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Authors
Braxton, Dominique
Spangenberg, Eric
Pechmann, Cornelia
et al.

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Managing in-store shopping disruptions with technology: the impact of self-service technology on consumer control and decision comfort☆

Dominique Braxton [a,*], Eric Spangenberg [b], Cornelia Pechmann [b], David Sprott [c]

[a] Loyola Marymount University, 1 LMU Drive, Los Angeles, CA 90045, USA
[b] University of California, Irvine, 4293 Pereira Dr, Irvine, CA 92697, USA
[c] Claremont Graduate University, 150 E. 10th Street, Claremont, CA 91711, USA

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ABSTRACT

Shoppers often encounter in-store disruptions that can undermine the shopping experience. This research examines how self-service technologies in physical retail stores can support customers in these moments by increasing perceived control and decision comfort. We further examine the moderating role of technology self-efficacy, with stronger benefits observed among customers with greater confidence in their ability to use technology. Across five studies, we demonstrate that using self-service technology to resolve in-store shopping disruptions increases perceived control, which in turn enhances decision comfort, and that this effect is stronger when technology self-efficacy is higher. Implications for theory, retail practice, and future research are provided.

1. Introduction

As physical and digital shopping environments converge, shoppers increasingly expect in-store retail experiences that allow them to easily move between physical and digital touchpoints as they shop. One way retailers have responded to this expectation is by integrating digital self-service technologies into physical stores—what some describe as “phygital” retail environments—where various technologies support retail customers as they shop (Stan, Baltas, & Pourot-Feenstra, 2024; Burke, 2002). These tools range from self-checkout to endless-aisle kiosks (i.e., in-store kiosks that provide customers with access to a retailer’s complete online inventory) and include store-mode mobile apps with store navigation maps, product locators, barcode scanners, and mobile purchase options.

Despite these technological advances, in-store shopping remains vulnerable to frequent disruptions, including missing products, unclear pricing, difficulty locating items, and uncertainty about product information. Such moments can derail shopping goals, create frustration, and lead shoppers to abandon purchases or (worse) exit the store altogether. Importantly, these kinds of disruptions occur while customers are actively shopping, navigating the store, and making decisions—not only at checkout. Consequently, consumer acceptance of retail technologies that support disruption resolution during the shopping trip is especially critical in today's retail environment.

Existing research on self-service technology has largely overlooked the mid-shopping phase of the retail experience, where disruptions like those noted above are most likely to occur. Instead, prior work has focused primarily on end-of-shopping technologies such as standalone self-checkout systems, emphasizing efficiency, speed, and user satisfaction (e.g., Meuter et al., 2000; Collier & Kimes, 2013). While these technologies undoubtedly improve transactional outcomes, they do little to address the information-gathering and decision-making challenges consumers face earlier in the shopping process —when disruptions threaten emotional engagement with the task and goal fulfilment. Such gaps are increasingly consequential for retailers, given both the frequency of disruptions and the availability of shopping alternatives (e.g., online shopping).

Most consumers still prefer physical stores as their primary shopping environment (Pew Research Center, 2022), a preference often supported by in-store technology that resolves issues related to price checks, store navigation, and product availability (PYMNTS, 2024). Although these technologies are becoming increasingly pervasive, we know relatively little about how their use shapes shoppers’ emotional experiences while actively searching and making in-store decisions. In this work, we build

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* Corresponding author.
E-mail addresses: Dominique.braxton@lmu.edu (D. Braxton), ers@uci.edu (E. Spangenberg), cpechman@uci.edu (C. Pechmann), David.sprott@cgu.edu (D. Sprott).

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on the shopper-marketing literature, which conceptualizes shopping as a series of stages, including motivation to shop, store navigation, purchase, consumption, repurchase, and recommendation (Shankar et al., 2011). Our work is situated in the store navigation stage, where customers often encounter disruptions while actively shopping that in-store technologies could mitigate.

The ‘store navigation’ stage of shopper marketing involves both exploratory and goal-oriented behaviors such as browsing, searching for information, and making purchase decisions (Shankar et al., 2011; Lee et al., 2018). Although this stage does not necessarily require real-time decision-making, it often involves deliberate search and evaluation. Unlike exploratory store navigation, in which customers casually browse or discover items unintentionally, goal-directed store navigation involves purposeful search and assessment. During this process, shoppers might encounter obstacles that slow or stop progress, such as out-of-stock items, difficulty locating products, or uncertainty about product or price details.

We recognize that technology increasingly blurs the boundary between the store navigation and purchase stages of shopping. Mobile self-checkout apps, smart carts, and kiosks enable checkout anywhere in the store, and while actively shopping, rather than at a designated checkout area at the end of a shopping trip. For instance, shoppers may use self-service tools to purchase out-of-stock items while continuing to navigate the store and select other items. In such cases, navigation and purchase decisions may occur concurrently rather than sequentially. Our research centers on the goal-oriented nature of store navigation, noting that technology enables purchases to occur during this phase rather than afterward. We call this phase ‘shopping’ for parsimony. Our research examines how self-service technologies assist in-store shoppers in handling disruptions, restoring control, and increasing decision comfort (i.e., emotional ease).

Retailers such as Target (see Fig. 1) and Home Depot (see Fig. 2) provide salient examples of how technology can support the shopping experience. These retailers’ mobile apps use location data to activate “Store Mode” when the customer enters one of their stores. Store mode offers convenient features like interactive store layout maps, shopping lists, personalized offers, real-time inventory, and online purchase options to help customers achieve their shopping goals. These technologies help people resolve disruptions and continue shopping with ease (Roggeveen and Sethuraman, 2020). In-store shoppers are increasingly adopting the technology. One survey found that 30 % of shoppers have used a smartphone to purchase a product while still actively shopping in the original store (Salsify, 2025). Another study found that when shoppers cannot locate an item, up to 44 % abandon the purchase

Fig. 1. Example of an Endless Aisle Kiosk.

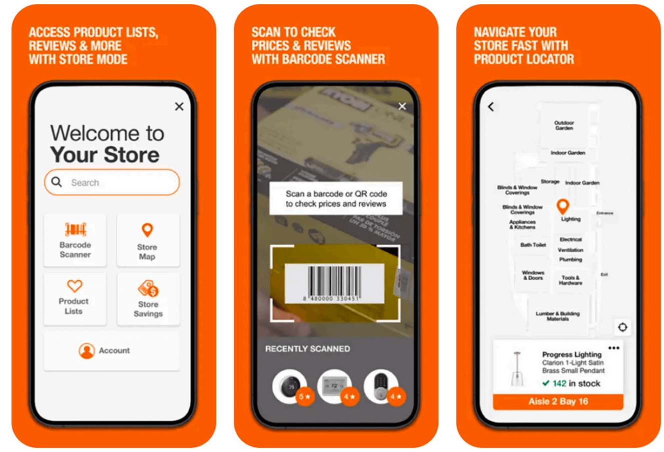

Fig. 2. Example of store mode app interface.

altogether, choosing instead to order online, shop elsewhere, or try again later (Cognizant, 2013). Together, these findings highlight the importance of digitally supporting in-store shopping behaviors.

Despite these trends, we know little about how self-service technologies used for goal-oriented shopping shape decision-making, particularly the emotional processes involved when things do not go as planned. Accordingly, we extend the self-service technology literature beyond post-shopping efficiencies—such as the speed and convenience of self-checkout—to include decision-support tools used during in-store navigation. Consistent with our focal construct, decision comfort, we focus on the emotional aspects of feeling comfortable, okay, or good about the small decisions made to resolve disruptions. We ask: What happens when a self-service technology supports the customer during an in-store shopping experience? Does it elicit an affective response like decision comfort, and if so, why?

