Exploring the impact of generative art in virtual stores: A metaverse study on consumer perception and approach intention

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ABSTRACT

Despite the increasing use of generative art in retail and service settings, its influence on consumer evaluations and approach behaviors remains underexplored. This study addresses this gap by examining how generative art affects consumers' approach intentions in metaverse-based virtual stores. Grounded in art infusion theory, two experiments using a 2 × 2 between-subjects design were conducted to test the effects of generative art in virtual fashion retail settings. The results of Study 1 (N = 120) reveal that the presence of generative art enhanced store visit intentions by increasing perceived exclusivity and aesthetic pleasure, with this effect moderated by brand type (mass vs. luxury). The results of Study 2 (N = 90) revealed that the dynamism of generative art positively influenced word-of-mouth intentions through two mediators, with the effect moderated by consumers' artistic openness (low vs. high). This study contributes to the retail literature by identifying generative art as a novel environmental cue that enhances consumer experience, with its effectiveness shaped by both contextual and individual factors. Moreover, the findings provide practical insights for retailers and service providers seeking to leverage generative art as an affordable and sustainable tool to foster positive consumer responses.

1. Introduction

Generative art is a form of computational art that employs computer algorithms to create unique, intricate, and evolving visuals autonomously, offering a new approach to artistic expression through technology. Generative art effectively replicates real-world characteristics, including sound, movement, or lighting cues, enabling diverse forms of creative and artistic content, namely, visual arts, literature, music, and video (Bandi et al., 2023; Epstein et al., 2023). With technological advances, generative artificial intelligence (AI) has emerged as a natural extension of generative art, expanding the possibilities and responsiveness of algorithm-driven visuals and allowing users without deep programming expertise or formal artistic training to generate rich, dynamic visuals.

In the retail context, art has been used to enrich customer experiences through "art infusion," incorporating artistic elements into product design, advertising, or store environments (Park et al., 2023a). Art infusion theory, serving as the theoretical foundation for this study, explains how the presence of art can positively influence consumer perceptions and attitudes toward the associated object by transferring the prestige and value typically attributed to art (Hagtvedt and Patrick,

2008; Peluso et al., 2017). Gupta and Joshi's (2023) systematic review conceptualized art infusion within the stimulus–organism–response (S-O-R) framework, where the artwork and its attributes serve as the stimulus, consumer perceptions of the product or brand as the organism, and resulting behaviors as the response. They proposed that the stimulus can have both direct and indirect influence on the organism and response.

Despite its contributions, the literature on art infusion presents three key limitations. First, most research has focused on art from an authoritarian perspective, primarily examining well-known or traditionally esteemed artworks (Estes et al., 2018; Hagtvedt and Patrick, 2008). While recent studies have moved beyond simply assessing the presence of art and have started investigating its effects across various dimensions, including type of art, familiarity, and the specific object to which art is applied (Hüttl-Maack, 2018; Park et al., 2023a; Peluso et al., 2017), the influence of emerging forms like generative art remains largely unexplored. Second, in response to the global pandemic, there is a growing demand for alternative online environments (Herrman and Browning, 2021), accelerating the shift from traditional in-store experiences to metaverse. Despite the increasing prevalence of 3D virtual environments for accelerating art consumption, research on the

influence of art infusion has focused predominantly on physical retail stores (Naletelich and Paswan, 2018; Oh et al., 2018), leaving the implications of virtual spaces insufficiently addressed. Third, although contextual and individual factors likely moderate the effects of art infusion, they have received limited empirical attention. For example, the literature examining brand types has often restricted itself to a single context (e.g., non-luxury retail stores; Naletelich and Paswan, 2018) or manipulated brand conditions (e.g., traditional vs. sustainable luxury brands; Quach et al., 2022b), without directly contrasting mass versus luxury brands.

These limitations define the scope and contribution of the present study. While generative art differs in character from traditional or symbolic art, art infusion theory remains applicable for understanding its impact on consumer behavior. Both luxury and mass-market retailers have begun integrating generative art into their physical stores. Bvlgari's Milan flagship first used AI-generated art to depict nature through machine learning algorithms (Hypebeast, 2021). H&M, a leading mass-market store retailer brand, also integrated generative art into its flagship store in London. A large LED screen powered by customized algorithms mimicked the movement of physical fabric, changing dynamically as customers used escalators between the ground and first floors (Hirsch and Mann, 2022). These broad applications of generative art in luxury and non-luxury retail environments imply its potential to evoke a sense of exclusivity and aesthetic appreciation among consumers experiencing the brand and its store.

Building on the core principle of art infusion theory—the positive spillover effect of art on consumer perceptions and further behavioral outcomes (Gupta and Joshi, 2023)—this study investigated whether the experience of generative art in a virtual retail store influences consumers' store evaluations and approach intentions. Additionally, it explored how these effects are moderated by brand type and individual differences in artistic openness. Two research questions guide this investigation: (1) Does the effect of generative art (absence vs. presence) on store visit intention, mediated by perceived exclusivity and aesthetic pleasure, differ according to brand type (luxury vs. mass)? (*Study 1*), and (2) Does the effect of generative artistic dynamism (static vs. dynamic) on electronic word of mouth intention, mediated by perceived exclusivity and aesthetic pleasure, vary depending on artistic openness of consumers? (*Study 2*) (Fig. 1).

By addressing these questions, this study contributes to the literature on virtual retailing and consumer behavior in three significant ways. First, it extends the art infusion framework by examining generative art,

an emerging and under-researched form, in virtual shopping contexts. It also emphasizes the dual perceptual mediators of perceived exclusivity and aesthetic appeal, core attributes of visual art (Hagtvedt and Patrick, 2008; Naletelich and Paswan, 2018). Second, while prior studies have focused on art infusion in product design, advertising, or physical retail environments (Baumgarth and Wieker, 2020; Oh et al., 2018; Quach et al., 2022a, 2022b), this study applies it to the metaverse, a rapidly growing virtual retail setting. Third, by incorporating both contextual and individual moderators, the study offers a more nuanced understanding of when and for whom generative art enhances consumer outcomes, providing theoretical and practical insights for future digital retail strategies.

2. Theoretical development

2.1. Generative art for art-infusion effect

Art significantly influences various aspects of consumer behavior, including advertising, branding, and retail experience. Visual art enhances brand image and extendibility by stimulating creativity and cognitive flexibility, ultimately strengthening brand perceptions (Hagtvedt and Patrick, 2008). This phenomenon, known as the "art-infusion effect" suggests that visual art enhances consumer perceptions of brands, leading to more favorable evaluations, increased perceived value, and greater product appeal (Quach et al., 2022a). Similarly, the concept of "artification" refers to the integration of art into product designs and retail atmospheres to enhance consumer perceptions of both products and spaces (Kim et al., 2020).

