



How virtual fitting rooms shape wellbeing and readiness for virtual events: The moderating role of self-perception traits[☆]

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ABSTRACT

As immersive experiences become prevalent, Virtual Fitting Rooms (VFRs) have emerged as a preparatory stage in which users create and dress avatars before participating in virtual events. Drawing on Self-Determination Theory, this study examines how aspects of VFR experience influence readiness for the virtual event through hedonic wellbeing. It also applies Social Comparison Theory to assess how fashionable self-image and tendency to social comparison moderate these effects. Two VFR experience-based studies (total $N = 507$) were conducted, in which participants dressed avatars for either a professional or an entertainment-focused virtual event. Results indicate that wellbeing mediates the effects of perceived clothing attractiveness and VFR design on readiness in both contexts, while self-congruence with avatar clothing influences readiness through wellbeing only in professional settings. The findings reveal moderation patterns, with self-perception traits shaping relationship strength. These insights emphasize the pivotal role of the VFR stage in shaping users' wellbeing and readiness.

1. Introduction

Immersive experiences are transforming industries across both professional and entertainment-focused domains. In professional contexts, they are reshaping workplace collaboration (Lennig et al., 2024), while in entertainment-driven sectors such as gaming (Zuo & Shen, 2024), travel (Shamim et al., 2025), tourism, and media (Flavián et al., 2024), they are redefining how users engage with digital and physical environments. As immersive experiences continue to evolve, developers face growing pressure to design them in ways that promote positive psychological outcomes (Orús et al., 2021). In this context, wellbeing has emerged as a critical consideration (Mygind et al., 2019; Riches et al., 2024). It captures the extent to which immersive environments contribute to users' overall life satisfaction and points to a broader challenge: understanding how the design of these environments shapes users' confidence and readiness for the virtual event (Frost et al., 2022; So et al., 2024).

Although prior work has emphasized the importance of wellbeing in immersive environments (e.g., Velasco et al., 2024), little is known about the specific antecedents that foster wellbeing in these contexts. Moreover, the influence of early immersive stages on users' hedonic

wellbeing remains largely unexplored. Importantly, how this wellbeing subsequently shapes readiness for the virtual event is also not well understood. This gap is particularly critical. Wellbeing is not merely a passive outcome but an active driver of downstream psychological and behavioral responses (Gaston-Breton & De Stefano, 2025), especially in experiences that involve social interaction (Nezlek et al., 2019). Consequently, understanding wellbeing at these early stages is essential for ensuring positive outcomes throughout the immersive experience. One important early stage is avatar customization within Virtual Fitting Rooms (VFRs), which are digital interfaces and environments where users create and dress their avatars before participating in virtual events (Elmashhara et al., 2024a). This preparatory process plays a pivotal role in shaping users' expectations and psychological states by interacting with self-presentation motives and self-perception dynamics (Nezlek et al., 2019).

Recent research has advanced the understanding of how various factors shape the VFR experience. For example, Barta et al. (2024) show that perceived attractiveness enhances engagement and satisfaction, while Elmashhara et al. (2024a) demonstrate that both attractiveness and self-congruence with avatar clothing positively influence attitudes toward virtual experiences. Other studies highlight the importance of

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virtual space design in creating seamless and satisfying experiences (Zhang & Wang, 2024) and demonstrate that aesthetically appealing and intuitive VFR interfaces foster favorable attitudes (Yang et al., 2023). Similarly, enjoyable virtual spaces have been shown to increase overall engagement (Abou-Shouk et al., 2024). Despite these advances, two major gaps remain. First, in the VFR context, most outcomes examined reflect experiential evaluations rather than underlying psychological mechanisms. To date, no studies have examined how such factors influence users' wellbeing, nor how this wellbeing contributes to readiness for the virtual event; an important consideration since early psychological states often determine users' sustained involvement and perceived value in digital experiences (Barta et al., 2024). Second, the factors identified in the literature are conceptually diverse and stem from different theoretical traditions. Therefore, it is necessary to employ a cohesive framework, such as Self-Determination Theory (SDT) (Ryan & Deci, 2000), to explain how different experiential factors within VFRs may fulfill basic psychological needs and thereby enhance hedonic wellbeing. Based on this reasoning, the first objective of this research is to examine how perceived clothing attractiveness, self-congruence with avatar clothing, VFR design, and VFR enjoyment influence users' hedonic wellbeing, and how hedonic wellbeing, in turn, shapes readiness for the virtual event.

Individual differences in self-perception also play a central role in shaping users' responses to digital environments, particularly those involving self-presentation (Belk, 2013). These differences are especially salient in virtual social contexts, where digital representations serve as extensions of the self (Javornik et al., 2021). Specifically, the fashionable self-image and tendency to social comparison may shape how wellbeing and readiness develop in VFR contexts. Informed by Social Comparison Theory (SCT) (Festinger, 1954), we argue that users with a strong fashionable self-image are likely to be more sensitive to avatar aesthetics and self-congruence (Klesse et al., 2019), and those with a high tendency to social comparison may be more affected by the social implications of avatar presentation and design quality (Chen et al., 2024). These traits can amplify or attenuate effects on wellbeing in the VFR and, through it, on readiness. Accordingly, the second objective of this study is to explore how fashionable self-image and tendency to social comparison moderate the different effects of clothing attractiveness, self-congruence, VFR design, and enjoyment on wellbeing and readiness for the virtual event.