Our theoretical expectations regarding the effects of self-service technologies on decision comfort and perceived ease are grounded in self-determination theory (Ryan & Deci, 2000). This theory posits that autonomy, competence, and relatedness are essential psychological needs that shape well-being. Because well-being stems from the satisfaction of these needs, emotional states like decision comfort —a low-arousal sense of ease and assurance after an action —can affect well-being (Parker et al., 2016). Greater control over navigating challenges mitigates stress and increases a sense of ease regarding the optimality of the chosen resolution strategy (Cutright and Wu, 2023). We propose that self-service technologies meet two key psychological needs: autonomy and competence. Self-service technologies enhance customers' sense of autonomy by enabling them to solve problems independently and foster competence by allowing them to act efficiently when they possess sufficient technology self-efficacy. Thus, we propose that self-service technology use increases autonomy, leading to greater decision comfort, particularly when customers have high confidence in their technological abilities (Compeau & Higgins, 1995).

Our research makes three main contributions. First, we advance the self-service technology literature by shifting the temporal focus from the end of the shopping journey (e.g., self-checkout) to the shopping stage when a customer is actively navigating the store, selecting items, and deciding what to purchase. This is the stage at which shoppers are most likely to encounter barriers that disrupt progress and threaten their overall experience. Recognizing this, retailers are increasingly adopting self-service tools for in-store use to address barriers as customers try to achieve their shopping goals. By examining how self-service tools support shoppers during this understudied yet critical phase, we broaden our understanding of when and how self-service technologies shape the in-store customer experience.

Second, we extend the construct of decision comfort, a low-arousal affective state reflecting shoppers’ sense of ease with in-the-moment decisions made during a shopping trip, by examining its role in overcoming shopping disruptions. Whereas prior self-service technology research has emphasized utilitarian outcomes such as efficiency, convenience, and speed, shopping disruptions are emotionally demanding, often requiring affective resolution. We show that using self-service technologies to overcome shopping barriers enhances perceived control, which increases decision comfort.

Finally, we identify technology self-efficacy as a key moderator that affects the benefits of self-service technology. Our findings demonstrate that the advantages of using self-service tools—namely, increased perceived control and decision comfort—are strengthened when people feel confident in their ability to use the technology competently. Past research has considered related constructs like ease of use related to system design (Dabholkar, 1996) or readiness to adopt technology related to openness to innovation (Lin & Chang, 2011; Liljander et al., 2006). We instead emphasize technology self-efficacy_confidence in one's ability to use technology competently—as newer shopping tools often demand greater user competence.

2. Theoretical background

2.1. Decision comfort and related decision assessments

Shoppers often evaluate the decisions they make during their shopping trips. In this research, we examine shoppers' evaluation of decision comfort—a post-decisional state characterized by a felt sense of comfort or ease with real-time, task-oriented shopping decisions (Parker et al., 2016). When shoppers make in-the-moment decisions to overcome barriers during a shopping trip, decision comfort becomes salient. For example, a shopper may notice a product is labeled "on sale" but is unsure whether the discount applies to the specific flavor or style they want. This uncertainty momentarily disrupts the trip. Using a self-service price scanner, the customer regains a sense of ease and can continue shopping. The scanner does not necessarily increase their confidence that they made the "best" choice, nor does it determine whether they will ultimately be satisfied with the purchase. Instead, it restores emotional comfort in the moment, allowing the trip to proceed smoothly rather than becoming disrupted or stressful.

Shoppers may use other criteria to evaluate their decisions, either instead of or in addition to decision comfort. One such criterion is decision confidence, which refers to how strongly they believe or doubt that they have chosen the best option among those available to them (Parker et al., 2016; Thomas & Menon, 2007; Zakay, 1985). With decision confidence, shoppers assess the optimality of their decisions relative to other options. If they suspect they may have made a suboptimal choice, they may experience low decision confidence (Thomas & Menon, 2007). Shoppers may also assess decision satisfaction, defined as their level of contentment with or liking of the options available to them and their overall experience of choosing among those options (Heitmann et al., 2007; Parker et al., 2016). For instance, when there is only a single option available, shoppers may experience low decision satisfaction because the choice set feels limited, even if making the decision itself feels easy.

In other words, shoppers may assess their emotional state of decision comfort in relation to the decision itself. Alternatively, or in addition, shoppers may assess their emotional state of decision satisfaction regarding the choice set or the process of choosing. Shoppers may also evaluate their cognitive state of decision confidence in the optimality of their choices relative to the choice set. We focus on decision comfort because it reflects the emotional ease associated with the decision itself, which helps sustain a goal-oriented shopping trip. In contrast, decision satisfaction and confidence require evaluating a decision's optimality relative to a given choice set. These are more deliberate, effortful decision assessments compared to a decision comfort assessment. The distinctions among these three types of decision assessments are summarized in Table 1.

Table 1
Assessment criteria of decision comfort, decision satisfaction, and decision confidence.

	Relative to an available choice set	According to felt emotions	According to judged optimality
Decision Comfort	No	Yes	No
Decision Confidence	Yes	No	Yes
Decision Satisfaction	Yes	Yes	Yes

2.2. Self-Service technologies across the In-Store shopping journey

Retailers increasingly allow shoppers to complete tasks using self-service technologies as an alternative to employee assistance (Meuter et al., 2000). We propose that the autonomy afforded by self-service technology use during a shopping trip, relative to reliance on employee assistance, influences shoppers' emotional sense of decision comfort. People tend to feel more comfortable with greater autonomy as it alleviates stress and fosters a sense of security (Cutright and Wu, 2023). Retailers now offer a wide range of self-service technologies that support customer goals across all phases of a shopper journey, including pre-shopping, in-store shopping and navigation (our focal stage), purchase, and post-purchase (Grewal & Roggeveen, 2020). Table 2 provides examples of common self-service technologies used across the stages of the in-store shopping journey.

Despite the growing adoption of self-service technologies across all stages of the retail experience, prior research has primarily focused on in-store self-service technologies used at the end of a shopping trip, namely during the purchase stage. Research spanning decades has studied self-checkout systems, self-service gas pumps, and ATMs, finding that these technologies increase consumers' perceived control, satisfaction, attitudes, and word of mouth (Cao et al., 2022; Collier & Sherrell, 2010; Curran & Meuter, 2005; Meuter et al., 2003; Lee & Allaway, 2002). However, comparatively little research has examined self-service technologies used during the shopping stage, such as kiosks or mobile apps—the focus of the current research. Appendix A summarizes existing self-service technology literature, identifies key gaps, and situates our contribution within this research stream.

2.3. Shopping disruptions and decision comfort

The shopping stage is a key part of the in-store retail experience, during which shoppers make a series of in-the-moment decisions, such

Table 2
Self-service technologies used during in-store shopping.

Stage	Customer Activities	Self-Service Technology Examples
Pre-shopping	Identify needs, create shopping lists, research and compare products, check store availability	Virtual assistants (e.g., Alexa), retail mobile apps (e.g., Target), digital couponing tools, comparison shopping engines, AR product configuration tools.
In-Store Shopping	Navigate the store, search for items, select products, compare products, check prices, place orders, finalize purchase decisions	Retail mobile apps, digital couponing tools, endless aisle kiosks, price scanners, smart mirrors (e.g., Sephora), Smart shopping carts
Purchase	Scan items, pay, complete transaction, complete shopping trip	Self-checkout machines, scan-and-pay apps (e.g., Sam's Club), smart shopping carts (e.g., Amazon Dash Cart)
Post-purchase	Pickup items, resolve issues, evaluate items, repurchase, returns	Pickup lockers (e.g., Safeway), self-service returns, order tracking apps, chatbots, warranty management, reorder features

as whether to search for a product, purchase it, select a substitute, or abandon the trip altogether. Customers increasingly rely on self-service tools when shopping, particularly when such tools are readily available, and store staff are less accessible or unavailable (Inman et al., 2009; Posavac et al., 1997).

Our research focuses on goal-directed shopping, where self-service technology is used to address challenges that inhibit shopping goal pursuit. This stage can be psychologically demanding, as customers encounter unexpected barriers that create emotional strain and discourage shopping completion (Kerin et al., 1992; Puccinelli et al., 2009). However, self-service technology in this stage has been largely overlooked. One exception is Lee and Yi (2022), who found that in-store self-service kiosks providing product information can enhance social comfort by helping customers avoid awkward or uncomfortable interpersonal interactions with store staff. Whereas this work focused on reducing social discomfort, we examine how self-service technologies can facilitate disruption resolution, enabling shoppers to continue their shopping journeys.

