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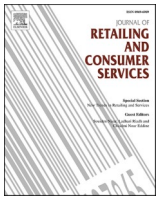

Walking on the tightrope: Unveiling the addictive power of hedonic motivations and marketing stimuli

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ABSTRACT

The rise of online commerce and the trend towards increased consumer exposure to digital content have brought about an emerging phenomenon – particularly among younger consumers–: online shopping addiction. While it has been studied from a psychological standpoint, the influence of online marketing strategies in addiction remains underexplored. Grounded in the uses and gratifications theory, this study examines how hedonic motivations increase exposure to marketing stimuli (social media, promotions, discounts, newsletters, etc.), resulting in online shopping addiction. The findings reveal that, although the consumption of marketing stimuli and online shopping may function as a form of retail therapy, individuals with heightened levels of hedonic gratifications are prone to developing online shopping addiction. This study provides empirical evidence that marketing stimuli play a limited role in driving addiction, as individuals strongly driven by hedonic motivations are inherently more susceptible to developing addictive shopping behaviours.

1. Introduction

The number of online shoppers has been steadily increasing year by year. In 2024, online purchases accounted for 20.1 % of total consumer spending, and this figure is projected to rise to 22.6 % by 2027 (Statista, 2024). The rapid growth of the e-commerce industry has intensified competition within the digital landscape. As the number of online shoppers continues to grow, increasingly sophisticated online marketing strategies are being developed to attract and retain customers more effectively. However, a specific segment of the population, especially young adults (Nyrhinen et al., 2023), have demonstrated heightened sensitivity to these marketing stimuli, exhibiting intensified purchasing behaviours that often manifest as impulsive and compulsive tendencies. This phenomenon has sparked considerable debate concerning the darker side of online shopping. The issue has become so pressing that international organizations –including the European Union– are actively working on regulations targeting aspects of digital services that are intentionally designed to foster addictive behaviours (European Parliament, 2023).

Online Shopping Addiction (hereinafter, OSA) is defined by Zhao et al. (2017) as a pattern of excessive, compulsive, and problematic shopping behaviours conducted via the internet, resulting in disruptive consumption patterns. Despite its growing prevalence, the concept of OSA has received little scholarly attention and has predominantly been approached from psychological or pathological perspectives, aiming to identify its causes and consequences and to raise awareness of this emerging addiction. Among the triggers identified, research has primarily focused on personality traits or psychological conditions such as stress (Dogan Keskin and Günüç, 2017; Zheng et al., 2020) and compulsive disorders (Duroy et al., 2014; Kukar-Kinney et al., 2016), together with sociodemographic characteristics such as age and gender. While these studies have explored how behavioural disorders contribute to OSA, they have largely overlooked other antecedents such as the pursuit of enjoyment and hedonism through online shopping, exposure to marketing stimuli (e.g., social media advertisements, promotional newsletters), and shopping frequency. These factors –which may appear harmless at low levels– have the potential to culminate in symptoms that are indicative of OSA at higher intensities. It is these factors that provide the focus of this study.

In this context, this study seeks to answer the following research question: To what extent are hedonic motivations, brands' online marketing stimuli, and shopping frequency antecedents of OSA? This research question is addressed through three objectives, which will enable us to understand how these variables influence OSA.

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Individuals motivated by the pursuit of enjoyment and entertainment frequently engage in activities that offer hedonic gratifications, i.e., fulfilling their need for escapism, sensory pleasure, aesthetic enjoyment, and emotional release. When guided by such motivations, consumers may perceive purchasing as a form of leisure or entertainment, which can serve a therapeutic function by alleviating negative emotional states through the gratification derived from shopping –a phenomenon widely referred to as retail therapy (Rick et al., 2014). However, the underlying presence of irrational purchasing behaviour driven by hedonic motivations (Günüç and Dogan Keskin, 2016), combined with the ease of acquiring products through online platforms, may have contributed to the rise in problematic consumption patterns. In other words, certain consumers may exceed the boundaries of reasonable or therapeutic shopping and progress toward developing addictive tendencies. Accordingly, the first objective of this paper is to understand this combined effect. Specifically, it is hypothesized that there exists a nonlinear relationship between hedonic motivation and OSA.

Although the existing literature acknowledges the role that marketing plays in fostering consumer addiction and in facilitating progression through stages of addictive behaviour (Martin et al., 2013), no studies to date have systematically examined what impact marketing has on OSA. The second objective of this research is therefore to address this gap by exploring whether the pursuit of hedonic gratification triggers greater exposure to and responsiveness towards online commercial communications, which ultimately heighten OSA. It is further hypothesized that a threshold effect may exist, whereby low levels of exposure to marketing stimuli contribute positively to hedonic value, whereas higher levels of exposure amplify addictive online shopping behaviours.

Emerging consumption patterns have led to an increase in the frequency of online purchases. Consequently, it is plausible that the pursuit of hedonic gratification partly translates into OSA through increased shopping frequency, driven by both pleasure-seeking tendencies and by heightened exposure to marketing stimuli. Online shopping frequency has been considered for characterizing individuals who suffer from OSA (Martin et al., 2013; Duroy et al., 2014) as well as for a predictive of the pathology (Duong and Liaw, 2022). However, its potential role as a mediating factor in the addiction process has not been explored. By incorporating this relationship, the present study articulates a third objective; namely, to determine whether increased shopping frequency is a prerequisite for the emergence of OSA or whether addiction-like behaviours can manifest themselves independently of frequency.

In summary, the three primary objectives are: (1) to understand if a non-linear effect of the hedonic shopping motivations on OSA; (2) to investigate whether marketing stimuli directly contribute to the development of OSA; and (3) to examine whether shopping frequency serves as a mediating variable within the proposed model. The findings of this study contribute to the development of a novel explanatory model for this pathology while offering practical implications at both societal and commercial levels.

Hence, this research aims to contribute to current understanding of this phenomenon and to the literature on consumer addictions by analysing emerging behaviours within a marketing context that facilitates or reinforces these patterns. Specifically, we explore how brands may be contributing –consciously or unconsciously– towards creating an addiction to online shopping among young people –the most vulnerable layer of society.

2. Literature review and contributions

The American Psychological Association (APA, 2023) defines addiction as a "state of psychological and/or physical dependence on the use of drugs or other substances, such as alcohol, or on activities or behaviours." Addictions are typically categorized based on whether they involve the consumption of substances or not (Griffiths, 2005). By contrast, behavioural addictions refer to compulsive engagement in activities not involving substance intake but characterized by addictive tendencies (Shaffer et al., 2004). Behavioural addictions include gambling (Menchon et al., 2018), exercise (Berzick et al., 2012), shopping (Davenport et al., 2012), and technological addictions such as internet addiction (Griffiths, 2000). This study examines OSA as a subset of internet addiction.

