

The influence of aesthetics and emotions on reuse intention and compulsive behaviour in food delivery usage

British Food
Journal

353

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Received 2 March 2024
Revised 11 April 2024
Accepted 4 May 2024

Abstract

Purpose – This study addresses the impact of aesthetics and formality in Food Delivery Applications (FDAs) in evoking emotions, and how these influence the intention to reuse and compulsive usage, providing critical insights for designing responsible and effective marketing strategies.

Design/methodology/approach – A quantitative analysis of data collected from 1,029 FDA users was employed, using the PAD (Pleasure, Arousal, Dominance) theory to investigate how aesthetic design and formality affect emotions and consumer behaviour towards the applications.

Findings – The study reveals that aesthetic appeal and formality significantly impact emotions of dominance, arousal, and pleasure, which are decisive in users' decisions to continue using FDAs and in the manifestation of compulsive usage behaviours.

Research limitations/implications – This study presents inherent limitations due to its cross-sectional design, which prevents offering a longitudinal perspective on the evolution of consumer behaviour regarding FDAs. The actual purchasing behaviour is not examined, but rather the suggested experiences. Future research could be enriched by considering cultural, social, and demographic factors, the influence of sustainability on the perception and use of FDAs, and the importance of specific sustainable practices. Adopting a longitudinal approach and utilising actual usage data would allow for a deeper and more nuanced understanding of consumer behaviour towards FDAs, taking into account both personal factors and functional attributes of FDAs along with their aesthetic appeal and emotional reactions.

Practical implications – The findings provide guidelines for FDA companies to optimise their interfaces to enhance user experience, foster loyalty, and prevent compulsive usage. They emphasise balancing aesthetics and functionality to induce more conscious and sustainable consumption behaviours.

Social implications – This study highlights significant social implications stemming from the integration of aesthetic appeal and formality in Food Delivery Apps (FDAs) and their effect on consumer emotions, which in turn influences reuse intention and compulsive use. Amidst the COVID-19 pandemic, consumer behaviours have shifted towards increased electronic transactions and hedonic consumption as responses to stress, anxiety, and boredom, leading to a reevaluation of life experiences through technological means. The research underlines the critical role of emotions, particularly pleasure, dominance, and arousal, in promoting the intention to reuse FDAs, which has far-reaching implications for consumer engagement, compulsive usage patterns, and the need for responsible, sustainable consumption practices. It suggests a new avenue for businesses and policymakers to consider emotional impacts and consumer satisfaction in the design and regulation of FDAs, aiming to mitigate potential adverse effects of compulsive usage and to encourage sustainable, responsible consumption behaviours.

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This research was supported by the Andalusian Research, Development and Innovation Plan (PAIDI 2020), Grant: Group SEJ-567 (Spain). Projects of the Internal Plan of the University of Malaga B3-2023/21 (MP-ECSTIA). Funding for the open access charge was provided by the University of Malaga/CBUA.

Authors' contribution: Francisco Rejón-Guardia: conceptualisation, methodology, formal analysis, visualisation, writing-original draft preparation, review and editing.



Originality/value – The research offers a novel perspective by exploring how aesthetic and emotional dimensions affect consumer loyalty and compulsivity. These areas are still to be examined in depth in the marketing literature. The findings enhance the theoretical and practical understanding of FDA marketing, demonstrating how design can influence consumer well-being and the sustainability of purchasing behaviour.

Highlights

- (1) Novel use of PAD theory to analyse FDA's aesthetic appeal and formality on user emotions.
- (2) FDA's aesthetic appeal significantly influences reuse intentions and compulsive usage.
- (3) Emotions of pleasure, dominance, and arousal are directly linked to FDA reuse intention.
- (4) Pleasure and reuse intention influence the compulsive use of FDAs.

Keywords PAD theory, FDAs, Aesthetic, Emotions, Intention to reuse, Compulsive usage

Paper type Research paper

1. Introduction

The remarkable expansion of the Food Delivery Application (FDA) industry has created a relevant shift in consumer behaviour, achieving unprecedented levels of growth both globally and regionally. According to [Statista \(2023a\)](#), global food delivery revenues reached \$760bn in 2022. In Europe, the online food delivery market alone generated approximately \$34bn in revenue, nearly doubling its 2019 figures. Moreover, projections suggest that this market will surpass \$176bn by 2027, predominantly driven by the UK and German markets. The COVID-19 pandemic significantly accelerated this growth, especially in Spain, where the online food delivery market doubled its revenue between 2019 and 2022, surpassing five billion euros ([Statista, 2023b](#)). Over 10 million Spaniards, about 21% of the total population, are now actively engaged in online grocery shopping ([Statista, 2023c](#)).

The global COVID-19 pandemic marked a milestone in consumer purchasing behaviour worldwide, significantly impacting electronic transactions ([Donthu and Gustafsson, 2020](#); [Saleem *et al.*, 2021](#)). This shift has also been reflected in the use of FDAs, particularly post-pandemic ([Sharma and Alam, 2022](#); [Madinga *et al.*, 2023](#)). The pursuit of new life-enriching experiences, often through technological means and innovations in consumption patterns, as well as responses to stress, anxiety, and boredom, have led to alterations in daily routines, intensified by the pandemic ([Arslan *et al.*, 2021](#); [Deng *et al.*, 2020](#)). In an attempt to counteract these negative effects, there has been a shift towards more hedonistic consumption, prioritising enjoyment and satisfaction, or towards impulsive (unplanned) ([Kshatriya and Shah, 2023](#)) and compulsive (uncontrolled) buying behaviours ([Aruldoss *et al.*, 2023](#)).

Given this backdrop, understanding consumer behaviour in relation to FDAs has garnered considerable academic attention ([Nguyen *et al.*, 2023](#); [Shankar *et al.*, 2022a](#); [Shah *et al.*, 2023](#)). Nevertheless, a clear gap remains in the existing literature: the influence of aesthetic and emotional dimensions on user retention and compulsive usage patterns. While previous research has investigated factors such as satisfaction and perceived value in determining the intention to reuse FDAs ([Ng *et al.*, 2023](#)), the effect of aesthetics and emotions has yet to be explored. This represents a critical oversight, especially as aesthetic features can provoke emotional reactions, substantially influencing user behaviour and potentially leading to maladaptive or undesirable actions, such as compulsive purchasing. Given the dearth of literature in the specific context of FDAs, this study suggests that future research should focus on unravelling the specific affective and cognitive mechanisms that drive compulsive purchasing on these platforms. This understanding is crucial for developing effective intervention strategies and well-founded public policies.

This research is important for several reasons. Firstly, it aims to bridge the identified gap in the literature by exploring the dynamics of reuse intention and compulsive purchasing behaviours on FDAs among European citizens in the aftermath of the COVID-19 health

emergency. Secondly, it aspires to expand and revalidate the application of the Pleasure, Arousal, Dominance (PAD) theoretical framework, originally proposed by Mehrabian and Russell (1974), to comprehend the complexities of repeated use and compulsiveness in FDA usage (Handayani *et al.*, 2022). Thirdly, by analysing how the aesthetics and formality of FDA interfaces impact user emotions and subsequent behaviours, this study contributes to a more sophisticated understanding of consumer psychology. Fourthly, this study examines the effect of emotions on the intention to reuse and the compulsive behaviour of FDA users.

