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The Impact of Choice Overload and Decision Fatigue on Cart Abandonment in Online Shopping

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Abstract

This study examines decision-making processes that challenge individuals' cognitive and emotional limits in a digitalized consumption environment from a multidimensional perspective. It is hypothesized that the overload of choices faced by consumers in online shopping is linked to increased decision fatigue, and that this fatigue is associated with a higher likelihood of cart abandonment. The research examines individuals' internal cognitive responses to environmental stimuli and their behavioral consequences within the Stimulus-Organism-Response (S-O-R) model. In the model, choice overload is considered an external stimulus, decision fatigue an internal organismal response, and cart abandonment a behavioral outcome. In this quantitative study, data were collected through an online survey of 321 participants from Türkiye who had experienced cart abandonment in the last three months. The analysis used partial least squares (PLS-SEM), beginning with an assessment of the measurement model's validity and reliability, followed by the evaluation of hypotheses through the structural model. The findings show that decision fatigue plays a significant mediating role in the relationship between choice overload and cart abandonment behavior. This research offers theoretical and practical contributions in terms of consumer welfare and user experience design by revealing the invisible mental pressures of digital consumption behaviors.

Keywords: choice overload, decision fatigue, online shopping cart abandonment, S-O-R model

Öz

Bu çalışma, dijitalleşen tüketim ortamında bireylerin bilişsel ve duygusal sınırlarını zorlayan karar süreçlerini çok boyutlu bir bakış açısıyla ele almaktadır. Çevrimiçi alışverişte tüketicilerin karşılaştığı aşırı seçenek yükünün, zihinsel kaynaklarını tüketerek karar yorgunluğuna yol açtığı; bunun da alışveriş sürecinin tamamlanmamasıyla, yani sepeti terk etme davranışıyla sonuçlandığı varsayılmaktadır. Araştırma, bireyin çevresel uyarıcılara verdiği içsel bilişsel tepkileri ve davranışsal sonuçlarını S-O-R (Uyarıcı–Organizma–Tepki) modeli çerçevesinde ele almaktadır. Modelde, aşırı seçenek yükü dışsal bir uyarıcı; karar yorgunluğu içsel bir organizmal tepki; sepeti terk etme ise davranışsal bir çıktı olarak değerlendirilmiştir. Nicel araştırma yönteminin benimsendiği çalışmada, veriler çevrimiçi anket yoluyla Türkiye'de yaşayan ve son üç ay içinde sepet terk etme deneyimi yaşamış 321 katılımcıdan toplanmıştır. Analiz sürecinde yapısal eşitlik modellemesi (PLS-SEM) metodu kullanılmış; önce ölçüm modelinin geçerliliği ve güvenilirliği test edilmiş, ardından yapısal model üzerinden hipotezler değerlendirilmiştir. Bulgular, karar yorgunluğunun aşırı seçenek yükü ile sepeti terk etme davranışı arasındaki ilişkide anlamlı bir aracı rol üstlendiğini göstermiştir. Araştırma, dijital tüketim davranışlarında görünmeyen zihinsel baskıları açığa çıkararak tüketici refahı ve kullanıcı deneyimi tasarımı açısından hem teorik hem uygulamalı katkılar sunmaktadır.

Anahtar Kelimeler: aşırı seçenek yükü, karar yorgunluğu, çevrimiçi alışveriş sepetini terk etme, S-O-R modeli

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Introduction

Today, due to the extensive usage of digital platforms, consumers experience mental exhaustion from the abundance of information and options, which complicates their rational decision-making processes and negatively affects their purchasing behavior (Eppler & Mengis, 2004; Malhotra, 1982). In particular, the variety of products in the online shopping environment, far from increasing consumer welfare, can aggravate the mental burden and make the decision process more complex and tiring (Schwartz, 2004; Iyengar & Lepper, 2000; Wang et al., 2023). This situation raises important discussions about the quality of the digital consumption experience both at the individual and social levels (Eppler & Mengis, 2004).

Despite the belief that greater diversity could boost customer satisfaction by giving them more choices, the literature suggests that individuals who encounter a large number of options have difficulty in making decisions, their satisfaction levels decrease, and they may postpone their decisions and leave the process halfway through (Schwartz, 2004; Iyengar & Lepper, 2000). Researchers define the accumulation of mental effort spent on making decisions and its transformation into burnout as decision fatigue, which may lead consumers to abandon their online shopping carts before completing their purchases (Baumeister et al., 1998; Vohs et al., 2008).

The structural features of online shopping reinforce such cognitive overload. The inability to physically evaluate products, switching between multiple tabs for price comparison, reviewing user reviews, and following promotions distract consumers and rapidly deplete their mental resources. Moreover, algorithmic recommendation systems and filtering tools, despite their intent to aid decisions, can paradoxically increase cognitive strain by requiring consumers to invest even more mental effort (Wang et al., 2023).

Although there is growing academic interest in online consumer behavior, studies examining the combined effects of choice overload and decision fatigue on cart abandonment behavior are quite limited. Most studies in the existing literature either explain cart abandonment only by technical or economic causes or focus on psychological concepts in isolation. However, the increasing complexity of digital shopping environments necessitates a holistic understanding of how cognitive and emotional burnout mechanisms shape consumer behavior. Researchers have not yet clarified sufficiently how the mental overload caused by variety clutter leads to cart abandonment behavior through decision fatigue. The main problem of this study is the need for a holistic model to demonstrate this relationship empirically. This research aims to fill this literature gap and provides a novel framework to explain how psychological pressure translates into behavioral consequences in the digital consumption process.