To address these objectives, we conducted two studies in which participants completed real VFR and avatar customization tasks. In Study 1, participants dressed avatars for a virtual work meeting; in Study 2, for a virtual party. This dual-context design supports generalizability and contextual validation (Völckner & Sattler, 2007) while enhancing the external validity of our findings (Winer, 1999). Results show similar patterns across both contexts: in professional settings, wellbeing and subsequently readiness are influenced by attractiveness, self-congruence, and VFR design, whereas in entertainment-focused settings, attractiveness and VFR design remain significant, but self-congruence plays a lesser role. Additionally, both fashionable self-image and tendency to social comparison moderate these relationships across contexts.

This study contributes to the literature in several ways. First, it extends SDT to the context of immersive fashion-based environments, explaining how distinct experiential components of virtual preparation stages influence users' hedonic wellbeing and subsequent readiness for the virtual event. Second, it enriches our understanding of individual differences by integrating self-perception traits as moderators within the studied antecedents and the wellbeing-readiness pathway. Thereby advancing knowledge of the psychological foundations of virtual experience design. Finally, at the managerial level, the study offers actionable insights for immersive experience designers, highlighting the role of early immersive stages such as VFRs in fostering user wellbeing and readiness.

2. Theoretical background and hypotheses development

2.1. Theoretical foundation: self-determination theory and social comparison theory

This research is grounded in SDT (Ryan & Deci, 2000), which explains human motivation and wellbeing as outcomes of the fulfillment of three fundamental psychological needs: autonomy, competence, and relatedness. Autonomy refers to the sense of volition and self-authorship in one's actions; competence involves feelings of mastery and efficacy; and relatedness captures the desire for meaningful connection with others. When these needs are satisfied, individuals experience enhanced motivation and wellbeing (Ryan & Deci, 2000, 2001).

Applying SDT to immersive environments, particularly VFRs, provides a powerful framework for understanding how digital interactions shape psychological outcomes. Within VFRs, users customize avatars to represent themselves in upcoming virtual events (Elmashhara et al., 2024a). We argue that this process engages affective and cognitive dimensions that fulfill the psychological needs described by SDT. In this vein, perceived clothing attractiveness can enhance feelings of competence by fostering confidence and perceived self-efficacy in one's digital appearance. Self-congruence with avatar clothing supports autonomy by allowing users to align their digital representation with their internal identity and sense of self. VFR design, when intuitive and aesthetically appealing, satisfies competence and autonomy by enabling effortless control and reinforcing users' agency over the experience. Finally, VFR enjoyment reflects affective engagement and emotional resonance with the virtual environment. This contributes to relatedness by generating feelings of connection and psychological presence (Ryan & Deci, 2000, 2001).

Recent studies suggest that wellbeing in social contexts predicts downstream psychological and behavioral responses (Nezlek et al., 2019; Pagán-Castaño et al., 2020). In line with this perspective, we argue that, within the VFR context – an early preparatory stage preceding subsequent immersive experiences such as virtual events – wellbeing predicts users' readiness for the virtual event. Accordingly, the conceptual framework of this research positions wellbeing as a central mediator linking attractiveness, self-congruence, design, and enjoyment to readiness, which reflects users' psychological preparedness and motivation for deeper immersive engagement.

While SDT explains how wellbeing emerges from need satisfaction, SCT (Festinger, 1954) offers a complementary lens for understanding why the strength of these effects may differ across individuals. SCT posits that people evaluate their own attributes and performance by comparing themselves with others, particularly in visible or socially evaluative contexts. Virtual events, where avatars serve as public representations of the self, naturally amplify these comparison processes (Duarte et al., 2025).

Within this study's context, two self-perception traits, fashionable self-image (Klesse et al., 2019) and tendency to social comparison (Chen et al., 2024), capture meaningful individual differences in how users interpret and respond to VFR experiences. We argue that users with a high fashionable self-image tend to view fashion as a salient aspect of identity and are therefore more sensitive to avatar aesthetics and congruence. Moreover, users high in the tendency to social comparison are more likely to evaluate their avatars in relation to others, interpreting design quality and attractiveness through a socially comparative lens (Chen et al., 2024; Klesse et al., 2019). Together, these traits may amplify or attenuate the paths from attractiveness, self-congruence, design, and enjoyment to wellbeing, and consequently, readiness for the virtual event.

2.2. Wellbeing and readiness in immersive contexts

Experience designers play a critical role in fostering user wellbeing by curating emotionally positive interactions that shape immediate

affective states and contribute to more meaningful psychological outcomes (Peters et al., 2018; Zha et al., 2023). Accordingly, wellbeing-oriented strategies have become central to user experience design, particularly in digital environments where engagement is often driven by short-term affective responses (Gretzel & Stankov, 2021; Lee et al., 2024). While prior studies have investigated the broader effects of digital experiences on wellbeing, both positive and negative (Anderson et al., 2025; McLean et al., 2023), less attention has been paid to the specific role of early immersive phases, such as VFRs, in shaping wellbeing and influencing readiness for the virtual event (So et al., 2024). This focus is important because the VFR typically serves as a preparatory stage that sets the tone for the broader immersive experience.