Addictions are characterized by specific behaviours (Griffiths, 2005). Griffiths' model (2005) identifies six core components necessary for the operational definition of addictive behaviours: salience, mood modification, tolerance, withdrawal, conflict, and relapse. *Salience* indicates whether addictive behaviour has become an important aspect of the individual's life. *Mood modification* is related to the positive feelings or a sense of relief from tension or anxiety that the individual experiences when engaging in addictive behaviour. *Tolerance* refers to the increase in frequency of the behaviour performed by the individual to achieve the effects equal to that in the past. *Withdrawal* refers to the negative emotional response if the individual is unable to pursue the addictive behaviour. *Conflict* measures whether the addictive behaviour affects the individuals' personal relationships or generates conflict within individuals. Finally, *relapse* refers to the individual's tendency to fall into the addictive behaviour despite the efforts to quit.

The six-factor model has been extensively used in quantitative studies as a framework to identify whether an individual exhibits addiction, and has evidenced its effectiveness in measuring addictive behaviours. Examples of its application include studies on social media addiction (Liu and Ma, 2018; Cuadrado et al., 2020), internet addiction (Brand et al., 2014; Kuss et al., 2014; Andreassen et al., 2016), and online gaming addiction (Griffiths and Wood, 2000). Similarly, OSA has been conceptualized and measured through the presence of these six dimensions (Zhao et al., 2017; Augsburger et al., 2020; Duong and Liaw, 2021).

Table 1 provides an overview of the key empirical studies that analyse the determinants of OSA and shows how research on this concept remains relatively scarce. The table includes articles that explicitly address OSA as well as those that examine compulsive and addictive online shopping behaviours without specifically labelling them as such (Kukar-Kinney, 2016; Augsburger et al., 2020).

Pre-existing studies have primarily focused on individual-level factors that predispose individuals towards OSA, such as sociodemographic characteristics, psychological states, or hedonic value as a motivational driver of shopping behaviour (Duroy et al., 2014; Günüç and Dogan Keskin, 2016). As shown in Table 1, the relationship between antecedent variables and OSA has been predominantly analysed through linear models. However, whether or not this relationship might exhibit a curvilinear pattern –as hypothesized in the introduction section– remains an unexplored issue. Online shopping driven by internal or external stimuli may serve as a benign mechanism to enhance mood. As reported in a Forbes article (Danziger, 2023), a survey conducted by Deloitte involving 114,000 adults across 23 countries revealed that nearly 80 % of respondents had made at least one indulgent purchase in the past month, specifically in an effort to boost their mood. Drawing on the Uses and Gratifications Theory and the concept of retail therapy, it is posited that while hedonic motivations may lead to gratifying or therapeutic purchases, beyond a certain threshold such stimuli could escalate into OSA. The first contribution of this study is therefore to test this potential non-linear effect.

The second contribution of this research relates to examining marketing stimuli, which have not yet been empirically studied as triggers of addiction but which have rather been conceptualized as consequences of compulsive purchasing behaviour. For example, Duroy et al. (2014) suggest that consumers who experience compulsive online buying disorder exhibit heightened sensitivity to marketing stimuli. Similarly, Kukar-Kinney et al. (2016) consider exposure to marketing stimuli as a consequence of compulsive buying behaviour. This study thus reconceptualises marketing stimuli as antecedents of OSA. Theoretical studies also suggest that marketing stimuli may act as triggers for OSA. Building on La Rose and Eastin's (2002) findings, Rose and Dhandayudham, 2014

Table 1
Literature review on online shopping addiction antecedents.

Author *Type of study*	Sample	Predictors	Mediators/Moderators	Effect	Consequences
Duroy et al. (2014) *Quantitative*	200 college students from Paris	Sociodemographic variables Compulsive-buying disorder Internet addiction disorder Means of access to shopping online Utilitarian and hedonic motivators Wage percent and time spent in online shopping Alcohol and tobacco use disorders		Linear	Online compulsive buying
Günüç et al. (2016) *Qualitative/ quantitative*	108 individuals who frequently shop online from a non-specified country	Hedonic and utilitarian shopping factors: hedonic impulses, motivational impulses, technological and psychological factors		Linear	OSA. Post-shopping problematic feelings and behaviours.
Kukar-Kinney et al. (2016) *Quantitative*	237 college students who are consumers within daily deal purchasing communities from an non-specified country	Compulsive buying	***Mediator*** Online shopping motivators: hedonic, utilitarian, social normative and social comparison.	Linear	Different use of marketing elements: discount size, quantity restriction, time restriction, offer distinctiveness, coupons sold
Dogan Keskin and Günüç (2017) *Quantitative*	105 adults who frequently shop online and who are susceptible to problematic behaviour, from a non-specified country	Stress Ease and usefulness	***Mediator*** Depression ***Mediator*** Hedonic shopping addiction	Linear	Hedonic shopping addiction Depression
Augsburger et al. (2020) *Quantitative*	1000 French or German speakers from Switzerland	Six-factor model predictors		Linear	Degree of online and offline shopping addiction
Zheng et al. (2020) *Quantitative*	548 female consumers from China	Perceived stress	***Moderator:*** Self-esteem ***Mediator:*** Negative coping	Linear	Online compulsive buying
Duong and Liaw (2022) *Quantitative*	250 college students engaged in online shopping communities and social networking sites from Vietnam	Age Gender Marital status Internet experience Daily internet shopping usage Daily internet shopping frequency		Linear	OSA
Nyrhinen et al. (2023) *Quantitative*	1000 answers from an online web panel in Finland. Young adults from 18 to 29 years old.	Self-regulation Lack of regulation in smartphone use	***Moderator:*** Lack of regulation in smartphone use	Linear	OSA
Our study *Quantitative*	181 young international consumers that shop online at least once a month from non-specified countries	Hedonic motivation	***Mediator:*** Exposure to online marketing stimuli Online shopping frequency	Linear and quadratic	OSA

argue that marketing stimuli can influence problematic online shopping behaviours by encouraging purchases and by undermining self-regulation. Although these factors have not been directly linked to addiction, various marketing strategies might be driving unplanned purchases due to their influence on consumers. In the future, such techniques, including real-time personalised marketing strategies (Behera et al., 2020), the use of influencers (Müller et al., 2022), as well as strategies involving AI aimed at enhancing brand engagement (Rather, 2025) could become sources of addiction.

The third contribution concerns purchase frequency, which is a variable often regarded as an indicator of addiction and which is widely used to characterize pathological consumption OSA –either as a descriptive attribute of the sample (Duroy et al., 2014) or as a significant indicator of addiction severity (Martin et al., 2013).

Previous research has also demonstrated that increased purchase frequency can lead to addictive behaviours (Duong and Liaw, 2022). Accordingly, this study explores the relationship between hedonic motivations, purchase frequency, and OSA. We posit that individuals who engage in online shopping more frequently are at greater risk of developing pathological behaviours, as mere characterization by frequency is insufficient to determine such a relationship.

3. Theoretical framework and hypotheses development

3.1. Uses and gratifications theory

In our attempt to analyse the determinants of OSA, we ground our study based on the Uses and Gratifications Theory (U&G Theory). The U&G Theory aims to elucidate users' motivations for media consumption across various contexts, ranging from traditional to online media (Lim and Ting, 2012). Its central tenet posits that users engage with media to fulfil specific needs, which ultimately result in gratifications (Katz et al., 1974). Consumers derive distinct gratifications based on their underlying motivational drivers (Lim & Kumar, 2019). The U&G Theory, therefore, provides a framework to explain the motivations that lie behind individual behaviours in media usage, leading to desired outcomes such as social interaction, information-seeking, entertainment, relaxation, communication utility, and convenience utility (Luo, 2002).