Thus, using a holistic model as a framework, this study attempts to investigate the relationships between choice overload, decision fatigue, and cart abandonment regarding online shopping. In this study, these concepts, which are often assessed separately in the literature, are integrated using the Stimulus-Organism-Response (S-O-R) model and examined with causal integrity. The main hypotheses of the study are that (1) choice overload in online shopping increases decision fatigue, (2) decision fatigue triggers cart abandonment tendency, and (3) decision fatigue mediates the relationship between these two factors. In addition to its theoretical contributions, this approach has important implications for the user-friendly design of digital platforms and consumer welfare by making visible the overlooked psychological burdens in online shopping experiences.

Conceptual Framework

Choice Overload

In modern consumer behavior, the phenomenon whereby individuals encounter a great number of choices poses challenges to their decision-making processes. This situation is defined by the concept of "choice overload." This concept is especially experienced in online shopping environments and may make it difficult for customers to decide or avoid the decision process due to the variety of products and abundance of information (Iyengar & Lepper, 2000). In this context, increasing the

number of choices may reduce consumers' motivation to make decisions by triggering mental fatigue and dissatisfaction instead of improving decision quality (Schwartz, 2004).

Iyengar and Lepper (2000) found that fewer options led to greater engagement and higher purchase rates, whereas too many choices hindered decision-making. This finding suggests that providing more choice is not always beneficial. Schwartz (2004) stated that an abundance of choice negatively affects overall life satisfaction by increasing regret, high expectations, and self-worth questioning. Therefore, the abundance of choices increases both cognitive and emotional burden for the consumer.

In online environments, especially personalized systems with a large number of recommendations provided by algorithms complicate users' decision-making processes and can lead to mental exhaustion when combined with information overload (Eppler & Mengis, 2004; Malhotra, 1982). Consumers' limited information processing capacity may result in postponement or complete abandonment of the decision process, especially when similar products require detailed comparisons.

Different concepts in the literature have also explained this decision-making difficulty. For example, Mitchell et al. (2005) associates this situation with the concept of "consumer confusion" and argues that it arises when consumers are exposed to too much and/or conflicting information, leading to difficulty in making optimal purchasing decisions. Similarly, Walsh et al. (2007) introduce the concept of "overload confusion" and emphasize that excessive flow of information and abundance of choices surpass what consumers can mentally handle, resulting in indecision and cart abandonment. The concept of information overload, which has been discussed in previous studies (Malhotra, 1982; Eppler & Mengis, 2004), has been identified as a key contributor to choice overload, especially in the digital context.

Park and Lee (2009) stated that choice confusion may vary according to product categories and that the complexity of decision-making increases, especially in experience-based products (e.g., clothing, cosmetics). In these categories, consumer evaluations and digital reviews can further prolong the

decision process, which may lead to decision fatigue and the finalization of the shopping process.

As a result, concepts such as choice overload, consumer confusion, overload confusion, and information overload refer to phenomena that overlap with each other but are addressed in different aspects in the academic literature. Taking these concepts into consideration, the study uses "choice overload" as an umbrella concept to explain the mental burnout experienced within the digital shopping environment. In terms of conceptual integrity, choice overload is a construct that encompasses both the burden on cognitive capacity and the psychological effects that reduce the willingness to make decisions.

In addition, choice overload is an important factor that undermines not only decision quality but also the willingness to make a decision (Iyengar & Lepper, 2000; Schwartz, 2004). Therefore, important strategies to reduce online cart abandonment rates include e-commerce platforms that optimize product presentations, guide users with decision support systems, and avoid information overload.

Decision Fatigue

The decision-making process is a complex mental activity during which individuals use their cognitive and emotional resources intensively. Due to the prolonged exertion of these cognitive resources, individuals experience mental fatigue, which eventually impairs their ability to make sound decisions. The concept of decision fatigue in the literature explains this circumstance. Decision fatigue is defined as an individual's reduced mental capacity as a result of making a large number of consecutive decisions and therefore tending to make less careful, superficial, or impulsive choices (Baumeister et al., 1998; Pignatiello et al., 2020).

This phenomenon is rooted in the "Ego Depletion Theory" developed by Baumeister et al. (1998), which suggests that cognitive processes such as self-control and decision-making depend on a limited energy source. Accordingly, when this resource is depleted, individuals show lower cognitive effort in their subsequent decisions, and this leads to a decrease in decision quality. Individuals

who experience decision fatigue are reported to be unable to make healthy comparisons between alternatives, may stick to previously preferred strategies, or may postpone making a decision altogether (Pignatiello et al., 2020).

Focusing on the measurability of this concept, Hickman et al. (2018) developed the Decisional Fatigue Scale (DFS). The scale addresses three core dimensions of decision fatigue: altered emotional regulation, increased mental effort, and impulsive decision-making tendency. The study found that fatigue is more pronounced in individuals who make decisions under uncertainty and high responsibility.

In internet-based buying scenarios, decision fatigue is associated with mental exhaustion resulting from prolonged engagement with online platforms and the need to choose between a large number of products, making constant comparisons. Wang et al. (2023) demonstrate that the extensive array of product choices available on e-commerce platforms correlates with decision fatigue among consumers, thereby heightening the inclination to employ simplification strategies (e.g., selecting the foremost option) during the decision-making process. In this context, decision fatigue may lead individuals to make more superficial but faster choices that require less effort.

According to the literature, decision fatigue is influenced not only by external environmental conditions but also by internal factors stemming from cognitive burnout (Pignatiello et al., 2020; Baumeister et al., 1998). In this context, the cognitive load from examining and selecting products during online shopping may lead consumers to abandon their carts without completing their purchases.