In doing so, we emphasize a distinctly affective outcome: decision comfort. Prior research has primarily examined utilitarian outcomes of self-service technology, such as satisfaction with the technology or reduced perceived wait times (Weijters et al., 2007; Lee & Yang, 2013; Meuter et al., 2000). Although satisfaction is sometimes treated as an emotional response, in the context of self-service technology, it is commonly measured in cognitive or evaluative terms, such as whether the technology was acceptable or met expectations. For example, Meuter et al. (2000) found that key drivers of satisfaction were whether the technology performed as intended and outperformed available alternatives.

By contrast, we use decision comfort to examine the emotional states people experience in response to decisions they make to resolve disruptions during the shopping task. Self-service technologies can alleviate emotional strain caused by shopping disruptions and restore a sense of control during the shopping trip (Ward & Barnes, 2001). Some prior studies have focused on how self-service technologies promote arousing and expressive reactions, such as fun during vacations (Rosenbaum & Wong, 2015). Others have investigated self-service technologies in hedonic environments, such as frozen yogurt shops, finding that factors such as task uncertainty, service features, perceived control, and perceived time pressure influence perceived efficiency and enjoyment (Collier & Barnes, 2015).

However, the subtle, affective impact of self-service technology use during task-oriented shopping trips remains understudied. Collier and Barnes (2015) explicitly called for more research on affective responses to self-service technology use in task-based contexts. We address this gap by examining how self-service technologies influence decision comfort, a low-arousal response defined as the ease consumers experience after making real-time decisions that collectively shape their shopping experience (Parker et al., 2016).

2.4. Autonomy and competence in self-service technology use

We anchor our predictions in self-determination theory, which states that well-being depends on satisfying three psychological needs: autonomy (control), competence (self-efficacy), and relatedness (belonging) (Ryan & Deci, 2000). In physical retail settings, people often encounter situations that challenge their autonomy or sense of control. For instance, a shopper looking for a product may feel a lack of autonomy or control if they must ask an employee for assistance. The need for autonomy, defined as acting with a sense of volition and psychological ownership over one’s actions (Ryan & Deci, 2000), is best supported by environments that minimize external constraints and reduce frustration (Deci & Ryan, 2012; Javornik, 2016).

Prior research has demonstrated that using self-service technology can enhance consumers’ feelings of control (Ward & Barnes, 2001; Shin & Dai, 2022). However, in-store self-service requires shoppers to independently use a technological interface, making autonomy closely tied to confidence in one's ability to use the technology effectively (Ryan & Deci, 2000). Drawing on self-determination theory (Ryan & Deci, 2000), we propose that self-service technology can enhance a shopper’s perceived autonomy (i.e., sense of control) during the shopping process, particularly when the shopper is confident in their technological skills.

2.5. Self-service technology, perceived control, and decision comfort

Research consistently shows that perceived control is a strong predictor of positive affect (Cutright & Wu, 2023; Langer & Rodin, 1976). Thus, when self-service technology supports a shopper’s need for control, it can produce a sense of psychological ease with a particular decision (Parker et al., 2016). In an in-store shopping context, decision comfort reflects the emotional reassurance that “this is good” or “good enough,” even when the outcome is shaped by situational constraints or convenience. For example, a shopper might experience decision comfort with using a kiosk to order an out-of-stock item, even without evaluating alternative courses of action.

In sum, we posit that self-service tools support consumers’ psychological needs for autonomy by increasing their perceived control when addressing shopping disruptions. Perceived control has been shown to yield numerous positive outcomes, including contentment, motivation, life satisfaction, and improved mood (Infurna et al., 2011; Kohn & Schooler, 1982; Hui & Bateson, 1991). Extending this logic, we argue that perceived control also enhances decision comfort: when customers independently resolve a disruption, their sense of control increases, producing a feeling of ease. In contrast, asking an employee for assistance—the primary alternative—may limit their agency and undermine perceived control and decision comfort. Thus, we hypothesize the following:

Hypothesis 1. *When consumers resolve a shopping disruption using self-service technology (vs. employee assistance), they will experience greater perceived control and more decision comfort, with perceived control mediating the effect on decision comfort.*

2.6. The moderating role of technology self-efficacy

Although self-service technology can enhance perceived control and positive affect, it can also generate stress when people feel unskilled in using it—for example, when it feels emotionally taxing or cognitively complex (Cutright & Wu, 2023). Thus, self-service tools are not always inherently beneficial; the effects may depend on a shopper’s confidence in their ability to use them properly. While many customers feel confident using established self-service technologies (e.g., self-checkouts, ATMs), newer technologies (e.g., apps and kiosks) often require greater technological competence. For these tools, decision comfort is more likely to emerge when shoppers feel confident in navigating the technology or have high technology self-efficacy.

The need for competence is another core psychological driver of positive affect and well-being (Ryan & Deci, 2000). In a self-service technology context, this need may be especially salient as shoppers independently make solution-oriented, in-the-moment decisions, relying only on technology. When shoppers feel confident in their ability to use technology effectively, self-service technology offers shoppers an opportunity to exercise control and overcome barriers.

Technology self-efficacy is a person’s belief in their ability to use technology or digital tools effectively (Compeau & Higgins, 1995). When shoppers lack technology self-efficacy, the technology may no longer impart a sense of control, leading to lower decision comfort. On the other hand, shoppers with high technology self-efficacy are more likely to feel in control when using self-service technology because they are confident they can complete the task independently (Meuter et al., 2003; Cao et al., 2022). Therefore, we posit that technology self-efficacy moderates the effect of self-service technology use on consumers’ perception of control and, in turn, decision comfort. Our second formal hypothesis is below, and our conceptual model is in Fig. 3.

Hypothesis 2. *Technology self-efficacy will moderate the effects of self-service technology on perceived control and decision comfort. Both effects will be stronger for consumers with high technology self-efficacy, and weaker but* still *significant among consumers with low technology self-efficacy.*

3. Overview of studies

To test our hypotheses, we conducted five experiments. In each experiment, participants were asked to envision encountering a disruption while completing a shopping task. Then they were randomly assigned to imagine that they decided to resolve the disruption either by deciding to use a self-service technology or by deciding to ask an employee for assistance. Across studies, we varied the types of disruptions and technologies involved to assess the robustness and generalizability of the effects. In later studies, we introduced perspective manipulations to further examine boundary conditions.

4. Distinguishing decision comfort from decision satisfaction and confidence

We conducted a measurement study to empirically verify that decision comfort operates as a distinct construct (Parker, 2016). This study examined the discriminant validity of decision comfort compared to the related constructs of decision confidence and decision satisfaction.

4.1. Participants and Procedure

One hundred twenty-two Prolific participants were recruited for this measurement study. Consistent with the main studies described below, participants were asked to imagine resolving a common in-store disruption, ordering an out-of-stock item, by deciding between using a self-service or seeking employee assistance. They read: "Imagine a situation in which you have to choose whether to order the T-shirt yourself using a kiosk or by asking an employee to order it for you. Briefly, consider which option you would choose." After this, participants completed measures of decision comfort, decision confidence, and decision satisfaction using the items in Table 3 (Parker et al., 2016).

4.2. Results and Discussion

We conducted a confirmatory factor analysis using structural equation modeling (Bagozzi & Yi, 1988; Hair et al., 2014). The results supported the proposed three-factor model, indicating that decision comfort, decision confidence, and decision satisfaction were distinct constructs ($\chi^2[87] = 156.137$, $p < 0.001$; CFI = 0.949; TLI = 0.938; RMSEA = 0.081 (90 % CI [.060, 0.101]; SRMR = 0.07). The three-factor model fit the data significantly better than the alternative two- and one-factor models ($\Delta\chi2(2) = 364.37$, $p < 0.001$ and $\Delta\chi2(3) = 449.73$, $p < 0.001$, respectively), supporting discriminant validity. All standardized factor loadings were significant at $p < 0.001$, and the internal consistency of the measures was high (Cronbach's $\alpha = 0.93$ for decision comfort; $\alpha = 0.93$ for decision confidence; $\alpha = 0.74$ for decision satisfaction).