Readiness is a multifaceted construct that broadly reflects an individual's state of preparedness – psychological, emotional, and in some cases, behavioral – to engage in an upcoming task or environment (Carroll, 2013). It can manifest across diverse contexts such as education (Zine et al., 2025), organizational change (Rafferty et al., 2013), and digital interaction (Blut & Wang, 2020), encompassing not only skill or resource availability but also cognitive and affective readiness to act (Cramer et al., 2021). In the context of this study, readiness specifically refers to a user's psychological preparedness to move from the preparatory VFR phase into the main immersive experience (Carroll et al., 2020). It is not merely about technical preparedness or task completion but reflects how mentally and emotionally equipped a user feels to meaningfully engage in the experience. Readiness for the virtual event is critical for two reasons: (1) it enhances users' cognitive and emotional preparedness, influencing the depth and quality of their engagement with the immersive environment, and (2) it increases the perceived value and satisfaction of the overall experience, strengthening intentions for continued participation (Elmashhara et al., 2024a; Zhang & Wang, 2024). Accordingly, recognizing readiness as a general psychological construct, while situating it within the immersive context, allows for a more precise understanding. Specifically, it clarifies how preparatory stages, such as VFRs, shape readiness for the virtual event. In this vein, we argue that, just as preparing for an in-person event can enhance wellbeing and readiness (Carroll et al., 2020), creating and dressing an avatar in a VFR can produce similar outcomes in virtual contexts.

The growing body of research on consumer wellbeing has led to some conceptual fragmentation, necessitating careful contextualization depending on the topic and level of analysis (Eshaghi et al., 2023). Wellbeing is generally understood as a multidimensional construct that includes both objective and subjective domains (Subramony et al., 2022). Objective wellbeing refers to measurable life conditions such as income or health, and is typically used in macro-level studies. In contrast, subjective wellbeing, more relevant to experience-based consumer research, is commonly divided into two interrelated components: eudaimonic and hedonic (Diener et al., 1995, 2002; Gaston-Breton & De Stefano, 2025). Eudaimonic wellbeing reflects long-term fulfillment and personal growth, while hedonic wellbeing focuses on short-term emotional experiences; specifically, the presence of pleasure, positive feelings, and the absence of discomfort (Huta & Waterman, 2014; Pomfret, 2021; Ryan & Deci, 2001). Though distinct, these forms are interdependent, as accumulated hedonic experiences may foster eudaimonic outcomes over time (Baselmans & Bartels, 2018; Li et al., 2022). Given its affective and episodic nature, hedonic wellbeing is particularly relevant to immersive consumer experiences that are short and emotionally charged.

Within this framework, avatar customization in VFRs is more than a form of digital styling. It becomes an act of self-expression. Avatars function as extensions of the self, and their psychological impact is closely tied to how users manage their visual presentation (Belk, 2013; Kalyvaki et al., 2023). Prior research shows that self-presentation through avatars can positively affect wellbeing (Bij de Vaate et al., 2020). Despite this, little is known about how the VFR experience itself influences wellbeing. As immersive platforms increasingly emphasize fashion and digital identity (Alexander et al., 2025), designing and

dressing avatars becomes an important psychological process; one that shapes both how users see themselves and how they wish to be perceived by others (Hadi et al., 2024; Javornik et al., 2021).

This identity-building process may enhance wellbeing and preparedness for immersive participation (Grewal et al., 2019; Jain et al., 2025). Based on that, we propose that, in a VFR context, (1) perceived clothing attractiveness, (2) self-congruence with avatar clothing, (3) VFR design, and (4) VFR enjoyment shape users' hedonic wellbeing, which in turn enhances readiness for the virtual event. To explain this relationship, as argued previously, we draw on SDT, which posits that wellbeing stems from the fulfillment of three fundamental psychological needs: autonomy, competence, and relatedness. When these needs are met, users are more likely to experience hedonic wellbeing, which in turn increases readiness for the virtual event (Ryan & Deci, 2001).

2.3. Antecedents of readiness for the virtual event through hedonic wellbeing

2.3.1. Perceived clothing attractiveness

Perceived clothing attractiveness, though inherently subjective and varying across individuals, is often shaped by prevailing trends and specific clothing attributes, with certain fashion styles being more universally perceived as appealing (Bagatini et al., 2023). In VFR settings, designers must account for these shared cues of attractiveness, as aesthetically pleasing virtual garments can enhance user acceptance and contribute to a more engaging and satisfying experience (Barta et al., 2024). Similar to real-world fashion choices, users in VFR contexts are drawn to apparel that aligns with both broader aesthetic appeal and personal preferences (Lee et al., 2021). Perceiving clothing as attractive in a virtual environment not only cultivates positive attitudes but also enhances overall satisfaction with the VFR experience (Elmashhara et al., 2024a).