However, there are also cases where product variety does not always have negative effects. For example, in an empirical study conducted by Dülgeroğlu (2019) in Türkiye, the researcher observed that increased product variety in the context of computer products created positive emotions in consumers and increased purchase intentions. This finding suggests that excess choice does not necessarily lead to decision fatigue or indecision and that variety can be perceived positively depending on product type, target audience, and contextual factors. Accordingly, it is important to recognize that the impact of variety complexity may vary by product category and consumer profile, and e-commerce strategies should be structured in line with this flexibility.

Consequently, decision fatigue is considered an important cognitive factor that shapes consumer behavior in online shopping. In this study, decision fatigue is considered the "organism" component of the S-O-R model and used as the main theoretical construct to explain the indirect effect of choice confusion (stimulus) on cart abandonment (response).

Online Shopping Cart Abandonment

Online shopping cart abandonment behavior is defined as *"consumers' placement of item(s) in their online shopping cart without purchasing any item(s) during that online shopping session"* (Kukar-Kinney & Close, 2010). Cart abandonment behavior is usually the result of a two-stage process: (1) adding the item(s) to the cart and (2) not performing the purchase step. This behavior is associated not only with economic but also with cognitive, emotional, and even motivational factors (Mittal, 2023; Erdil, 2018). Some studies emphasize that this behavior may be a planned strategy (e.g., keeping products in the cart to compare prices) or a result of internal conflicts (e.g., inability to make decisions or low satisfaction) (Wilson & Ndoro, 2023; Kukar-Kinney & Close, 2010).

In particular, it is observed that consumers who shop online for hedonic purposes use the cart mostly to have fun, explore, or relieve boredom; however, they do not intend to purchase (Kukar-Kinney & Close, 2010). Therefore, interactive and entertaining user interfaces may lead consumers to spend time browsing rather than purchasing, with the cart serving as a cognitive or emotional space for exploration (Kukar-Kinney & Close, 2010).

Alternatively, using the cart as a tool for organizational and research purposes is also a factor that increases cart abandonment. Consumers often add products to the cart to compare prices, track products, or list products for future purchase (Huang et al., 2018; Wang et al., 2022). This usage causes the cart to function as a "temporary list" or a "wish

list", thus not resulting in a direct purchase behavior.

Perceived difficulties in the transaction process (e.g., long forms, payment problems, technical glitches) may cause consumers to abandon the transaction (Egeln & Joseph, 2012; Erdil, 2018). However, Wilson and Ndoro's (2023) study found that the perception of transaction difficulty does not directly explain cart abandonment in a significant way and that such technical barriers can be tolerated, especially among young consumers.

Moreover, psychological factors such as indecision, cognitive conflict, perceived risk, and lack of digital satisfaction have been identified as contributing factors to cart abandonment (Huang et al., 2018; Roy, 2024). Especially in individuals with decision fatigue, the inability to complete the process is considered a result of mental burnout (Baumeister et al., 1998).

Some studies conducted in Türkiye also shed light on the reasons for this behavior. Öztürk and Şahin (2020), who examined the relationship between consumers' decision-making styles and virtual shopping cart abandonment behavior, found that consumers with a "variety confusion" style have a higher tendency to abandon their shopping carts. Similarly, Temel (2023) found that choice overload, emotional ambivalence, and hesitation at checkout, experienced during online shopping, trigger cart abandonment. These studies reveal that cart abandonment is not only a technical or economic behavior but also a multidimensional behavior shaped by cognitive and emotional processes.

In conclusion, cart abandonment behavior in online shopping goes beyond a transaction deficiency; it is a multidimensional and dynamic consumer decision problem. Understanding this behavior requires consideration of cognitive and emotional processes in addition to technical factors. Therefore, strategies to improve the user experience should consider not only "save the cart" campaigns but also solutions that balance the number of choices, simple interfaces, personalized reminders, and decision support.

S-O-R Model

The S-O-R model (Mehrabian & Russell, 1974; Donovan & Rossiter, 1982), commonly used to explain consumer behavior, provides a holistic framework for understanding the impact of environmental stimuli on the internal states of individuals and its behavioral consequences. At its core, the model suggests that the individual does not react directly to environmental factors; on the contrary, these stimuli are transformed into behaviors through a series of cognitive and emotional evaluation processes in the organism (Mehrabian & Russell, 1974).

The present study conceptualizes the S-O-R model as follows:

- Stimulus (S - Stimulus): The choice confusion encountered in the online shopping environment, i.e., the excess of alternatives and information overload, is considered a cognitive stimulus in the consumer's decision process.
- Organism (O - Organism): The decision fatigue caused by the choice confusion on the consumer is considered the internal reaction of the organism. At this stage, the consumer may feel that their cognitive resources are diminishing and that they are mentally worn out.
- Response (R - Response): As a result of cognitive fatigue, the consumer's termination of the shopping process and abandonment of the shopping cart is defined as the observed behavioral response.

The S-O-R model provides an effective theoretical structure for understanding the indirect effects of factors such as information density, product variety, and decision complexity on consumer behavior, especially in online shopping environments (Donovan & Rossiter, 1982; Eroğlu et al., 2001). As a matter of fact, online stores tend to offer unlimited products to consumers, which may create a mental burden due to excessive choice instead of providing a better experience (Iyengar & Lepper, 2000; Schwartz, 2004). In this context, choice over-

load resulting from excessive variety acts as a stimulus that triggers decision fatigue (Wang et al., 2023).

Decision fatigue refers to a cognitive state in which the consumer's mental capacity decreases, experiences burnout in the decision-making effort, and therefore avoids the decision-making process (Baumeister et al., 1998; Pignatiello et al., 2020). In this case, the consumer either turns to superficial decision-making strategies or abandons the process altogether. Cart abandonment represents a behavioral outcome resulting from this mental fatigue.