This study focuses specifically on hedonic, or entertainment-based, gratifications as a key driver of behaviour that may lead to addiction. Consumers derive hedonic value from experiences surrounding the act of purchasing (Brodie et al., 2013; Hollebeek, 2013). Motivated by hedonic value, individuals engage in shopping behaviours characterized by searching for information as a source of fun, excitement, arousal, joy,

escapism, fantasy, and adventure (Arnold and Reynolds, 2003). The purchasing process itself thus becomes a means of satisfying the need for hedonic pleasure (Overby and Lee, 2006).

In the context of online commerce, consumers may derive enjoyment from activities such as browsing, discovering products or promotions, making purchases, or anticipating the receipt of their items. These observations suggest that hedonic gratifications are derived not only from the purchased product but also from the process of searching for and acquiring it (Ruggiero, 2000). Indeed, online shopping has been associated with fantasy, escapism, alleviation of negative emotions, playfulness, arousal, and sensory pleasure (Bridges and Florsheim, 2008).

3.2. From hedonic motivations to online shopping addiction

Consumers driven by the pursuit of hedonic gratifications often engage in behaviours that may inherently predispose them to addiction. On the one hand, individuals motivated by hedonic drivers tend to shop in a less efficient, rational, and deliberate manner compared to those guided by utilitarian motivations (Bridges and Florsheim, 2008). On the other hand, prior studies have demonstrated that hedonic values and shopping experiences are positively correlated with compulsive buying tendencies (Bridges and Florsheim, 2008; Horváth and Adıgüzel, 2018; Tarka et al., 2022a, 2022b; Febrilia et al., 2024a).

For instance, Darrat et al. (2016) argue that consumers who engage in impulsive and irrational purchases often justify these indulgences as a form of self-reward or compensation. Rooted in the pursuit of hedonic gratifications, these impulsive purchases exacerbate consumer anxiety, foster escapism, and contribute to compulsive buying behaviours. Compulsive buyers frequently report short-term mood improvements following a purchase, thereby reinforcing their behaviour (O'Guinn and Faber, 1989). This phenomenon underscores the prioritization of hedonic over utilitarian value during the shopping process (O'Guinn and Faber, 1989; Bridges and Florsheim, 2008). Combined with the pursuit of temporary mood enhancement, a lack of self-awareness and rationality during purchasing signifies a loss of control and reflects the onset of addictive behaviours. Accordingly.

H1a. Hedonic shopping motivations increase the likelihood of developing OSA.

Beyond this direct positive relationship, we further hypothesize the existence of a non-linear relationship between hedonic shopping motivations and OSA. Drawing on the coping theory (Lazarus and Folkman, 1993), individuals under stress tend to employ coping mechanisms to restore psychological equilibrium. Within this framework, "retail therapy" has been studied as a coping mechanism for mitigating stress or alleviating negative moods (Zielke et al., 2023; Han et al., 2024). Encompassing both offline and online consumption (Zulauf and Wagner, 2021), retail therapy represents a consumer strategy for managing emotional states.

However, retail therapy is also associated with the emergence of impulsive and even compulsive buying behaviours. Through the ritualization of retail therapy, consumers who suffer from anxiety become increasingly susceptible to compulsive shopping (Darrat et al., 2016). Consequently, the pursuit of hedonic gratifications in online contexts may serve as an effective coping mechanism up to a certain threshold, beyond which excessive and problematic purchasing behaviours are likely to emerge. Therefore.

H1b. A curvilinear relationship, with a positive increasing slope, is expected to exist between hedonic shopping motivations and OSA.

3.3. The mediating effect of online marketing stimuli

The dynamic interaction between consumers and brands on social media platforms creates opportunities for brands to implement marketing strategies that foster customer engagement and that encourage purchases. Beyond simply seeking information or purchasing products, consumers derive value from these interactions. Through these interactions, brands foster a sense of community, build trust, and evoke emotional engagement among consumers (Brodie et al., 2013). Online marketing strategies are thus positioned as a source of hedonic gratifications that motivate consumers to stay engaged with brands' activities and updates as they create a space for interaction with firms and their community (Tsimonis and Dimitriadis, 2014).

In the context of hedonic gratification-seeking behaviours, individuals are particularly sensitive to online marketing stimuli that encourage browsing, discovering new products, or capitalizing on discounts and promotions. Evidence suggests that individuals who are prone to compulsive buying exhibit heightened sensitivity to marketing stimuli (Rose and Dhandayudham, 2014; Duroy et al., 2014). Kukar-Kinney et al. (2016) further link compulsive buying tendencies to a greater responsiveness to marketing techniques such as discounts, coupons, and time-limited offers.

Overexposure to online marketing stimuli significantly increases the risk of OSA behaviours. Research by Martin et al. (2013) emphasizes the critical role of marketing cues in advancing consumers along the consumption continuum towards addiction. These cues can undermine consumers' self-control and their ability to regulate consumption. Furthermore, trust in digital retailers decreases the perceived risks involved in the purchase (Al-Kfairy et al., 2022; Al-Kfairy et al., 2023), which decreases the perception of the risk of addiction. Moreover, brands that successfully engage hedonic-value-seeking consumers may inadvertently contribute to the negative consequences of pathological Internet use (Bridges and Florsheim, 2008). Consequently.

H2a. Exposure to online marketing stimuli positively mediates the relationship between hedonic shopping motivation and the likelihood of developing OSA.

In line with the argument for H1b, we also hypothesize that the mediation effect of exposure to online marketing stimuli follows a curvilinear pattern. According to the model of marketing cue impact on the consumption continuum proposed by Martin et al. (2013), we could argue that consumers may initially respond adaptively to online marketing strategies, so that the harmful consequences of being exposed to social media and other online communications are minimal or non-existent. It could even have a therapeutic effect (Kang & Johnson, 2010, 2011). However, as tolerance to these stimuli increases, maladaptive responses may emerge –with harmful consequences for OSA. Moderate exposure to marketing cues may promote healthy consumer engagement by stimulating interest in brands and products (Martin et al., 2013). Conversely, excessive exposure to online marketing actions may foster impulsive and compulsive shopping, thereby increasing vulnerability to addictive behaviours. Accordingly.

H2b. A curvilinear mediation effect of exposure to online marketing stimuli, with a positive increasing slope, is expected to exist between hedonic shopping motivations and OSA.

3.4. The mediating effect of frequency of online shopping

The impact of hedonic shopping motivations on OSA is also mediated by the frequency of online shopping. Perceiving online shopping as a source of hedonic gratification enhances users' interactions with the online environment (Ruggiero, 2000). Previous studies demonstrate that hedonic gratifications derived from entertainment and satisfaction improve attitudes toward websites (Luo, 2002) and positively influence purchase intentions in online contexts (Lim and Ting, 2012).

