

UNDERSTANDING COMPULSIVE BUYING IN THE METAVERSE: A DUAL-ROUTE PERSUASION PERSPECTIVE

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Abstract

Compulsive buying continues to be recognized as a maladaptive consumer behavior and has increasingly attracted the attention of both scholars and practitioners. Despite this growing interest, limited empirical work has examined consumer behavior within Metaverse environments, highlighting a clear need for further investigation. This study addresses this gap by examining compulsive buying behavior in a simulated Metaverse setting. A 3 by 3 factorial experimental design was employed, and data were collected from 87 participants. The findings reveal that more immersive Metaverse experiences significantly intensify compulsive buying tendencies within the Metaverse. In addition, ideal self-congruence with the Metaverse was found to play a significant indirect role in shaping this behavior. By integrating insights from established behavioral theories with emerging Metaverse literature, this study contributes to the theoretical understanding of compulsive consumption in virtual environments and offers meaningful implications for managers seeking to design responsible and engaging Metaverse experiences.

1. INTRODUCTION

Within the rapid evolving digital landscape, innovation in interactive technologies and consumer engagement practices are advancing at an unprecedented pace. Among these innovations, Augmented Reality (AR), and in particular, Virtual Reality (VR), have emerged as critical success factors for facilitating reality-driven communication, where real and virtual experience are seamlessly blended (De Keyser et al., 2019; Hilken et al., 2021). VR offers the capability to explore future scenarios, shape immersive experiences, and develop stronger consumer-brand engagement (De Keyser et al., 2019; Hilken et al., 2021). Applications of AR and VR span

various domains: learners and tutors can engage in virtual classrooms (Kaser et al., 2019), tourists can experience high-end resorts virtually before booking (Bogicevic et al., 2019), and consumers can visualize IKEA furniture in their homes through AR (Hilken et al., 2020). AR also supports navigation and interaction in complex service environments such as trade shows (Gäthke, 2020). To keep pace with technological advancements, leading brands such as Walmart, Adidas, and Maybelline are leveraging the Metaverse to enhance customer experiences. These organizations recognize the transformative potential of the Metaverse for customer engagement.

Understanding these benefits, however, requires examining the Metaverse's key characteristics and its evolution over time. The Metaverse integrates technological innovations with virtual communities, which are increasingly attracting academic and organizational attention (Luo et al., 2013; Park et al., 2022; Yeh & Choi, 2011). Virtual communities facilitate consumer engagement, interaction, and co-creation of value, highlighting their significance for both marketing practice and research (De Bruyn & Lilien, 2008; Donthu et al., 2021; Verma & Yadav, 2021). This study is grounded in the Elaboration Likelihood Model (ELM), conceptualized by Petty and Cacioppo (1986). Although originally developed before the Internet era to explain consumer behavior, the ELM remains highly applicable in cyberspace, particularly in understanding user responses to online advertisements. The model posits two pathways to persuasion—central and inherent, based on an individual's motivation and ability to process information (Petty & Cacioppo, 1986).

Despite extensive research on persuasion in marketing, psychology, and sociology, little attention has been given to the integration of self-congruence and virtual experiences within the Metaverse. Unlike other online platforms, the Metaverse enables interactive virtual experiences through digital representations of the self-avatars. These avatars allow interactions unconstrained by physical barriers and serve as extensions of users' identities.

Prior research in gaming contexts demonstrates that self-congruence with avatars significantly influences perception, engagement, and behavior (Ko & Park, 2020). Similarly, in the Metaverse, avatars play a crucial role in immersion and active participation (Sirgy, 1982; Sirgy & Su, 2000). Accordingly, the current study investigates the impact of central and peripheral route processing, self-congruence (actual and ideal), and Metaverse experiences on purchasing behaviors. By applying the principles of ELM with self-congruence as a mediating variable, this research makes two contributions. Firstly, it highlights a previously underexplored variable in ELM studies. Secondly, it extends the understanding of persuasion processes in online environments, identifying factors that shape compulsive buying in immersive settings. While prior studies have explored consumer behavior

related to virtual products and VR (Barhorst et al., 2021), few have considered the Metaverse, where interaction attributes and identity representation are central. This quantitative study has two objectives:

RQ1. What is the role of the central and peripheral route in creating a Metaverse experience and subsequently creating an effect on Compulsive Buying in Metaverse?

RQ2. What is the intervening role of actual and ideal self-congruence with the Metaverse in creating the Metaverse experience?

2. Literature Review

2.1. Elaboration likelihood model

The central route is one of the two core pathways proposed in the Elaboration Likelihood Model (ELM), which explains how individuals process persuasive messages when they are both motivated and able to think carefully about information (Petty & Cacioppo, 1986). Under high elaboration conditions, individuals evaluate the logical strength, accuracy, and credibility of information rather than relying on superficial cues. Research has shown that accurate, well-structured, and evidence-based arguments result in stronger and more long-lasting attitudes, as people scrutinize the content through systematic reasoning. Information accuracy thus plays a central role in this process, since individuals ascribe greater weight to messages that are factually correct and internally coherent (Chen, Duckworth, & Chaiken, 1999). Digital and immersive contexts, like those of the Metaverse, make central-route processing increasingly relevant because users very often assess information quality before forming judgments, especially for complex or personally relevant content (Petty & Cacioppo, 1986). The peripheral route denotes the low-effort information processing, whereby persuasion occurs through simple cues like vividness, color, attractiveness, and emotional appeal (Petty & Wegener, 1999). When people lack either the motivation or ability to process information deeply, they rely on sensory or aesthetic cues to make quick judgments (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997). Visual attributes of color and vividness have been shown time and again to impact affect, recall, and immediate impression, hence turning them into one of the effective peripheral cues

for persuasive communications (Meyers-Levy & Peracchio, 1995). In highly immersive environments, such as the Metaverse, sensory richness and aesthetic stimulation significantly influence user experiences and attitudes because the cues operate automatically and require little cognitive effort. Consequently, vivid and colorful design can elicit enjoyment and emotional engaging experiences even when people are not actively evaluating information structure or accuracy (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997).