The S-O-R model in this study provides both a theoretical aspect and a structural basis for explaining the relationship between variables. The model suggests that choice overload as an environmental factor can lead to decision fatigue, which is a cognitive outcome in the organism, and this can lead to cart abandonment behavior, which is a behavioral outcome. This approach emphasizes that consumer behavior is not only about responses to stimuli but also about the individual's internal processes.

Methodology of the Study

Purpose, Model and Hypotheses

The primary goal of this study is to examine the impact of choice overload on online shopping cart abandonment behavior through decision fatigue, bringing together the disciplines of psychology and marketing. Although today's e-commerce platforms aim to increase consumers' freedom of choice by offering a wide variety of product options, this diversity increases cognitive load and may lead to mental burnout instead of facilitating consumers' decision-making process. This study aims to reveal the impact of this burnout on decision-making motivation and how it ultimately disrupts purchase behavior from an interdisciplinary perspective.

The research is theoretically based on the S-O-R model framework. In this context: "Choice overload" is modeled as a stimulus externally presented to the consumer (S), "Decision fatigue" is modeled as the consumer's internal cognitive response process (O), "Online shopping cart abandonment" behavior is modeled as the observed behavioral output (R).

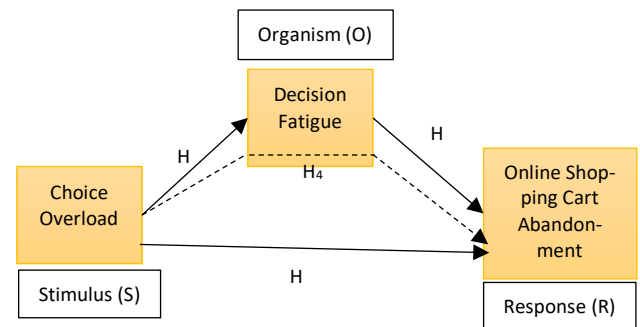The following model represents the theoretical construct of the research:

Figure 1. Conceptual Framework

In line with this structure, both direct effects and mediation relationships are examined in the study.

H_1: Choice overload positively predicts decision fatigue.

Information overload and abundance of alternatives increase the effort of individuals to compare options, which predicts cognitive burnout (Malhotra, 1982; Eppler & Mengis, 2004). Wang et al. (2023) empirically demonstrated that information abundance and product variety increase decision fatigue in an online shopping environment. Therefore, it is predicted that choice overload functions as a stimulus triggering decision fatigue.

H_2: Decision fatigue positively predicts cart abandonment behavior.

Decision fatigue is defined as a decrease in decision quality and a tendency to avoid making decisions as a result of the depletion of an individual's mental energy in the process of making successive decisions (Baumeister et al., 1998). Consumers may become mentally exhausted when they are exposed to continuous information processing and alternative evaluation processes in online shopping, leading to behaviors such as decision postponement, transaction abandonment, and cart abandonment (Pignatiello et al., 2020). Ding (2017) found that users who experience mental fatigue

are significantly more likely to exhibit cart abandonment behavior. Therefore, it is predicted that decision

H3: Choice overload positively predicts cart abandonment behavior.

Choice overload may cause consumers to experience intense emotions such as indecision, fear of regret, and dissatisfaction during the decision-making process (Schwartz, 2004). These cognitive and emotional pressures may cause consumers to give up on the purchase before they have made a final decision (Walsh et al., 2007). Kukar-Kinney and Close (2010) found that information and choice confusion are associated with cart abandonment, while Wang et al. (2022) reported that choice confusion is related to shopping incompletion. Therefore, it suggests that an abundance of options could directly lead to cart abandonment behavior.

H4: Decision fatigue mediates the relationship between choice overload and cart abandonment behavior.

In line with the S-O-R model, Choice overload (S) functions as an environmental stimulus that is related to increased decision fatigue (O), which is further associated with cart abandonment (R) as a behavioral response (Donovan and Rossiter, 1982; Eroğlu et al., 2001). Wang et al.'s (2022) review suggests that information overload and diversity are not directly associated with cart abandonment but may be linked to it indirectly through mental burnout. Therefore, this study suggests that decision fatigue mediates the relationship between choice overload and cart abandonment.

These hypotheses form the foundation of the research model. Their evaluation is expected to provide valuable insights into the emotional and cognitive aspects of consumer behavior.

Participants

The study's population comprises individuals who live in Türkiye and shop online. The study only included individuals who had shopped online in the last three months but abandoned their carts.

Purposeful (judgmental) sampling method was used for selecting the participants. In line with this method, the aim was to reach participants who

were best qualified to address the research questions. The suitability of the participants for the research criteria was checked with the filter questions at the beginning of the survey form.

Data were collected through social media platforms, e-mail groups, and online communities. It was ensured that the participants participated in the study voluntarily. Every participant was free to withdraw from the study at any moment. The data were collected over a 15-day period in May 2025.

The study sample consisted of individuals aged 18 and over with different demographic characteristics residing in Turkey. Sample size adequacy was assessed using the "10-times rule" (Barclay, Higgins, & Thompson, 1995) for PLS-SEM, which suggests that the minimum sample should be 10 times the number of indicators pointing to the most complex construct. In this model, the most complex construct has 6 predictors, indicating a minimum requirement of 60 participants. With a final sample size of 321, this threshold is exceeded.

Data collection tool and scales used in the study

An online structured questionnaire created through Google Forms served as the instrument for data collection in this research. The questionnaire was divided into three parts: filtering questions, scale items, and questions on demographic information. Ethical approval for this study was granted by the Anadolu University Research and Publication Ethics Committee, based on the meeting held on 14.05.2025 with protocol number 891404. During the data collection process, participants were asked to provide informed consent at the beginning of the survey. No personally identifiable information was requested, in order to ensure anonymity and confidentiality. The data were stored in a secure digital environment accessible only to the researcher. Participants who were deemed unsuitable were excluded through the filter questions at the beginning of the survey, and the study was conducted with minimal risk.