Finally, it offers practical insights for companies operating in the FDA sector to enhance customer service policies and heighten awareness about potential health and social concerns, such as excessive consumption and food waste (Sharma *et al.*, 2021). Given these goals, the present study poses the following research questions: Do aesthetic appeal and formality impact the emotions generated by FDA usage? What role do these emotions play in the intention to reuse and in the compulsive use of FDAs? Addressing these issues is vital, both academically and socially, as understanding emotional and aesthetic factors could lead to more responsible consumer behaviour and more ethical marketing practices.

2. Literature review

2.1 Food delivery apps (FDAs)

FDAs are digital platforms that enable the placement of online food orders for direct home delivery (Ray *et al.*, 2019). These applications can be classified into two main types (Zhao and Bacao, 2020): (1) those developed and managed by restaurants or catering services themselves, such as Domino's, Pizza Hut, and KFC, to receive online orders and oversee the delivery process; and (2) those that act as third-party brokers, such as Glovo, Uber Eats, Grubhub, which function as intermediaries between customers and the food establishments (Belarmino *et al.*, 2021; Gunden *et al.*, 2020). This investigation primarily explores the latter category of FDAs, those that function as strategic go-betweens amid food franchises, where the delivery operation plays a mediating role (Ray *et al.*, 2019).

In the midst of the COVID-19 pandemic, FDAs adopted contactless delivery protocols to reduce the risk of virus transmission. Additionally, innovative strategies were implemented, such as supplying essential goods to consumers, extending COVID insurance to delivery workers, establishing a pandemic aid fund, and ensuring strict adherence to hygiene regulations at restaurants throughout all steps, from meal preparation to packaging. These initiatives and services provided several advantages (Madinga *et al.*, 2023), both for customers through effective social distancing and service optimisation, and for catering firms that received support during the pandemic and achieved reduced spatiotemporal delay during the ordering and consumption process (Madinga *et al.*, 2023; Zhao and Bacao, 2020). As a result, the FDA sector witnessed significant expansion, drawing researchers' attention. Existing research has largely analysed the adoption and usage motives of FDAs across different regions such as Malaysia (Ng *et al.*, 2023), India (Kapoor and Vij, 2018; Ray *et al.*, 2019), South Korea (Jeon *et al.*, 2016; Lee *et al.*, 2019), Jordan (Alalwan, 2020), Saudi Arabia (Abed, 2024), the United States (Gunden *et al.*, 2020), Spain (Gavilan *et al.*, 2021), Germany (Shah *et al.*, 2023), Indonesia (Handayani *et al.*, 2022), China and New Zealand (Shah *et al.*, 2022; Wang and Scrimgeour, 2021), Brazil (Pigatto *et al.*, 2017; Zanetta *et al.*, 2021), Taiwan (Tsai *et al.*, 2023), and South Africa (Madinga *et al.*, 2023). Theoretical frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.*, 2003), the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) (Venkatesh *et al.*, 2012; Tsai *et al.*, 2023; Abed, 2024), the Theory of Planned Behaviour (TPB) (Ajzen, 1991), the Technology Acceptance Model (TAM) (Davis, 1989), the Expectation Confirmation Model (ECM) (Oliver, 1980), the Pleasure, Arousal, Dominance (PAD) theory (Shah *et al.*, 2023), the Value Attitude Behaviour (VAM) model (Homer and Kahle, 1988), the Attention, Interest,

Desire, Action (AIDA) model (Song *et al.*, 2021), the Behavioural Reasoning Theory (BRT) (Sharma *et al.*, 2021), and the Privacy Calculus Theory (Laufer and Wolfe, 1977), Uses and Gratifications (U&G) (Shah *et al.*, 2022) have been applied to explain the adoption and usage of FDAs (Shankar *et al.*, 2022a). Furthermore, these studies utilised various analytical methods, emphasising quantitative techniques, qualitative methods, mixed methodologies, and experimental designs (Shankar *et al.*, 2022a).

The main antecedents used to analyse FDA usage include service-related factors, for instance price and discounts/promotions, convenience, compatibility, delivery time, or FDA visual design; interpersonal factors such as subjective norms and social influence; psychological factors such as risk, value, trust, perceived ease of use, behavioural control, passion, or product knowledge; mediators such as attitude towards FDAs, self-efficacy, or perceived usefulness; or moderators such as product involvement and personal innovation. As dependent variables, usage intention, recommendation, satisfaction, propensity to pay more, current usage, continue intention to utilise or intention to reuse have been analysed. It is noteworthy that the existing literature has rarely explored the role of emotions in utilising FDAs, (Jeon *et al.*, 2016; Shah *et al.*, 2023; Shankar *et al.*, 2022a; Handayani *et al.*, 2022; Yao and Li, 2024).

Additionally, recent studies have evaluated FDA Quality Attributes, such as Trustworthiness, Convenience, and Price Information, and their impact on behaviours such as the intention to reuse FDAs (Handayani *et al.*, 2022). On the other hand, studies such as that by Shah *et al.* (2022) address the importance of mobile applications for food ordering (MFOAs) during the COVID-19 crisis, focussing on how these technologies have contributed to meeting consumer needs and preferences in China. Specifically, they found that ease of use, perceived value, and mobile compatibility are critical for influencing FDA user satisfaction. Meanwhile, the study by Shah *et al.* (2023) explores how online reviews impact ongoing login activity for meal delivery apps, finding that textual reviews affect pleasure and dominance, while pictographic reviews evoke pleasure and arousal, both leading to continued usage, with the role of these emotions as mediators confirmed, and their influence varying by user familiarity with the app. Additionally, Abed's (2024) study investigates factors affecting the continued intention to use food delivery apps in Saudi Arabia's post-pandemic context, offering key insights. By employing an expanded UTAUT2 model to include trust, it highlights the crucial roles of social influence and performance expectancy in maintaining user engagement. Interestingly, the direct impact of effort expectancy on continued use intention was unsupported, pointing to the intricate dynamics in consumer decision-making. This research emphasises the evolving nature of consumer expectations and behaviours in the digital food delivery sector, suggesting a nuanced understanding of what drives app usage sustainability post-pandemic. Meanwhile, Yao and Li's (2024) research provides insightful analysis on the dynamics between employees' intention to continue using Online-to-Offline Food Delivery Services (O2OFDS) and their actual usage, highlighting sedentary behaviour's moderating role. The study emphasises the significant effects of satisfaction, perceived time-saving, promotion, and food desires on user engagement with O2OFDS, noting that sedentary behaviour not only increases service use likelihood but also shifts usage towards being more habitual. This sheds light on the complexities of adopting digital food services among workers, underlining the importance of balancing convenience with healthy lifestyle choices.

However, there is a lack of research on maladaptive usage behaviours, including compulsive FDA usage and its potential consequences. Very few studies have examined FDA usage in the European context (Gavilan *et al.*, 2021).