Attractiveness also acts as a psychological resource that improves positive feelings and satisfaction (Diener et al., 1995; Elmashhara et al., 2026b). It plays a crucial role in interpersonal perceptions, as individuals who perceive themselves as attractive tend to receive more favorable social judgments (Horton, 2003). In socially interactive environments, attractiveness shapes how individuals are perceived by others and how they perceive themselves, contributing to confidence and social readiness (Jiang et al., 2021).

Building on these insights and drawing on SDT, we conceptualize attractiveness as a factor that satisfies users' competence needs in immersive digital environments. When users perceive their avatars' clothing as attractive, they are more likely to feel capable and socially competent, reinforcing their sense of mastery and control over digital self-presentation (Ryan & Deci, 2000, 2001). This perception of competence supports a more affectively rewarding VFR interaction, thereby increasing hedonic wellbeing. In turn, users experiencing enhanced wellbeing are more likely to feel psychologically ready to engage in the next stage of the immersive experience (the virtual event, in our study). Therefore, we propose the following hypothesis:

H1. Hedonic wellbeing mediates the relationship between perceived clothing attractiveness and readiness for the virtual event.

2.3.2. Self-congruence with avatar clothing

Self-congruence refers to the degree of alignment between an individual's self-concept and external representations, such as images, products, brands, or behaviors (Sirgy et al., 1997), and has been shown to influence attitudes and behavioral responses (Japutra et al., 2019; Sirgy et al., 2000). Sirgy (1986) suggests that this construct reflects the idea that individuals are more likely to engage with experiences that express or reinforce their identity (Japutra et al., 2019). In the fashion domain, clothing often serves as a tool for self-expression, and individuals report greater satisfaction and positive affect when their apparel aligns with their self-concept (Anand & Kaur, 2018).

In immersive digital settings, such as VFRs, the act of dressing an avatar extends beyond aesthetics; it becomes a symbolic act of identity projection (Belk, 2013). Elmashhara et al. (2024a) demonstrated that self-congruence with avatar clothing can enhance satisfaction and attitudes toward the VFR interface by increasing perceived attractiveness and popularity. However, the direct relationship between self-congruence and wellbeing, particularly in immersive settings, remains underexplored, despite longstanding evidence that congruent self-expression supports psychological outcomes such as confidence (Malär et al., 2011), wellbeing (Pavot et al., 1997), engagement (Roy Bhattacharjee et al., 2023), and readiness (Shin et al., 2018).

Drawing on SDT, we propose that self-congruence satisfies the psychological need for autonomy, defined as the experience of acting in accordance with one's authentic self. When users perceive a strong match between their avatar's appearance and their internal identity, they experience a greater sense of personal expression and self-alignment, which fosters intrinsic motivation and psychological fulfillment (Ryan & Deci, 2000, 2001). This alignment enhances hedonic wellbeing by making the experience feel personally meaningful and identity-consistent. In turn, individuals experiencing heightened wellbeing are more likely to feel confident and mentally prepared – key indicators of readiness – to engage in the subsequent immersive stage, namely the virtual event. Thus, we propose the following hypothesis:

H2. Hedonic wellbeing mediates the relationship between self-congruence with avatar clothing and readiness for the virtual event.

2.3.3. Virtual fitting room design

The design of digital interfaces, such as virtual stores or VFRs, plays a pivotal role in shaping user experience and influencing emotional, cognitive, and behavioral outcomes (Elmashhara et al., 2024b; Jayawardena et al., 2023). As immersive technologies evolve, effective VFR design becomes essential for fostering a seamless and engaging user experience (Lee et al., 2021). Like their physical counterparts, VFRs benefit from clear layout structures, intuitive navigation, and aesthetically pleasing visuals (Beck & Crié, 2018; Zhang & Wang, 2024). These design features help users evaluate clothing options more easily and form favorable attitudes toward the virtual experience (Yang & Xiong, 2019; Yang et al., 2023).

A growing body of research has linked digital space design to positive affective and psychological outcomes (Huyghe et al., 2017). For example, visually engaging and functionally coherent virtual environments have been shown to enhance users' emotions, perceived value, and cognitive ease (Bleier et al., 2019). Building on this foundation, we propose that well-designed VFRs foster a sense of control and engagement, thereby enhancing users' affective evaluations of the experience. However, despite these insights, prior work has not explicitly examined whether VFR design directly contributes to users' wellbeing or readiness.

Drawing on SDT, we conceptualize VFR design as contributing to the satisfaction of two core psychological needs: competence and autonomy. Competence is supported when intuitive design enables users to navigate the environment smoothly and make informed choices (Bleier et al., 2019). Autonomy is reinforced through customizable interfaces that enable users to express their personal preferences (Pizzi et al., 2020). When these needs are satisfied, users are more likely to experience hedonic wellbeing, characterized by feelings of pleasure and gratification (Ryan & Deci, 2001). In turn, heightened hedonic wellbeing is expected to increase users' psychological preparedness and motivation to engage in subsequent stages of the immersive experience, namely the virtual event. Therefore, we propose the following hypothesis:

H3. Hedonic wellbeing mediates the relationship between VFR design and readiness for the virtual event.