The influence of art mediums in retail contexts is both profound and multifaceted (Hagtvedt and Patrick, 2008). Research grounded in art infusion theory has demonstrated that visual art tends to elicit more favorable consumer perceptions, attitudes, and behavioral intentions toward the infused object (Hagtvedt and Patrick, 2008; Naletelich and Paswan, 2018; Park et al., 2023a). Although art has traditionally been associated with luxury products due to its inherent originality, this pairing does not always produce universally positive effects. For instance, Dion and Arnould (2011) demonstrated that integrating art into retail settings reinforces luxury brand perceptions by linking them with artistic value. Conversely, Naletelich and Paswan (2018) showed that art infusion effects extend beyond luxury, influencing consumer behavior in non-luxury contexts as well. Wang et al. (2023) identified conditions under which art infusion may be less effective in luxury
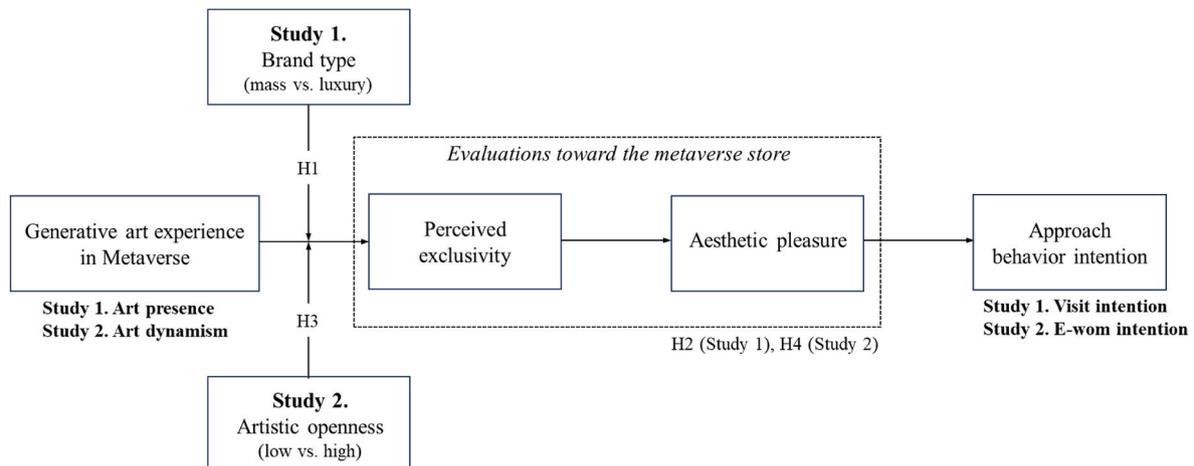

Fig. 1. Overall research model.
Note. (1) To measure the presence of generative art as an independent variable in Study 1, the absence condition was coded 0 and the presence condition was coded 1. (2) In measuring brand type as a moderator in Study 1, the mass brand was coded as 0 and the luxury brand was coded as 1. (3) To measure the dynamism of generative art as an independent variable in Study 2, the static condition was coded 0 and the dynamic condition was coded 1. (4) To measure the dependent variable, store visit intention was used in Study 1, whereas e-WOM intention was used in study 2.

retail. One finding indicated that when consumers perceive the artwork as an independent art piece—rather than as an integrated brand element—they show lower interest in luxury goods compared to a control group exposed to no art. These mixed results emphasize the need to examine various types of art and the contexts in which they are presented to deepen our understanding of the art infusion mechanism.

Generative art offers a compelling avenue for advancing art-infusion research. An emerging artistic medium, generative art utilizes computational algorithms to autonomously produce novel, immersive, and often unique visual content. It is increasingly embraced by retailers, brands, and artists as a cost-effective yet aesthetically engaging tool for enhancing consumer experiences in retail environments. This study posits that generative art may communicate both exclusivity and aesthetic value because of its algorithmic novelty and visually distinctive outputs.

Drawing on Gupta and Joshi's (2023) conceptualization of the art infusion effect within the framework of the Stimulus-Organism-Response (S-O-R) model, this study investigated how generative art operates as a visual stimulus that influences consumers' store-related perceptions (organism) and approach intentions (response). Furthermore, we explored the conditions under which these effects vary, focusing on differences across brand types (luxury vs. mass-market) and the individuals' openness to art consumption.

2.2. The interaction effect of artistic presence and brand type on perceived exclusivity toward the store

Prior findings highlight a strong association between visual art and high culture, where the symbolic traits of art—like sophistication and exclusivity—are conferred onto products, leading to more favorable consumer evaluations (Hagtvedt and Patrick, 2008). Lee et al. (2015) identified two primary effects of art infusion, the *halo effect*, which helps extend an initial positive perception to subsequent evaluations, and the *contagion effect*, which enables the attributes of one object to be transferred to another through both direct and indirect contact.

These mechanisms have made art infusion particularly relevant in the luxury context, as art can elevate perceptions of exclusivity and prestige (Lee et al., 2015; Peluso et al., 2017; Quach et al., 2022a, 2022b). For example, Lee et al. (2015) found that artwork enhanced perceived prestige, with consumers rating luxury brands more favorably when they are accompanied by artistic elements. Similarly, in luxury advertising, products paired with well-known artworks (e.g., paintings by Kandinsky) are perceived as more luxurious and desirable than those paired with less recognizable artworks (Peluso et al., 2017). Quach et al. (2022b) examined how art can stimulate cognitive flexibility and thereby reduce perceived tension between seemingly incompatible attributes—such as sustainability and luxury. Their findings indicated that this reconciliatory effect of art occurred only in sustainable luxury contexts, not with traditional luxury products.

Given the mixed findings of the art-infusion effect, it is crucial to recognize that art does not necessarily enhance perceptions of luxury. Since luxury is closely tied to attributes like rarity and prestige (Kapferer and Michaut-Denizeau, 2019), art is expected to have a more pronounced impact on perceived exclusivity when associated with luxury brands than that with non-luxury brands. Similarly, when art is incorporated into highly hedonic products (vs. less hedonic products), it enhances luxury perceptions, which, in turn, positively influences the attitude and willingness to pay (Hüttl-Maack, 2018).

However, art infusion's effectiveness also depends on contextual and stylistic factors, including the type of artwork, nature of the product it accompanies, and broader retail environment. For instance, although fine art and street art have been found to enhance product evaluations, graffiti does not yield a significant difference from non-art conditions, suggesting that the art-infusion effect does not always translate into more favorable product assessments (Baumgarth and Wieker, 2020).

Unlike classical art, generative art is characterized by its infinite variability, driven by computer-based algorithms (Vianna, 2020), raising questions about its compatibility with conventional notions of luxury and exclusivity. Its effect on consumer perceptions in retail environments—particularly within the context of brand positioning—remains underexplored. Given that exclusivity refers to a brand characteristic that differentiates it from others, often perceived when consumers encounter novel or limited experiences that satisfy their desire for uniqueness (Wang et al., 2022), experiencing generative art in a virtual retail setting may serve as a unique and exclusive experience for consumers. However, whether this artistic experience enhances perceptions of exclusivity may depend on the type of brand—luxury vs. mass—into which the art is integrated.