Fornell–Larcker tests also largely supported discriminant validity. The shared variance between each construct pair was generally lower than the corresponding average variance extracted (AVE) (Comfort–Confidence = .32 < 0.75 and 0.78; Comfort–Satisfaction = .52 < 0.75 and 0.49; Confidence–Satisfaction = .18 < 0.78 and 0.49). Although the shared variance between decision comfort and satisfaction marginally exceeded the average variance extracted for satisfaction, the constructs loaded cleanly on distinct factors, supporting their

Table 3
Decision comfort, decision confidence, and decision satisfaction: measurement items and confirmatory factor analysis loadings.

Measurement Items	Loadings
Decision Comfort ($\alpha = 0.93$)	
I am comfortable with my decision to order the T-shirt from this store.	0.960
I feel good about my decision to order the T-shirt from this store.	0.933
I wish I would have chosen not to order the T-shirt from this store. (r)	0.773
I am okay with the decision to order the T-shirt from this store.	0.891
I am experiencing negative emotions about the decision to order the T-shirt from this store. (r)	0.831
Although I am not sure if it was best to order the T-shirt from this store, I feel perfectly comfortable with my decision.	0.778
Decision Confidence ($\alpha = 0.93$)	
I am 100 % confident my choice of how to order is objectively better than the other option available.	0.898
I am certain that my choice of how to order is the best I could have made.	0.922
It is clear that my choice of how to order is superior to the other option	0.843
Even if my friends might not agree, I am confident that my choice of how to order is the best option	0.857
Decision Satisfaction ($\alpha = 0.74$)	
I found the process of choosing how to order frustrating (r)	0.564
Two good options were available for me to choose how to order	0.445
I would be happy to choose how to order from the same set of options in the future.	0.906
I found the process of choosing how to order interesting.	0.534
I was satisfied with my experience of choosing how to order.	0.900

Note. All standardized loadings are significant at $p < 0.001$. r = reverse-coded.

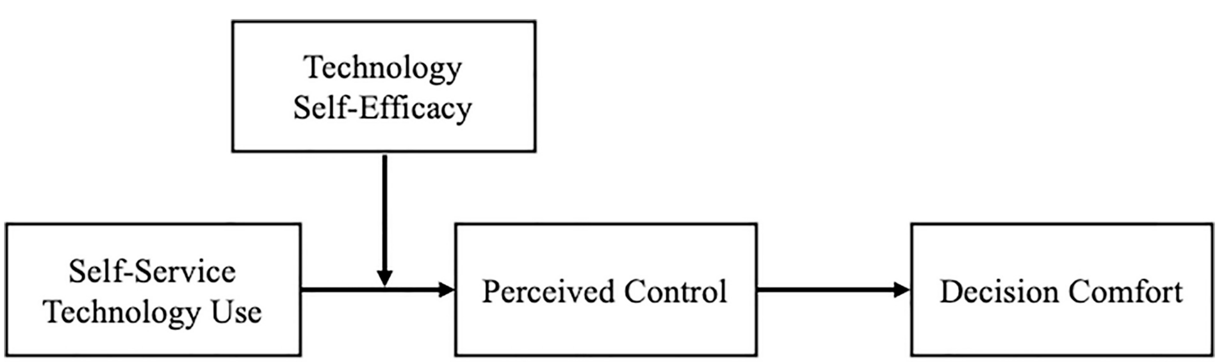

Figure 3. Conceptual model of the effects of self-service technology use. Note, the analytical model is Hayes' PROCESS model 8. The conceptual model shown here is simplified for parsimony.

Fig. 3. Conceptual model of the effects of self-service technology use. Note. The analytical model corresponds to Hayes' PROCESS Model 8. The conceptual model is simplified for parsimony.

distinctiveness (See Appendix B).

5. Study 1: Self-Service technology effects on perceived control and decision comfort

Study 1 investigated how using a self-service kiosk to address a stockout shopping disruption, compared to employee assistance, influenced shoppers' perceived control and decision comfort. We predicted that using self-service technology would increase perceived control over the shopping task and thus enhance decision comfort (H1).

5.1. Participants, Design, and Procedure

Participants ($N = 137$) were recruited from MTurk and randomly assigned to one of two shopping scenarios in a between-subjects design (self-service vs. employee assistance). Participants were asked to envision shopping in a physical retail store and wanting to purchase a store-exclusive t-shirt, only to find that their size was not in stock. In the self-service condition, participants placed the order using an in-store self-service kiosk, whereas in the employee-assistance condition, they asked a store employee to place the order. The shopping scenarios for all five studies and their respective conditions are provided verbatim in Appendix C.

All participants imagined deciding to buy the same out-of-stock item but using different designated methods. This context reflects how consumers often take task-driven, time-sensitive in-store actions without considering alternative actions (Reinders, Dabholkar, & Frambach, 2008). Perceived control was measured using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) with four items (e.g., I feel in control using this ordering process; $\alpha = 0.91$) adapted from Collier and Sherrell (2010). Decision comfort was measured 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; $\alpha = 0.90$) (Parker et al., 2016). See Table 4 for the complete list of measurement items.

5.2. Results and discussion

An ANOVA found that participants using self-service (as opposed to an employee) reported greater decision comfort ($F(1,135) = 20.24$, $p < 0.001$; $M_{self\text{-}service} = 6.11$, $M_{employee} = 5.22$) and greater perceived control ($F(1,135) = 101.82$, $p < 0.001$; $M_{self\text{-}service} = 6.30$, $M_{employee} = 4.33$). A mediation analysis using PROCESS Model 4 with 5,000 bootstrap samples revealed a significant indirect effect of self-service technology (vs. employee) assistance on decision comfort through perceived control as the mediator (indirect effect = 1.25, SE = 0.23, 95 % CI: 0.83, 1.71). These findings supported Hypothesis 1: Using a self-service technology increased decision comfort more than relying on an employee, and this relationship was mediated by perceived control.

6. Study 2: the moderating role of technology self-efficacy

In Study 2, we investigated whether technology self-efficacy moderated the effect of self-service technology use on perceived control and decision comfort. We predicted that participants with higher technology self-efficacy who used the self-service technology (versus employee) would report greater perceived control and thus greater decision comfort, and that these effects would be weaker but still significant among participants with lower technology self-efficacy (Hypothesis 2).

6.1. Participants, design, and procedure

MTurk participants ($N = 161$) were randomly assigned to a between-subjects design (self-service vs. employee assistance). They were first asked to respond to several self-reflective questions regarding shopping patterns and habits. Embedded within these questions, technology self-efficacy was assessed using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) with three items (e.g., I am highly confident that I can use an in-store electronic touchscreen kiosk for tasks other than a simple price check; $\alpha = 0.91$) (Dabholkar and Bagozzi 2002). We otherwise used the Study 1 methods.

Table 4
Measures used in experimental studies (study 1 – study 5).

	Cronbach's α				
Measures	**S1**	**S2**	**S3**	**S4**	**S5**
Perceived Control, Collier and Sherrell (2010)	0.91	0.909	0.917	0.921	0.840
- I feel (He likely felt) in control using this ordering process.					
- (He likely felt) This ordering process lets the customer be in charge.					
- While placing my (his) order, I (he likely felt) feel decisive.					
- (He likely felt) This process gives me (him) more control over placing my (his) order.					
Decision Comfort, Parker et al. (2016)	0.90	0.90	0.81	0.937	0.836
- I am (He was likely) comfortable with my (his) decision to order the T-shirt from this store.					
- I feel (He likely felt) good about my (his) decision to order the T-shirt from this store.					
- I wish I (He likely wished he) would have chosen not to order the T-shirt from this store. (R)					
- I am (He was likely) okay with the decision to order the T-shirt from this store.					
- I am (He was likely) experiencing negative emotions about the decision to order the T-shirt from this store. (R)					
- Although I am not (he may not have been) sure if it was best to order the T-shirt from this store, I feel (he likely felt) perfectly comfortable with my (his) decision.					
Tech Self-Efficacy, Dabholkar and Bagozzi (2002)	N.A.	0.911	0.952	N.A.	N.A.
- I am highly confident that I can use an in-store electronic touchscreen kiosk for tasks other than a simple price check.					
- I believe that I have the ability to use an in-store electronic touchscreen kiosk for tasks other than a simple price check.					
- I am highly capable of using an in-store electronic touchscreen kiosk for transactions other than a simple price check.					