2.2 PAD emotional state model

Mehrabian and Russell (1974) proposed the Pleasure, Arousal, and Dominance (PAD) theory based on environmental psychology to understand the emotions that influence users'

judgements and responses. The authors identified three basic emotions linked to pleasure, arousal, and dominance as a response to an individual's evaluation of stimuli in their environment: pleasure refers to the degree to which users feel happy or satisfied with an environment; arousal refers to how users feel excited or active in a particular situation; dominance refers to the degree to which users feel free to act or in control of a situation. The PAD theory has proven to be particularly valid for analysing emotional responses shaped by the environment that affect individual behaviours (Chang *et al.*, 2014; Krey *et al.*, 2018). In the context of offline commerce in retail stores, PAD refers to the emotions that consumers experience when they interact with the physical store environment. For example, pleasure may be related to store comfort, visual aesthetics, and product quality. Arousal may be related to lighting, music, and product layout. And dominance may be related to the organisation and design of the store (Krey *et al.*, 2018). In the online realm, PAD theory has been successfully used to analyse usage intention of technology interfaces (apps, websites, etc.) in the retail sector (Krey *et al.*, 2018), in e-commerce websites (Chang *et al.*, 2014), in luxury fashion websites and apps (Jebarajakirthy *et al.*, 2020), in the use of social networks, for example, Facebook (Hall *et al.*, 2017) and, recently, it has proven very useful for explaining the use of FDAs and their recurrent use (Jeon *et al.*, 2016; Handayani *et al.*, 2022) or continued log-in behaviours (Shah *et al.*, 2023).

It is essential to note that when consumers interact with FDAs, they establish emotional connections with the aesthetic characteristics and functionalities of the application (Kumar *et al.*, 2021). Functionality refers to aspects such as personalisation or the degree of interactivity of the service offered, while aesthetic characteristics refer to design aspects such as the graphic user interface (GUI) or the product presentation. Both attributes of the FDA generate different emotional responses to the application, which can lead to desired behaviours such as revisiting or positive word of mouth (Kumar *et al.*, 2021). As the frequency and duration of FDA use increases, the relationship the consumer establishes with the application can strengthen and become more durable (Yang *et al.*, 2020). Moreover, during the COVID-19 pandemic, the FDA expanded its scope to deliver not only food but also essential supplies, increasing the emotional connection of consumers with these platforms (Kumar and Shah, 2021). Therefore, in the present study, the PAD theory is used as a context for the use of FDA applications for two reasons. Firstly, when an online food menu is selected, the purchasing process includes food selection, payment, and transactions, which can have a significant impact on consumers' emotions. Emotions can affect consumer behaviour, influencing their purchasing decisions, their permanence on or abandonment of a platform (Eroglu *et al.*, 2001; Sharma and Alam, 2022), and can condition the future consumer behaviour. Secondly, the PAD framework has already been successfully used to evaluate the effects of emotional responses associated with the context of the use of FDA applications (see Kumar *et al.*, 2021; Shah *et al.*, 2023).

3. Development of hypotheses

3.1 *Aesthetic appeal and aesthetic formality*

In the digital environment, aesthetics plays a crucial role in shaping the user experience and the associated emotions (Sharma and Alam, 2022). The concept of aesthetic appeal pertains to the satisfaction a user derives from interacting with a web-based application or interface (i.e. form, User Interface – UI) (Chang *et al.*, 2014; Stoyanov *et al.*, 2015). When an application's various components and features align effectively, they may create a favourable perception and evoke emotional responses in the consumer (Kumar *et al.*, 2021). Conversely, poor aesthetics or extended loading durations can elicit negative feelings, thus reducing the likelihood of reusing an application (Blázquez-Cano *et al.*, 2017). In the realm of FDAs, aesthetic appeal is discerned in the proficient functioning of their characteristics: visual design, simplicity of searches, and the ease of placing orders and conducting financial

transactions (Kapoor and Vij, 2018). FDAs pay meticulous attention to interface design and incorporated features, resulting in striking aesthetics (Kapoor and Vij, 2018). Hence, engaging aesthetic stimuli may enhance performance in demanding tasks by providing intrinsic rewards (Reppa *et al.*, 2021). A visually engaging aesthetic characterised by graphic sophistication, pleasing visuals, legible text, fluid navigation, and well-organised content can trigger fundamental emotions related to Aesthetic Appeal (AE), which foster positive consumer behaviours (Khan *et al.*, 2021; Kumar *et al.*, 2021; Sharma and Alam, 2022). AE is defined as the ability of an application or website to evoke pleasurable sensory emotions that contribute to a positive attitude and the intention to continue using the platform (Chang *et al.*, 2014; Gatautis and Vaiciukynaite, 2013). AE is particularly relevant for hedonistic consumers, as the use of visuals and graphics can generate sensory pleasure (Bufquin *et al.*, 2020). For instance, if an FDA employs a vibrant colour palette and appealing images of food, it will capture users' attention, creating a pleasurable sensory experience and increasing their intention to continue using the app for their food orders.

In contrast, aesthetic formality (AF) refers to the simplicity, structuring, navigational ease, and text readability of an application or web portal (i.e. function or User Experience - UX) (Chang *et al.*, 2014; Liu *et al.*, 2016). AF has an impact on emotions and customer loyalty, as a well-structured and easy-to-use interface can generate positive emotions (Kumar *et al.*, 2021) and consumer satisfaction (Stone *et al.*, 2018). Accordingly, blending colours, choice of font, and use of straightforward language are paramount, and disregarding these facets can bewilder the user. Previous research has indicated that the consumer's response is influenced by the atmospheric cues emanating from aesthetics and design (Chang *et al.*, 2014; Stoyanov *et al.*, 2015). In a digital ecosystem, an application's aesthetic allure and formality create a context which incentivises consumers to revisit the application or engage in word-of-mouth marketing. Therefore, in the context of FDAs, it is suggested that an application's atmosphere tone, as expressed by formality and aesthetic allure, moulds the consumers' reaction, since aesthetics create an amenable environment for consumers to immerse themselves in (in the application). This positive experience encourages consumers to return to the application and spread positive word of mouth (Verma *et al.*, 2023).

From the above discussion, the following hypotheses for the model under investigation are proposed:

- H1. Aesthetic Appeal (AE) is positively related to Dominance (DOM).
- H2. Aesthetic Appeal (AE) is positively related to Arousal (ARO).
- H3. Aesthetic Appeal (AE) is positively related to Pleasure (PLE).
- H4. Aesthetic Formality (AF) is positively related to Dominance (DOM).
- H5. Aesthetic Formality (AF) is positively related to Arousal (ARO).
- H6. Aesthetic Formality (AF) is positively related to Pleasure (PLE).

3.2 Dominance, arousal, and pleasure

Dominance pertains to the extent to which individuals perceive control over their surroundings (Miniero *et al.*, 2014). This emotion is one of the primary three connected to one's sense of control while carrying out a task. It demonstrates a positive correlation between satisfaction and pleasure across various settings, for instance, social media platforms, e-commerce sites, online review helpfulness (Xu *et al.*, 2023), and notably FDAs (Hall *et al.*, 2017; Miniero *et al.*, 2014). Users' feelings of dominance can heighten satisfaction and enjoyment, which could further lead to increased usage (Hall *et al.*, 2017; Miniero *et al.*, 2014). The consumer's perceived level of control over the app can augment their emotional

responses, enticing them to interact with the app over prolonged periods (Nguyen *et al.*, 2023; Zhou *et al.*, 2022). Regarding FDAs, users value a sense of dominance, as these apps are designed to facilitate task completion efficiently, providing users with a sense of environmental control and enhancing the propensity to engage with them (Kumar and Shah, 2021).

The connection between dominance and pleasure has been investigated in terms of emotional responses and consumer reactions to various stimuli. Hall *et al.* (2017) found a link between dominance and pleasure, implying that a heightened sense of control could lead to enhanced consumer pleasure. Regarding the connection between activation and pleasure, earlier studies by Yang *et al.* (2020) and Hall *et al.* (2017) found a positive relationship, suggesting that an exciting environment can enhance consumer pleasure. The relationship between pleasure and the intention to reuse FDAs, as well as its link to login behaviour in meal delivery apps, has been explored in previous research, including studies by Miniero *et al.* (2014), Yang *et al.* (2020) and further extended to the context of 020 meal delivery apps by Shah *et al.* (2023). If a user derives pleasure from using an FDA, they will probably intend to use the app again in the future (Jeon *et al.*, 2016; Kumar *et al.*, 2021; Kumar and Shah, 2021).