Without assuming a specific directional effect, the following hypothesis is posited regarding the interaction effect of the presence of generative art and brand type on perceived store exclusivity:

H1. The presence of generative art and brand type interactively impacts perceived exclusivity toward a store.

2.3. The sequential process of perceived exclusivity and aesthetic pleasure toward the store on approach intention

Sensory cues embedded in a store's atmosphere can shape consumers' perceptions and emotional responses, ultimately influencing positive approach behaviors (Cho and Lee, 2017; Murray et al., 2019; Shahid et al., 2022). In virtual retail contexts, this study proposes a sequential mediation model in which perceived exclusivity serves as the first mediator and aesthetic pleasure as the second. This model aims to explain the relationship between the interaction of generative art presence and brand type and consumers' approach intentions toward the store (Study 1).

First, exclusivity is recognized in the marketing literature as a brand characteristic or capability "to differentiate, rather than affiliate oneself from the rest of others" (Le Monkhouse et al., 2012). Perceived exclusivity is a fundamental component of luxury (Kapferer and Laurent, 2016) and is experienced when consumers engage with luxury products or services that set them apart. According to Cho and Lee (2017), perceived store exclusivity refers to the extent to which consumers perceive a store as luxurious and exclusive, a perception largely shaped by the retail atmosphere. Elements such as interior color also influence perceptions of luxury, which in turn evoke emotional responses such as pleasure and arousal (Cho and Lee, 2017).

This study examines generative art as a novel sensory stimulus in the retail environment that may enhance perceived exclusivity. While increasingly adopted in both luxury (e.g., Bvlgari) and mass-brand (e.g., H&M) offline stores, generative art remains relatively unfamiliar — especially within virtual retail contexts. This unfamiliarity can heighten the perception of exclusivity by offering consumers a distinctive, limited, and memorable experience that enhances aesthetic pleasure.

Second, aesthetic pleasure refers to positive aesthetic responses or appraisals of designed artifacts (e.g., products, packaging, music, landscapes; Blijlevens et al., 2017). It is characterized as a direct, enjoyable, and individual experience involving various senses, focused on a specific object (Blijlevens et al., 2017; Graf and Landwehr, 2017). Numerous studies have demonstrated the importance of design attributes—such as novelty, variety, and typicality—in enhancing perceptions of aesthetic pleasure (Blijlevens et al., 2012; Murray et al., 2019). For example, Wang et al. (2022) found that luxury products' perceived rarity contributes positively to emotional value. Consumers' appraisals of store atmospherics influence their intention to browse and make purchases (Murray et al., 2019). Similarly, pleasure derived from luxurious interior elements increases consumer preference for a store (Cho and Lee, 2017). The integration of virtual reality into digital retail settings can enhance perceived experiential value, increasing consumers' intention to visit virtual stores (Jang et al., 2019).

Building on these insights, this study hypothesizes that the effect of

interaction between the presence of generative art and brand type on store visit intentions is mediated by perceived exclusivity and aesthetic pleasure. Thus, we propose the following hypothesis:

H2. Perceived exclusivity and aesthetic pleasure toward the store sequentially mediate the interactive effect of generative art presence and brand type on visit intention.

2.4. The interactive effect of artistic dynamism and artistic openness on perceived exclusivity toward the store

Generative AI can procedurally generate diverse and immersive visual content, including images, animations, videos, and 3D-rendered objects (Chamola et al., 2024). Visual artworks are generally perceived in terms of their composition, arrangement, and dynamics, including rhythm and movement (Meng et al., 2023). Generative art is created using generative systems, including a set of computer programs, natural language rules, and procedural algorithms (Galanter, 2016). This enables generative art to produce not only static works but also dynamic compositions involving interactive and complex motions and patterns (Meng et al., 2023).

According to the art infusion literature, the effects of visual artworks differ depending on whether they are static or dynamic. Static non-art visuals (e.g., photographs) tend to have limited impact, while static but artistic visuals (e.g., paintings) can positively influence product evaluations—though this effect depends on factors such as genre (Baumgarth and Wieker, 2020), content (Hagtvedt and Patrick, 2008), and familiarity (Hüttl-Maack, 2018). Although technological advancements permit dynamic elements to be embedded into visual art, current research on how dynamic generative art is aesthetically perceived remains limited (Meng et al., 2023). The literature on how the level of artistic dynamism—comparing static and dynamic conditions—affects consumer responses in retail settings remains limited.

To address these gaps, this study posits that when the visual composition of generative art remains constant, its dynamic presentation (e.g., rhythmic, animated motion) is perceived as more novel and engaging than a static version. This enhanced sense of novelty can increase perceived exclusivity, as consumers may interpret the dynamic art experience as rare and distinctive within the retail environment.

In this study, artistic openness, a moderating variable, refers to an individual's cognitive capacity and intellectual curiosity to engage in aesthetic and artistic stimulation of ideas, concepts, and works (John and Srivastava, 1999). Previous research suggests that artistic openness is strongly linked to a preference for artistic activities (Chamorro-Premuzic et al., 2009) and fosters more positive reactions to retail environments featuring artwork (Feist and Brady, 2004). However, recent studies on art infusion have provided a more nuanced understanding of artistic openness. For example, Hüttl-Maack (2018) found no moderating effect of art interest (high vs. low) on the relationship between art presence and luxury perception in the context of highly hedonic products. Naletelich and Paswan (2018) found that the positive association between artistic openness and purchase intention in art-infused retail settings was only significant in the presence of abstract art, and not for realistic or non-art stimuli.

Considering the scarce empirical research on how dynamism of art relates to openness to art, particularly in the context of generative art and the metaverse, this study aimed to investigate how the interplay between artistic dynamism (static vs. dynamic) and artistic openness (low vs. high) influences perceptions of exclusivity, either by amplifying or diminishing them. Without making a directional assumption, we propose the following hypothesis:

H3. The dynamism of generative art and artistic openness interactively impact perceived exclusivity toward the store.

2.5. The sequential process of perceived exclusivity and aesthetic pleasure toward the store on e-WOM

Building on the rationale employed for Hypothesis 2, this study proposes that perceived exclusivity and aesthetic pleasure are sequential mediators in the relationship between the interaction effect of generative art dynamism and artistic openness on consumers' electronic word-of-mouth intentions toward the store (Study 2).

e-WOM refers to the dissemination of positive or negative opinions shared by current, past, or potential consumers about a product or business made accessible to a broad audience through online platforms (Hennig-Thurau et al., 2004). Alongside repurchase intention and brand loyalty, WOM intention is a core indicator of behavioral intention (Zeithaml et al., 1996). Consumers who have novel and satisfying retail experiences are more likely to engage in positive WOM (Duarte et al., 2018; Pape and Toporowski, 2023). Pape and Toporowski (2023) found that shopping in experiential stores featuring scarce products increased store novelty, particularly when consumers encountered something surprising or unexpected. This heightened perception of novelty boosted both electronic and interpersonal word-of-mouth.