Note. All scales are adapted. Parentheses indicate the perspective-taking scenario used in studies 4–5. Study 3 involved a wayfinding task rather than an out-of-stock scenario; thus, decision comfort items were contextually adapted (e.g., "I am comfortable with my decision to look for this t-shirt in my size"), while maintaining the same construct assessed in Studies 1–2.

6.2. Results and discussion

Consistent with Study 1, a one-factor ANOVA revealed a main effect of service type (self-service vs. employee assistance) on decision comfort ($F(1,159) = 8.61$, $p < 0.01$; $M_{self\text{-}service} = 5.79$, $M_{employee} = 5.28$) and perceived control ($F(1,159) = 91.07$, $p < 0.001$; $M_{self\text{-}service} = 5.86$,

$M_{employee} = 4.10$). PROCESS Model 4 revealed a significant indirect effect of service type on decision comfort with perceived control as the mediator (indirect effect = 1.04, SE = 0.18, 95 % CI: 0.71, 1.43). Hypothesis 1 was again supported.

To examine whether participants' technology self-efficacy moderated the effect of service type on perceived control, we conducted a general linear model analysis with service type (self-service vs. employee) as a fixed factor, technology self-efficacy as a continuous predictor, and their interaction term. The main effects for service type ($F(1,157) = 0.79$, $p > 0.05$) and technology self-efficacy ($F(1,157) = 0.83$, $p > 0.05$) were nonsignificant, but as expected, the interaction between service type and technology self-efficacy was significant ($F(1,157) = 7.78$, $p < 0.05$). Given high technology self-efficacy (1 standard deviation above the mean), self-service substantially increased perceived control ($M_{self\text{-}service} = 6.24$, $M_{employee} = 3.95$; $t = 8.93$, $SE = 0.26$, $p < 0.001$). At moderate technology self-efficacy (Mean = 5.87), the effect of self-service on perceived control remained strong ($M_{self\text{-}service} = 5.90$, $M_{employee} = 4.12$; $t = 9.82$, $SE = 0.18$, $p < 0.001$). At low technology self-efficacy (1 standard deviation below the mean), the effect of self-service on perceived control was weaker but remained significant ($M_{self\text{-}service} = 5.56$, $M_{employee} = 4.29$; $t = 4.88$, $SE = 0.26$, $p < 0.001$).

We tested moderated mediation using PROCESS Model 8 (Hayes, 2017). As we hypothesized (H2), technology self-efficacy moderated the effect of service type on decision comfort through perceived control as the mediator (moderated mediation effect = 0.26, SE = 0.11, 95 % CI: 0.06, 0.50). The indirect effect of self-serve technology use on decision comfort through perceived control strengthened as technology self-efficacy increased. At low technology self-efficacy [value = one standard deviation below the mean], indirect effect = 0.74, 95 % CI: 0.36, 1.13. At moderate technology self-efficacy [value = mean], indirect effect = 1.04, 95 % CI: 0.68, 1.42. At high technology self-efficacy [value = one standard deviation above the mean], indirect effect = 1.34, 95 % CI: 0.867, 1.88).

The moderated mediation results support Hypothesis 2. Across all levels of technology self-efficacy, using self-service technology increased perceived control relative to employee assistance, which in turn increased decision comfort. However, this increase was more pronounced among consumers with higher technology self-efficacy. For consumers low in technology self-efficacy, self-service still improved perceived control, but the gains were smaller, and the resulting increase in decision comfort was modest. This pattern suggests that self-service technology benefits most shoppers, though it may offer weaker psychological reassurance to those who feel less confident in their ability to use it.

7. Study 3: wayfinding (store navigation) with an in-store kiosk

Study 3 focused on wayfinding (i.e., navigating a store using technology). Wayfinding maps in self-service kiosks help customers locate products and navigate the store without assistance from an employee (Blut, Wang, & Schoefer, 2016). Such technology facilitates in-store navigation by providing detailed location information to aid shopping disruptions.

7.1. Participants, design, and procedure

Participants (N = 160), recruited from MTurk, first responded to several self-reflective questions, including measures of technology self-efficacy. Participants were then randomly assigned to one of two conditions (self-service vs. employee) in a between-subjects design. They were asked to imagine shopping in a physical retail store, where they found a t-shirt they wanted to purchase, but discovered it was not their size and was in the wrong place. In the self-service condition, participants imagined deciding to use a wayfinding kiosk with an interactive map to find the correct location of the product. In the employee assistance condition, participants imagined deciding to ask a store employee to guide them to the proper location. Participants then responded to perceived control and decision comfort measures, as in Studies 1–2. The decision comfort items were slightly modified to reflect the new task (e.g., "I am comfortable with my decision to look for this t-shirt in my size").

7.2. Results and discussion

A one-factor ANOVA revealed a significant main effect of service type on decision comfort ($F(1,157) = 4.46$, $p < 0.05$; $M_{self\text{-}service} = 5.93$, $M_{employee} = 5.65$) and perceived control ($F(1,159) = 72.68$, $p < 0.001$; $M_{self\text{-}service} = 5.86$, $M_{employee} = 4.30$). A mediation analysis using PROCESS Model 4 found a significant indirect effect of service type on decision comfort with perceived control as the mediator (indirect effect = 0.37, SE = 0.11, 95 % CI: 0.18, 0.60). These results were consistent with Studies 1 and 2, further supporting Hypothesis 1.

To examine whether participants' technology self-efficacy moderated the effect of service type on perceived control, we conducted a general linear model analysis with service type as a fixed factor, technology self-efficacy as a continuous predictor, and their interaction term. We found significant and positive effects for service type ($F(1,155) = 4.64$, $p < 0.05$) and technology self-efficacy ($F(1,155) = 6.48$, $p < 0.05$), and the expected interaction between service type and technology self-efficacy ($F(1,155) = 9.20$, $p < 0.01$). Given high technology self-efficacy (1 standard deviation above the mean), self-service (vs. employee) increased perceived control ($M_{self\text{-}service} = 6.24$, $M_{employee} = 4.05$; $t = 8.83$, $SE = 0.25$, $p < 0.001$. At moderate technology self-efficacy (mean = 6.02), the effect remained strong ($M_{self\text{-}service} = 5.88$, $M_{employee} = 4.31$; $t = 8.84$, $SE = 0.18$, $p < 0.001$). At lower levels of technology self-efficacy (1 standard deviation below the mean), the effect was smaller yet still significant ($M_{self\text{-}service} = 5.51$, $M_{employee} = 4.59$; $t = 3.68$, $SE = 0.25$, $p < 0.001$).

Regarding decision comfort, we found a significant effect of service type ($F(1,155) = 5.58$, $p < 0.05$), a nonsignificant effect of technology self-efficacy ($F(1,155) = 0.29$, $p > 0.05$), and a significant interaction ($F(1,155) = 13.01$, $p < 0.05$). Given high technology self-efficacy, self-service (vs. employee) increased decision comfort ($M_{self\text{-}service} = 6.31$, $M_{employee} = 5.62$; $t = 3.75$, $SE = 0.18$, $p < 0.001$). At moderate technology self-efficacy, the effect remained significant ($M_{self\text{-}service} = 5.95$, $M_{employee} = 5.65$; $t = 2.29$, $SE = 0.13$, $p < 0.001$). At low technology self-efficacy, self-service (vs. employee) did not increase decision comfort ($M_{self\text{-}service} = 5.58$, $M_{employee} = 5.68$; $t = 0.53$, $SE = 0.19$, $p > 0.05$).