2.2 Metaverse and compulsive buying

Metaverse experience can be defined as the subjective perception of a user about immersion, interaction, and presence felt within a digitally simulated environment. It includes sensory richness, social presence, interactivity, and emotional engagement (Suh & Prophet, 2018). In the case of the Metaverse, as VR, AR, and other 3D spaces, combined with virtual social interaction, create such environments in which users have life-like experiences of vivid sensations, the involvement is high (Park & Kim, 2022). Studies have revealed that deep immersion and presence enhance emotional arousal and cognitive absorption, which makes Metaverse experiences more effective in shaping attitudes and behaviors (Dwivedi et al., 2022). Rich Metaverse experiences in turn facilitate identity exploration and emotional connection with a virtual setting, thus fostering the attachments of users to virtual environments. (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997). Compulsive buying has been defined as repetitive and uncontrolled purchasing behavior as a result of emotional impulse rather than a rational decision-making process (Faber & O'Guinn, 1992). Common correlates include temporary emotional relief, psychological compensation, or diminished self-control. Research explains how an immersive and interactive environment may strengthen compulsive tendencies since continuous stimulation can provide emotionally loaded cues to such behavior (Ridgway, Kukar-Kinney, & Monroe, 2008). At the same time, the visual richness of virtual space, personalization of the experience, and immersion into digital space would increase emotional arousal and thus make one more suspect to unplanned or excessive purchases

(Dittmar, 2005). Within the Metaverse, this sensory immersion with enhanced identity play makes them particularly vulnerable to compulsive buying behavior (Faber & O'Guinn, 1992; Dittmar, 2005)

2.3. Self-concept and self-congruity

Self-congruence with an avatar begins to develop when the user first creates their avatar. Avatar creation is often one of the very first tasks users are given in the Metaverse. During this process, a user's main consideration is the physical appearance of the avatar, and one of the most available references would be their own physical traits in shaping the avatar's appearance. This phenomenon has been clearly observed in several studies. Nowak and Rauh (Citation2005) noted that people tend to prefer avatars that align with their own gender and choose avatars featuring characteristics that are similar to their own. Williams (Citation2010) also suggested that users are more likely to identify with avatars that are physically similar to the users (Sirgy, 1982; Sirgy & Su, 2000).

Actual self-congruence is defined as correspondence between a consumer's actual self-concept and the symbolic attributes of a brand, product, or digital environment (Sirgy, 1982). When individuals perceive a stimulus as a reflection of who they truly are, they show stronger emotional comfort, authenticity, and psychological coherence. It has been found that actual self-congruence boosts positive evaluations, strengthens identification, and deepens the attachment to a brand or experience (Kressmann et al., 2006). In immersive environments, congruity between virtual elements and an individual's real identity becomes of particular concern. For instance, congruence of Metaverse content with a user's actual self leads to perceived authenticity and enhances the satisfaction of experiences (Malär et al., 2011). This congruence can lead to more meaningful interactions and stronger emotional connections within digital platforms. (Sirgy, 1982; Sirgy & Su, 2000). Ideal self-congruence will capture the extent to which a stimulus is aligned with a person's ideals, goals, and desired identity. Unlike actual self-congruence, ideal self-congruence emanates from who individuals wish to become (Sirgy & Su, 2000). Ideal self-congruence research shows that aligning with a consumer's ideal

self is associated with self-esteem enhancement, emotional elevation, and motivational engagement, making aspirational identities central to consumer behavior (Aguirre-Rodriguez, Bosnjak, & Sirgy, 2012). The Metaverse gives users a special arena for ideal self-expressiveness because users can manipulate avatars, environments, and interactions in ways that reveal their ideal selves. Ideal self-congruence in these digital settings facilitates emotional engagement and leads to higher experiential assessments (Malär et al., 2012). Users are therefore much more likely to experience deep connections with those exposures that symbolically express who they aspire to be. (Sirgy, 1982; Sirgy & Su, 2000). Metaverse experience can be defined as the subjective perception of a user about immersion, interaction, and presence felt within a digitally simulated environment. It includes sensory richness, social presence, interactivity, and emotional engagement (Suh & Prophet, 2018). In the case of the Metaverse, as VR, AR, and other 3D spaces, combined with virtual social interaction, create such environments in which users have life-like experiences of vivid sensations, the involvement is high (Park & Kim, 2022). Studies have revealed that deep immersion and presence enhance emotional arousal and cognitive absorption, which makes Metaverse experiences more effective in shaping attitudes and behaviors (Dwivedi et al., 2022).

Rich Metaverse experiences in turn facilitate identity exploration and emotional connection with a virtual setting, thus fostering the attachments of users to virtual environments. (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997). Compulsive buying has been defined as repetitive and uncontrolled purchasing behavior as a result of emotional impulse rather than a rational decision-making process (Faber & O'Guinn, 1992). Common correlates include temporary emotional relief, psychological compensation, or diminished self-control. Research explains how an immersive and interactive environment may strengthen compulsive tendencies since continuous stimulation can provide emotionally loaded cues to such behavior (Ridgway, Kukar-Kinney, & Monroe, 2008). At the same time, the visual richness of virtual space, personalization of the experience, and immersion into digital space would increase emotional arousal and thus make one more

suspect to unplanned or excessive purchases (Dittmar, 2005). Within the Metaverse, this sensory immersion with enhanced identity play makes them particularly vulnerable to compulsive buying behavior (Faber & O'Guinn, 1992; Dittmar, 2005)

3. Hypothesis Development

In this study, we propose that eWOM responses involve dual information-processing routes, which can be explained by the Elaboration Likelihood Model (ELM). Specifically, these responses are influenced by the trustworthiness dimension of message source credibility and by emotional message appeal, as shown in Figure 1. We focus on trustworthiness and emotional appeal because users primarily engage with social networking sites (SNSs) to build relationships, and most individuals on their friend lists are real-life acquaintances. In contrast, the expertise dimension of source credibility is considered less salient in this context (Petty & Cacioppo, 1986).