2.3.4. Virtual fitting room enjoyment

Enjoyment refers to positive emotional responses, such as happiness and pleasure, that arise from experiences (Schepers et al., 2022). It plays a central role in shaping digital experiences (Akdin et al., 2022; Elmashhara et al., 2026a), particularly in immersive environments, as enjoyment has been shown to increase user satisfaction and promote more favorable attitudes toward the overall experience (Abou-Shouk et al., 2024). Within fashion contexts, enjoyment has also been linked to deeper levels of engagement (Blazquez, 2014; Silva & Bonetti, 2021) and positive responses (Papagiannidis et al., 2017).

In VFR settings, enjoyment refers specifically to users' affective responses to the interface itself and can stem from both the process of interacting with the digital interface and the creative expression perceived. While prior research acknowledges the importance of enjoyment in broader immersive experiences (e.g., Zhang et al., 2024), its specific role within early immersive stages, such as the VFR, remains underexplored. This is a critical gap, as enjoyment at this stage may shape users' affective evaluations of the overall avatar dressing experience and influence their readiness for the virtual event.

Drawing on SDT, we conceptualize enjoyment as contributing to hedonic wellbeing by satisfying two core psychological needs: relatedness and autonomy. Relatedness is supported through emotional connection to the activity – users who enjoy the VFR are more likely to feel immersed and emotionally invested (Abou-Shouk et al., 2024). Autonomy is fulfilled as users feel free to make choices and engage creatively in designing their avatars. When these needs are met, users experience a sense of intrinsic satisfaction that contributes to hedonic wellbeing. This heightened wellbeing, in turn, increases users' psychological readiness to proceed confidently into the immersive experience, namely the virtual event. Therefore, we propose the following hypothesis:

H4. Hedonic wellbeing mediates the relationship between VFR enjoyment and readiness for the virtual event.

2.4. The moderating role of self-perception traits

Avatar creation offers users the opportunity to express and experiment with their identities in virtual environments (Zimmermann et al., 2023). This process involves both internal self-evaluation and external impression management, particularly in socially visible contexts (Taylor & Carlson, 2025). Building on the foundations established in Section 2.1, we focus on two self-perception traits – fashionable self-image and tendency to social comparison – that capture meaningful individual differences in how users experience VFR interactions. These traits are expected to influence how users interpret and respond to aesthetic cues, design, and enjoyment, thereby shaping the strength of how different determinants affect wellbeing and readiness. Understanding these moderating mechanisms strengthens our model's explanatory power, extends SCT's application to immersive environments, and offers actionable insights for tailoring VFRs to diverse user profiles (Klesse et al., 2019).

2.4.1. Fashionable self-image

Fashionable self-image refers to the degree to which individuals perceive themselves as stylish and believe others recognize and admire their fashion choices and sense of style (Rocamora, 2017). In digital environments, particularly avatar-based contexts, users have the freedom to experiment with virtual garments that express and reinforce this fashionable self-image (Elmashhara et al., 2024a). Those with a strong fashionable self-image tend to be more invested in how they present themselves, both through clothing and within the surrounding environment (Klesse et al., 2019).

According to SCT, these individuals derive self-worth and confidence from being perceived as fashion-forward, even in virtual settings. When the avatar's appearance aligns with their fashionable self-image –

through perceived attractiveness or self-congruence – the impact on hedonic wellbeing is likely to be stronger (Rocamora, 2017). In addition, fashionability is not limited to garments; it includes the aesthetic and functional qualities of the environment (Holmqvist & Lunardo, 2015). Hence, a well-designed and enjoyable VFR may also enhance users' self-expression, thereby increasing wellbeing and readiness. Therefore, we propose:

H5. Fashionable self-image moderates the indirect effects of (a) perceived clothing attractiveness, (b) self-congruence with avatar clothing, (c) VFR design, and (d) VFR enjoyment on readiness for the virtual event through hedonic wellbeing. These indirect effects are stronger for individuals with higher levels of fashionable self-image and weaker for those with lower levels of fashionable self-image.

2.4.2. Tendency to social comparison

Tendency to social comparison refers to the habitual inclination to evaluate one's abilities, appearance, or behaviors relative to others (Bearden & Rose, 1990; Dakin & Arrowood, 1981). As a dispositional trait, it influences how individuals appraise themselves even in the absence of explicit social interaction. In immersive virtual settings, where avatars often serve as visible extensions of the self, the potential for social comparison becomes particularly prominent (Duarte et al., 2025). Even in solitary avatar customization moments, such as engaging with a VFR, individuals with a high tendency to social comparison may imagine how others would evaluate their clothing choices or user experience (Unkelbach et al., 2023; Venkatesh et al., 2010). These anticipated comparisons can influence psychological responses, including wellbeing, and shape subsequent outcomes such as readiness (Hudson et al., 2019; Song & Kim, 2006).