Shopping frequency also increases with greater exposure to commercial stimuli (Martin et al., 2013). Marketing communication on social media has been shown to influence purchase intentions, particularly among younger consumers (Le and Ngoc, 2024). Social media interactions resulting from marketing strategies have also been shown to

influence purchase intentions (Hollebeek, 2013). Receiving updates from brands through newsletters, social networks, emails, notifications, and other information sources encourages individuals to visit the online store, explore products, offers, and promotions, and, eventually, make a purchase. Indeed, brands aim to increase consumer propensity to purchase from their site through these interactions (Bridges and Florsheim, 2008).

Sustained increases in shopping frequency –particularly when such behaviour becomes unconscious or compulsive– heighten the risk of developing addictive tendencies (Dittmar, 2005; Duong and Liaw, 2022). Duong and Liaw (2022) show that daily internet shopping frequency increases OSA, and Zheng et al. (2020) relate compulsive buying with the frequency of online shopping. Purchases trigger excitement and gradually become a way to experience positive feelings or alleviate negative moods (Darrat et al., 2016). As shopping frequency intensifies, consumers attach greater importance to purchasing actions, which become central to their behaviour, i.e., it becomes a salience behaviour. Driven by tolerance, this escalation necessitates higher levels of shopping to achieve the same gratification, thereby reinforcing addictive tendencies. Accordingly.

H3. Hedonic motivations influence OSA through online shopping frequency mediation, and through the serial mediation of marketing stimuli and online shopping frequency.

4. Methodology

4.1. Data gathering

The empirical study focuses on younger consumers aged 18 to 35. According to the Rubicon Recovery Center, 2024, s hopping addiction in the U.S. is a behavioural disorder that predominantly affects adolescents and young adults. Research suggests that young adults represent the demographic segment that is most susceptible to shopping addiction due to their access to credit cards, low self-regulation in money management (Nyrhinen et al., 2023), frequent use of smartphones for online purchases (Faverio and Anderson, 2022), and exposure to social media platforms that feature ever-increasing numbers of influencers and sponsored content (The Summit Wellness Group, 2024), among other factors.

To collect the data required to test our model, we used the Prolific online platform, which is a digital platform that connects researchers with participants for academic studies and surveys. The survey was distributed via the Prolific online platform to 25,373 eligible English speakers who were consumers aged between 18 and 36 years from the Prolific panel. One pre-screening question ("How often (on average) do you shop online?") was used to identify qualified participants. Only respondents who had made at least one purchase over the past month were eligible to form part of the sample. The sample was obtained without gender restrictions, thereby reflecting the natural composition of users registered on the platform during the study period. Data collection commenced on December 22, 2022, and was completed after surpassing the threshold of 200 answers. Specifically, we collected 206 answers, with Prolific validating 200 responses and excluding six for not being deemed valid.

To minimize the risk of fraudulent responses, attention-check questions were included. A control process was adopted to ensure the reliability of the responses (Huang et al., 2014; Aguinis et al., 2020). Specifically, two basic questions were repeated using different response formats, and additional questions with impossible or highly improbable content were introduced, where uniform –or nearly uniform– responses were expected from most respondents. The initial dataset consisted of 200 users. After thorough review, 19 cases were excluded due to concerns about reliability. Consequently, the final sample used to test the hypotheses comprised 181 users.

The sample was balanced in terms of gender, with 49.2 % female and 50.8 % male participants. As regards occupational status, 6.1 % of respondents were unemployed, 14.4 % were students, 14.4 % worked part-time, and 65.2 % were employed full-time, indicating that the majority of participants were full-time workers. In terms of educational attainment, 2.3 % had completed basic studies, 23.8 % had secondary education, 12.2 % had vocational education and training, while 42.5 % held a university degree, and 19.3 % had attained a master's degree or PhD. Participants' ages ranged from 18 to 35 years. As for income levels, 5.5 % of respondents classified their income as low, 28.7 % as low-middle, 51.4 % as middle, 13.8 % as middle-high, and 0.6 % as high.

4.2. Construct measurement

To measure the constructs, we adapted pre-existing scales or developed new ones ad hoc. The constructs along with other measurement instruments are presented in Table 2. In this study, OSA was assessed using Griffiths' (2005) six-factor model, which consists of the following dimensions: salience, mood modification, tolerance, withdrawal, conflict, and relapse. This scale has been widely applied in previous research to measure online shopping addiction (Rose and Dhandayudham, 2014; Zhao et al., 2017; Duong and Liaw, 2022; Augsburger et al., 2020). *Salience* was measured with three items and evaluates whether online shopping has become a central aspect of the individual's life, as evidenced by recurring thoughts about shopping. *Mood modification* was assessed with two items and captures the positive emotional states experienced during online shopping. *Tolerance* was measured using three items, examining whether individuals have increased their frequency of online shopping in response to reduced sensitivity to its rewarding effects. *Withdrawal* was assessed with two items and refers to the negative emotional responses that arise when individuals are unable to shop online. *Conflict* was measured using two items, evaluating whether online shopping disrupts personal relationships or causes internal conflict. *Relapse* was assessed with two items, examining individuals' tendencies to revert to online shopping despite efforts to reduce or stop. These dimensions collectively reflect the symptoms of addiction, which may manifest to varying degrees throughout the addiction process.

Online purchase frequency was measured using a five-category scale ranging from the lowest frequency (once a month) to the highest frequency (every day). *Hedonic motivation* was measured using a scale inspired by the Hedonic Shopping Value Scale developed by Babin et al. (1994). Our scale, which consists of four items, measures the extent to which visiting online stores –regardless of purchase intent– serves as a source of gratification, amusement, or reward fulfilment. *Exposure to marketing stimuli* was measured using a newly developed scale consisting of seven items. This scale assesses the extent of consumer engagement with brands and their promotions via various online marketing tools, including newsletters, pop-ups, emails, social media platforms, and online advertisements.

Additionally, two control variables were included in the model. *Gender* has been shown to be a relevant variable in OSA research, with prior studies (Rose and Dhandayudham, 2014; Augsburger et al., 2020) identifying being female as a predictor of OSA. *Income level* was also included, as it may influence the frequency of online shopping.

4.3. Scales validation

Together with their descriptive statistics (mean and standard deviation –SD), the variables and items are presented in Table 2. No outliers were detected in the sample. The measurement and structural models were analysed using Partial Least Squares (PLS) path modelling with Smart PLS software (Hensler et al., 2015). To assess the significance of the parameter estimates, we used a bootstrapping procedure with 5000 subsamples.

In the measurement model, OSA was conceptualized as a second-order reflective-reflective construct with six dimensions (salience,

Table 2
Construct measurement.