Regarding message appeal, previous research has shown that emotionally appealing messages—such as coupons and discounts—more effectively elicit user engagement, such as clicking “Like” (Vorvoreanu, 2009). When users are passively exposed to promotional messages rather than actively seeking them, their involvement with the product or message is generally low (MacInnis & Jaworski, 1989). Literature further supports that emotional and recreational appeals are more persuasive in generating interest in a product (Holmes & Crocker, 1987), which is why we select emotional appeal as the key factor for investigating message effectiveness. According to ELM, when the elaboration likelihood is high, users rely on the message source (central route) to process information; when elaboration likelihood is low, users rely on peripheral cues. Although source credibility has traditionally been treated as a peripheral factor, this study posits that it can serve as a central route variable in the SNS context. Because messages originate from friends and acquaintances, users possess prior knowledge of the source, which enhances their ability to elaborate on the message. Additionally, we examine the effects of profile variables, such as gender and age, on these factors. Multiple-group analysis is conducted to assess the

strength of these relationships across different profile groups (Chen et al., 1999).

3.1 Central Route and Metaverse Experience

The central route of the Elaboration Likelihood Model (ELM) refers to a mode of information processing where users engage in high-effort, cognitive evaluation of message content, carefully considering argument strength, logical consistency, and factual accuracy. In this route, attitude formation or change depends principally on users' systematic review of substantive information rather than superficial cues (Petty & Cacioppo, 1986). Under central processing, individuals scrutinize the quality of information and integrate it with existing cognitive schemas, producing more enduring attitudes that are resistant to change and more predictive of actual behavior. This is because users' judgments are grounded in thoughtful elaboration rather than instantaneous heuristics (Petty & Cacioppo, 1986).

In Metaverse environments, which are characterized by complex interactive content and high degrees of user agency, central processing plays a significant role in shaping user experience. When users are motivated and able to process detailed information (e.g., accurate product descriptions, clear instructions, credible social feedback, and logically structured content), they form rich cognitive representations of the virtual environment that support effective navigation and engagement. Research in digital settings shows that information clarity and accuracy reduce cognitive friction—users expend less effort reconciling contradictory or unclear cues—thereby enhancing perceptions of usefulness, competence, and control within the environment. This enhanced comprehension strengthens both flow states (deep engagement) and presence (the subjective sensation of “being there”), which are key indicators of positive digital experience.

The role of central processing is supported by information processing theory and Uses and Gratifications Theory, which argue that users seek gratification through meaningful engagement with content that aligns with their goals, tasks, and expectations. In immersive contexts such as the Metaverse, users who centrally process high-quality informational cues tend to report greater satisfaction,

higher intention to continue engagement, and stronger experiential involvement, because they can meaningfully interpret and act upon virtual stimuli in ways that mirror real-world cognition.

Hypothesis 1

The accuracy and clarity of central route information positively influence the Metaverse experience because they enable deep cognitive elaboration, reduce cognitive load, support coherent mental models of the virtual environment, and strengthen users' perceived control and presence (Chen et al., 1999).

3.2 Peripheral Route and Metaverse Experience (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997)

The peripheral route in the ELM encapsulates the processing that is based on heuristic, affective, and sensory cues rather than detailed cognitive analysis. Under conditions of either low motivation or limited cognitive capacity, users attend to environmental cues relating to visual aesthetics, sensory richness, animation, vividness, color contrast, and affective stimuli. These cues do not have a logical connection with the meaning of the content but can influence the users through emotional resonance, immediate affective reaction, or sensory attraction. The peripheral route usually results in faster but less stable attitude formation than the central route (Chen et al., 1999). In Metaverse environments, peripheral cues are particularly powerful because users are embedded in rich multisensory worlds designed to elicit emotional responses and motivate curiosity. Vivid designs, immersive audio-visual effects, and sensory triggers can quickly capture attention and lead to immediate affective processing, with positive contributions to users' overall sense of presence and enjoyment (Kim & Biocca, 1997; Hsu et al., 2022). Research in immersive advertising and virtual commerce indicates that visual attractiveness and interactivity play decisive roles in attitudes toward content and an increase in behavioral intentions, even when cognitive elaboration is low (Meyers-Levy & Peracchio, 1995; MDPI, 2022) (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997). Peripheral cues are particularly relevant for users who approach the Metaverse not as an analytical task but as an

exploratory, entertainment, or social space. In such settings, sensory and heuristic cues serve as affective anchors, decreasing the need for deep cognitive processing, while at the same time driving high experiential involvement by inspiring positive emotions, curiosity, and flow states. Peripheral processing, in other words, allows users to experience a sense of enjoyment and engagement without necessarily evaluating the detailed meaning or factual quality of the stimuli they encounter. This form of engagement is especially impactful in contexts where emotional involvement and pleasure are core to user goals.

Hypothesis 2

It also can be conceptualized that the peripheral route cues, such as vividness, color, and sensory appeal, will have positive influences on the Metaverse experience by evoking immediate emotional viewing and increasing telepresence and enjoyment even when deep cognitive elaboration is not present (Petty & Cacioppo, 1986; Kim & Biocca, 1997; Meyers-Levy & Peracchio, 1995; Hsu et al., 2022). (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997).