Building on SCT, we argue that individuals with higher levels of tendency to social comparison will be more sensitive to the VFR experience, its visuals, and fashion expression. As a result, the positive effects of perceived attractiveness, self-congruence, VFR design and enjoyment on wellbeing, and in turn on readiness, are expected to be stronger for these users. Thus, we propose:

H6. Tendency to social comparison moderates the indirect effects of (a) perceived clothing attractiveness, (b) self-congruence with avatar clothing, (c) VFR design, and (d) VFR enjoyment on readiness for the virtual event through hedonic wellbeing. These indirect effects are stronger for individuals with higher levels of tendency to social comparison and weaker for those with lower levels of tendency to social comparison.

Fig. 1 presents our proposed research framework.

3. Overview of studies

To evaluate the proposed model, we conducted two VFR experience-based studies, each with a distinct participant sample. These studies examine how attractiveness, self-congruence, VFR design and enjoyment influence readiness for the virtual event, considering the mediating role of hedonic wellbeing and the moderating roles of fashionable self-image and tendency to social comparison. These studies took place in two common virtual settings: a professional virtual work meeting (Study 1) and an entertainment-focused virtual party (Study 2). This dual-context approach was intended to ensure contextual validation and enhance the external validity of our findings (Völckner & Sattler, 2007; Winer, 1999).

4. Study 1

4.1. Research design and data collection

Study 1 aims to test our model within a virtual professional context. This event type was selected because virtual work meetings are among the most prevalent forms of professional immersive interaction today, especially in hybrid and remote work settings (Lennig et al., 2024). These meetings also represent contexts in which users are concerned with projecting competence and credibility, and where self-monitoring and identity signaling are naturally heightened (Gajendran et al., 2024).

To conduct the study, we used the "Style Me" VFR platform (<https://style.me>), which enables users to visualize and select fashion items for various virtual experiences. The selection of "Style Me" was

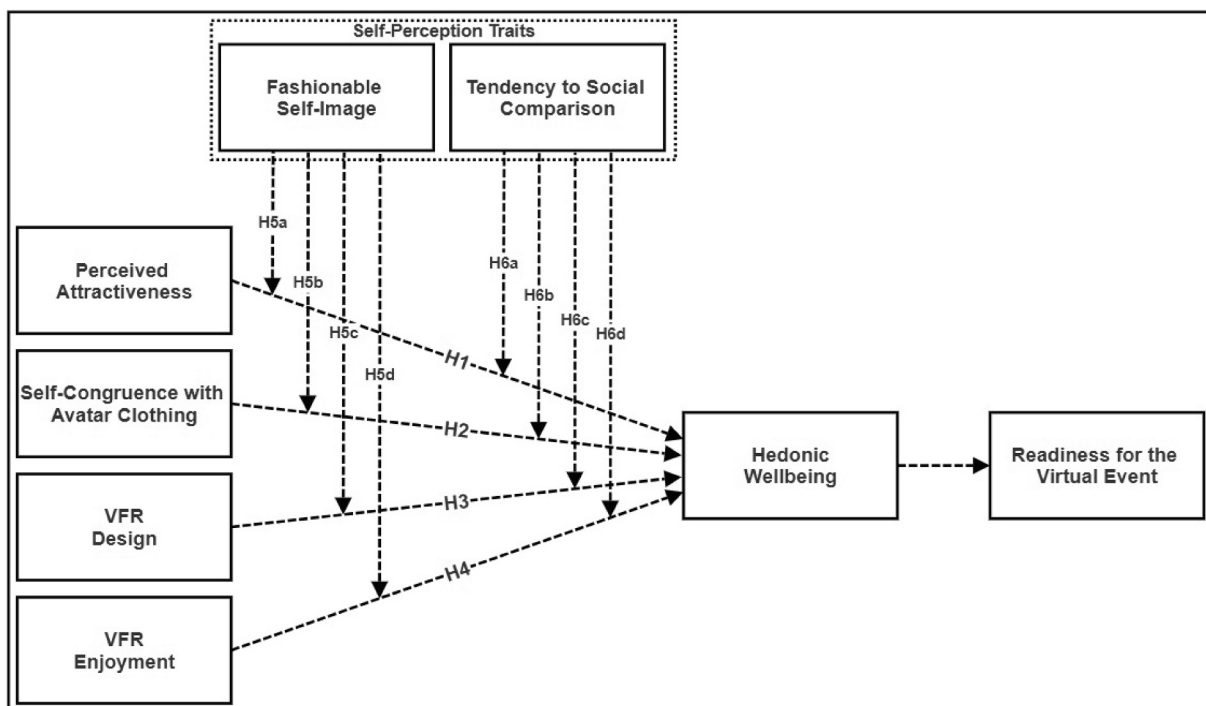


Fig. 1. Research framework.

based on a comparative evaluation of different approaches (e.g., using screenshots vs. designing a custom VFR) and alternative platforms. “Style Me” was chosen for its realism and practical application, offering a diverse range of fashion collections suitable for both formal and informal gatherings. The platform also allows users to customize avatar attributes, including weight, height, and clothing size, and provides 360° visualization, thereby enhancing the immersive experience. Fig. 2 presents examples of avatar customization on “Style Me”.