To measure the choice overload that consumers experience due to the variety of products in the online shopping process, the 4-item Choice Confusion Experiencing Scale developed by Sproles and Kendall (1986) and adapted into Turkish by Öztürk

and Şahin (2020) was used. The scale was adapted to online shopping experiences in line with the context of the study.

The 9-item Decision Fatigue Scale, developed by Hickman et al. (2018) and adapted into Turkish by Sarıakçalı and Kırpık (2022), was used to assess the participants' mental exhaustion during the decision-making process. The scale was adapted and applied to the online shopping context.

In order to measure the tendency to abandon the cart, a 4-item scale developed by Kukar-Kinney and Close (2010) and adapted into Turkish by Öztürk and Şahin (2020) was used. This scale was used to understand why and how often the participants terminated the purchasing process after adding products to the shopping cart.

A 5-point Likert-type rating system was used for all scale items (strongly disagree to strongly agree). In addition, demographic information such as age, gender, education, and income level was collected.

Data Analysis Method

The data gathered for this research were assessed using quantitative research techniques and analyzed through the structural equation modeling (SEM) method. In the modeling process, the Partial Least Squares Structural Equation Modeling (PLS-SEM) method was preferred because it accommodates small- to medium-sized samples and can work with reflective structures. The analyses were conducted using ADANCO 2.4.1 software in accordance with this method.

A two-stage analysis strategy was used to assess the study model. The first step involved testing the measurement model's validity and reliability criteria. To this end, the following were investigated: each construct's external loadings, Average Variance Extracted (AVE), discriminant validity (HTMT ratios and the Fornell-Larcker criterion), and composite reliability. All constructs were modeled as reflective and defined as latent variables (mode A consistent).

The structural model was assessed in the second phase. In this context, path coefficients, explained variance values (R^2), effect sizes (Cohen's f^2), and indirect effects were analyzed. The significance of indirect effects was tested at a 95% confidence interval using the bootstrap method (999 samples). By doing so, the role of the mediating variable "decision fatigue" in the relationship between "choice confusion" and "cart abandonment behavior" was tested.

Results

The participants' demographic details are summarized in Table 1.

Table 1. Demographic Characteristics of the Participants

Baseline characteristic N (321)	%	Baseline characteristic N (321)	%
Gender		**Age**	
Female	77,6	Between18-25	6,5
Male	22,4	Between 26-30	10,4
Personal Income		Between 31- 35	21,5
No income	8,4	Between 36- 40	30,8
Between 0-25000 ₺	5,6	Between 41- 45	17,8
Between 25001 – 50000 ₺	19,6	Between 46- 50	6,5
Between 50001 – 75000 ₺	40,2	51 and above	6,5
Between 75001 - 100000 ₺	15,0	Graduation status	
100000 ₺ and above	3,7	High school or lower degree	5,6
Prefer not to say	7,5	Associate degree	6,5
		Bachelor's degree	32,7
		Graduate degree (Master's/Ph.D.)	55,2

Of the 362 responses collected through Google Forms, 321 that passed the filtering questions constituted the research sample. 77.6% of the participants were female, and 22.4% were male. In terms of education level, 32.7% of the participants had a bachelor's degree, 55.1% had a graduate degree, 6.5% had an associate's degree, and 5.6% had a high school or a lower degree. In terms of income distribution, 40.2% of the participants declared an income between 50,001 and 75,000 ₺, 19.6% between 25,001 and 50,000 ₺, and 15% between 75,001 and 100,000 ₺. 8.4% stated that they had no income, 3.7% had an income of 100,000 ₺ and above, and 7.5% did not mention their income information. In terms of age distribution, 30.8% of participants were aged 36-40, 21.5% were 31-35, 17.8% were 41-45, 10.4% were 26-30 and 6.5% fell into each of the 18-25, 46-50 and 51-and-above age groups. These

data indicate that the sample consists of well-educated, middle-income individuals who are active on digital platforms.

Evaluation of the Measurement Model

The measuring model's validity and reliability in the study were assessed using the ADANCO program. First, the outer loadings of each construct were assessed, indicating that certain items exhibited loadings lower than 0.70 (DF8 = 0.6832, DF9 = 0.3610, DF10 = 0.6123). As suggested in the PLS-SEM literature (Hair et al., 2019), these items were removed from the analysis to enhance the quality of the measurement model.

Although these items were statistically excluded, conceptual relevance was considered. DF8, DF9, and DF10[1] reflected peripheral dimensions of decision fatigue, such as indecision (DF8), impulsive decision-making (DF9), and emotional interference (DF10). In contrast, the retained items (DF1–DF6) represent the core psychological constructs of decision fatigue, including mental depletion, reduced concentration, and diminished decision-making capacity. These six items demonstrated strong internal consistency and convergent validity, supporting the conceptual and psychometric adequacy of the refined scale.

After the items were removed, all factor loadings exceeded 0.70. Details regarding factor loadings, Cronbach's alpha, CR, and AVE values are shown in Table 2.

Table 2. Factor Loadings and Reliability Indicators

Factor	Indicators	Factor Loadings	Cronbach Alpha	CR	AVE
Choice Overload	CO1–CO2-CO3-CO4	0.73–0.80	0.8557	0.8564	0.5987
Decision Fatigue	DF1–DF2-DF3-DF4-DF5-DF6	0.71–0.83	0.8977	0.8988	0.5976
OSCA	OSCA1–OSCA2-OSCA3	0.75–0.80	0.8259	0.8266	0.6139

The Standardized Root Mean Square Residual (SRMR) value was used to assess the research model's overall fit quality. With the removal of the items, the SRMR value was calculated as 0.0642. Since this value is < 0.08, it shows that the model fits with the data sufficiently (Hair et al., 2019). The SRMR value is summarized in Table 3.