From the above discussion, the following hypotheses for the model under investigation are proposed:

H7. Dominance (DOM) is positively related to Pleasure (PLE).

H8. Dominance (DOM) is positively related to Intention to Reuse (REU).

Arousal is the degree to which individuals feel excited or stimulated (Miniero *et al.*, 2014). Previous research has found a relationship between arousal and pleasure (Sharma and Alam, 2022). For instance, Hall *et al.* (2017) suggested that arousal is a determining factor for the pleasure experienced by an individual, affecting their attitude and intention to use social platforms. Arousal positively impacts the pleasure derived from using e-commerce sites (Chang *et al.*, 2014), fashion brand websites (Yang *et al.*, 2020), and educational apps (Sharma and Alam, 2022). Therefore, arousal will be associated with the pleasure of using FDAs and the intention to persist in their use. With this understanding, the following hypotheses are suggested:

H9. Arousal (ARO) is positively related to Pleasure (PLE).

H10. Arousal (ARO) is positively related to Intention to Reuse (REU).

3.3 Intention to reuse and compulsive behaviour

Research carried out by Huang *et al.* (2017) and Hall *et al.* (2017) discovered a positive correlation between enjoyment and behavioural intentions, such as the consistent use and endorsement of online platforms. The element of enjoyment can result in habit-forming user behaviour, as individuals often desire to relive pleasing experiences. For FDAs, a user deriving pleasure from application usage might lead to obsessive usage patterns. This could appear as an increased application usage rate, a more substantial reliance on the application to fulfil food requirements, and/or an intensified investment of their time in and attention to the application. Furthermore, the food items most frequently ordered via FDA applications are ultra-processed and highly flavourful, purposely intended to create a certain level of dependency (InfoHoreca, 2020). More recent research has confirmed this connection between the feeling of enjoyment related to FDAs and the intention to reuse or revisit applications (Kumar *et al.*, 2021). In the realm of FDA research, a correlation has been found between the pleasurable experience of using these apps and the tendency to repeatedly use them (Jeon *et al.*, 2016), which may lead to compulsive food purchasing.

Occasionally, individuals attempt to counter negative life situations, feelings of depression, stress, or even the desire for affection by making compulsive or obsessive purchases (Kshatriya and Shah, 2023; Lejoyeux *et al.*, 2007), or engaging in obsessive behaviours (Farhat *et al.*, 2022). Inefficient handling of these negative factors may lead to compulsive buying, marked by enduring obsessive thoughts about obtaining products, insufficient control over spending impulses, and severe social, psychological, and economic repercussions (Kshatriya and Shah, 2023; Müller *et al.*, 2022; Vij and Singla, 2023). Typically, compulsive buying serves as a defensive tactic against daily anxiety, providing a brief distraction through the purchasing process and momentarily alleviating other adverse feelings (Darrat *et al.*, 2016; Koran *et al.*, 2006). Adding to this, the research by Yao and Li (2024) an intertwined relationship between lifestyle choices and consumption behaviours, where sedentary behaviour not only increases service utilisation but also signifies a shift towards more habitual use, indicating that such consumption patterns might also serve as a coping mechanism for modern lifestyle-induced stresses.

An affinity for e-commerce positively correlates with the study of compulsive behaviour in e-commerce and FDAs. This rapidly growing research area has garnered the attention of marketing scholars and practitioners. Studies by Koran *et al.* (2006) suggest that those who exhibit compulsive buying behaviours tend to be younger and have lower incomes than other consumers. Furthermore, Davenport *et al.* (2012) and Baker *et al.* (2016) have identified psychological traits such as low self-esteem, materialism, and a tendency to seek relief from negative emotions through impulsive actions among such individuals. In addition, researchers have explored the impact of e-commerce on impulsive and compulsive buying behaviours, as seen in studies by Chan *et al.* (2017), Bighiu *et al.* (2015), Vonkeman *et al.* (2017), and Zhou *et al.* (2023). Kukar-Kinney *et al.* (2009, Kukar-Kinney *et al.*, 2016) have found that compulsive buyers are more inclined to make purchases online to avoid social interaction and scrutiny, leading to increased online spending. Conversely it was also determined that consumers who prefer physical stores are less inclined towards compulsive buying.

Recent studies have added new dimensions to this concept. Particularly, Müller *et al.* (2022) identify Online Compulsive Buying and Shopping Disorder (Online CBSD) as a virtual version of compulsive buying disorder in physical stores within the broader context of problematic Internet use. Vij and Singla (2023) focus on internal variables such as Internet addiction, behavioural response, materialism, and self-perception of attractiveness as significant factors impacting online compulsive buying. Furthermore, research such as that by Mundel *et al.* (2023) and Harnish *et al.* (2023) has explored how external factors such as the influence of social media and alcohol consumption may be linked to impulsive purchases and, consequently, to compulsive behaviours (see Figure 1).

Hence, in the context of FDAs, a connection exists between the sensation of pleasure, the intent to revisit or reuse, and compulsive buying.

H11. Pleasure (PLE) is positively related to Intention to Reuse (REU).

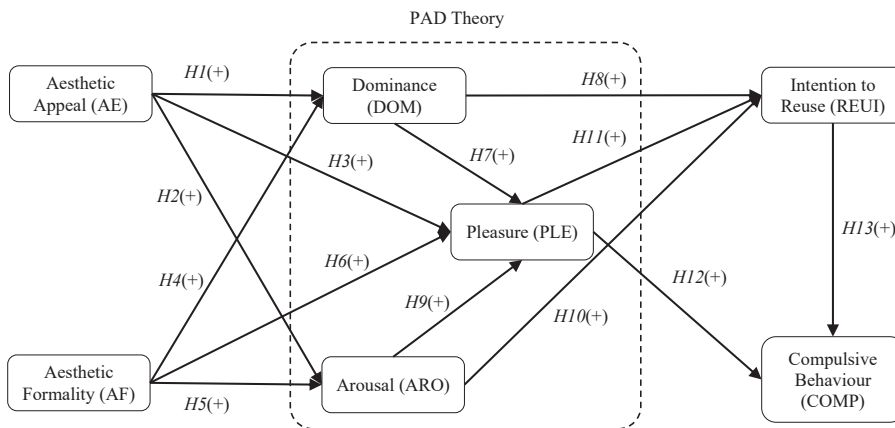
H12. Pleasure (PLE) is positively related to Compulsive Behaviour (COMP).

H13. Intention to Reuse (REU) is positively related to Compulsive Behaviour (COMP).

4. Methodology

4.1 Procedure and sample

A questionnaire was designed to evaluate the conceptual model, and data were collected from face-to-face user interactions. The instrument consisted of 18 items with seven-point scales ranging from 1 (“strongly disagree”) to 7 (“strongly agree”) and adapted from previous studies. Established measures from existing literature were drawn upon to ensure rigour and



Source(s): Authors' work

Figure 1.
Theoretical model

validity for the current study. Following the scales previously utilised by [Sharma and Alam \(2022\)](#), the Aesthetic Appeal (AE) and Aesthetic Formality (AF) of FDAs were assessed. Dominance (DOM) was operationalised through two items ([Sharma and Alam, 2022](#)). Pleasure (PLE) and Arousal (ARO) were previously used by [Huang et al. \(2017\)](#). The Intention to Reuse (REUI) construct, based on [Yang et al. \(2020\)](#), consists of two items. Compulsive Behaviour (COMP), from [Ridgway et al. \(2008\)](#), was measured through three items (see [Table 1](#)). The questionnaire was initially validated with a subsample of 100 students from a Spanish university. This initial sample was employed to validate the model and to ascertain whether the items of the proposed scales were comprehensible and to assess their reliability and trustworthiness.