The current study posits that the interaction between generative art dynamism and individual artistic openness influences consumers' e-WOM intentions through a sequential process, wherein perceived store exclusivity enhances aesthetic pleasure, which in turn fosters e-WOM behavior. Thus, the following hypothesis is proposed:

H4. Perceived exclusivity and aesthetic pleasure toward a store sequentially mediate the interaction effect of generative artistic dynamism and artistic openness on e-WOM.

3. Study 1: methods and results

3.1. Participants and procedure

With approval from the Institutional Review Board (No. [blinded for review]), an online experiment was conducted in December 2023. Study 1 employed a 2 (generative art presence: no art vs. art) × 2 (brand type: mass vs. luxury) between-subjects design.

To construct the experimental stimuli, 3D retail environments were created in SketchUp Pro. These environments then were exported in OBJ format to Adobe Dimension to preserve visual fidelity during the conversion for use in Spatial.io, the metaverse platform utilized in this study. The generative art featured within the virtual retail space was created using TouchDesigner, a node-based visual programming tool that served as the generative art authoring platform. The content was rendered as a video file and applied to a designated wall in Spatial.io, simulating a dynamic art display in the virtual store.

The interior design of the two fashion retail stores used achromatic color schemes. One store featured a static generative art wall, while the other included a plain white wall to represent the no-art condition. Both environments were modeled on fashion brand stores in major shopping malls. Common design elements, e.g., mannequins, clothing racks, dressing mirrors, fashion products, and cashier desks, were included for realism and consistency. Except for the manipulated variable (presence or absence of generative art), all other aspects of the store environments (spatial dimensions, materials, merchandise, and aesthetic style) were held constant.

Given that the displayed merchandise (e.g., high heels, handbags) was primarily targeted toward female consumers, the sample was restricted to women to ensure alignment between the product offerings and participant profiles. A metaverse platform was employed as the medium for experiencing art. As a novel and user-interactive virtual environment, the metaverse requires participants to navigate digital spaces by controlling avatars, which can present varying levels of complexity depending on users' technological proficiency. Younger consumers tend to be more comfortable and proficient in using high-tech

services (Venkatesh et al., 2012). Therefore, this study targeted women in their 20s and 30s, who are less likely to face difficulties navigating metaverse environments.

To further ensure the relevance and realism of the store environments, a pilot test was conducted with a convenience sample of 20 female participants (age mean [*M*] = 28.05, standard deviation [*SD*] = 3.73; minimum = 24, maximum = 35). An independent *t*-test indicated that participants exposed to the generative art reported significantly higher levels of perceived art (*M* = 4.00, *SD* = 0.47) than those who viewed a plain white wall (*M* = 3.10, *SD* = 0.91, *t* = −2.785, *p* < .05). Based on these evaluations, two virtual stores were selected to represent each experimental condition.

To recruit participants for the main study, we employed a purposive sampling method, targeting females aged 18–39 residing in the United States. Purposive sampling, also referred to as judgmental or selective sampling, involves deliberately selecting participants considered most relevant to the study (Akram et al., 2024). Using Amazon Mechanical Turk (MTurk), only workers who met these gender and age criteria and had an approval rating of 95 % or higher were allowed to participate in the experimental survey. This approach helps enhance data quality by ensuring that participants meet the study's predefined requirements.

After excluding 20 participants who failed an attention-check item related to the assigned virtual store, 120 participants were retained. To complete the experiment, participants followed a structured procedure: (1) they provided informed consent using the Qualtrics platform, (2) they were randomly assigned to one of the four experimental conditions using Qualtrics' randomization function (n = 30 per condition), (3) they were presented with a brief scenario and a URL link to access the metaverse retail store along with navigation guidelines, (4) after exploring the virtual store, they completed survey items related to the study variables, manipulation checks, attention checks, and demographic information, and (5) received a $2 incentive upon completion. Appendix B contains the stimuli and brief scenarios used in Study 1 to aid participant understanding.

3.2. Measurement

The perceived presence of generative art was assessed using two items derived from Quach et al. (2022b) as manipulation checks. To evaluate the two serial mediators, perceived exclusivity toward the store was measured using four items based on Hagtvedt and Patrick (2008), and aesthetic pleasure toward the store was assessed using three items adapted from Murray et al. (2019). Visit intention, used as the dependent variable, was measured using three items adapted from Jang et al. (2018). Participants responded to these main variables on a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). Demographic information, including age, race, education, and annual household income, was collected (Appendix A).

3.3. Common method bias

To resolve potential concerns of common method bias, a marker variable test was carried out, following the guidelines set by Lindell and Whitney (2001). A theoretically irrelevant scale item (i.e., "In terms of my ability to learn new tasks that are high tech, I would describe myself as one of the best in my work group.") was utilized as a covariate (|*r*| = 0.05–0.08). The findings from this test showed no significant discrepancies between the observed and adjusted correlations, implying that common method bias had a negligible impact on the data. Harman's single-factor test was also performed by subjecting all measurement items to an exploratory factor analysis. According to Fuller et al. (2016), if the unrotated factor solution yields a single factor accounting for more than 50 % of the total variance, common method bias may be present. In this study, the largest single factor accounted for 41.4 % of the variance, indicating that bias is unlikely to be a concern.

3.4. Results

3.4.1. Preliminary analysis

The mean age of participants was 28.56 years (*SD* = 4.47; minimum = 23, maximum = 39). Most participants were Caucasian (96.7 %, *N* = 116), followed by American Indian, Native American, and Alaska Natives (3.3 %, *N* = 4). Approximately 75 % of participants had a bachelor's degree (*N* = 90), with 16.7 % holding graduate or professional degrees (*N* = 20), and the remaining 8.3 % were categorized as "other" (*N* = 10). In terms of annual income, approximately half of the sample fell within the lower-income bracket, ranging between $25,000 and $74,999 (50.8 %, *N* = 61), whereas the other half fell into the higher-income bracket, ranging from $75,000 to $150,000 or more (49.2 %, *N* = 59).

Before proving the hypotheses, the normality and multicollinearity of the constructs were evaluated. The skewness and kurtosis values were within acceptable ranges (Table 1; skewness < |2| and kurtosis < |7|) (West et al., 1995), demonstrating that the distribution of data was normal. To assess multicollinearity, the variance inflation factor (VIF), which measures the correlation between independent variables in a regression model, was used. The VIF values for all constructs were below 1.9 (thresholds of VIF <5.0) (O'Brien, 2007), suggesting no multicollinearity issues. Additionally, the reliability of the scales was confirmed, as Cronbach's alpha values for all variables exceeded the recommended threshold of 0.7 (Nunnally and Bernstein, 1994), demonstrating internal consistency.