3.3 Metaverse Experience and Compulsive Buying

Metaverse experience is a multi-dimensional construct that encompasses immersion, presence, interactivity, and emotional involvement (Suh & Prophet, 2018; Park & Kim, 2022). Immersive and engaging environments heighten emotional arousal and cognitive absorption, which can increase susceptibility to compulsive buying behavior (Faber & O'Guinn, 1992; Dittmar, 2005). Excessive levels of MVE might affect behavioral outcomes, for instance, compulsive buying, which can be described as the persistent and automatic act of acquisition, inspired by motives that are not based on function or task-oriented objectives or behaviors (Faber & O'Guinn, 1992). The constantly engaging and activating ambiance of immersive spaces lessens user self-control and enhances their vulnerability to impulsive behaviors and actions due to flow and other affective responses, which inhibit their reflective thinking and actions and inspire those inspired by impulse or desire (Faber & O'Guinn, 1992; Dittmar, 2005). Empirical research has shown that virtual environments involving high

interactivity and rich sensory feedback positively affect involvement and impulsive behavior, including unplanned purchases (Shahab et al., 2021; Kim et al., 2020). The users' perceptions of being present in the virtual environment and the emotional involvement in the avatars or products further strengthen the psychological pull of rewards, thus forming a cycle where fun and emotional resonance drive the impulsive to purchase (Nowak & Rauh, 2005; Williams, 2010). When it comes to immersive consumption or gaming, the consumers might experience ideal self-projection, perceiving consumption as part of their ideal or aspirational self. Such integration amplifies the intensity of the arousal process, leading more easily to compulsive consumption, especially when accompanied by peripheral cues such as the attractiveness of virtual items.

Hypothesis 3

Metaverse experience affects the compulsive buying behavior positively because of the fact that immersion, involvement, and interaction lower reflective self-control while increasing affectively based purchasing (Faber & O'Guinn, 1992; Dittmar, 2005).

3.4 Intervening Role of Actual Self-Congruence

Real self-congruence refers to the correlation between the user's actual self-concept and virtual self-concept. Realms that portray some elements of the user's self-concept, either in the form of an avatar, actions, or style, will cause feelings of comfort, self-validation, or resonance in the user (Kressmann et al., 2006) (Sirgy, 1982; Sirgy & Su, 2000). The Metaverse allows for more centrality route processing, which increases the validity of real self-congruence because it involves important and accurate information that relates to one's identity. One would also experience peripheral cues, such as the use of similar-looking avatars or environments that include similar symbols (Sirgy, 1982; Sirgy & Su, 2000). Nonetheless, empirical findings indicate that true self-congruence might not play an important mediator role in user experience as self-concepts in reality are stable entities that cannot easily be influenced by new representations in cyberspace. However, in cases where true self-congruence is strong, it will continue to promote

psychological coherence and user satisfaction (Sirgy, 1982; Sirgy & Su, 2000).

Hypotheses 4a & 4b

4a: Actual self-congruence acts as the mediator that links the central route cues and the Metaverse experience, and this process enables self-congruence in the users' actual (Chen et al., 1999)

4b: The actual self-congruence mediates between peripheral route cues and the Metaverse experience, supported by the fact that emotionally comforting and familiar feelings are reinforced (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997)

3.5 Intervening Role of Ideal Self-Congruence (Sirgy, 1982; Sirgy & Su, 2000)

Ideal self-congruence is when there is a match between users' ideal self-concept and their online presence. Through the use of the Metaverse, users have the capacity to express their ideal self through avatars, behaviors, and symbols. When users find themselves in an environment where their ideal self-concept is supported, it leads to high levels of motivation, positive affect, and engagement, as cited by Higgins (1987) (Sirgy, 1982; Sirgy & Su, 2000). Central cues, for example, information that can help in developing skills or self-enhancement, can easily enhance ideal self-congruence, as these motivate individuals to explore more. Peripheral cues, for example, visually

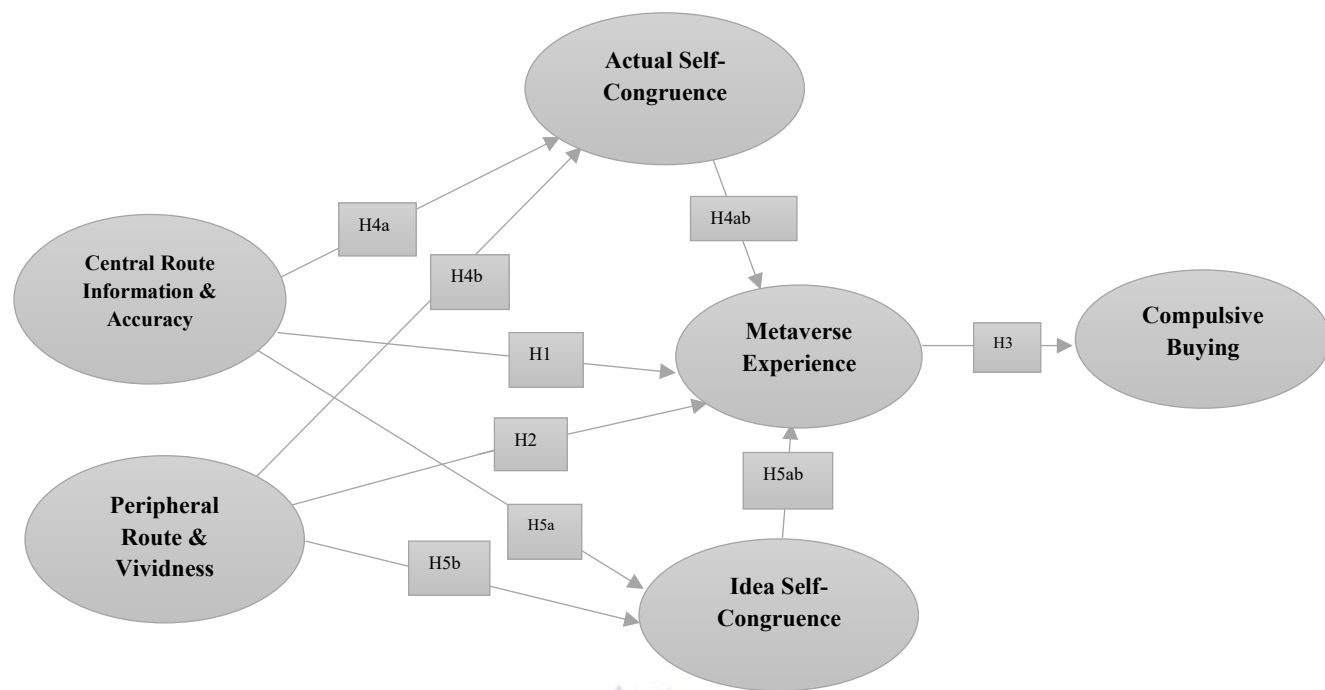
appealing elements, are symbolic representations of desired qualities, and these can also enhance identification with the ideal self. Ideal self-congruence can easily enhance emotional engagement, motivation, and behavioral intention, increasing the influence of both central as well as peripheral cues on Metaverse experience (Sirgy, 1982; Sirgy & Su, 2000). Findings from research show that ideal self-congruence works as a more potent mediator than actual self-congruence, especially within fully immersed virtual environments where users tend to be driven for exploration purposes or for social engagements and gamification. (Sirgy, 1982; Sirgy & Su, 2000)

Hypotheses 5a & 5b

5a: Ideal-self congruence serves as the mediator between the central route cues and the experience of the Metaverse, given that important information is related to the ideal-self-identity goals (Chen et al., 1999).