Subsequently, a sample of 1,029 Spanish FDA consumers were strategically selected to garner authentic insights into FDA usage patterns. These individuals were approached randomly in public spaces, ensuring an unbiased selection, and invited to complete a questionnaire facilitated by Computer-Assisted Personal Interviewing (CAPI) technology. A requirement for participation was to have purchased through FDAs in the past twelve months, thus guaranteeing a sample of current users. The sample consisted of 50.6% men, with an average age of 34.9 years (SD = 9.39), declared income between 1,001 and 1,500€ (40.5%), and 61.7% working full-time. Additionally, 56.9% reported living with family, while 20.2% lived with a partner. Regarding buying behaviour on FDA apps, the most used platform was Glovo (44.4%), followed by JustEat (20.4%), with an average spend per order and person between 10.1 and 16 € (55.1%). These figures are comparable to those obtained by Statista worldwide, particularly in Europe ([Statista, 2023a, b, c, d](#)). Furthermore, respondents reported ordering more frequently and in larger quantities with friends and family than alone (M = 5.098; SD = 1.855).

4.2 Normality and common method bias

Before model evaluation, normality and common method bias were verified. Following [George and Mallery's \(2021\)](#) recommendations, skewness and kurtosis were confirmed to be within the recommended range. During the sample analysis, no outliers or seemingly convenience-based responses were detected. Common method bias could have presented an issue as the data were collected from a single source through a single instrument. To minimise this bias, several strategies were employed ([Podsakoff et al., 2003](#)). Firstly, a survey was

Table 1.
Standardised estimates for observable indicators, Cronbach's alpha values, convergent validity, and reliability assessment

Latent variable	Observable variable	Mean (SD)	λ	Cronbach's α	CR (composite reliability)	AVE (average variance extracted)
Aesthetic appeal (AE) (Sharma and Alam, 2022)	AE1. The FDA is fascinating	4.05 (1.409)	0.879	0.863	0.916	0.785
	AE2. The FDA is creative	4.228 (1.373)	0.882			
	AE3. The FDA is impressive	3.873 (1.465)	0.896			
Aesthetic formality (AF) (Sharma and Alam, 2022)	AF1. The FDA is well organised	5.203 (1.318)	0.914	0.900	0.938	0.834
	AF2. The FDA is neat	5.224 (1.29)	0.938			
	AF3. The FDA is legible	5.389 (1.353)	0.888			
Dominance (DOM) (Sharma and Alam, 2022)	DOM1. FDA use is better if I feel in control over the application	5.261 (1.394)	0.864	0.638	0.847	0.734
	DOM2. I feel in control of the FDA	5.03 (1.43)	0.849			
Pleasure (PLE) (Huang et al., 2017)	PLE1. I feel joyful using the FDA	4.042 (1.679)	0.903	0.914	0.946	0.854
	PLE2. I feel grateful using the FDA	4.308 (1.68)	0.935			
	PLE3. I feel satisfied using the FDA	4.335 (1.674)	0.933			
Arousal (ARO) (Huang et al., 2017)	ARO1. I find the use of FDAs very exciting	4.01 (1.695)	0.930	0.861	0.935	0.878
	ARO2. I feel very excited using the FDAs	3.729 (1.706)	0.943			
Intention to reuse (REU) (Yang et al., 2020)	REU1. I intend to return to the FDA	4.405 (1.811)	0.853	0.595	0.831	0.712
	REU2. I intend to revisit the FDA during any crisis	5.472 (1.556)	0.834			
Compulsive Behaviour (COMP) (Ridgway et al., 2008)	COMP1. I experienced sudden impulses to order food when using FDA	3.287 (1.802)	0.727	0.683	0.788	0.558
	COMP2. I experienced a strong impulse to order food when using FDA	3.369 (1.827)	0.745			
	COMP3. In the past, when I made purchases through an FDA, I felt a sudden impulse to buy something	4.776 (1.753)	0.820			

Note(s): * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, one-tailed test; $n = 5,000$ subsample. * 95% confidence interval - two-tailed
Source(s): Authors' work

developed in which the order of the sequence of items on each scale was randomised (Galbreath and Shum, 2012; Steenkamp and Maydeu-Olivares, 2021). Additionally, it was ensured that the survey's independent and dependent variables were separated (Jordan and Troth, 2020). Following data collection, Harman's single-factor test was employed to alleviate potential doubts about the impact of common method variance on the results (Markel and Frone, 1998; Podsakoff *et al.*, 2003). Specifically, a single factor explained 26.45% of the variance, below the maximum threshold of 50% (Podsakoff *et al.*, 2012). Given the known limitations of this test, the results were checked using a procedure proposed by Pavlou *et al.* (2007) that checks for the presence of CMB in the context of PLS-SEM. All the correlations observed in the matrix were below the critical threshold ($r > 0.90$), indicating that CMB is not present. In addition, Kock's (2015) full collinearity assessment approach was followed to test for the presence of CMB. All the variance inflation factors (VIF) in the internal model were equal to, or less than, 3.816, well below the maximum threshold of 5, confirming that no collinearity existed in the model and, therefore, no CMB. Furthermore, Eichhorn's (2014) common latent factor technique was also used, indicating that common method bias was absent in the data.

4.3 Structural equation modelling

To assess the proposed model, given the relatively small sample size, the data were analysed using partial least squares structural equation modelling (PLS-SEM). The PLS-SEM technique is particularly suited for exploring unique associations not previously examined in other empirical studies, which is notably relevant for replicating this study and analysing the moderating effects. Additionally, PLS-SEM efficiently manages latent constructs under non-normality conditions, demanding fewer restrictions regarding sample size and residual distribution (Chin, 1998; Hair *et al.*, 2022). To ensure result consistency, the consistent version of PLS (PLSc) was implemented, which addresses potential inconsistencies associated with the traditional PLS method, such as erroneous route and construct measurement estimates (Dijkstra and Henseler, 2015). The Smart PLS 4.0.8 software was used for the analysis (Hair *et al.*, 2019).

The evaluation of the conceptual model was conducted in two phases through PLS-SEM: first, the measurement model was evaluated, followed by the structural model, according to Sarstedt *et al.*'s (2016) recommendations. The stability of the estimates was confirmed through the bootstrapping method with 5,000 subsamples, using two-tailed tests and a significance level of 0.05.

4.4 Assessment of the measurement model

The measurement model's reliability, convergent validity, and discriminant validity were evaluated. Firstly, the internal consistency of the items was verified using Cronbach's alpha and Rho coefficient, obtaining values above the minimum recommended of 0.7 and 0.9 for composite reliability (Cronbach, 1951; Nunnally and Berstein, 1994) (Table 1). Regarding convergent validity, the standardised loadings of each factor's items were examined, ensuring they were all above or close to 0.7 and significant. Also, multicollinearity among predictive variables was evaluated, obtaining values below 5 in the variance inflation factor (VIF) collinearity assessment test, thus discarding the existence of collinearity (Hair *et al.*, 2022).