3.4.2. Manipulation checks

An independent *t*-test showed that participants who experienced generative art in a retail store reported a significantly higher perception of art presence (*M* = 4.23, *SD* = 0.45) than those who did not (*M* = 3.92, *SD* = 0.60, *t* = −3.289, *p* < .001). Thus, the manipulation of art presence was confirmed successfully.

3.4.3. Moderated sequential mediation analysis

For testing H1 and H2, a moderated sequential mediation analysis was performed using the PROCESS macro (Model 83; Hayes, 2017) with 5000 bootstrapped samples. Art presence (coded 0 = non-generative art and 1 = generative art) was used as a binary independent variable, perceived exclusivity and aesthetic pleasure toward the store were used as mediators, visit intention was used as a dependent variable, brand type (coded 0 = mass brand and 1 = luxury brand) was used as a moderator, and individuals' education and income were included as covariates.

First, the results verifying H1 indicate that the main effect of generative art presence on perceived exclusivity is positively significant (Table 2; *b* = 0.87, *SE* = 0.31, 95 % CI = [0.2511, 1.4851], *p* < .01). This implies that incorporating generative art into a retail store stimulates

Table 1
Descriptive statistics and correlation values (Study 1).

Variables	Art presence	Perceived exclusivity	Aesthetic pleasure	Visit intention
Art presence[a]	1			
Perceived exclusivity	0.25*	1		
Aesthetic pleasure	0.24*	0.69**	1	
Visit intention	0.26*	0.79**	0.63**	1
Mean	–	4.13	4.11	4.08
Standard Deviation	–	0.55	0.62	0.67
Skewness	0.00	−1.60	−0.51	−1.73
Kurtosis	−2.03	4.08	0.39	6.41
Cronbach's alpha	–	0.74	0.75	0.79

Note. a = categorical variable; **p* < .01, ***p* < .001.

Table 2
Results of the moderated sequential mediation model (Study 1).

Independent variables	Perceived exclusivity (M1)			Aesthetic pleasure (M2)			Store visit intention (Y)		
	B	SE	p	B	SE	p	B	SE	p
Constant	2.89	0.58	0.00	0.86	0.37	0.02	−0.96	0.33	0.00
Art presence (X)	0.87	0.31	0.01	−0.00	0.08	0.96	0.11	0.07	0.10
Brand type (W)	0.67	0.31	0.03	–	–	–	–	–	–
Art presence × Brand type	−0.40	0.20	0.04	–	–	–	–	–	–
Perceived exclusivity (M1)	–	–	–	0.74	0.07	0.00	0.73	0.09	0.00
Aesthetic pleasure (M2)							0.33	0.08	0.00
Education	−0.02	0.06	0.75	0.04	0.04	0.39	0.06	0.04	0.14
Income	−0.02	0.04	0.62	−0.01	0.03	0.89	0.07	0.03	0.02
Index of moderated-mediation	Index = −0.0999 BootSE = 0.0525 BootCI [−0.2084 to −0.0042]								
Summary of model	$R^2 = 0.102$ F(5, 114) = 2.591			$R^2 = 0.515$ F(4, 115) = 30.463			$R^2 = 0.726$ F(5, 114) = 60.366		

Note. B = unstandardized coefficients; SE = standard error; p = p-value; BootCI [LCI to UCI]; LCI = lower confidence interval; UCI = upper confidence interval; R^2 = coefficient of determination.

higher perceptions of exclusivity than not incorporating generative art into a retail store. Moreover, the main effect of brand type on perceived exclusivity is also positive and significant ($b = 0.67$, $SE = 0.31$, 95 % CI = [0.0567, 1.2899], $p < .05$), suggesting that exposure to luxury brands is positively associated with the perception of exclusivity.

Interestingly, the interaction effect of generative artistic presence and brand type on perceived exclusivity was negatively significant ($b = -0.40$, $SE = 0.20$, 95 % CI = [−0.7944, −0.0147], $p < .05$), suggesting that, for consumers in a mass brand context (as opposed to a luxury brand), the effect of generative art presence on perceived exclusivity becomes more pronounced. In case of a mass brand, infusing generative art into a store provokes greater perceptions of exclusivity than that in a store without infusing generative art, thus supporting H1 (Fig. 2).

Furthermore, we explored whether this interaction effect extended to aesthetic pleasure and visit intention toward the store by examining the conditional indirect effects. Perceived exclusivity positively affects aesthetic pleasure toward the store (Table 2; $b = 0.74$, $SE = 0.07$, 95 % CI = [0.6009, 0.8744], $p < .001$). Additionally, both mediators positively influence consumer visit intention (perceived exclusivity: $b = 0.73$, $SE = 0.09$, 95 % CI = [0.5545, 0.8972], $p < .001$; aesthetic pleasure: $b = 0.33$, $SE = 0.08$, 95 % CI = [0.1709, 0.4988], $p < .001$). Consequently, the moderated mediation index was statistically significant (index = −0.10, BootSE = 0.05, 95 % BootCI = [−0.2084, −0.0042]). Specifically, the conditional indirect effect was observed in the mass-brand condition (indirect effect = 0.11, BootSE = 0.05, 95 %

BootCI = [0.0287, 0.2077]) but not in the luxury brand condition (indirect effect = 0.01, BootSE = 0.03, 95 % BootCI = [−0.0444, 0.0753]). This finding supports H2 by confirming that perceived exclusivity and aesthetic pleasure toward the store serially mediate the interaction effect of generative art presence and brand type on visit intention toward the store.

4. Study 2: methods and results

4.1. Participants and procedure

Consistent with Study 1, we employed purposive sampling, restricting participation to female MTurk workers aged 18–39 years residing in the United States. This study used a single-factor (generative art dynamism: static vs. dynamic) between-subjects design.

Building on the findings from Study 1, Study 2 focused specifically on the mass brand context. Spatial.io was utilized to create an immersive virtual shopping experience. In the static condition, the generative art–infused store from Study 1 was reused, displaying a single still frame extracted from the original generative art video. However, the dynamic condition featured a full generative art video created using TouchDesigner, incorporating controlled motion effects such as speed and zoom while maintaining the original art wall dimensions. Visuals representing the dynamic condition are included in Appendix C.

To validate the experimental stimuli, a pilot test was conducted with a convenience sample of 20 female participants (age $M = 28.05$, $SD = 3.07$; minimum = 23, maximum = 32). An independent samples t-test indicated no significant difference in the perceived presence of art between the two conditions (static art: $M = 4.20$, $SD = 0.35$; dynamic art: $M = 4.45$, $SD = 0.49$; $t = -1.301$, $p = .21$), suggesting that both conditions were perceived as comparably artful in terms of presence. Participants in the dynamic condition reported significantly higher perceptions of art dynamism ($M = 4.50$, $SD = 0.45$) compared to those in the static condition ($M = 3.30$, $SD = 0.29$, t = −7.060, $p < .001$). Based on these results, two virtual stores were selected to represent each experimental condition.