Table 3. Goodness of Fit Values

Indicator	Value
SRMR	0.0642

In addition, the combined reliability (CR) and average variance explained (AVE) values of the model are within acceptable limits (CR > 0.70, AVE > 0.50) (Hair et al., 2010). Discriminant validity was tested by applying the Fornell-Larcker criterion along with HTMT ratios. As shown in Tables 4 and 5, discriminant validity was achieved between the constructs as a result of both methods.

Table 4. Fornell-Larcker Discriminant Validity

Factor	Decision Fatigue	CO	OSCA
Decision Fatigue	√0.5976		
Choice Overload	0.5904	√0.5987	
OSCA	0.1137	0.0432	√0.6139

The Fornell-Larcker approach suggests that a construct demonstrates discriminant validity when the square root of its AVE is higher than its correlations with all other constructs (Fornell & Larcker, 1981; Hair et al., 2010). All three constructs met this requirement in the model, and discriminant validity was confirmed by the Fornell-Larcker criterion.

Table 5. Heterotrait-Monotrait Ratio (HTMT)

Factor	Decision Fatigue	CO	OSCA
Decision Fatigue	-		
Choice Overload	0.7632	-	
OSCA	0.3377	0.2243	-

As illustrated in Table 5, all of the HTMT values were below the recommended threshold value of 0.85 (Henseler et al., 2015). These findings support that the discriminant validity between the constructs is sufficient.

As part of the multicollinearity test, variance inflation factors (VIF) were evaluated. According to Hair et al. (2017), the VIF value shouldn't exceed 5. The VIF values of all indicators are below 5 (maximum VIF = 4.12). This finding suggests that the

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[1] *Although the item labels extended to DF10, the original Hickman Decision Fatigue Scale included 9 items only, as DF7 was removed by the scale developers during initial validation and was never part of the dataset.*

model does not experience multicollinearity issues; that is, the indicators are not excessively independent from each other but have an acceptable level of correlation. Therefore, it is recognized that there is no multicollinearity problem that would negatively affect the model's predictive ability.

Moreover, when the cross-loading values are examined, it becomes evident that each indicator reaches the highest loading value only in the construct to which it belongs. This reveals that the measurement model achieves discriminant validity. The outer weights are positive and evenly distributed, indicating that all of the indicators contribute significantly to the model.

The internal consistency of the scales employed in the study was evaluated using the Cronbach's Alpha coefficient. The analysis indicated that all subscales' reliability coefficients were above .70, demonstrating the scales' high level of reliability (Hair et al., 2017).

Structural model and testing of hypotheses

Drawing on the findings derived from structural equation modeling, the significance levels, the path coefficients, and the t-values generated from evaluations conducted on 999 samples through the bootstrap method to assess the hypotheses are detailed below. Figure 2 displays the conceptual model and path coefficients. The hypothesis test results are shown in Table 6.

H_1: Choice Overload (CO) → Decision Fatigue (DF) path $\beta = 0.7957$, $t = 26.66$, $p < 0.001$; effect size (Cohen's f^2) was found as 1.725. This result indicates that online decision-making difficulties significantly increase decision fatigue. The unusually high f^2 value is attributable to the fact that decision fatigue is explained solely by choice overload in the model, with no other predictor included, leading to a very large share of variance explained ($R^2 = 0.63$).

H_2: DF → OSCA path $\beta = 0.4136$, $t = 3.7951$, $p < 0.001$; Cohen's f^2 value is 0.070. Decision fatigue has a positive impact on shopping cart abandonment behavior.

H_3: $\beta = -0.1065$, $t = -0.9215$, $p = 0.3570$ in the CO → OSCA path, and there is no statistical significance in this relationship. Therefore, hypothesis H_3 is rejected.

H_4: When the indirect effect in the direction of CO → DF → OSCA is analyzed, $\beta = 0.3291$, $t = 3.6086$, $p < 0.001$. This result suggests that online decision difficulty has an indirect but significant effect on shopping cart abandonment through the mediating effect of decision fatigue.

Additionally, R^2 values were used to assess the model's explanatory power:

$R^2 = 0.6331$ for the Decision Fatigue variable, which indicates that online decision-making difficulties explain 63.31% of the variance in decision fatigue. A considerable amount of explanatory power is provided by this rate.
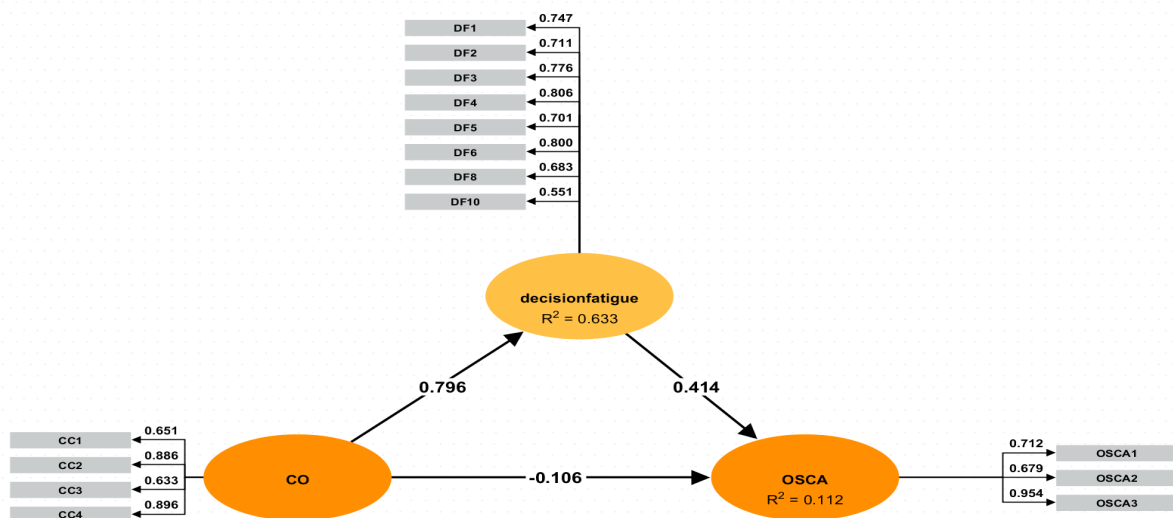