Discriminant validity was assessed through two approaches: firstly, by examining whether the correlations between constructs were lower than the square roots of their respective Average Variance Extracted (AVE) values, as outlined by Fornell and Larcker (1981), and secondly, by investigating whether the Heterotrait-Monotrait relationship (HTMT) between any pair of reflective constructs fell below 0.90. This threshold is recommended for structural models featuring conceptually similar constructs (Henseler *et al.*, 2015).

Ensuring discriminant validity is crucial to confirm that variations in responses can indeed be attributed to the constructs being measured, and that there is no overlap between concepts (Roemer *et al.*, 2021; Voorhes *et al.*, 2016). While the Fornell-Larcker criterion is widely utilised in structural equation models, its effectiveness in evaluating discriminant validity has been challenged by some scholars. Henseler *et al.* (2015) have argued that this criterion has limitations, particularly within variance-based methods such as PLS-SEM, which tend to overestimate indicator loads. Additionally, the inclusion of the variance of error for each indicator in the construct can inflate loading estimates, potentially leading to the misconception of discriminant validity where it may not exist. To enhance discriminant validity assessment, Henseler *et al.* (2015) recommended employing the HTMT criterion, derived from the multitrait-multimethod matrix, which they deemed more reliable with PLS-SEM. The HTMT ratio compares the mean correlations of items across constructs relative to the average correlations of items measuring the same construct. As explained by Hair *et al.* (2019), a clear deviation from one in the HTMT value suggests that the true correlation between the two constructs is unlikely to be unity, thus indicating their distinctiveness. The HTMT ratio serves as a highly sensitive indicator of discriminant validity issues in PLS-SEM, surpassing other conventional approaches like the Fornell-Larcker criterion and cross-loading assessment. Finally, all values from the measurement model evaluation were found to be below the maximum recommended thresholds, supporting the reliability and validity of the measures used and the appropriateness of the structural model for analysis (see Table 2).

4.5 Structural model evaluation

The research hypotheses were tested through comparative analysis of the structural coefficients. Furthermore, the determination coefficients R^2 (explained variance) and f^2 (effect size) predicting the capacities and relationships between the constructs (Hair *et al.*, 2022) were evaluated. f^2 values greater than 0.35, 0.15, and 0.02 can be considered strong, moderate, and weak, respectively. Table 3 shows that all relationships between constructs are significant at a confidence level of 99.9%, except for H4, which did not garner sufficient empirical support. The effect sizes indicated a moderate to strong impact across all the supported relationships. This finding indicates that these variables have a significant relationship with considerable impact. Specifically, the pleasure variable is explained by activation and dominance at 54.3%, while the compulsive behaviour in FDA use is explained by pleasure and the intention to reuse at 47.3%. Moreover, the model explains the intention to reuse at 16.9%. It is also important to check the predictive relevance of Stone-Geisser (Q^2) through the blindfolding analysis in Smart PLS. According to Chin (1998), a model demonstrates good predictive relevance when its Q^2 value is greater than zero, as is the case in all instances. Furthermore,

	COMP	DOM	AE	ARO	AF	PLE	REUI
COMP – Compulsive behaviour	<i>0.747</i>	0.311	0.261	0.424	0.311	0.487	0.783
DOM – Dominance	0.247	<i>0.857</i>	0.398	0.297	0.507	0.440	0.449
AE – Aesthetic appeal	0.216	0.296	<i>0.886</i>	0.490	0.459	0.473	0.275
ARO – Arousal	0.353	0.221	0.424	<i>0.937</i>	0.203	0.803	0.386
AF – Aesthetic formality	0.285	0.384	0.401	0.178	<i>0.913</i>	0.311	0.399
PLE – Pleasure	0.435	0.337	0.420	0.713	0.283	<i>0.924</i>	0.437
REUI – Intention to reuse	0.632	0.276	0.197	0.278	0.290	0.323	<i>0.844</i>

Note(s): The Fornell-Larcker criterion (below the main diagonal) and HTMT (above the main diagonal). In italic, the square root of AVE

Source(s): Authors' work

Table 2.
Discriminant validity

Hypothesis	Beta	Standard deviation	t-statistics	p-values	f ²	[2.5%]	95%]	Result
H1 (+) Aesthetic appeal (AE) → Dominance (DOM)	0.170	0.033	5.094	0.000	0.029	0.104	0.234	Supported
H2 (+) Aesthetic appeal (AE) → Arousal (ARO)	0.420	0.033	12.856	0.000	0.181	0.356	0.482	Supported
H3 (+) Aesthetic appeal (AE) → Pleasure (PLE)	0.074	0.028	2.606	0.009	0.009	0.590	0.680	Supported
H4 (+) Aesthetic formality (AF) → Dominance (DOM)	0.316	0.037	8.623	0.000	0.101	0.244	0.387	Supported
H5 (+) Aesthetic formality (AF) → Arousal (ARO)	0.009	0.031	0.294	0.769	0.000	-0.051	0.070	Not Supported
H6 (+) Aesthetic formality (AF) → Pleasure (PLE)	0.085	0.025	3.478	0.001	0.012	0.037	0.1233	Supported
H7 (+) Dominance (DOM) → Pleasure (PLE)	0.188	0.024	7.875	0.000	0.074	0.141	0.236	Supported
H8 (+) Dominance (DOM) → Intention to reuse	0.189	0.033	5.772	0.000	0.038	0.126	0.252	Supported
H9 (+) Arousal (ARO) → Pleasure (PLE)	0.672	0.019	35.248	0.000	0.938	0.634	0.708	Supported
H10 (+) Arousal (ARO) → Intention to reuse (REU)	0.144	0.042	3.404	0.001	0.012	0.057	0.225	Supported
H11 (+) Pleasure (PLE) → Intention to reuse (REU)	0.192	0.043	4.428	0.000	0.020	0.105	0.278	Supported
H12 (+) Pleasure (PLE) → Compulsive behaviour (COMP)	0.215	0.026	8.322	0.000	0.077	0.164	0.265	Supported
H13 (+) Intention to reuse → Compulsive behaviour (COMP)	0.580	0.022	26.248	0.000	0.557	0.537	0.624	Supported

Source(s): Authors' work

Table 3.
Solution of the general
SMARPLS. Calculation
through the PLS
algorithm and
bootstrapping

the model's goodness of fit was assessed through various metrics. In addition, the standardised root mean square residual (SRMR) was calculated as 0.055, lower than the acceptable maximum value of 0.08. The Normed Fit Index (NFI = 0.901) was equal to the 0.9 value considered the threshold. Moreover, the Chi-Square value was 1,253.095. Thus, we can conclude that the model has goodness of fit.

4.6 Hypothesis testing

H1 proposed a positive impact of Aesthetic Appeal on Dominance, and this was supported ($\beta = 0.170, p < 0.000$). Likewise, H2, which predicted that Aesthetic Appeal would positively affect Arousal, was also supported ($\beta = 0.420, p < 0.000$). H3 proposed a positive impact of Aesthetic Appeal on Pleasure ($\beta = 0.074, p < 0.009$), which was also supported.

H4 proposed a positive impact of Aesthetic Formality on Dominance. It was found to be supported ($\beta = 0.316, p < 0.000$), while H5, which suggested a positive impact of Aesthetic Formality on Arousal, was not supported ($\beta = 0.009, p = 0.769$). In contrast, H6 was supported, which was that Aesthetic Formality would positively affect Pleasure ($\beta = 0.085, p = 0.001$).