For the main survey in Study 2, participants followed the same experimental procedures established in Study 1. The same attention-check items from Study 1 were employed. After excluding 10 participants who failed the attention check, 90 responses were retained for analysis. Participants were randomly assigned to one of the two experimental conditions (n = 45 per group) and received a $2 incentive upon completing the survey.
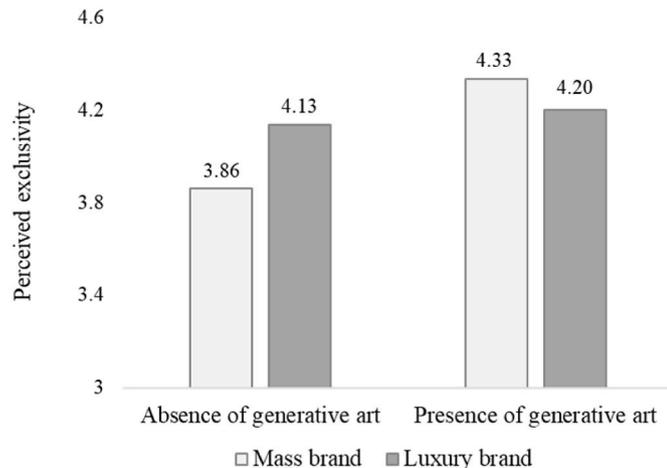

Fig. 2. Interaction effect of generative art presence and brand type on perceived exclusivity.

4.2. Measurement

For manipulation check, the perceived presence of generative art was measured using the same scale in Study 1. The dynamism of perceived art was assessed using three items derived from Skandrani et al. (2016). The two serial mediators, perceived exclusivity and aesthetic pleasure towards the store, were measured using the same items in Study 1. The dependent variable, e-WOM intention, was assessed using three items adapted from Okazaki et al. (2014). Artistic openness, the moderating variable, was measured using three items based on Naletelich and Paswan (2018). All items in Study 2 were rated on a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). Additionally, the participants' demographic information, including age, race, education, and annual income, were collected (Appendix A).

4.3. Common method bias

In line with the process followed in Study 1, a marker variable test was conducted to evaluate the presence of common method bias. Thus, a theoretically unrelated scale item (i.e., "I would like to take off on a trip with no pre-planned routes or timetables") was selected as a covariate ($|r| = 0.11$–0.15). The test results revealed that the observed and adjusted correlations were essentially the same, suggesting that common method bias did not influence the data. Harman's single-factor test was conducted to enhance the assessment's robustness. The results indicated that the largest single factor accounted for 44.1 % of the variance—below the commonly accepted threshold of 50 %—supporting the conclusion that common method bias did not substantially affect the results.

4.4. Results

4.4.1. Preliminary analysis

The mean age of participants was 28.04 years (SD = 3.49, minimum = 23 years, maximum = 39 years). All participants were Caucasian (100 %, $N = 90$). The educational backgrounds of the participants were as follows: 77.8 % held a bachelor's degree ($N = 70$), 10.0 % had completed college but did not obtain a degree ($N = 9$), 6.7 % held graduate or professional degrees ($N = 6$), and 5.6 % had a high school diploma ($N = 5$). Of all, 43.3 % of the participants reported annual earnings between $50,000 and $74,999 in the past 12 months ($N = 39$), 41.1 % reported earning less than $49,999 annually ($N = 37$), and 15.6 % reported annual incomes ranging from $75,000 to $149,999 ($N = 14$).

In line with Study 1, the normality and multicollinearity of the constructs were evaluated. The skewness and kurtosis values for all key variables were within the recommended ranges of −2 to +2 and −7 to +7, respectively, confirming that normality was achieved (Table 3). Moreover, the VIF values for all constructs were below 3.8, which was well within the acceptable threshold of less than 5.0, indicating no multicollinearity issues. The Cronbach's alpha values for all variables exceeded the recommended threshold of 0.7, ensuring internal consistency.

4.4.2. Manipulation checks

An independent samples *t*-test was conducted to assess the effectiveness of the manipulation of artistic dynamism. Consistent with the results of the pre-test, there was no significant difference in the perceived presence of art between the two conditions (static art: M = 4.20, SD = 0.83; dynamic art: M = 4.39, SD = 0.57; t = −1.258, p = .21), indicating that both were perceived as equally artful in presence. However, participants in the dynamic condition reported significantly higher perceptions of dynamism (M = 4.44, SD = 0.47) compared to those in the static condition (M = 4.08, SD = 0.78, t = −2.637, p < .01). Therefore, the manipulation checks were effective.

4.4.3. Moderated sequential mediation analysis

For testing H3 and H4, a moderated sequential mediation analysis was performed through the PROCESS macro (Model 83; Hayes, 2017) with 5000 bootstrapped resamples. Artistic dynamism (coded as 0 = static art and 1 = dynamic art) was used as a binary independent variable, perceived exclusivity and aesthetic pleasure toward the store were used as mediators, e-WOM intention was used as a dependent variable, artistic openness was used as a moderator, and individuals' education and income were included as covariates.

First, the main effect of generative artistic dynamism on perceived exclusivity is positive and significant (Table 4; b = 2.19, SE = 0.57, 95 % CI = [1.0697, 3.3223], p < .001). This implies that infusing dynamic generative art into a retail store (i.e., moving like a video) provokes higher exclusivity than in static art stores (i.e., moving like a picture). Furthermore, the main effect of artistic openness as an individual trait was positively significant for perceived exclusivity (b = 1.46, SE = 0.18, 95 % CI = [1.0947, 1.8262], p < .001). Comparable with the general expectations, this finding suggests that individuals open to and interested in the arts perceive higher exclusivity in art-infused stores than those with lower openness to the arts. Notably, the interaction effect of generative artistic dynamism and artistic openness on perceived exclusivity was negative and significant (b = −0.47, SE = 0.13, 95 % CI = [−0.7241, −0.2099], p < .001). This suggests that the effect of generative artistic dynamism on perceived exclusivity is more pronounced among consumers with low (M = 3.63; effect = 0.50, SE = 0.12, 95 % CI = [0.2562, 0.7461], p < .001) or average (M = 4.29; effect = 0.19, SE = 0.08, 95 % CI = [0.0245, 0.3543], p < .05) levels of artistic openness, compared to those with high levels (M = 4.96; effect = −0.12, SE = 0.12, 95 % CI = [−0.3531, 0.1084], p = .29). Under conditions of low and average artistic openness, the infusion of dynamic generative art into the store led to higher perceptions of exclusivity than static generative art, thereby supporting H3 (Fig. 3).