Figure 2. The Conceptual Model and Path Coefficients

$R^2 = 0.1123$ was calculated for the variable OSCA (abandoning the shopping cart). This shows that decision fatigue and decision difficulty variables together explain 11.23% of the cart abandonment behavior. Although this rate is low, it is statistically significant, and especially in psychological and sociological studies examining human behavior, low R^2 values are normal, and this should not be interpreted as a sign of model inadequacy. This is because the main purpose of models in social sciences is often to examine relationships between independent and outcome variables rather than predicting behavior with high accuracy (Garson, 2016; Moksony, 1999). Therefore, even R^2 values above 0.10 are considered acceptable in social sciences (Ozili, 2023; Cohen, 1988). As a matter of fact, Ozili (2023) stated that low R^2 values are also considered valid in empirical models in social sciences, provided that the explanatory variables are significant.

By following the guidelines from Cohen (1988), to measure the relative effect size of the exogenous construct on the endogenous construct, the f^2 values of 0.02 may be considered as a small effect, 0.15 is considered a medium effect, and above 0.35 is a large effect. Accordingly, the path from CO to DF demonstrated a large effect ($f^2 = 1.725$), while the path from DF to OSCA showed a small effect ($f^2 = 0.070$), and the direct effect of CO on OSCA was negligible ($f^2 = 0.004$). The result is shown in Table 6.

Discussion, Conclusions, and Recommendations

Discussion

This study examined the psychological mechanism behind online shopping cart abandonment (OSCA) behavior, specifically the interaction of the variables choice overload, decision fatigue, and online shopping cart abandonment, within the Stimulus-Organism-Response (S-O-R) paradigm. The findings indicate strong support for the central mechanism of decision fatigue while challenging the direct role of choice confusion.

The Effect of Choice Overload on Decision Fatigue (H1 Supported): Support for H1 indicates that choice overload significantly increases decision fatigue. This aligns with prior studies (e.g., Iyengar & Lepper, 2000; Schwartz, 2004), which suggest that an excessive number of options can overwhelm individuals and exceed their cognitive limits. As consumers face more alternatives in online shopping, the mental effort required to evaluate these options increases, leading to cognitive exhaustion (Malhotra, 1982; Eppler & Mengis, 2004). This finding reinforces the conceptualization of decision fatigue as a psychological depletion triggered by overchoice.

The Effect of Decision Fatigue on Online Shopping Cart Abandonment Behavior (H2 Supported): Support for H2 confirms that decision fatigue directly

Table 6. Structural Model Results and Hypothesis Evaluation

Hypothesis	Path	β	t-value	p-value	Cohen's f²	Result
H1	CO → DF	0.795	26.660	< 0.001	1.725	Accepted
H2	DF → OSCA	0.413	3.795	< 0.001	0.070	Accepted
H3	CO → OSCA	-0.106	-0.921	0.3570	0.004	Rejected
H4	CO → DF → OSCA (indirect)	0.329	3.608	< 0.001	—	Accepted

As a result, in the structural model, hypotheses H1, H2 and H4 were supported and only hypothesis H3 was rejected.

increases online shopping cart abandonment. This finding reflects the idea that cognitive exhaustion impairs self-regulation and encourages avoidance behaviors. Consistent with prior research (e.g., Baumeister et al., 1998; Pignatiello et al., 2020; Ding (2017), individuals under decision fatigue tend to delay or withdraw from decisions.

In online shopping contexts, abandoning the cart emerges as a coping response to mental overload and reduced decision quality.

The Effect of Choice Overload on Basket Abandonment Behavior (H₃ Rejected): The rejection of Hypothesis H3, namely the finding that Choice Overload (CO) does not have a direct positive effect on the online shopping cart abandonment rate, confirms the existence of complex mediating mechanisms underlying consumer behavior. (Wang et al. 2022; Chopra et al. 2024). This result contradicts the direct effect assumptions proposed in studies such as Kukar-Kinney and Close (2010) and suggests that there are more complex mental processes behind the surface-observed reasons for shopping behaviors. The S-O-R theory provides an excellent theoretical framework for explaining this indirect relationship. This model highlights how environmental factors (stimulus) trigger an individual's cognitive and emotional responses (organism) and how these internal states ultimately translate into avoidance or approach behavior (response). (Mehrabian & Russell, 1974). In this context, an excessive presentation of options serves as a stimulus (Malhotra, 1982; Araslı & Yıldırım, 2021). This stimulus does not directly increase OSCA on its own but instead triggers a series of cognitive and emotional responses within the organism. Information overload refers to a situation where a person is confronted with more information than they can perceive and effectively process (Malhatro, 1982). This situation leads to the depletion of limited cognitive resources in the decision-making process, which requires cognitive effort (Baumeister et al. 1998; Hickman et al. 2017). This exhaustion is called decision fatigue, which results in self-regulation failure and decreased decision-making quality as a result of an individual's repeated decision-making actions (Baumeister et al., 1998; Hickman et al., 201). According to the S-O-R model, individuals who become cognitively exhausted and cognitively stingy tend to accept the status quo or simplify decisions to conserve energy (Baumeister et al. 1998). This preference for a passive role result in avoiding the purchase action (i.e., abandoning the cart) to end the conflict. The rejection of Hypothesis 3 strongly supports the notion that this avoidance behavior (OSCA) is an indirect result arising not from the excessive choice itself (stimulus), but from the internal tension and fatigue it creates. This finding indicates that consumers' cognitive and emotional motivations play a central role in explaining shopping cart abandonment behavior because positive emotions were found to increase purchase intention, while negative emotions decrease it. (Tang et al. 2017)