Participants were instructed to dress their avatars for a virtual work meeting, where they would engage in professional interactions, thereby simulating a real-life workplace environment. To ensure participants engaged with the task in a contextually grounded manner, they were informed that the meeting would take place in a virtual space similar to the *Metaverse*, closely resembling a physical professional setting. They were asked to imagine interacting with colleagues, participating in work-related discussions, and maintaining a professional appearance. This scenario was clearly introduced before the avatar customization task and reinforced throughout the questionnaire to ensure participants remained anchored in the intended professional context (Gu et al., 2024).

After completing the avatar-dressing task, participants answered a questionnaire regarding their VFR experience. This approach goes beyond previous studies, which primarily relied on static images of virtual clothing or website exploration tasks (e.g., Beck & Cri e, 2018). In contrast, our participants engaged in a realistic, interactive avatar-dressing experience before completing the survey. To ensure meaningful engagement with the VFR, the questionnaire began with an open-ended item requiring participants to describe their avatar and chosen garments, thereby verifying genuine interaction. Furthermore, attention-check questions were included to eliminate inattentive respondents (Paas & Morren, 2018).

Participants were recruited via *Prolific*. All participants were UK residents, as “Style Me” operates effectively in the UK market – a digitally

advanced and fashion-forward environment where virtual fashion engagement is relevant. The sample included individuals aged 18 to 60, excluding retirees, to maintain the contextual relevance of a work meeting scenario. To ensure familiarity with the study setting, all participants had prior experience with simulated and virtual environments.

Initially, 275 participants completed the study; however, 24 were excluded for failing to provide realistic descriptions of their avatar’s garments, completing the survey too quickly, or failing attention checks. Additionally, we conducted the Mahalanobis distance *d*-square test (Cohen et al., 2013) to identify multivariate outliers, but none were detected. To ensure adequate sample size, we conducted a power analysis using G*Power 3.1 (Faul et al., 2009), which indicated that our final sample was sufficient to detect medium effects ($f = 0.25$) with over 95 % power at a 0.05 significance level, well above the 80 % benchmark commonly recommended in behavioral research (Cohen, 2013).

The final sample consisted of 251 participants ($M_{age} = 36.77$; Age range = 19–60; Male = 49.8 %; Female = 47.4 %; Non-Binary/Third Gender = 2.8 %). All participants had a prior engagement with immersive experiences (VR or AR); 78.1 % reported having used VR applications for more than three months, and 73.7 % indicated moderate to high familiarity with virtual fashion items.

4.2. Scales and pretest

We adapted validated scales to measure the constructs under study, with all items and sources presented in Table 1. Given the conceptual fragmentation and context-specific nature of wellbeing (Gaston-Breton & De Stefano, 2025), particular care was taken to operationalize hedonic wellbeing within the study context. Recognizing that wellbeing is a subjective construct whose meaning and measurement depend on the setting in which it is examined, we conducted a thorough review of existing concepts, definitions, and scales.

After evaluating multiple instruments, we selected five items from

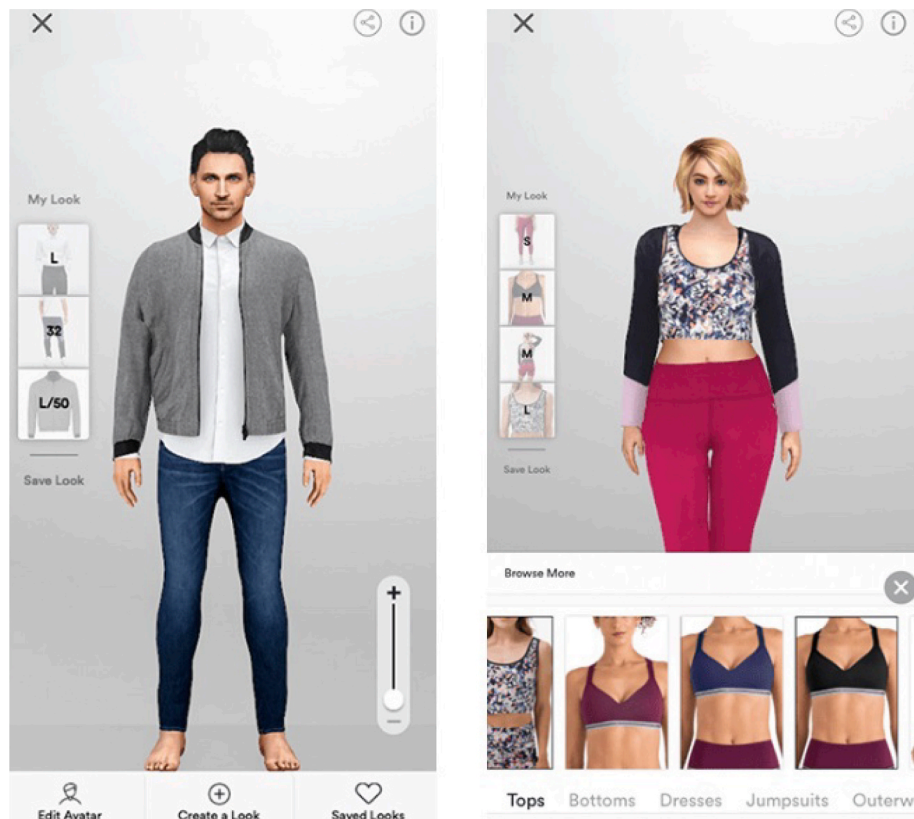


Fig. 2. Examples of avatar customization on “Style Me” | Source: “Style Me” Website.