5b: The mediation of Metaverse experience between peripheral route cues and ideal self-congruence occurs because ideal self-congruence facilitates symbolic identification with self-traits preferred by users through aesthetic and sensory stimulation. (Meyers-Levy & Peracchio, 1995; Kim & Biocca, 1997)

Research Model



4. Methodology

4.1 Research Design & Experimental Conditions

The research framework is grounded in the Elaboration Likelihood Model (ELM) and self-concept theory, consistent with prior Metaverse research (Balakrishnan et al., 2023). The study investigates both direct effects (central and peripheral routes on Metaverse experience; Metaverse experience on compulsive buying behavior) and indirect effects through actual and ideal self-congruence. This study adopts a quantitative, the 3x3 factorial conclusive research design to examine hypothetical model given in Fig. 1. The two experimental variables represent the central “Information clarity and accuracy” (high, medium, and low) route and peripheral route. “Design vividness and color” (high, medium, and low) Table 1 shows the conditions corresponding to each

variable. The respondents were exposed to a specific Metaverse condition, an image given in the form first and then questions were asked subsequently to know how they feel about the experience. The socio-demographic information about the participants is given in Table 2. A Metaverse retail outlet was created on Roblox and the stimulus was manipulated nine

times to test the two experimental conditions. The form was filled by 94 participants, at least 10 respondents of each.

4.2. Experiment procedure

The created Metaverse image is manipulated to fit with the 9 blocks (3x3). The respondents were first exposed to the stimulus image of Metaverse retail outlet created on the Roblox platform. The information is appended in terms of clarity and accuracy to operationalize the first variable (Information clarity and accuracy). The second independent variable (Design vividness and color) is also operationalized using three conditions. At a high level, the vividness and color are found to be very bright in the meta-retail store. At a low level, the meta-retail store is set to be less aesthetic in terms of

Vividness and coloring. The avatar is different according to the experimental condition. (Balakrishnan, 2024). The structured questionnaire form begin from the stimulus image to test the effect of different experimental conditions and questions were asked regarding Central and Peripheral route.

they were asked to fill a questionnaire containing total of six questions three of each independent variable, measured on a five-point scale with “5” being Strongly Agree and “1” being Strongly Disagree, , “The information shared in the Metaverse was helpful for me to navigate the retail store and helped me understand the products (CR1)”, “The information shared in the Metaverse had clarity in guiding me to the retail store and in understanding the products (CR2)”, “The information shared in the Metaverse had better accuracy in providing information about the retail store and the products (CR3) of central route. For peripheral route the questions are “I like the design of the Metaverse (PR1)”, “The Metaverse to me is more vivid and clear to interact with (PR2)”, “The Metaverse is colorful with clarity to interact with (PR3)”. The responses were tested using ANOVA to understand the differences in mean values. Given in

Table 3. For example, image1 represents high in formation clarity and accuracy with high design vividness and color. Likewise, each image was manipulated according to the manipulation condition. Detailed manipulations of the nine images is given in Table 1.

The items to test the latent variables in the Theoretical Model were also asked by using the Likert scale. The Metaverse experience items were adopted from Balakrishnan and Dwivedi (2021) 5-item Likert scale and the actual and ideal self-congruence questions were assessed with the Liu, Zhang, and Zhang (2020) and Rabbanee et al. (2020) 5-item Likert scale. At last, the compulsive buying was tested by adapting the scale of Ridgway et al. (2008) 7-item Likert scale which has been widely used in consumer behavior research.

Table 1. Detailed manipulations of the nine images

Route	Condition	Description
Central Route	High (3)	Metaverse designed with high information cues, greater clarity, and high accuracy. Clear signboards placed both inside and outside the retail outlet.
	Medium (2)	Metaverse designed with normal information cues and medium accuracy. Signboards feature medium clarity and accuracy both inside and outside the outlet.
	Low (1)	Metaverse designed with fewer information cues and lower clarity/accuracy. Signboards feature low clarity and accuracy both inside and outside the outlet.
Peripheral Route	High (3)	High vividness and visual appeal. The environment features a high-vivid look and high RGB coloring.
	Medium (2)	Normal vividness and visual appeal. The environment features a medium-vivid look and medium RGB coloring.
	Low (1)	Low vividness and visual appeal. The environment features a low-vivid look and low RGB coloring.

4.3. Sample and Data Collection

The sampling technique used was Convenience sampling, a non-probability sampling technique, because the sample consisted of friends, family, and any acquaintance who were easily accessible to fill the questionnaire. Data were collected through a self-administered online questionnaire, in which the questions were consistent in all forms but the stimulus, different experimental conditions were change, what each stimulus image consists is given in table 1. The participants are randomly assigned to each group. Malhotra and Birks (2006) recommended that randomization can reduce the selection bias error

during experimental research. By randomly setting the participants to blocks, we tried to control the effect of.

selection bias. The total number of respondents were 96 but was reduced to 87 after Data screening by identifying outliers on SPSS and eliminating the respondents completely. A total of 87 valid responses were obtained and used for analysis; ANOVA, CFA and SEM. Respondents were exposed to 9 different Metaverse stimuli designed to reflect variations in informational (central route) and peripheral cues, ensuring adequate experimental manipulation given in Table 1. The sample size meets the minimum

threshold for SEM analysis, particularly for models with moderate complexity and well-defined constructs. Participation was voluntary, and

respondents were assured of anonymity to minimize response bias.