The model proposed that Dominance positively affects Pleasure (H7) and Intention to Reuse (H8). Both hypotheses were supported ($\beta = 0.188, p < 0.000$) for Pleasure and ($\beta = 0.189, p < 0.000$) for Intention to Reuse). H9 and H10 predicted positive impacts of Arousal on Pleasure and Intention to Reuse, respectively. Both hypotheses were supported ($\beta = 0.672, p < 0.000$) for Pleasure and ($\beta = 0.144, p = 0.001$) for Intention to Reuse. H11, H12, and H13 proposed direct effects of Pleasure on Intention to Reuse and Pleasure on Compulsive behaviour, and of Intention to Reuse on Compulsive behaviour, respectively. All three hypotheses were supported ($\beta = 0.192, p < 0.000$; $\beta = 0.215, p < 0.000$; $\beta = 0.580, p < 0.000$). Thus, among the 13 hypotheses, 12 were supported, and only one (H5) was not supported. This suggests that Aesthetic Appeal, Dominance, Arousal, Pleasure, and Intention to Reuse positively affect each other and Compulsive behaviour significantly. In contrast, Aesthetic Formality has a significant effect on Dominance and Pleasure but not on Arousal.

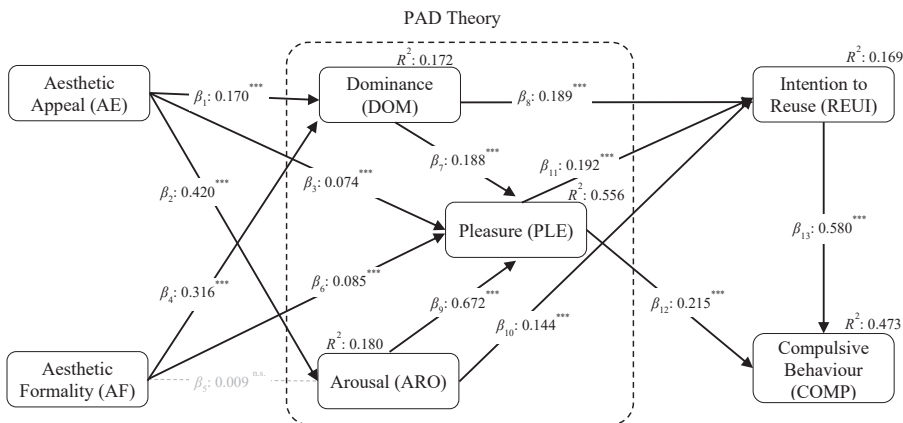
As the results presented in Table 4 show, the dependent variables Dominance (DOM), Arousal (ARO), Pleasure (PLE), Intention to Reuse (REUI), and Compulsive Behaviour (COMP) were measured in terms of R^2 and Q^2 values. The variable Pleasure (PLE) had the highest R^2 value at 0.556, accounting for 55.6% of the variance in the dependent variable. Compulsive Behaviour (COMP) followed with an R^2 value of 0.473 or 47.3%. The variables Dominance (DOM), Arousal (ARO), and Intention to Reuse (REUI) had lower R^2 values of 0.172 (17.2%), 0.180 (18%), and 0.169 (16.9%), respectively.

Regarding Q^2 values, Pleasure (PLE) also showed the highest value at 0.460, indicating a strong predictive relevance for this construct. The Q^2 values for the other constructs were 0.243 for Compulsive Behaviour (COMP), 0.155 for Arousal (ARO), 0.124 for Dominance (DOM), and 0.085 for Intention to Reuse (REUI), indicating a lower predictive relevance. These results suggest that Pleasure (PLE) and Compulsive Behaviour (COMP) had the most substantial influence within the model, while the other variables had less predictive power (see Figure 2).

Table 4.
 R^2 and Q^2 for all
dependent variables
and model fit indices

	DOM	ARO	PLE	REUI	COMP
R^2	0.172	0.180	0.556	0.169	0.473
Q^2	0.124	0.155	0.460	0.085	0.243

Source(s): Authors' work



Note(s): * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; n.s.: not significant
Source(s): Authors' work

Figure 2.
 The structural model

5. Discussion and conclusion

The expansion of FDAs and shift in consumer preferences have led to heightened competition and growing academic interest in consumer behaviour (Shah *et al.*, 2022, 2023; Nguyen *et al.*, 2023; Shankar *et al.*, 2022a). This study is one of the first to employ PAD theory (Mehrabian and Russell, 1974) to analyse the impact of aesthetic appeal and formality on emotions evoked through FDA use (dominance, arousal, and pleasure) to explain reuse intention and compulsive usage.

The global COVID-19 pandemic marked a turning point in consumer purchasing behaviour globally (Donthu and Gustafsson, 2020), causing a powerful impact on electronic transactions (Saleem *et al.*, 2021). This trend was also observed in the use of FDAs (Ng *et al.*, 2023) during (Shah *et al.*, 2022) and especially after the pandemic (Sharma and Alam, 2022; Abed, 2024; Madinga *et al.*, 2023). Specifically, the search for new ways to enjoy life experiences, often through technological means and innovations in consumption modes, along with the response to stress, anxiety, and boredom, have led to changes in daily routines, which increased during the pandemic (Arslan *et al.*, 2021; Deng *et al.*, 2020). To mitigate negative effects, people have increasingly turned to hedonic consumption that prioritises enjoyment, satisfaction, and the pleasure of buying (Aruldoss *et al.*, 2023).

In this context, this research presents a new perspective in the literature on consumer behaviour by evaluating the impact of the aesthetic appeal and formality of FDAs on emotions, and how these influence the intention to reuse and the compulsive use of FDAs.

Until now, few studies have explored the role of emotions in using FDAs (Shah *et al.*, 2023; Shankar *et al.*, 2022a), most research having focused on the significance of FDAs during the COVID-19 crisis (Shah *et al.*, 2022), finding that ease of use, perceived value, and mobile compatibility are key variables influencing FDA user satisfaction. Furthermore, Shah *et al.* (2023) examined how textual or pictographic reviews on FDAs affected continued use, confirming the mediating effect of emotions on app usage.

The present study is pioneering in the context of the study of FDAs by focussing on compulsive usage, an area largely unexplored in the context of FDAs, but which is critical to understand due to concerns about electronic device addiction (Park and Lee, 2012; Montag *et al.*, 2015) and awareness of sustainability and food waste (Shankar *et al.*, 2022b; Sharma *et al.*, 2023; Trivedi *et al.*, 2023). Therefore, this research seeks to provide relevant information

for companies behind FDAs, policymakers, and society in general, in order to address potential adverse effects and promote sustainable, responsible strategies.

5.1 Theoretical contributions

The findings of this study establish a number of theoretical implications. Firstly, the study's conclusions broaden PAD theory in the context of FDAs. Specifically, it suggests that app aesthetics create an environment and act as an external stimulus that generates arousal, dominance, and pleasure emotions. This finding aligns with prior research highlighting the fact that aesthetic appeal has a more significant influence on arousal than dominance (Kumar *et al.*, 2021). The aesthetic appeal of FDAs, expressed through captivating, creative, and impressive design, can excite consumers, making their FDA app experience enjoyable, and is, therefore, a significant factor in evoking positive responses (Kumar *et al.*, 2021).