	Mean	SD	Outer loading (1-order)	Outer loading (2-order)
Online Shopping Addiction Risk Scale[a]				
Salience				0.916
When I am not shopping online, I keep thinking about it	1.96	1.095	0.880	
I often think about how to save more time or money to spend in online shopping	2.10	1.230	0.904	
Online shopping is important for my life	2.37	1.202	0.873	
Mood				0.825
When I feel bad, online shopping can make me feel good	2.53	1.352	0.968	
Online shopping can help me to temporarily forget real life troubles	2.47	1.331	0.967	
Tolerance				0.877
Recently, I have an urge to do more and more online shopping	2.48	1.289	0.921	
I spend more and more time in online shopping	2.32	1.232	0.928	
Recently I often shop online unplanned	2.44	1.203	0.877	
Withdrawal				0.797
When I can't shop online for certain reasons, I get depressed or lost	1.47	0.853	0.892	
Life without online shopping for some time would be boring and joyless for me	1.75	1.130	0.924	
Conflict				0.686
My work or study productivity has decreased as a direct result of online shopping	1.43	0.775	0.865	
I have quarrelled with my parents or family as a result of my online shopping	1.44	0.852	0.855	
Relapse				0.790
I have tried to cut back on or stop my online shopping, but have failed	1.80	1.058	0.948	
I have decided to shop online less frequently, but have not managed to do so	1.77	1.001	0.952	
Online shopping frequency				
How many times do you shop online? *(1: Once a month; 2: More than once a month; 3: Once a week; 4: Several times a week; 5: Every day)*	2.69	0.866		
Hedonic motivation [a]				
When I go into an online shop, I spend a lot of time browsing	3.80	1.056	0.697	
I frequently visit online shops to look at items, even if I have no intention of buying anything	3.54	1.254	0.740	
To me, visiting online shops is a form of entertainment	3.06	1.216	0.799	
I often think of the purchase as a personal reward	2.85	1.277	0.722	
I am excited about the delivery and about being able to get the items purchased	3.35	1.280	0.733	
Exposure to online marketing stimuli[a]				
I subscribe to the newsletters of my favourite brands	2.39	1.289	0.710	
I pay attention to pop-up ads from shops I like	2.07	1.133	0.762	
I stay tuned to the news I see on social networks and emails sent to me by brands I like	2.42	1.150	0.808	
I stay tuned to the communication of the brands I like on the networks	2.42	1.220	0.862	
I often receive many notifications of offers, promotions or commercial information from brands	3.02	1.276	0.774	
I keep an eye out for discounts and promotions of my favourite online sites	3.43	1.216	0.796	
When I receive discount codes I use them by making a purchase	3.22	1.275	0.774	
Income level				
Income level *(1: Low; 2: low-middle; 3: Middle; 4: Middle-high; 5: High)*	2.75	0.781		

[a] 5-point Likert scales (1: disagree, 5: agree).

mood, tolerance, withdrawal, conflict, and relapse). All first-order and second-order factor loadings were significant and exceeded the recommended value of 0.68. Additionally, a confirmatory factor analysis (CFA) demonstrated a good model fit (χ^2/df = 461.51/285, $p < 0.00$; GFI = 0.847; AGFI = 0.812; NFI = 0.868; CFI = 0.944; RMSEA = 0.059), thereby supporting convergent validity.

As regards reliability, all the values for Cronbach's alpha (α) and composite reliability (CR) exceeded the threshold of 0.7, while the average variance extracted (AVE) surpassed the recommended minimum of 0.5 (Table 3). Discriminant validity was confirmed using both the Fornell and Larcker (1981) criterion and the HTMT criterion (see Table 3).

To evaluate common method bias, a common latent factor test was performed following the approach of Podsakoff et al. (2003). As previously noted, CFA demonstrated an acceptable model fit. When a direct latent common method factor was added, the results of the chi-square test ($\chi^2(284) = 457.87$) indicated that the difference ($\chi^2(1) = 3.64$, $p = 0.056$) was not significant, suggesting that common method bias is not a major concern.

4.4. Endogeneity

To address potential endogeneity in our model, we employed the procedure proposed byHult et al., (2018). Since we lacked any suitable instrumental variables, we applied the Gaussian Copula method in SmartPLS following the guidelines proposed by Hult et al., 2018 and the considerations by Becker et al., 2022. According to the results of the Kolmogorov-Smirnov test with Lilliefors correction, the composite values of OSA ($p < 0.001$), hedonic shopping motivations ($p < 0.001$), online shopping frequency ($p < 0.001$), and exposure to marketing stimuli ($p < 0.001$) were not normally distributed, thus fulfilling the requirement for use of the Gaussian Copula approach. However, quadratic variables were not included in the Gaussian Copula approach, since this method is generally applied to linear variables (Hult et al., 2018; Becker et al., 2022). The results of the 15 remaining combinations of the Gaussian Copula test indicated no endogeneity issues in this study, since all the p-values were above 0.05 Hult et al., (2018).

In order to control for endogeneity, the model estimation also evaluated the effect of the two control variables −gender and income level− on exposure to marketing stimuli. As the resulting control effects are not statistically significant and the variables' coefficients remain unchanged, the interpretation does not differ. We therefore consider that endogeneity is not an issue of concern in our study. The results of this analysis are provided in the Web Supplement.

Table 3
Zero-order correlations and scales' psychometric properties.

	1	2	3	4	5	6
1 Hedonic motivation	*0.739*	0.619	n.a.	0.738	n.a.	n.a.
2 Marketing stimuli	0.537**	*0.785*	n.a.	0.630	n.a.	n.a.
3 Shopping frequency	0.265**	0.301**	*n.a.*	n.a.	n.a.	n.a.
4 OSA	0.657**	0.596**	0.425**	*0.757*	n.a.	n.a.
5 Income	0.029	0.128*	0.187**	0.151**	*n.a.*	n.a.
6 Gender	−0.268**	−0.218**	−0.155*	−0.263**	−0.116	*n.a.*
CR	0.857	0.918	–	0.949	–	–
AVE	0.546	0.616	–	0.573	–	–
Cronbach's alpha	0.793	0.896	–	0.941	–	–

Note: italic values on the diagonal show the square root of AVE; values over the diagonal show HTMT; CR: Composite reliability, AVE: average variance extracted, n.a.: not applicable.
Gender: 0 female and 1 male.
Significance levels: **p < 0.01; *p < 0.05.

5. Results

5.1. Model estimation and hypothesis testing

Fig. 1 presents the path coefficients (β) for the estimated model, together with the significance levels and the variance explained (R^2) in the dependent variables. Table 4 displays the estimates of the direct and indirect effects proposed in the hypotheses.

In support of H1a and H1b, both the linear (β = 0.451, p < 0.01) and quadratic (β = 0.065, p = 0.09) coefficients for the effect of hedonic gratifications on OSA are positive and statistically significant. As shown in Fig. 2a, OSA remains at minimal levels (clearly below 2) for hedonic motivation values below 3, with a marked increase in OSA occurring only at higher levels of hedonic motivation.

Evidence suggests the presence of a curvilinear mediation effect of hedonic gratifications on OSA via exposure to online marketing stimuli. Specifically, we find that hedonic gratifications significantly influence exposure to marketing stimuli (β = 0.537, p < 0.01), and that exposure to such stimuli has a curvilinear positive impact on OSA (β = 0.242, p < 0.01 for the linear coefficient, and β = 0.089, p < 0.05 for the quadratic coefficient). As illustrated in Fig. 2b –and similar to the pattern observed in Fig. 2a– OSA remains below 2 for exposure levels of under 3, with a marked increase in OSA occurring only at higher levels of marketing stimuli exposure.