Table 2. Social demographic information about the study participants.

Variable	Characteristics	Frequency	Percentage (%)
Gender	Male	52	59.77%
	Female	35	40.23%
Age	18 - 24 years	71	81.61%
	25 - 30 years	16	18.39%
	31 - 40 years	0	0.00%
	Above 40 years	0	0.00%
Occupation	Student	61	70.11%
	Working	16	18.39%
	Professional	10	11.49%
	Others	0	0.00%
Previous Experience in Metaverse	Gaming	9	10.35%
	Tourism	12	13.79%
	Shopping	18	20.69%
	No Experience	48	55.17%

4.3.4 Data Analysis Procedure

Prior to testing the hypothesized model, preliminary analysis, one-way ANOVA, was performed to assess group-level differences across experimental conditions. These findings indicate that there were no statistically significant differences in participants' perceptions across the experimental conditions. Confirmatory Factor Analysis (CFA) was conducted using AMOS to assess the reliability and validity of the measurement model. Standardized factor loadings were examined to evaluate convergent validity. Model fit was assessed using multiple indices, including χ^2/df , CFI, TLI, RMSEA, and SRMR. The CFA model demonstrated a good overall fit, indicating that the measurement model was suitable for structural analysis. Composite Reliability (CR) and Average

Variance Extracted (AVE) were computed to further establish construct reliability and convergent validity (Table 4). Also, the common method bias analysis (CMB) is employed to test whether the data is free from CMB. Following the validation of the measurement model, this study employed covariance-

based structural equation modeling (CB-SEM) using AMOS to test the hypothesized relationship

5. Results

5.1. One-way ANOVA

One-way ANOVA was conducted using SPSS to examine group-level differences across experimental conditions. Mean values, standard deviations, F-statistics, and significance levels were reported to support initial comparisons given in table below. Although the mean values suggested moderate agreement with the central and peripheral route items, the differences among conditions were not large enough to reach statistical significance. This indicates that participants perceived the information clarity and design vividness similarly across all experimental conditions.

Table: Descriptive Statistics and ANOVA Results for Central and Peripheral Route Items

Variable	Item Code	Mean	df	F-value	Significance (p)
Central Route	CR1	3.44	86	.441	.893
	CR2	3.44	86	.868	.547
	CR3	3.55	86	.591	.783
Peripheral Route	PR1	3.54	86	1.240	.287
	PR2	3.74	86	.700	.690
	PR3	3.66	86	1.120	.359

5.2. Confirmatory factor analysis

The CFA analysis confirmed the validity and reliability requirements for structural equation modelling. Model fit was assessed using multiple goodness-of-fit indices. The CFA model exhibited a **good overall fit** to the data. The chi-square to degrees of freedom ratio (χ^2/df) was **1.505**, well below the recommended threshold of 3. The GFI value is 0.815.

The Comparative Fit Index (CFI = **0.926**) and Tucker-Lewis Index (TLI = **0.908**) exceeded the recommended value of 0.90. The Root Mean Square Error of Approximation (RMSEA = **0.077**) and Standardized Root Mean Square Residual (SRMR = **0.074**) were within acceptable limits, further confirming the adequacy of the measurement model. These results indicate that the measurement model is valid and suitable for subsequent structural analysis. Table 3 shows that all the constructs' items are above 0.60, ensuring adequate constructs' content validity (Nunally, 1978; Portney & Watkins, 2000). Also, Table 3 shows Cronbach's Alpha value above 0.70, confirming that the scale is consistent for further

analysis. The Average Variance Extracted (AVE) values are given in Table 4. The AVE values are above 0.50, which confirms the presence of convergent validity in the constructs (Fornell & Larcker, 1981). Table 4 also shows the Squared Root of AVE values in the table's diagonal, which is less than the inter-correlation of respective constructs. This condition indicates that the constructs are discriminant to each other, confirming the discriminant validity requirements (Fornell & Larcker, 1981). Thus, the confirmatory factor analysis shows that the reliability and content, convergent, discriminant validity requirements are met as suggested by Bagozzi et al. (1991) and Fornell and Larcker (1981), and the constructs can be employed to test the hypothetical relationships. Besides the CFA, we also tested for common method bias (CMB: Podsakoff et al., 2003) analysis. Common method bias was assessed using the full collinearity test proposed by Kock (2015). The variance inflation factor (VIF) values for all constructs were below the threshold of 3.3, indicating that common method bias is not a concern in this study.

Table 3. Standardized Factor Loadings

Construct	Item	Factor Loading (Estimate)	Mean (SD)	Cronbach's Alpha (α)
ME	ME3	.777	3.62 (.955)	0.796
	ME2	.710	3.59 (1.073)	
	ME1	.775	3.60 (0.933)	
ASC	ASC4	.869	3.37 (1.058)	0.885
	ASC3	.722	3.37 (1.036)	
	ASC2	.805	3.38 (1.092)	
	ASC1	.695	3.36 (1.078)	
ISC	ISC2	.844	3.20 (1.119)	0.716
	ISC1	.792	3.29 (1.088)	
CB	CB4	.800	4.08 (1.421)	0.854

	CB3	.782	4.30 (1.373)	
	CB2	.860	4.22 (1.386)	
	CB1	.719	4.20 (1.374)	

Table 4. Inter-construct correlations and AVE value.

Construct	CR	AVE	1	2	3	4
1. Metaverse Experience (ME)	0.77	0.57	0.75			
2. Actual Self-Congruence (ASC)	0.78	0.67	0.592	0.82		
3. Ideal Self-Congruence (ISC)	0.71	0.53	0.554	0.649	0.73	
4. Compulsive Buying (CB)	0.86	0.60	0.587	0.655	0.626	0.77

Notes: 1. AVE represents Average Variance Extracted; 2. CR represents composite reliability; 3. Square root of AVEs are presented in the diagonal for each construct in bold format; 4. all values in the correlation matrix are significant at 99% confidence level.

