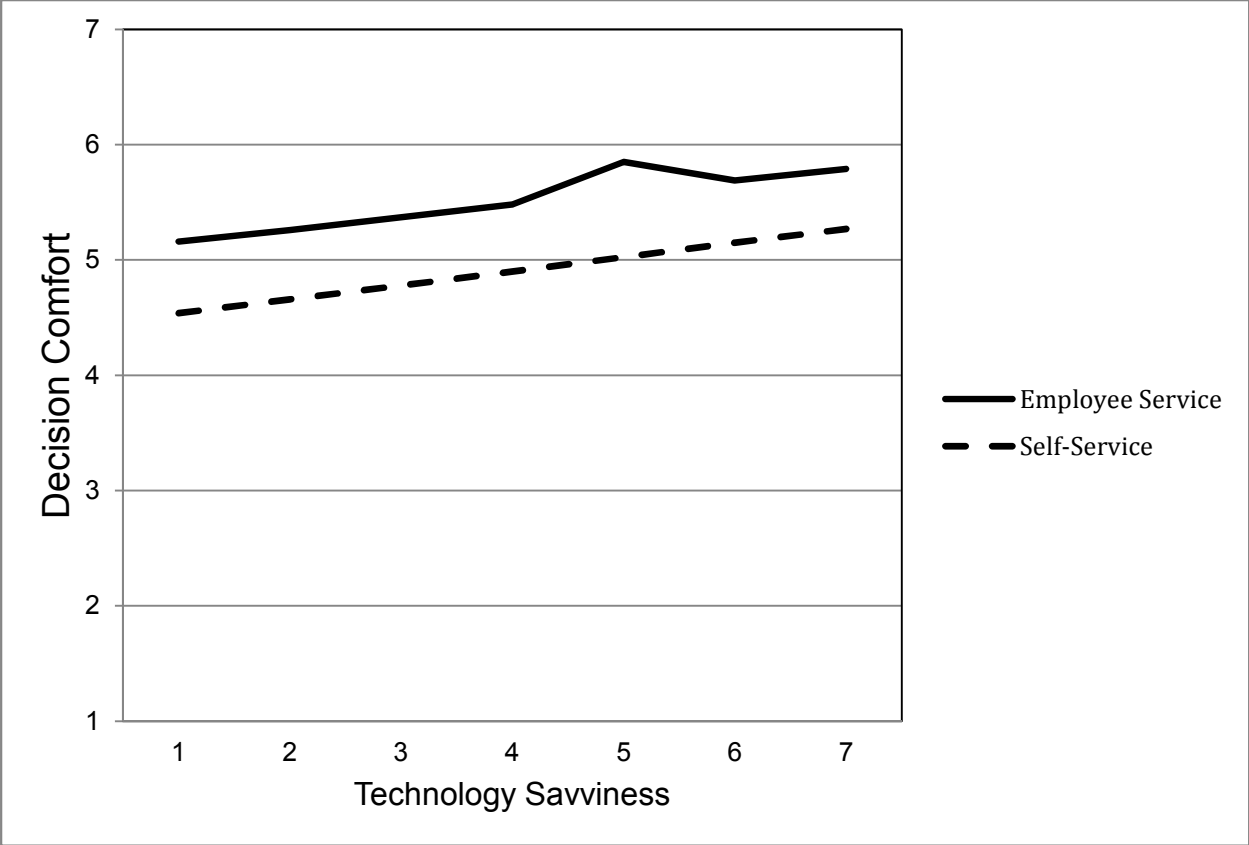
Figure 8a: Study 5 bar graph; technology-based self-service on decision comfort by technology savviness

Figure 8b: Study 5 bar graph; technology-based self-service on perceived control by technology savviness in study 5

Figure 9a: Study 6 – Floodlight graph; the effect of technology-based self-service versus employee service on perceived control at different levels of technology savviness

Figure 9b: Study 6 - Floodlight graph; effect of technology-based self-service versus employee service on decision comfort at different levels of technology savviness