We tested moderated mediation using PROCESS Model 8 (Hayes, 2017). As hypothesized, we found that technology self-efficacy moderated the effect of service type on decision comfort through perceived control as the mediator (moderated mediation effect = 0.13, SE = 0.06, 95 % CI: 0.04, 0.26). The indirect or mediating effect of service type on decision comfort through perceived control strengthened as technology self-efficacy increased. At low technology self-efficacy [value = one standard deviation above the mean], indirect effect = 0.18, 95 % CI: 0.06, 0.35. At moderate technology self-efficacy [value = mean], indirect effect = 0.31. 95 % CI: 0.12, 0.53. At high technology self-efficacy [value = one standard deviation below the mean], indirect effect = 0.44, 95 % CI: 0.17, 0.76). Thus, Hypothesis 2 was supported.

8. Study 4: a store mode app as self-service technology

In Study 4, we tested a mobile app, as this represents an increasingly common self-service technology in retail. The "Store Mode" feature in retail mobile apps leverages location technology to provide contextually relevant services such as interactive maps, real-time inventory, digital coupons, shopping lists, and advanced ordering for a specific store location. Also in Study 4, we manipulated technology self-efficacy rather than measuring it to study its causal effects directly.

To manipulate technology self-efficacy, we used a perspective-taking technique. We chose this method because online panel participants are generally skilled with technology, so asking them to imagine low-technology self-efficacy might weaken the manipulation, lead to poor engagement, or elicit unrealistic responses. Instead, participants were asked to evaluate a fictional shopper (“Mr. Customer”) described as either tech-savvy or tech-averse. This approach is grounded in research showing that perspective-taking can activate self-relevant processing. For example, Heath et al. (1995) demonstrated that third-person projection scenarios elicit attitudinal and emotional responses similar to those elicited by first-person scenarios. Neuroimaging studies verify that taking another’s perspective increases self-based processing (Ames et al. 2008; Davis et al. 1996). For our study, we used a minimal projection approach, in which participants were not explicitly instructed to adopt the customer’s perspective but were instead asked to indicate how they believed that customer would feel, eliciting spontaneous perspective-taking without strong demand characteristics.

8.1. Pretest

To validate our manipulation of self-efficacy, we conducted a pretest with a separate MTurk sample ($N = 104$). Participants were randomly assigned to one of two between-subjects conditions (high vs. low technology self-efficacy), where they read a brief scenario describing a fictional customer (“Mr. Customer”) as either tech-savvy or tech-averse. They then completed the technology self-efficacy measure detailed previously, adapted to this context (e.g., “Mr. Customer is highly confident that he can use self-service technology for transactions other than a price check” $\alpha = 0.99$). Participants in the high technology self-efficacy condition gave a higher rating to technology self-efficacy ($M = 6.31$, $SD = 0.99$) than those in the low efficacy condition ($M = 1.67$, $SD = 1.36$), $t(101) = 19.84$, $p < 0.001$, $d = 1.19$) validating the manipulation.

8.2. Main study

8.2.1. Participants, design, and procedure

MTurk participants ($N = 207$) were randomly assigned to one of four conditions in a 2 (technology self-efficacy: high vs. low) × 2 (service type: mobile app vs. employee) between-subjects design. Participants first read the pretested technology self-efficacy manipulation about a customer. Next, participants read a shopping scenario in which the customer, while shopping in a physical retail store, wanted to purchase a shirt that was out of stock in their size. In the self-service condition, the customer decided to use a mobile app to place the order; in the employee condition, the customer decided to ask a store employee to place the order. Participants then rated how they believed the customer would feel about the experience by completing the same perceived control and decision comfort measures used in earlier studies.

8.2.2. Results and discussion

A one-factor ANOVA revealed a nonsignificant effect of service type on decision comfort ($F(1,197) = 2.62$, $p = 0.11$; $M_{self\text{-}service} = 4.99$, $M_{employee} = 4.69$) but a significant effect on perceived control ($F(1,197) = 74.76$, $p < 0.001$; $M_{self\text{-}service} = 5.19$, $M_{employee} = 3.52$). PROCESS Model 4 revealed that the effect of service type on decision comfort was mediated by perceived control (indirect effect = 1.13, SE = 0.15, 95 % CI: 0.84, 1.42), supporting Hypothesis 1.

To examine whether the effects of service type depended on technology self-efficacy, we conducted a two-factor ANOVA including these two manipulated factors. For perceived control, we found a nonsignificant effect of service type ($F(1,195) = 1.64$, $P > 0.05$), a significant effect of technology self-efficacy ($F(1,195) = 23.53$, $P < 0.001$), and the expected interaction ($F(1,157) = 62.15$, $p < 0.001$). Given high technology self-efficacy, self-service (vs. employee) increased perceived control ($M_{self\text{-}service} = 6.10$, $M_{employee} = 3.25$; $t = 12.47$, $SE = 0.23$, $p < 0.001$); but given low technology self-efficacy, self-service (vs. employee) did not increase perceived control ($M_{self\text{-}service} = 3.75$, $M_{employee} = 4.04$; $t = 1.28$, $SE = 0.23$, $p > 0.05$).

In a two-factor ANOVA on decision comfort, we found significant effects of service type ($F(1,195) = 14.91$, $p < 0.001$) and technology self-efficacy ($F(1,195) = 51.61$, $p < 0.001$), and the expected interaction ($F(1, 195) = 44.02$, $p < 0.001$). Given high technology self-efficacy, self-service (vs. employee) increased decision comfort ($M_{self\text{-}service} = 5.95$, $M_{employee} = 4.74$; $t = 5.53$, $SE = 0.22$, $p < 0.001$); but given low technology self-efficacy, self-service (vs. employee) significantly decreased decision comfort ($M_{self\text{-}service} = 3.80$, $M_{employee} = 4.65$; $t = -3.86$, $SE = 0.22$, $p < 0.001$). This pattern suggests that while self-service technology increases decision comfort when shoppers have higher technology self-efficacy, it can have an adverse effect when low technology self-efficacy is made salient, rather than merely measured as in studies 2 and 3. Fig. 4 depicts these results, which support Hypothesis 2.

We used PROCESS Model 8 to test for moderated mediation (Hayes, 2017). As predicted in Hypothesis 2, we again found that technology self-efficacy moderated the effect of service type on decision comfort through perceived control as the mediator (moderated mediation effect = 1.40, $SE = 0.25$, 95 % CI: 0.94, 1.91). The indirect or mediating effect of service type on decision comfort through perceived control strengthened as technology self-efficacy increased. At low technology self-efficacy, control as a mediator was nonsignificant (indirect effect = 0.16, SE = 0.15, 95 % CI: –0.12, 0.46); at high technology self-efficacy, control as a mediator became significant (indirect effect = 1.56, $SE = 0.22$, 95 % CI: 1.14, 2.01).

Study 4 results further support our hypotheses by showing that the effects of self-service technology on perceived control and decision comfort persist when technology self-efficacy is manipulated rather than measured and when a more advanced in-store technology is used. Consistent with Studies 1–3, higher technology self-efficacy was associated with increased perceived control and, in turn, greater decision comfort when using self-service technology (vs. employee assistance). However, low technology self-efficacy was associated with an adverse effect, where decision comfort was reduced with self-service technology compared to employee assistance. This triangulation strengthens our confidence in technology self-efficacy as a moderator and demonstrates the robustness of these effects across different self-service technology contexts and measurement approaches.

9. Study 5: testing the model in a controlled environment

In Studies 1–4, we tested our hypotheses using online samples of MTurk participants, which could lead to self-selection and concerns about attention quality (Goodman & Paolacci, 2017). To address these concerns, in Study 5 we replicated Study 4 using an undergraduate student sample in a controlled lab environment.

9.1. Participants, design, and procedure

Undergraduate students ($N = 144$) from a large Southwestern U.S. university participated in exchange for course credit. Participants completed the study in person in a supervised lab, using university computers in cubicles. The experimenter was nearby to ensure standardization and minimize distractions. Participants were randomly assigned to one of four conditions in a 2 (technology self-efficacy: high vs. low) × 2 (service type: app vs. employee) between-subjects design. Procedures, manipulations, and measures were otherwise identical to those of Study 4.