To formally test H2a and H2b –which is the curvilinear indirect effect through exposure to marketing stimuli– we employed the MEDCURVE macro, a special SPSS program designed to test non-linear mediation (as SmartPLS does not offer this functionality). This macro allows the inclusion of only one mediator variable, meaning that only the effect of *exposure to online marketing stimuli* could be tested as the sole mediator in the model. The results from this test show that the indirect effect of hedonic gratifications on OSA is as follows: for low levels, it is 0.137 (95 % CI: 0.0708; 0.2270), for medium levels, it is 0.181 (95 % CI: 0.1103; 0.2714), and for high levels, it is 0.224 (95 % CI: 0.1345; 0.3471). H2a and H2b are thus confirmed (more estimation details are provided in the Web Supplement).

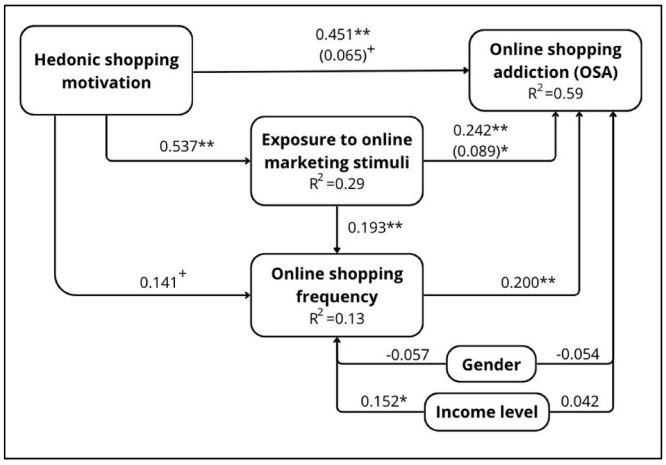


Fig. 1. Estimation of direct effects.
**p < 0.01; *p < 0.05; +p < 0.10 (one-tailed test).
NOTE. Quadratic effect in brackets.

Table 4
Effects of hedonic motivation on OSA.

Relationships	Direct effect	Indirect effect through marketing stimuli	Indirect effect through shopping frequency
Hedonic motivation → OSA (Hedonic motivation)^2 → OSA	H1a 0.451[a] H1b 0.065[c]	H2a 0.130[d] H2b [a] **Low HM (-1 SD)** 0.1373 [0.0708; 0.2270] **Medium HM** 0.1814 [0.1103; 0.2714] **High HM (+ 1 SD)** 0.2254 [0.1345; 0.3471]	H3 0.049[b]

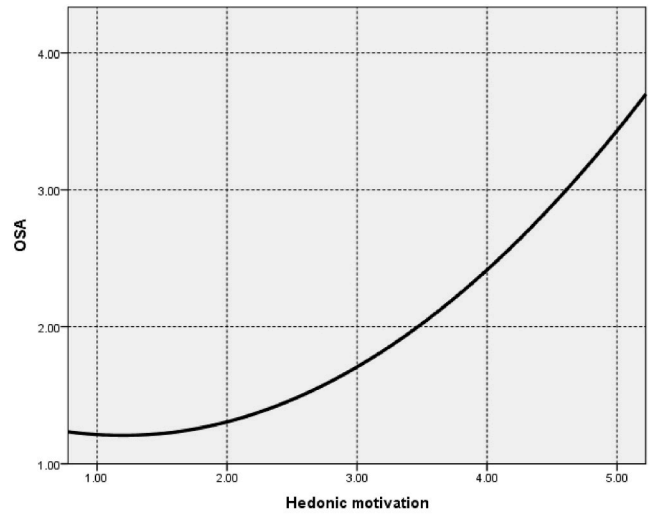
[a] p < 0.01.
[b] p < 0.05.
[c] p < 0.10 (one-tailed test).
[d] Significant and increasing positive relationship. Indirect curvilinear effect cannot be determined with SmartPLS. To establish its significance, the MEDCURVE macro for SPSS was used.

In support of H3, an indirect positive effect of hedonic gratifications on OSA through shopping frequency was observed (B = 0.049, p < 0.05). This effect is further decomposed into two distinct indirect effects: direct online shopping frequency mediation (hedonic motivation → frequency → OSA, B = 0.028, p < 0.10), and serial online shopping frequency mediation (hedonic motivation → marketing stimuli → frequency → OSA, B = 0.021, p < 0.05).

5.2. Additional analysis and robustness check

An additional analysis was conducted to assess the extent to which hedonic motivations and marketing stimuli influence the development of different OSA symptoms. For this purpose, two OSA variables were created: one representing mild symptoms of addiction (salience, mood, and tolerance), and another reflecting more severe symptoms (withdrawal, conflict, and relapse). According to Augsburger et al. (2020), severe symptoms appear more acutely in highly addicted consumers, but to a lesser extent in those still at the risk stage. The model was re-estimated for each of these dependent variables. The results are

a. Quadratic effect of hedonic motivation



b. Quadratic effect of marketing stimuli

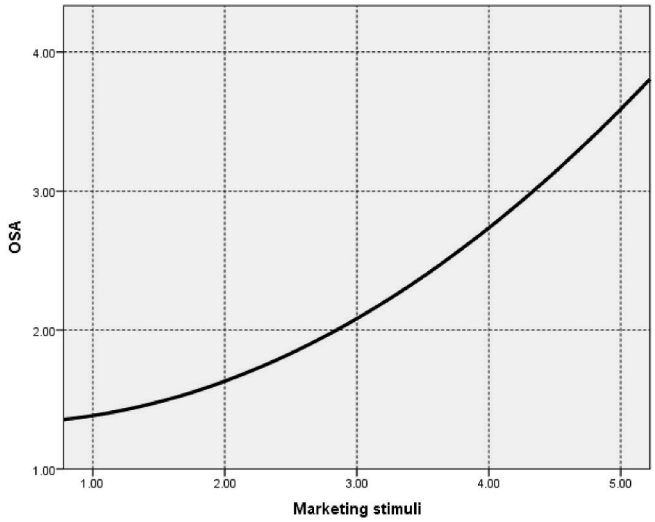


Fig. 2. Quadratic effects.

presented in Table 5.

As shown in Table 5, the model's ability to explain OSA differs when considering mild versus severe symptoms. Notably, there are two key differences. With regard to the effect of hedonic motivation on OSA, the relationship is positive and linear for OSA's mild symptoms ($\beta = 0.449$, $p < 0.01$), whereas it is less intense and curvilinear for severe symptoms ($\beta = 0.338$, $p < 0.01$, $\beta = 0.110$, $p < 0.05$).

As regards the role of marketing stimuli, the mediating effect is also stronger for mild symptoms than for severe symptoms. The mediating effect of marketing stimuli is significant for mild symptoms ($B = 0.163$, $p < 0.01$), but not for severe symptoms ($B = 0.053$, $p > 0.10$). As for the curvilinear indirect effect, for mild symptoms, the effect is consistently significant, with an increasing positive relationship ($B = 0.166$ for low levels, $B = 0.202$ for medium levels, and $B = 0.238$ for high levels). However, for severe symptoms, the effects are smaller and only significant at medium and high levels of hedonic motivation ($B = 0.102$ for medium levels and $B = 0.157$ for high levels).

In conclusion, both hedonic motivation and marketing stimuli have the potential to explain how online shopping can become a central aspect of an individual's life. However, they are less effective in explaining more severe issues such as anxiety, internal conflicts, or difficulties in abstaining from shopping, unless very high levels of hedonic behaviour are observed.