Additionally, by examining conditional indirect effects, this study explored whether this interaction effect extended to aesthetic pleasure and e-WOM intention toward the store. Perceived exclusivity positively affects aesthetic pleasure toward the store (Table 4; b = 0.78, SE = 0.06, 95 % CI = [0.6550, 0.9047], p < .001). Furthermore, both mediators

Table 3
Descriptive statistics and correlation values (Study 2).

Variables	Art dynamism	Perceived exclusivity	Aesthetic pleasure	e-WOM intention	Artistic openness
Art dynamism[a]	1				
Perceived exclusivity	0.20	1			
Aesthetic pleasure	0.21	0.71**	1		
e-WOM intention	0.19	0.70**	0.69**	1	
Artistic openness	0.09	0.71**	0.71**	0.68**	1
Mean	–	4.31	4.34	4.19	4.29
Standard Deviation	–	0.70	0.67	0.75	0.66
Skewness	0.00	−1.86	−1.70	−1.26	−1.14
Kurtosis	−2.04	5.71	4.64	2.64	0.77
Cronbach's alpha	–	0.80	0.75	0.72	0.73

Note. a = categorical variable; *p < .01, **p < .001.

Table 4
Results of the moderated sequential mediation model (Study 2).

Independent variables	Perceived exclusivity (M1)			Aesthetic pleasure (M2)			e-WOM intention (Y)		
	B	SE	p	B	SE	p	B	SE	p
Constant	−2.05	0.79	0.01	0.83	0.36	0.02	−0.25	0.39	0.52
Art dynamism (X)	2.19	0.57	0.00	0.06	0.08	0.47	−0.00	0.09	0.96
Artistic openness (W)	1.46	0.18	0.00	–	–	–	–	–	–
Art dynamism × Artistic openness	−0.47	0.13	0.00	–	–	–	–	–	–
Perceived exclusivity (M1)	–	–	–	0.78	0.06	0.00	0.51	0.11	0.00
Aesthetic pleasure (M2)							0.43	0.11	0.00
Education	−0.01	0.05	0.85	−0.01	0.05	0.86	0.09	0.05	0.09
Income	−0.05	0.04	0.21	0.03	0.04	0.48	−0.02	0.05	0.72
Index of moderated-mediation	Index = −0.158 BootSE = 0.067 BootCI [−0.2843 to −0.022]								
Summary of model	R^2 = 0.724 $F_{(5, 84)}$ = 43.957			R^2 = 0.666 $F_{(4, 85)}$ = 42.481			R^2 = 0.707 $F_{(5, 84)}$ = 40.476		

Note. B = unstandardized coefficients; SE = standard error; p = p-value; BootCI [LCI to UCI]; LCI = lower confidence interval; UCI = upper confidence interval; R^2 = coefficient of determination.
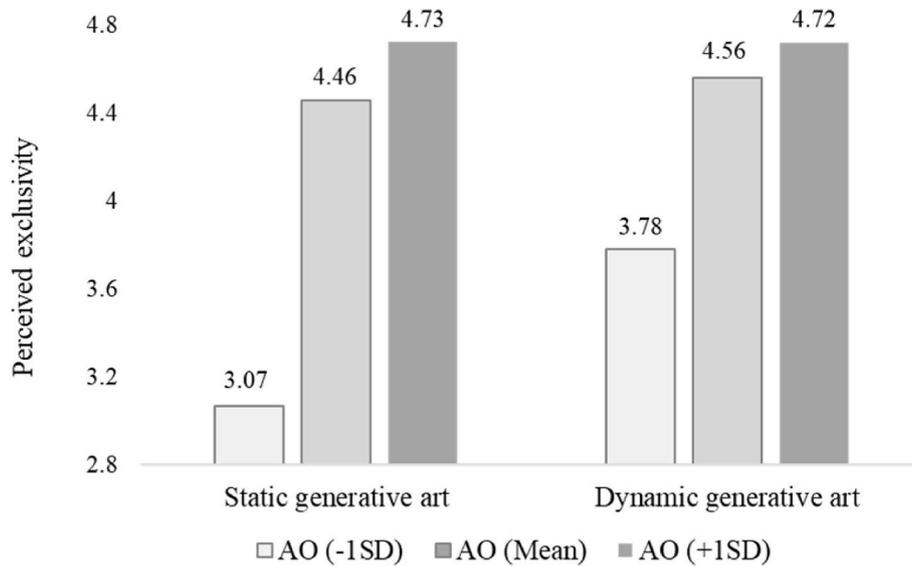

Fig. 3. Interaction effect of generative art dynamism and artistic openness on perceived exclusivity.
Note. AO = Artistic openness.

positively influenced e-WOM intentions of consumers (perceived exclusivity: b = 0.51, SE = 0.11, 95 % CI = [0.2927, 0.7347], $p < .001$; aesthetic pleasure: b = 0.43, SE = 0.11, 95 % CI = [0.2056, 0.6607], $p < .001$). Consequently, the index of moderated mediation was statistically significant (index = −0.16, BootSE = 0.07, 95 % BootCI = [−0.2843, −0.0215]). Specifically, the conditional indirect effect was evident in the low artistic openness condition (indirect effect = 0.17, BootSE = 0.07, 95 % BootCI = [0.0379, 0.2959]) and the medium condition (indirect effect = 0.06, BootSE = 0.03, 95 % BootCI = [0.0073, 0.1278]), but not under the high artistic openness condition (indirect effect = −0.04, BootSE = 0.04, 95 % BootCI = [−0.1179, 0.0381]). This finding supports H4 by confirming that perceived exclusivity and aesthetic pleasure toward the store serially mediate the interaction effect of generative artistic dynamism and artistic openness on e-WOM intention toward the store.

5. Discussion and implications

5.1. Theoretical implications

This study presents two significant contributions to the literature.

The first builds on the concept of the art infusion effect to highlight the significance of generative art as a novel and influential form of visual art, characterized by its unique presence and dynamic nature.

Numerous studies on the art infusion effect have emphasized advertising contexts, examining how art-infused advertisements or products enhance consumer evaluations through various perception-based mechanisms, such as prestige (Lee et al., 2015), value for money (Hüttl-Maack, 2018), positive affect (Estes et al., 2018), and aesthetic judgement (Park et al., 2023b). Recent research has expanded this focus to more specific aspects by considering variables, including the art type (abstract vs. figurative) (Park et al., 2023a), genre of art (fine art vs. urban art) (Baumgarth and Wieker, 2020), recognition of art (non-recognizable vs. recognizable) (Peluso et al., 2017), and functional messages conveyed through artworks (social-adjustive vs. value-expressive) (Quach et al., 2022a). Epstein and Hertzmann (2023) proposed that a major use of generative AI is the creation of high-quality artistic media, such as videos, animation, visual arts, and music. Recent literature on generative AI has predominantly focused on its role as a communication tool, such as through ChatGPT (Kim et al., 2023, 2025). To extend the existing research streams, this study initially considers visual works created by an AI-powered design program as a new art

genre and examines its effects within virtual retail environments. Specifically, it broadens our overall understanding of how generative art, as a novel environmental stimulus, can enhance the consumer experience during virtual shopping.