In contrast, aesthetic formality influences dominance, and pleasure but not emotional arousal (Kumar *et al.*, 2021). This result concurs with prior studies affirming the role of external stimuli in aesthetic formality (Wang *et al.*, 2011), suggesting a well-structured or legible FDA will evoke gratification in consumers, as they find it straightforward to search, navigate, and place orders, affecting the dominance they feel over the app. Thus, this study contributes new insights by emphasising the critical role of formal aesthetics in shaping user experience in FDA apps and their impact on consumer emotions. However, the findings do not show a relationship between formality aesthetics and arousal. The likely explanation for this phenomenon is that the organised and orderly structure of FDA apps does not excite consumers, as they may have previously interacted with other apps (such as flight or hotel booking apps) with superior aesthetic design. In summary, although existing literature on FDAs focuses on functional and utilitarian aspects (for example, Ray *et al.*, 2019), on the present study centres on app design, highlighting the importance of the aesthetic dimension in influencing user responses.

Secondly, using PAD theory, this study further explores the relationship between emotions evoked by FDAs (Shah *et al.*, 2023). It was observed how experiential arousal and dominance amplified the pleasure state in FDA use. As in other studies, arousal was found to be the primary antecedent of pleasure, followed by dominance (Yang *et al.*, 2020). These results are consistent with other studies/research exploring the relationship between PAD emotions on digital platforms, which have also found a clear association between arousal and pleasure (Hall *et al.*, 2017; Kumar and Shah, 2021; Yang *et al.*, 2020), consumers using FDAs are excited about the concept of ordering and receiving food with greater convenience, which evokes a sense of pleasure. The relationship between dominance and pleasure also proved significant, as in previous research (Mimiro *et al.*, 2014). Therefore, dominance is also a fundamental emotion to develop a positive experience, and even more so for the experience of using FDAs.

Thirdly, emotions - specifically pleasure, dominance, and arousal, in this order - are directly linked to the intention to reuse FDAs. This finding is consistent with the outcomes of previous research (Kumar *et al.*, 2021). A positive experience with FDAs encourages consumers to revisit applications to re-experience these emotions. Notably, the positive influence of pleasure on the intention to reuse FDAs is affirmed (Jeon *et al.*, 2016; Kumar and Shah, 2021; Kumar *et al.*, 2021). While studying the variables predicting continued log-in behaviour in relation to reviews on FDAs, Shah *et al.* (2023) discovered that if the content of the reviews evokes pleasure and dominance, these elements would be effective in boosting consumer FDA engagement, leading to successful transactions. Their results suggest that users primarily focus on pleasure and design, paying less attention to the arousal triggered by the application. The present study broadens the argument that consumers who derive pleasure from using FDAs will experience a sense of dominance and arousal or excitement

with their use and will consequently reuse FDAs. Therefore, understanding behaviour related to reuse intention can be beneficial for formulating strategies for FDA companies (Kumar *et al.*, 2021).

Fourthly, this study has, for the first time, analysed the effect of pleasure and reuse intention on compulsive FDA usage. Specifically, it has been observed how reuse intention is the main predictor of compulsive usage. This result supports the idea that there are compulsive or addictive forms of behaviour on the Internet (LaRose and Eastin, 2002; Vij and Singla, 2023), highlighting that FDAs have become a significant food ordering channel, with FDA usage being part of many users' buying routine (Sharma *et al.*, 2021, 2023).

5.2 Managerial implications

In practical terms, the findings of this study have several implications that can be applied to various areas of FDA operation. For FDA companies, understanding the role of aesthetic appeal and formality can help inform app design strategies. For example, investing in an aesthetically pleasing user interface characterised by attractive visual elements and creative design can generate consumer excitement and evoke positive emotions. This emotional response can contribute significantly to user enjoyment and overall satisfaction with the app, ultimately driving reuse intention. An FDA such as Uber Eats or Deliveroo might consider working with graphic designers or UI/UX specialists to ensure their app interface is as visually compelling as possible, leveraging colours, layouts, and graphic elements that align with consumer preferences and trends. Specifically, they should embrace emerging trends, including smarter app capabilities through AI, smartwatch functionalities, foldable device designs, and enhanced accessibility options (Dean, 2020).

While not contributing to emotional arousal, the formality of aesthetics has been shown to increase user feelings of dominance or control over the app. A user-friendly and well-structured interface, which enables consumers to search, navigate, and place orders easily, could enhance user gratification and confidence. An FDA such as Glovo could prioritise improving its app's logical flow and structure, ensuring that it is intuitive for users to navigate and complete tasks. This could involve streamlining the checkout process, enhancing search functions, or introducing features to facilitate easy reordering of favourite meals.

This study underscores the impact of pleasure and positive emotions on the reuse of FDAs. As a result, it is advisable for businesses to customise their apps to enhance these emotions. This may entail improving the user interface to boost pleasure, optimising customer experiences, and incorporating gamification components. By highlighting the importance of pleasure in reuse intentions, companies can refine their marketing strategies to showcase how their apps deliver these positive emotions. They can achieve this by utilising user testimonials, product demonstrations, or showcasing examples of how the application has enriched users' lives.

Beyond the app experience, this research underscores the need for FDA companies to monitor and address compulsive usage, given its close association with intention to reuse the app. With the proliferation of internet addiction, companies need to be responsible for implementing measures to discourage compulsive behaviour and promote responsible use. FDAs could introduce features that monitor usage patterns, provide reminders for breaks, or even set limits to the number of orders that can be placed within a specific timeframe.

5.3 Limitations and future research

As in any research, this study has certain limitations that should be acknowledged. First and foremost, the cross-sectional nature of the study design means that it does not provide a longitudinal perspective on the evolution of the intention to use and compulsive purchasing

on FDAs. As such, the dynamics of consumer behaviour over time remain an area of uncertainty. Furthermore, the research focuses on the suggested experience of the subjects analysed, rather than their actual purchasing behaviour.

Several other avenues future lines of research are evident. Firstly, future studies could benefit from exploring the impact of cultural, social, and demographic factors on consumers' emotional responses and behavioural intentions towards FDAs. Deepening the understanding of how factors such as cultural background, social influences, or demographic characteristics such as age and gender shape these relationships can offer valuable insights into diverse consumer segments. Secondly, considering the growing emphasis on sustainability and responsible consumer behaviour, it would be worthwhile for future research to investigate the influence of these trends on FDA perception and usage. Specifically, researchers could examine how consumers' attitudes towards sustainability practices intersect with their interactions with FDAs. Furthermore, the role of sustainability in the design and appeal of FDAs also merits closer investigation. For example, future research should explore the effectiveness of sustainable practices in the FDA sector, focussing on waste reduction through packaging reuse incentives, partnerships for food waste management, and educational campaigns on responsible consumption.

Adopting a longitudinal approach in future studies could provide insights into how consumers' emotional experiences and behavioural intentions evolve over time with increased interaction with FDAs. In this vein, it would be beneficial for future studies to incorporate actual usage data into their research designs. This would allow a more realistic understanding of consumer behaviour towards FDAs. Future studies should also take into consideration personal factors and moderating variables, such as levels of environmental awareness or the practice of mindfulness during FDA usage. Finally, while this study has emphasised the importance of aesthetic appeal and emotional reactions in FDA usage, future research could also consider the influence of functional attributes, such as usability, usefulness, and reliability of FDAs. A comprehensive understanding of FDA usage could be achieved by considering these functional aspects in conjunction with aesthetic elements and emotional responses. This multi-dimensional approach may offer a more nuanced understanding of consumers' relationships with FDAs.

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