5.3 Structural Equation Modeling

Structural equation modeling was conducted to test the hypothesized relationships among the central route, peripheral route, Metaverse experience, self-congruence dimensions, and compulsive buying behavior. The structural model demonstrated an acceptable fit to the data (CMIN/df = 1.793, TLI = 0.850, RMSEA = 0.096, SRMR = 0.094), indicating that the proposed model adequately represents the observed data. Regarding the direct effects, the relationship between the central route and Metaverse experience (H1) was found to be non-significant ($\beta = -0.035$, CR = -0.218 , $p = 0.828$). Thus, H1 was not supported. In contrast, the peripheral route exhibited a significant positive effect on Metaverse experience (H2) ($\beta = 0.674$, CR = 2.934, $p = 0.003$), providing strong support for H2. The relationship between Metaverse experience and compulsive buying behavior (H3) was found to be positive and highly significant ($\beta = 1.144$, CR = 5.465, $p < 0.001$), indicating that stronger Metaverse experiences substantially increase compulsive buying tendencies. With respect to self-congruence, actual self-congruence did not significantly predict Metaverse experience ($\beta = -0.144$, CR = -0.732 , $p = 0.464$). Consequently, H4a and H4b, which proposed the indirect effects of actual self-congruence on the relationships between persuasion routes and Metaverse experience, were not supported. In

contrast, ideal self-congruence demonstrated a significant positive effect on Metaverse experience ($\beta = 0.783$, CR = 2.613, $p = 0.009$). This indicates that users' aspirational self-images play a meaningful role in shaping Metaverse experiences. Accordingly, H5a and H5b received partial empirical support, suggesting the relevance of ideal self-congruence in the proposed theoretical framework.

6. Discussion

The present study aimed to examine how central and peripheral routes of persuasion influence Metaverse experience, and how this experience subsequently drives compulsive buying behavior in the Metaverse environment. In addition, the study investigated the mediating role of actual and ideal self-congruence in strengthening these relationships. The findings provide meaningful theoretical and empirical insights into consumer behavior in immersive digital environments. First, the non-significant effect of the central route on Metaverse experience suggests that users do not primarily rely on cognitive, information-based processing when engaging with Metaverse environments. This finding can be explained through the Elaboration Likelihood Model, which posits that high-effort cognitive processing occurs only when individuals are motivated and capable of deep evaluation. In immersive and visually rich environments such as the Metaverse, users are more likely to seek entertainment and emotional engagement rather than analytical assessment, thereby weakening the influence of the central route. In contrast, the significant effect of the peripheral route on Metaverse experience highlights the dominance of heuristic cues such as visual design, interactivity, and

aesthetic appeal. This finding aligns with prior Metaverse and experiential marketing research, which emphasizes that sensory and emotional stimuli play a crucial role in shaping user perceptions in virtual environments. The study further reveals that Metaverse experience strongly predicts compulsive buying behavior, supporting Hypothesis 3, indicates that immersive digital experience may intensify emotional engagement and impulsive consumption. This result supports prior literature on experiential consumption, which suggests that heightened immersion and engagement reduce self-regulatory control and increase emotional decision-making. In the context of the Metaverse, users may perceive purchases as part of the experience rather than as deliberate economic decisions, thereby increasing the likelihood of compulsive buying. Regarding self-congruence, the failure of actual self-congruence to influence Metaverse experience suggests that users do not seek to replicate their real-world identities in virtual spaces. Instead, Metaverse platforms function as symbolic arenas where users explore idealized versions of themselves. This interpretation is reinforced by the significant effect of ideal self-congruence, which indicates that aspirational identity alignment enhances experiential engagement. Consequently, hypotheses related to actual self-congruence (H4a and H4b) failed due to the limited relevance of real-self alignment in immersive virtual environments, whereas hypotheses related to ideal self-congruence (H5a and H5b) received support.

7. Theoretical Implications

This study makes several important theoretical contributions. First, it extends the Elaboration Likelihood Model to the Metaverse context by demonstrating that both central and peripheral persuasion routes jointly influence immersive experiences. Second, it integrates self-concept theory into Metaverse research by empirically validating the mediating roles of actual and ideal self-congruence. By combining persuasion theory with self-concept mechanisms, the study offers a more comprehensive understanding of how consumers cognitively and emotionally engage with Metaverse environments and how these engagements translate into behavioral outcomes such as compulsive buying.

8. Managerial Implications

From a managerial perspective, the findings suggest that Metaverse designers and digital marketers should focus on both informational quality and aesthetic appeal when developing virtual environments. Providing rich, meaningful content alongside visually engaging elements can significantly enhance user experience. Moreover, brands operating in the Metaverse should design experiences that align with users' actual and ideal self-concepts. Customizable avatars, identity-driven environments, and aspirational brand narratives can strengthen self-congruence, thereby increasing engagement and purchase propensity. However, given the link between immersive experience and compulsive buying, managers should also consider ethical implications and promote responsible consumption within Metaverse platforms.

9. Limitations

Despite its contributions, this study has certain limitations. First, the relatively small sample size used to test the structural model of the research paper. Though the reference paper of Computer in Human Behaviors has used $n=90$ to test the experimental variable: the central route (information clarity and accuracy) and the peripheral route (Design Vividness and Color), 45 participants deployed in each experimental condition and then they were further divided into 15 participants in each condition but it was only for ANOVA testing of two experimental conditions which consisted of three questions in each condition. Second, the study relied on self-reported measures, and the respondents were those which were conveniently available, and many did not have a previous, Metaverse experience; thus, lack of awareness. Finally, the study focused on a single experimental Metaverse image as a stimulus, which may not fully capture the immersive nature of Metaverse world which the real-world Metaverse platforms offer.

10. Future Research Directions

Future research may address these limitations by employing larger and more diverse samples to examine changes in user behavior over time. Additionally, future studies could incorporate

psychological control variables, such as impulsivity or self-regulation, to better explain compulsive buying behavior in virtual environments. Researchers may also explore moderating variables such as immersion, presence, or personality traits to further refine the understanding of persuasion processes in the Metaverse.