Second, to the best of our knowledge, this research initially explored how the effect of generative art, when used as an experiential element in virtual retail environments, can be either enhanced or diminished based on both brand types and consumer traits, offering a fresh perspective in marketing research. Park et al. (2023a) highlighted the need for further investigation, as the effect of art infusion on consumer shopping behavior can vary across product types, such as luxury versus non-luxury. Nevertheless, the understanding of how generative art, which differs fundamentally from any traditional art form, can be effectively applied across various brand types remains limited. This study addresses this gap by demonstrating that generative art can serve as an innovative strategy, particularly for creating unique experiential environments within the non-luxury sector. Furthermore, it deepens our understanding of consumer behavior in response to novel retail stimuli by examining how perceptions of generative art among consumers are shaped by their openness to art, a personal trait that is closely tied to their engagement with artistic experiences.

5.2. Managerial implications

This study offers two key practical insights for decision-makers—including retailers, artists, and technicians—interested in developing distinctive shopping experiences in both physical and virtual environments. It highlights the potential of generative art, which is not only cost-effective but also capable of producing infinite design variations in real time.

First, this study recommends that practitioners recognize the broad applications of generative art across various retail formats in shaping unique and psychologically pleasurable shopping experiences, which ultimately influence positive approach behaviors, such as store visits and e-WOM. Retailers can initially implement generative art in metaverse platforms as a testbed before incorporating it into physical store environments. The metaverse's flexibility in time and space compared to offline channels allows for efficient experimentation and targeted marketing communication, particularly among younger, digitally native consumers.

As demonstrated in H1 and H2, generative art evoked higher perceptions of exclusivity in mass brand retail environments than in luxury brand settings. This outcome may stem from a contrast effect, wherein the unexpected integration of artistic elements in typically non-luxurious settings creates a heightened sense of rarity and novelty. In contrast, consumers generally expect luxury stores to provide a refined and exclusive atmosphere, which may diminish the perceptual impact of added generative art. Accordingly, generative art may be particularly effective for mass-market fashion brands. Specifically, for emerging fashion brands with relatively limited financial resources and brand recognition, generative art can serve as a tool to enhance consumers' perceptions of exclusivity and aesthetic pleasure without relying on expensive or well-known artworks. For instance, given that many fashion brands prioritize the development of seasonal concepts as part of their branding strategy, generative art can function as a medium for brand storytelling by embedding seasonal themes, campaign messages, or brand narratives within digital displays in virtual stores. Consequently, mass or emerging fashion brands can create generative art that aligns with each season's theme or design concept and display it on digital walls or at the entrance of a metaverse store, thereby effectively enhancing the consumer shopping experience.

Even with limited financial resources, mass fashion brands can create a sense of exclusivity and aesthetic pleasure through generative art without relying on well-known or expensive artworks. From a managerial standpoint, incorporating personalized generative art backgrounds into the landing screens of mass brands' mobile apps or

metaverse stores can further enhance the personalization and appeal of the shopping experience.

Second, based on the findings related to H3 and H4, the importance of understanding consumer traits—such as artistic openness—when designing art-infused retail environments or marketing campaigns is noted. Results suggest that in virtual shopping environments, dynamic and rhythmic generative art increases perceptions of store exclusivity among consumers with relatively low levels of openness to artistic experiences. Conversely, for consumers with high artistic openness, generative art's dynamism did not significantly influence exclusivity perceptions. These insights imply that incorporating dynamic, motion-based generative art—such as continuously evolving video installations on digital walls or window displays—can elevate the perceived distinctiveness and uniqueness of a store, particularly among consumers who may not actively seek out artistic experiences.

5.3. Limitations and future research

This study had several limitations that should be addressed in future studies. First, the participant eligibility criteria limit the findings' generalizability. Participants were recruited through Amazon MTurk, with a predominantly Caucasian sample. As Litman and Robinson (2020) noted, while MTurk offers access to diverse samples in terms of gender, age, education, and socioeconomic status, it tends to be less ethnically diverse than the general U.S. population. Additionally, considering that the 3D virtual fashion store created for the experiment consisted of fashion products designed for female consumers, the sample was restricted to young women in their 20s and 30s. Although this sampling decision ensured perceived consistency between the stimuli and the participants, the demographic constraints limit the generalizability of the findings across gender, cultural, and generational groups. Future studies should seek to recruit more diverse participants through systematic and representative sampling methods and incorporate gender-neutral stimuli to enhance external validity.

Second, methodological limitations related to sample size and potential experimental bias were present. Given the nature of the experimental study, which required participants to engage directly with a virtual store environment, the final sample size was relatively small. Future studies can increase sample size to enhance statistical power and to gain a more comprehensive understanding of metaverse users across diverse demographic segments. In addition, although all aspects of the store environments were carefully controlled apart from the manipulated variables, this study did not include explicit measures to verify participants' perceptions of consistency in non-manipulated elements. Future research should incorporate perception checks to ensure that variations in responses are attributable solely to the manipulated features.

Furthermore, despite measures to minimize demand characteristics—such as embedding filler items unrelated to the main variables, participants may still have inferred the study's purpose, potentially biasing their responses. This possibility is acknowledged as a limitation. Future research could mitigate this risk by incorporating suspicion probes or other post-task measures to assess participant awareness of the study's objectives.

Third, this study examined the effect of generative art on a virtual fashion store with clothes, shoes, bags, and similar items. The fashion sector is a leading adopter of generative art in retail environments, which motivated this study. However, as fashion products are typically associated with experiential and hedonic aspects, it remains uncertain whether similar effects will be observed in more utilitarian shopping contexts. Given that the extant research on art infusion demonstrates how the influence of art-infused objects on consumers' perceptions, attitudes, and behaviors is shaped by product-centric factors, such as aesthetic appeal, functionality, symbolic meaning (Naletelich and Paswan, 2018), and the hedonic nature of the product (Hüttl-Maack, 2018), future research should explore how generative art performs across

diverse retail settings. Comparing environments that offer varying shopping values—from utilitarian to highly experiential—will help clarify the boundary conditions under which generative art enhances or limits consumer engagement.

CRediT authorship contribution statement

Woo Bin Kim: Writing – review & editing, Writing – original draft, Validation, Project administration, Methodology, Investigation, Conceptualization. **Jhovanna Vanessa Perez:** Writing – review & editing, Visualization, Software, Resources, Methodology. **So-Yeon Yoon:** Writing – review & editing, Visualization, Supervision, Project administration, Data curation, Conceptualization.

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Declaration of competing interest

We decare that we have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jretconser.2025.104542.

Data availability

Data will be made available on request.

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