Table 5
Effects of hedonic motivation on different OSA symptoms.

Dependent variable	Relationships	Direct effect	Indirect effect through marketing stimuli	Indirect effect through shopping frequency
OSA Mild symptoms	Hedonic motivation → OSA (Hedonic motivation)^2 → OSA	H1a 0.449[c] H1b 0.034	H2a 0.163[a] H2b [a] **Low HM (-1 SD)** 0.1668 [0.1008; 0.2545] **Medium** 0.2026 [0.1299; 0.2926] **High HM (+ 1 SD)** 0.2384 [0.1490; 0.3417]	H3 0.049[b]
OSA Severe symptoms	Hedonic motivation → OSA (Hedonic motivation)^2 → OSA	H1a 0.338[a] H1b 0.110[b]	H2a 0.053 H2b [a] **Low HM (-1 SD)** 0.0477 [-0.0455; 0.1361] **Medium** 0.1027 [0.0280; 0.1895] **High HM (+ 1 SD)** 0.1577 [0.0591; 0.2956]	H3 0.042[b]

[+] $p < 0.10$ (one-tailed test).
[a] $p < 0.01$.
[b] $p < 0.05$.
[c] To establish its significance, the MEDCURVE macro for SPSS was used.

Finally, a robustness check was conducted. To this end, a new sample of individuals was collected to test the stability of the estimated model. In this case, it was a convenience sample consisting of 107 Spanish undergraduate students (52.3 % women, 47.7 % men, with an age range from 18 to 25 years). The results from this new sample are shown in

Table 6
Effects of hedonic motivation on OSA (new sample).

Relationships	Direct effect	Indirect effect through marketing stimuli	Indirect effect through shopping frequency
Hedonic motivation → OSA (Hedonic motivation)^2 → OSA	H1a 0.519[a] H1b 0.145[b]	H2a 0.170[c] H2b [a] **Low HM (-1 SD)** 0.1610 [0.0517; 0.3036] **Medium** 0.1968 [0.0987; 0.3208] **High HM (+ 1 SD)** 0.2316 [0.0378; 0.4908]	H3 0.082 [b]

[+] $p < 0.10$ (one-tailed test).
[a] $p < 0.01$.
[b] $p < 0.05$.
[c] To establish its significance, the MEDCURVE macro for SPSS was used.

Table 6.

As can be seen, the hypotheses are similarly confirmed with this new sample, which supports the stability of the model and the hypotheses. Notably, all the estimated coefficients are higher in this new sample compared to the original one. This may suggest that the effect of hedonic motivations and the mediation of marketing stimuli are more pronounced among younger populations, further highlighting the vulnerability of young adults to online shopping addiction issues.

6. Discussion

Addressing the growing issue of online shopping addiction (OSA), this study seeks to expand current understanding of this condition among young people from a consumer behaviour perspective.

The findings confirm that hedonic motivation is a significant predictor of OSA. Specifically, the hedonic motivations driving online shopping among young people can exacerbate problematic shopping behaviours, and manifest themselves in addiction-related symptoms and contribute to the development of OSA. These results align with prior research, which has identified a positive relationship between hedonistic shopping experiences and compulsive buying (Bridges and Florsheim, 2008; Tarka et al., 2022b; Horváth and Adıgüzel, 2018). Moreover, this study extends previous research by demonstrating that the relationship between these constructs is not merely linear. One key finding is the identification of a curvilinear relationship with an increasingly positive slope. When hedonic motivation is low to moderate, individuals typically use online shopping as a coping mechanism for short-term mood enhancement –with minimal impact on addiction– which reflects a behaviour associated with retail therapy. However, as the motivation to engage in hedonic shopping intensifies, young people begin to ritualize shopping as a mood-regulating activity, which ultimately leads to onset of OSA. This is creating cause for concern since, according to TIME, 2024, the use of digital platforms to alleviate negative moods through retail therapy does not always prove effective. In fact, those who repeatedly resort to this practice often experience a deterioration in their emotional well-being.

The results also indicate that marketing stimuli mediate the relationship between hedonic buying motivations and OSA. This suggests that consumers derive perceived value from brands' online media, which serves as a source of hedonic gratification. Consistent with Martin et al. (2013), our study demonstrates that exposure to brands' commercial actions can undermine self-control in purchasing decisions, thereby triggering OSA. The influence of marketing stimuli on the potential onset of OSA becomes evident when examining the practices employed by major online retailers such as Wish, Shein and, in particular, Temu. These practices involve regular promotions that encourage daily visits with the application and web, time countdowns for offers, or an interface overloaded with pop-ups –among other strategies. As Mark Griffiths notes in a BBC article (2024a), although Temu's marketing strategies may not necessarily trigger an all-consuming addiction in the clinical sense, they can nonetheless pose a problem for consumers. Additionally, our findings align with those of Bridges and Florsheim (2008), who underscore the role of brands' online media in fostering pathological internet use. A further contribution of this study is the evidence that the effect of hedonic motivations on OSA –mediated by marketing stimuli– is not linear. Individuals who are overexposed to online marketing strategies no longer engage with brand content merely for enjoyment. Instead, they develop a maladaptive reliance on such content, which leads to OSA. In summary, the greater the exposure to marketing stimuli, the more exponentially the risk of developing OSA increases.

Additionally, the findings suggest that purchase frequency plays a mediating role in the relationship between hedonic motivation and OSA. The need to increase purchase frequency arises as a result of growing tolerance towards the hedonic value derived from online shopping. By increasing purchase frequency, individuals aim to sustain or enhance the hedonic gratification obtained from shopping online. This relationship is further mediated by marketing stimuli; in other words, the rise in purchase frequency is also influenced by exposure to brands' online content. Marketing stimuli encourage individuals to interact with online platforms and increase their purchase frequency, as intended by many marketing strategies, ultimately increasing the risk of addiction. This is reflected in the strategies of large online retailers such as Shein, who use online marketing stimuli to encourage frequent visits to their shopping app and to increase purchases in exchange for rewards (BBC, 2024b).

While we acknowledge the positive impact of marketing stimuli on purchase frequency and OSA, the findings suggest that the influence of marketing on OSA development is comparatively limited in contrast to the effect of individuals' pursuit of hedonic gratification. Specifically, the direct effect of hedonic motivations on OSA is stronger than the indirect effect mediated by marketing stimuli. Similarly, the direct effect of hedonic motivations surpasses any effect mediated by purchase frequency. This implies that even in the absence of marketing communications or promotions, individuals who seek entertainment by browsing online stores or by deriving pleasure from shopping online are inherently at greater risk of engaging in problematic shopping behaviours, and of ultimately developing OSA. Furthermore, an increase in purchase frequency is not a prerequisite for addiction. Individuals who are primarily driven by the pursuit of hedonic shopping experiences may develop OSA without any notable change in their purchase frequency.