9.2. Results and discussion

A one-factor ANOVA revealed a nonsignificant main effect of service type on decision comfort ($F(1,142) = 0.32$, $p > 0.05$; $M_{self\text{-}service} = 4.72$, $M_{employee} = 4.82$), but a significant effect on perceived control ($F(1,142) = 29.23$, $p < 0.001$; $M_{self\text{-}service} = 5.10$, $M_{employee} = 3.89$). PROCESS Model 4 indicated that the effect of service type on decision comfort was

Fig. 4. Study 4: Self-service technology effects on decision comfort.

mediated by perceived control (indirect effect = 0.42, SE = 0.10, 95 % CI: 0.24, 0.62), again supporting Hypothesis 1.

To examine whether the effects of service type depended on participants' technology self-efficacy, we conducted two-factor ANOVAs including these two manipulated factors. For perceived control, we found a nonsignificant effect of service type ($F(1,140) = 0.14, p > 0.05$), a significant effect of technology self-efficacy ($F(1,140) = 5.38, p < 0.05$), and the expected significant interaction ($F(1,140) = 28.67, p < 0.001$). Given high technology self-efficacy, self-service (vs. employee) increased perceived control $M_{self\text{-}service} = 5.84$, $M_{employee} = 3.57$; $t = 7.94$, $SE = 0.29$, $p < 0.001$); but given low technology self-efficacy, self-service (vs. employee) did not increase perceived control ($M_{self\text{-}service} = 4.29$, $M_{employee} = 4.18$; $t = 0.37$, $SE = 0.29$, $p > 0.05$).

For decision comfort, we found significant effects of service type ($F(1, 140) = 11.38, p < 0.001$) and technology self-efficacy ($F(1, 140) = 18.59, p < 0.001$), and the expected interaction ($F(1, 140) = 15.70, p < 0.001$). Given high technology self-efficacy, self-service (vs. employee) increased decision comfort ($M_{self\text{-}service} = 5.37$, $M_{employee} = 4.86$; $t = 2.23$, $SE = 0.24$, $p < 0.05$), but given low technology self-efficacy, self-service (vs. employee) decreased decision comfort ($M_{self\text{-}service} = 4.00$, $M_{employee} = 4.80$; $t = -3.37$, $SE = 0.24$, $p < 0.01$). This pattern again indicates that making low technology ability salient can reduce shoppers' decision comfort when using self-service technology. Fig. 5 illustrates these results.

PROCESS Model 8 (Hayes, 2017) tested moderated mediation, finding that technology self-efficacy moderated the effect of service type on decision comfort through perceived control as the mediator (moderated mediation effect = 0.54, SE = 0.19, 95 % CI: 0.20, 0.96). The indirect effect of service type on decision comfort via perceived control was stronger with high technology self-efficacy (indirect effect = 0.57, SE = 0.17, 95 % CI: 0.24, 0.91). However, with low technology self-efficacy, the indirect effect was nonsignificant (indirect effect = 0.03, SE = 0.08, 95 % CI: –0.14, 0.17). Thus, Study 5 also supported Hypothesis 2.

10. Discussion

Our research advances understanding of how in-store self-service technologies shape emotional outcomes during the shopping experience, particularly when shoppers encounter disruptions. In five studies conducted across multiple contexts and research settings, we consistently find that self-service technology use leads to increased perceived control over shopping situations and greater decision comfort, particularly when customers feel they have adequate technology self-efficacy. Study 1 finds that using self-service technology (vs. employee assistance) to resolve a shopping disruption (ordering an out-of-stock product) enhances perceived control and, in turn, decision comfort (Hypothesis 1). Study 2 finds that, for people with greater technology

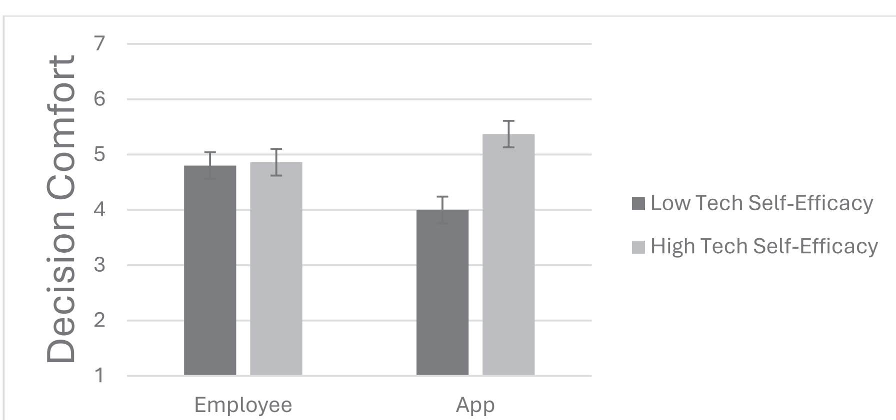

Fig. 5. Study 5: Self-service technology effects on decision comfort.

self-efficacy, self-service technology use (vs. employee assistance) to order an out-of-stock product more strongly affects perceived control and, in turn, decision comfort (Hypothesis 2). In Study 2, even people with moderate to low technology self-efficacy benefit from using self-service technology (vs. employee assistance); they also experience higher perceived control and, consequently, greater decision comfort. Those effects are weaker but still significant.

Study 3 tested a different self-service technology, a wayfinding (store navigation) kiosk used to locate a misplaced product, and found similar results. Study 4 found similar results using a mobile app rather than a kiosk, ruling out a platform-specific explanation. Study 4 also manipulated technology self-efficacy rather than measuring it, thereby offering causal evidence of its moderating role. Study 5 replicated Study 4 using a university student participant pool in the lab rather than an online panel. This set of studies robustly supports our predictions that self-service technology increases decision comfort through perceived control, particularly when users feel technologically competent. In Studies 4–5, which manipulated rather than measured technology self-efficacy, people with low self-efficacy who used a self-service technology rather than an employee for assistance experienced lower decision comfort. However, their feelings of control were not lower, and perceived control did not mediate. Thus, there is some indication that self-service technologies could pose risks when people perceive they lack competence in using them, but our results are mixed: we did not find this in Studies 1–3. This boundary condition underscores the importance of offering hybrid service pathways or optional employee assistance to users who may feel uncertain about their ability to use self-service technologies.

10.1. Theoretical implications

Our findings offer three main theoretical contributions. First, we examine psychological processes that occur during the shopping stage of the customer's in-store journey. While prior literature has primarily focused on self-service technology supporting customers at the end of the shopping journey, people often require support for tasks during their shopping trip (e.g., locating products, checking prices, ordering an out-of-stock item). Indeed, retailers have invested considerable resources in providing such decision tools to their customers. Researchers frequently overlook this stage, yet it is a critical moment when emotional ease or difficulty can shape shopper engagement and affect the likelihood of trip abandonment by frustrated shoppers.

Second, we establish decision comfort as a meaningful emotional response in this shopping context. Decision comfort is a low-arousal affective state that reflects consumers' sense of ease after making small, often automatic decisions during shopping trips—e.g., checking a price or looking for a misplaced product—in response to shopping disruptions. Prior research has focused on practical outcomes of self-service technologies, such as shopping speed and overall satisfaction (Collier & Kimes, 2013; Meuter et al., 2000), as well as on strong emotional responses, such as delight (Collier & Barnes, 2015). Instead, we follow the call of Collier and Barnes (2015) for more research on subtle emotional reactions to self-service technology use in task-based settings. We do so by exploring how self-service tools such as store kiosks and apps influence decision comfort. These tools are primarily goal-oriented, designed to resolve disruptions and help consumers complete shopping tasks, and thus ideal for exploring feelings of decision comfort.