11. Conclusion

This study contributes to the literature by integrating persuasion theory and self-concept theory to explain Metaverse experience and compulsive buying behavior. Using CB-SEM, the findings demonstrate that peripheral persuasion cues and ideal self-congruence are key drivers of Metaverse experience, which in turn significantly influences compulsive

buying behavior. The results indicate that Metaverse environments are more effective when they emphasize emotional appeal, symbolic meaning, and aspirational identity expression rather than information-based persuasion. Overall, the study provides empirical evidence that immersive digital experiences can significantly shape consumer behavior, particularly in terms of compulsive buying tendencies.

Disclose Statement

The authors have no conflict of interest.

Appendix

Construct	Code	Measurement Item
Actual Self-Congruence	ASC1	Concerning the Metaverse, the avatar and I are very similar.
	ASC2	I resemble the avatar in the Metaverse very much.
	ASC3	I can easily identify myself with this avatar in the Metaverse.
	ASC4	My actual self-image is consistent with the overall image in this Metaverse.
Ideal Self-Congruence	ISC1	The ideal of myself is very similar to the avatar in the Metaverse.
	ISC2	Participating in this Metaverse activity, I want to show the best of me.
	ISC3	The avatar in the Metaverse reflects my ideal self.
	ISC4	My ideal self-image is consistent with the overall image in this Metaverse.
Metaverse Experience	ME1	The interaction in the Metaverse is more appealing.
	ME2	It is easy to navigate in the Metaverse during the visit.
	ME3	The interaction and designs are more personalized.
	ME4	The designs and experience in the Metaverse are up to date.
Compulsive Buying	CB1	While shopping in this Metaverse environment, I feel an irresistible urge to buy products.
	CB2	When I see products in this Metaverse, I find it difficult to resist buying them.
	CB3	I feel that even when I don't need something, I would still want to buy it in this Metaverse.
	CB4	I tend to buy things in this Metaverse even if I hadn't planned to.

REFERENCES

- Baía Reis, A., & Coelho, A. F. V. C. C. (2018). Virtual reality and journalism: A gateway to immersive journalism. *Digital Journalism*, 6(8), 1090-1100.
- Bogicevic, V., Seo, S., Kandampully, J., Liu, S. Q., & Rudd, N. A. (2019). Virtual reality presence as a preamble of tourism experience. *Tourism Management*, 74, 55-64.
- Chen, S., Duckworth, K., & Chaiken, S. (1999). Motivated heuristic and systematic processing. *Psychological Inquiry*, 10(1), 44-49.
- De Keyser, A., Köcher, S., Alkire, L., Verbeeck, C., & Kandampully, J. (2019). Frontline service technology infusion. *Journal of Service Management*, 30(1), 7-34.
- Dittmar, H. (2005). Compulsive buying—A growing concern? *Journal of Consumer Policy*, 28(4), 411-427.
- Dwivedi, Y. K., et al. (2022). Metaverse beyond the hype. *International Journal of Information Management*, 66, 102542.
- Faber, R. J., & O'Guinn, T. C. (1992). A clinical screener for compulsive buying. *Journal of Consumer Research*, 19(3), 459-469.
- Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D., & Keeling, D. I. (2020). Augmenting the eye of the beholder. *Journal of the Academy of Marketing Science*, 48(4), 598-620.
- Kim, J., & Biocca, F. (1997). Telepresence via television. *Human Communication Research*, 23(3), 452-474.
- Malär, L., Nyffenegger, B., Krohmer, H., & Hoyer, W. D. (2012). Implementing an intended brand personality. *Journal of the Academy of Marketing Science*, 40(5), 728-744.
- Nowak, K. L., & Rauh, C. (2005). The influence of the avatar on online perceptions. *Journal of Computer-Mediated Communication*, 11(1), 153-178.
- Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion*. Springer.
- Sirgy, M. J. (1982). Self-concept in consumer behavior. *Journal of Consumer Research*, 9(3), 287-300.
- Suh, A., & Prophet, J. (2018). The state of immersive technology research. *Journal of Management Information Systems*, 35(3), 735-772.
- Japutra, A., Ekinci, Y., & Simkin, L. (2019). Self-congruence, brand attachment and compulsive buying. *Journal of Business Research*, 99, 456-463.
- Javornik, A., Marder, B., Pizzetti, M., & Warlop, L. (2021). Augmented self—The effects of virtual face augmentation on consumers' self-concept. *Journal of Business Research*, 130, 170-187.
- Lam, S. C., Chan, Z. S. L., Chong, A. C. Y., Wong, W. W. C., & Ye, J. (2018). Adaptation and validation of Richmond compulsive buying scale in Chinese population. *Journal of behavioral addictions*, 7(3), 760-769.
- Moon, M. A., & Attiq, S. (2018). Psychometric validation and prevalence of compulsive buying behavior in an emerging economy. *Sukkur IBA Journal of Management and Business*, 5(2), 92-113.
- Moon, M. A., Majeed, J., & Attiq, S. (2024). Enigma unveiled: decoding trust and relationship dynamics in the mobile banking sector of an emerging economy. *Pakistan Journal of Commerce and Social Sciences (ISSN 1997-8553)*, 18(2), 380-407.
- Farooq, A., & Moon, M. A. (2025). Addicted to the fake: Coaction theory and the psychology behind counterfeit consumption. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 19(3), 648-672.
- Farooq, A., & Moon, M. A. (2025). From Impulse to Imitation: Hedonic Motivation as a Bridge to Counterfeit Consumption. *Journal of Asian Development Studies*, 14(3), 263-276.
- Moon, M. A., & Abbas, A. (2024). Untold Intelligence: Tacit Knowledge and Marketing Success. *Journal of Information & Knowledge Management*, 23(05), 2450067.
- Integrating the S-O-R framework to assess social media marketing in the aviation sector: a study of pakistani travelers. (2026). *Center for Management Science Research*, 4(1), 64-78.