The Mediating Role of Decision Fatigue (H₄ Supported): Support for H₄ reveals that decision fatigue mediates the effect of choice overload on cart abandonment, confirming the S-O-R framework. Rather than a direct link, the effect of excessive choice leads to cognitive strain, which then drives cart abandonment. This highlights that internal psychological states—specifically mental depletion—act as a bridge between external stimuli and consumer response. The finding aligns with the concept of "overload confusion" (Walsh et al., 2007), showing that cognitive overload disrupts decision completion in online environments.

Conclusion and Recommendations

Summary of Key Findings: This study investigated the psychological relationships between choice overload, decision fatigue, and cart abandonment behavior in online shopping. The findings confirmed that decision fatigue plays a strong mediating role in choice overload, leading to cart abandonment behavior (H₄). It was found that choice overload does not have a direct significant effect on cart abandonment behavior (H₃).

Contribution to Theory: Even though the findings corroborate much of the existing literature, the research fills gaps in the literature and opens new areas of discussion in some aspects. First, the relationship between choice overload and online shopping cart abandonment is indirect, occurring through decision fatigue. This result contradicts the direct effect assumptions proposed in studies such as Kukar-Kinney and Close (2010) and suggests that there are more complex mental processes behind the surface-observed reasons for shopping

behaviors. In this respect, the study offers a new explanatory framework to the field.

Secondly, the study conceptualized decision fatigue as a "mediating variable". However, many studies in the literature treat this variable as an outcome variable (Olsen et al. 2017; Pignatiello et al. 2018). This approach reveals that decision fatigue is not only an individual affective state but also a strategic turning point in the consumer decision chain.

Third, while decision fatigue has generally been studied in areas such as health (Pignatiello et al., 2020), managerial and judgmental decisions (Danziger et al., 2011), or academic preferences (Natal & Saltzman, 2022), this research brings an interdisciplinary perspective to the marketing and user experience literature by bringing the concept to the context of digital consumption. This model, which brings together the fields of consumption psychology and digital marketing, is distinctive in that it simultaneously targets an individual's internal cognitive processes and external environmental stimuli.

This study contributes to both local and international literature by integrating previously scattered findings, such as choice-related hesitation and emotional conflict, into a unified explanatory framework. It extends earlier fragmented observations within the Turkish context by modeling the mediating role of decision fatigue between choice overload and cart abandonment.

As a result, this research offers an approach to understanding online shopping behavior that goes beyond traditional rational models and makes visible the psychological burden of the decision-making situations. This study supports the phenomenon of decision fatigue, often viewed as an abstract idea in the literature, and reveals the cognitive struggle behind consumer decisions in the digital age. This makes the study an interdisciplinary contribution that examines both the mental processes that are associated with behavioral consequences and the behavioral outcomes themselves.

Managerial Contributions: From an implementation perspective, the study suggests that e-commerce platforms should design cognitively simplified experiences to reduce not only product presentation and technical infrastructure but also the decision-making burden of users. Accordingly, simplified interfaces, smart filtering systems without distractions, and micro-interactions such as "buy later" or "are you undecided?" can become ethical design elements that will increase purchase rates and support the mental well-being of the consumer.

Limitations and Future Research Recommendations

This research has certain limitations. To begin with, the data collected pertains only to individuals living in Turkey who have experienced cart abandonment while shopping online in the past three months. This might limit the extent to which the findings can be applied. Furthermore, the data gathering was conducted using a self-report technique and an online survey, depending on the participants' memories of their personal experiences. This may lead to possible response biases. Software restrictions prevented the execution of certain advanced predictive studies (e.g., blindfolding-Q^2), even if the measurement model was tested using PLS-SEM.

Future research could make cross-cultural comparisons by testing similar models in different cultural contexts. Furthermore, the effects of choice redundancy and decision fatigue on cart abandonment can be examined and compared separately for different product categories. The decision fatigue variable can be modeled together with factors such as time pressure and digital distraction to create more complex constructs. We can also consider the influence of algorithmic prompts on consumer decision processes in online shopping environments. In particular, how digital interventions such as personalized recommendation systems, product rankings, and filtering algorithms of e-commerce platforms affect consumers' decision fatigue levels can be examined. In this context, understanding whether algorithms simplify or complicate the decision process is important for both user experience design and ethical consumer guidance. A more in-depth analysis of this process through qualitative research is also suggested.

Declarations

Funding: No funding was received for conducting this study.

Conflicts of Interest: The author declares no conflict of interest.

Ethical Approval: Ethics committee permission for this study was obtained with the decision of Anadolu University Research and Publication Ethics Committee meeting decision dated 14.05.2025 and protocol number 891404.

Informed Consent: Participation in the study was voluntary, and informed consent was obtained from all individuals involved in the survey.

Data Availability: The data supporting the findings of this study, collected from 321 participants residing in Türkiye, are available from the corresponding author upon reasonable request.

AI Disclosure: No artificial intelligence-based tools or applications were used in the conception, analysis, writing, or preparation of figures for this study. All content was generated by the author in accordance with scientific research methods and academic ethical standards.

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