Lastly, we identify and demonstrate technology self-efficacy as a key moderator of self-service technology effectiveness. Specifically, self-service technology use was most effective at enhancing perceived control and decision comfort if people believed they were technologically efficacious. Further, drawing on self-determination theory (Ryan & Deci, 2000), we empirically demonstrate the dual importance of autonomy and competence in the context of self-service technology. Specifically, we show that while self-service technologies can satisfy the need for autonomy by offering control over in-store shopping disruptions, this benefit reliably emerges only when customers feel they have sufficient technological competence.

10.2. Managerial implications

Our findings offer several managerial implications. Retailers are increasingly implementing self-service technology to facilitate in-store shopping trips. Shoppers are being encouraged and incentivized to use these technologies to manage shopping disruptions related to item location, price checks, and consumer reviews rather than seeking help from employees. Importantly, shopping disruptions can influence whether the shopping trip is completed or abandoned early. Our findings suggest that self-service tools can enhance consumer comfort with handling disruptions, streamline the shopping process, and potentially reduce the risk of shopping trip abandonment. By focusing on decision comfort, our research shows that self-service technologies as shopping aids can provide emotional relief in resolving shopping disruptions. Prior work links decision comfort to downstream benefits such as reduced decision regret, increased loyalty intentions, and positive word of mouth (Parker et al., 2016; Heitmann et al., 2007), positioning it as a meaningful contributor to long-term customer engagement.

Importantly, our results also suggest that self-service technologies may not uniformly enhance customer experience. For consumers low in technology self-efficacy, the benefits of self-service technology are smaller, and in some cases, may reduce decision comfort relative to traditional employee assistance. This pattern highlights an important managerial consideration. Specifically, shoppers with low technology self-efficacy might feel intimidated and frustrated with a push towards self-service technology use (Meuter et al., 2003; Liljander et al., 2006). Therefore, even if self-service technology does not negatively affect decision comfort, some shoppers might experience negative emotions simply because they have to use it. While technology self-efficacy is relatively malleable through customer education, interface design, and retail support (Ben-Ami et al., 2014), retailers may still risk shopping trip abandonment from those low in technology self-efficacy. To mitigate such risks, retailers could consider hybrid service models (e.g., optional employee assistance or embedded guidance) that maintain autonomy without overburdening users with low confidence. Some versions of these models can serve as "learning experiences" to increase shoppers' technology self-efficacy over time. Ultimately, retailers must ensure that human service remains available, even if reduced, when rolling out new self-service technologies (Scherer et al., 2015).

As more consumers expect seamless, on-demand in-aisle support, retailers must optimize both the functionality of self-service technologies and their impact on customer experience and retention. The overfocus on technologies toward the end of the customer journey (e.g., self-checkouts) should change through the design of self-service technologies that support customers' in-store shopping activities. Such a shift is likely to reduce walkouts, protect revenue, and elevate in-store engagement in our increasingly digital retail landscape.

Retailers should evaluate these recommendations within the constraints of operational and financial realities. Implementing and maintaining such self-service technology can require substantial upfront investment and ongoing system updates, potentially resulting in very high upfront costs. Further, employees may need to shift from task execution to guidance and exception handling, which may require staff training and procedural changes. Therefore, retailers should deploy self-service technology strategically, prioritizing high-friction categories or zones, offering optional human support during transition periods, and assessing customer readiness before a full-scale deployment.

10.3. Limitations and future research directions

Although our core findings are robust, several questions emerge. First, our theorizing is grounded in self-determination theory (Ryan & Deci, 2000), which posits that intrinsic motivation is driven by three psychological needs: autonomy, competence, and relatedness. Our findings suggest that, with enough technological skill, self-service technology use can enhance perceived control and satisfy the psychological needs for autonomy and competence. However, it may also provoke challenges to other psychological needs. For example, reduced human interaction may undermine the need for relatedness (Giebelhausen et al., 2014), while the cognitive effort required to navigate complex interfaces may threaten perceptions of competence (Zhu et al., 2007). On the other hand, some consumers may view autonomy negatively, especially when they expect or feel entitled to full-service support (Nusrat & Huang, 2024).

Future research should explore these potential trade-offs by identifying additional factors that may influence consumer responses to self-service technologies. Examining how consumers prioritize addressing competing psychological needs across different shopping contexts is an interesting extension. Additional work should further test the generalizability of our findings by extending them beyond online survey platforms like MTurk, incorporating simulated in-person lab experiments, and doing real-world field studies.

Our findings also suggest that self-service technologies may not uniformly enhance the customer experience. For consumers with low technology self-efficacy, the advantages of self-service appear more limited, and decision comfort may be comparable to or even lower than that experienced with traditional employee assistance. Future research could investigate whether reduced comfort among consumer segments with lower technology self-efficacy results in downstream consequences, such as decreased purchase completion or shopping abandonment. Exploring how interface design, adaptive prompts, or opt-out pathways restore comfort for these shoppers would advance both theory and practice.

Although our studies focused on in-store retail, self-service technology is widely used in other domains, like restaurants, banks, and airlines, where service interactions differ. For instance, restaurants allow customers to order additional food and drinks during a meal using a self-service tablet; movie theatres offer concession ordering during a movie via apps or theater tablets; and hotels use self-service kiosks or apps to manage guest needs, such as checking in, keyless entry, extending a stay, or booking services. These examples suggest opportunities for future research to examine how self-service technology shapes different types of consumption experiences based on the nature of the offering (Voss, Spangenberg, and Grohmann, 2003).

Finally, the growing integration of artificial intelligence into self-service raises compelling new research questions. On the one hand, AI-powered assistants could enhance perceived control by providing tailored support and reducing decision effort (André et al., 2018). On the other hand, if AI is overly prescriptive, it may undermine the consumer's sense of autonomy (Longoni, Bonezzi, and Morewedge, 2019). Future research could explore how varying types of AI tools might shape decision-making assessments.

11. AI Statement

During the preparation of this work, the authors used Grammarly Pro and ChatGPT (GPT-5) to review their writing for spelling, grammatical, and structural consistency. The authors reviewed and edited the content as needed and take full responsibility for the content of this publication.

CRediT authorship contribution statement

Dominique Braxton: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Eric Spangenberg:** Supervision, Resources, Methodology, Funding acquisition, Conceptualization. **Cornelia Pechmann:** Supervision, Methodology, Formal analysis, Conceptualization. **David Sprott:** Writing – review & editing, Supervision, Resources, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

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Dominique Braxton PhD, received her PhD from the University of California Irvine and is an Assistant Professor of Marketing at Loyola Marymount University. Her research specializes in marketing and consumer behavior, exploring consumer health and well-being, consumer engagement with social, retail store environments, and more recently consumer well-being related to justice and inclusion.

Eric Spangenberg, PhD, is a Professor of Marketing and Psychology & Social Behavior at UC Irvine. He served The Paul Merage School of Business at the University of California, Irvine, as dean from 2014 through 2020. He also served as Dean 2005 to 2014 at the Carson College of Business at Washington State University where he was also named the Maughmer Freedom Philosophy Chair and Professor of Marketing. His research focuses on environmental psychology, consumer skepticism toward advertising, question-behavior effects, psychometrics, and brand extended self-construal, and has been published in leading scholarly journals and recognized by popular trade journals.

Cornelia Pechmann, PhD is a Professor of Marketing at UCI Paul Merage School of Business, studying the effects of advertising, social media, product labeling, brand names and retail store locations on consumers. She has received a $1.5M grant to study youths' responses to pro- and anti-smoking ads and currently studies online communities on Twitter for smoking cessation funded by a $2.5M R01 grant from NIH. She received the Pollay Prize for Public Interest Research and the best journal article award from the Journal of Consumer Research. She served a three-year term as editor-in-chief of the Journal of Consumer Psychology.

David Sprott received his PhD in Marketing from the University of South Carolina. He is the Henry Y. Hwang Dean and a professor of marketing in the Peter F. Drucker and Masatoshi Ito Graduate School of Management and is on faculty at the University of St. Gallen in Switzerland. His research interests include retailing, branding, influence strategies, and marketing public policy, and has been published in leading scholarly journals including Journal of Applied Psychology, Journal of Consumer Research, Journal of Marketing, Journal of Marketing Research, and Journal of Retailing.