These findings have been further refined by re-estimating the model based on the type of symptoms. In this study, we differentiate between mild OSA symptoms –salience, mood, and tolerance– and severe symptoms –withdrawal, conflict, and relapse. When analysing these symptoms separately, we found that while hedonic gratifications and purchase frequency influence the development of both mild and severe symptoms, marketing stimuli exhibit a differentiated effect. Specifically, exposure to marketing stimuli does not act as a triggering factor –either linearly or quadratically– for the most severe and conflicting symptoms of OSA. The curve describing the mediating effect of marketing stimuli on severe symptoms remains below that describing their effects on mild symptoms. This distinction supports our hypothesis that, even at high levels of marketing content exposure, the influence of marketing is primarily confined to aspects such as the salience of purchases in an individual's life, improvements in mood, or increased time spent shopping (tolerance). However, marketing stimuli are not the primary drivers of the more conflictual aspects of OSA. In conclusion, once an individual is driven by recurrent hedonic impulses, the progression towards the most severe symptoms of OSA appears inevitable and independent of marketing stimuli.

7. Implications and future research lines

7.1. Policy and managerial implications

This study offers several important implications for policymakers, marketing managers, and therapists. First, for policymakers, the findings suggest significant implications for developing social marketing campaigns aimed at addressing OSA and promoting responsible online shopping behaviours. Given that young people are obtaining credit cards at increasingly younger ages, online shopping is becoming more accessible, and youngsters are engaging in these shopping behaviours during a vulnerable developmental stage when they may have limited ability to control the impulse-driven satisfaction of needs through online purchases. Policymakers should therefore implement initiatives aimed at raising awareness of OSA –similar to how awareness is raised regarding other harmful social behaviours– that include campaigns to promote healthy digital habits and self-control strategies. Additionally, policymakers should regulate promotional materials that are specifically targeted at vulnerable populations who may be more susceptible to such stimuli. This could include restrictions on addictive digital features of digital platforms such as infinite scroll, persistent push notifications, or

the requirement for commercial notifications to be disabled by default and only manually enabled. Moreover, a fair label could be created in order to identify websites as "OSA prevention compliance platforms" or not.

For marketing managers, it is crucial to adopt responsible marketing practices. While online shopping may sometimes serve an appropriate purpose, excessive engagement in this behaviour may prove harmful. Instead of promoting shopping behaviours that immediately gratify hedonic needs, campaigns should be designed to encourage more balanced consumption. This could involve creating messages that emphasize responsible and balanced shopping by displaying a message before the checkout screen that encourages users to assess whether their purchase is really necessary and that allows them to reflect on a purchase before making it. Additionally, managers may consider developing ethical codes aimed at self-regulating their online marketing strategies, by reducing the intensity of notifications and commercial communications during night-time hours, which is when consumers are more susceptible to making irrational purchases (BBC News, 2016). Managers could also implement a personalised commercial content filter, allowing users to control the intensity and timing of the promotional content they receive. This would help reduce their exposure to aggressive promotions and flash sales. These recommendations will strengthen the brand's commitment toward its online community and its trust-based relationship with customers, who increasingly demand an authentic and transparent connection with brands (González, 2025). Furthermore, it would position the platform as being OSA-responsible and thereby attract ethical investors.

Finally, therapists may find these findings valuable as they underscore the emergence of a new addiction or pathology that requires treatment. Treatment becomes crucial when hedonic impulses are so recurrent that they persist "independently", even in the absence of marketing stimuli or increased purchase frequency.

7.2. Theoretical contributions

The present study enriches OSA framework-based studies by providing three main contributions. First, this is the first research to propose and confirm a non-linear impact of hedonic motivations on OSA, a finding that can be related to prior research on retail therapy (Darrat et al., 2016; Zielke et al., 2023; Han et al., 2024). Our results reveal the existence of a threshold effect, beyond which the pursuit of hedonic stimuli no longer serves as an effective mood-alleviating strategy, instead evolving into an addiction to online shopping.

Second, this study contributes to expanding the thus far limited literature on the role of external factors as determinants of OSA. To our knowledge, it is the first study to consider and confirm the mediating role of marketing stimuli in this context. Our findings indicate a growing positive influence of marketing stimuli on OSA.

Third, and in contrast to other studies (Martin et al., 2013; Duroy et al., 2014), we demonstrate that frequency is not an appropriate variable for characterizing consumers at different stages of OSA. Instead, frequency serves as an external antecedent, and our findings show that addiction can develop regardless of whether purchase frequency increases. It is therefore insufficient to categorize an individual as addicted or non-addicted based solely on the frequency of their online shopping.

7.3. Limitations and directions for future research

This study leads to several areas for development and improvement, which we propose as directions for future research, organized into three key areas: model refinement, sample diversification, and data type.

First, as regards the model, our current proposal simplifies the reality by focusing on only two factors –hedonic motivation and marketing stimuli– while numerous internal and external factors have been identified in previous studies as influencing OSA (see Table 1). Future research could integrate additional variables into this model. For example, Febrilia et al. (2024b) suggest antecedent and moderating variables for hedonic motivations –such as e-commerce attributes and consumer mood– that could be considered predictors of OSA. Along this line, a more detailed analysis could be conducted to examine the distinct effects of various types of specific online marketing actions or how OSA might develop due to the use of certain platforms. Further in-depth analysis could also be carried out into emerging factors related to brands' use of influencers, as well as into real-time personalised marketing strategies. Such personalised marketing strategies are powerful tools for attracting consumers (Behera et al., 2020), yet are often invasive (Goic et al., 2021) since they determine precisely which purchases to promote for each consumer, which could negatively impact individuals who have limited impulse control. In addition, brands' use of credible influencers can shape product perception and can lead to impulsive purchases driven by the hedonic aspects of shopping (Samim et al., 2024). Such analysis would help to identify which strategies and actions are more likely to induce problematic shopping behaviour and exacerbate severe OSA symptoms, versus those that foster mood improvements. Furthermore, while we use the concept of retail therapy to justify our hypotheses and findings, it has not been explicitly measured in this study. Future research could measure retail therapy directly to investigate whether it is the driving factor behind the identified curvilinear effect. It is also important to note that our study is limited in terms of methodology, since the endogeneity tests could not be conducted for the model in its entirety, due to the existing constraint on applying these tests to quadratic variables.

As for the sample, it would be interesting to test the model on a different consumer profile. For instance, the model could be tested on adult consumers who, although less prone to shopping addiction, are increasingly engaging in online shopping. Alternatively, the model could be tested on individuals who already exhibit symptoms of OSA. This approach would provide insights into the behaviour of individuals who are already experiencing this pathology. Furthermore, the model could be studied in a different sociodemographic profile or contrasted across different cultural contexts. This could yield varying results depending on the level of e-commerce penetration in different countries or regions, or according to the consumer cultural profile of the population.

Finally, this study uses cross-sectional data based on participants' perceptions. An extension of this work could involve using longitudinal, objective data. Since online retailers track customer purchase data over time, future research could examine the impact of variables such as purchase intensity, the number of visits to online stores, or product returns, and assess how these factors influence the development of OSA.

CRediT authorship contribution statement

Laura Carmen Heredero: Sánchez, Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Carmen Camarero:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization. **Ana Isabel Rodríguez-Escudero:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Carmen Camarero and Ana Isabel Rodriguez-Escudero reports financial support was provided by University of Valladolid. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix ASupplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jretconser.2025.104308.

Data availability

Data will be made available on request.

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