Table 1
Item loading, Cronbach's α values, AVE, composite reliability, and scale sources – studies 1 and 2.

Factor	Item Loading		Cronbach's α		AVE		Composite Reliability		Scale Sources
	Study 1	Study 2	Study 1	Study 2	Study 1	Study 2	Study 1	Study 2	
Perceived Attractiveness – The displayed virtual clothes are:			0.99	0.98	0.93	0.91	0.99	0.98	Cox and Cox (2002)
ATT1: Very bad / Very good	0.96	0.97							
ATT2: Very unpleasant / Very pleasant	0.97	0.96							
ATT3: Not likable at all / Very likable	0.98	0.96							
ATT4: Very unflattering / Very flattering	0.96	0.92							
ATT5: Very unattractive / Very attractive	0.97	0.96							
ATT6: Not stylish at all / Very stylish	0.94	0.95							
Self-Congruence with Avatar Clothing – The clothes I selected for my avatar are:			0.93	0.95	0.81	0.92	0.93	0.97	Sirgy et al. (1997)
SCG1: Consistent with how I see myself during a work meeting/party	0.90	0.95							
SCG2: A mirror image of me during a work meeting/party	0.92	0.96							
SCG3: Close to my own personality	0.88	0.96							
VFR Design			0.97	0.94	0.97	0.90	0.94	0.96	Bart et al. (2005)
DSG1: The overall layout of the virtual fitting room is clear	0.97	0.96							
DSG2: Browsing items in the virtual fitting room seems easy	0.97	0.95							
DSG3: The virtual fitting room is visually appealing	0.93	0.94							
VFR Enjoyment – The virtual fitting room is:			0.98	0.97	0.93	0.95	0.98	0.98	Togawa et al. (2019)
ENJ1: Interesting	0.96	0.96							
ENJ2: Fun	0.97	0.98							
ENJ3: Enjoyable	0.97	0.97							
Hedonic Wellbeing – Dressing my avatar in this virtual fitting room is:			0.95	0.97	0.81	0.88	0.96	0.97	Campbell et al. (1976)
WLB1: Very boring / Very interesting	0.84	0.95							
WLB2: Very miserable / Very enjoyable	0.93	0.96							
WLB3: Very useless / Very worthwhile	0.93	0.94							
WLB4: Very discouraging / Very hopeful	0.89	0.93							
WLB5: Very disappointing / Very rewarding	0.92	0.92							
Readiness for the Virtual Event – After the avatar dressing experience, I feel ready to attend the meeting/party:			0.96	0.96	0.88	0.93	0.96	0.98	Zhang and Buda (1999)
RED1: Very uncertain / Very certain	0.90	0.97							
RED2: Not sure at all / Very Sure	0.98	0.96							
RED3: Not confident at all / Very confident	0.93	0.96							
Fashionable Self-Image			0.97	0.97	0.91	0.94	0.97	0.98	Klesse et al. (2019)
FSI1: I am a fashionable person	0.99	0.98							
FSI2: Others admire me for my sense of style	0.96	0.97							
FSI3: I know what looks good on me	0.92	0.95							
Tendency to Social Comparison			0.97	0.95	0.84	0.91	0.94	0.97	Song and Kim (2006)
I would often compare my avatar to those of others attending the meeting/party to see which one is more attractive.	0.82	0.96							
I would always evaluate the efforts I put into my Avatar relative to those of others.	0.96	0.97							
I would judge the attractiveness of my Avatar against that of others.	0.97	0.93							

the ten-item wellbeing scale developed by Campbell et al. (1976), a measure widely used in consumer research (e.g., Burroughs & Rindfleisch, 2002). The items were retained verbatim from the original anchors, with the only contextual adaptation being a short lead-in phrase (“Dressing my avatar in this virtual fitting room is”) to situate responses within the VFR context.

The selected items were chosen because they align with the conceptualization of wellbeing adopted in this study, specifically as a short-term affective state emerging from interactive experiences, such as those typical of avatar dressing. Our intention was not to treat wellbeing as a reflection of long-term life satisfaction but rather as an immediate evaluative response to a digital experience – one that may influence users’ readiness for the virtual event. Consistent with scale adaptation procedures (e.g., Wolter et al., 2022), (a) the authors independently reviewed all ten original items against the construct definition and the VFR context; (b) an internal discussion was held to reach consensus on contextual fit and comprehension; and (c) two external experts in fashion and user behavior reviewed the subset.

Before the main survey, a pretest was conducted with six volunteers

to ensure clarity of the study design and to address any comprehension issues (Elmashhara & Soares, 2024; Hunt et al., 1982). Minor improvements were made to the study design, along with slight wording revisions. Items measuring attractiveness, wellbeing, and readiness were rated on a seven-point semantic differential scale (e.g., 1 = “Not stylish at all”; 7 = “Very stylish”), while items assessing self-congruence, design, enjoyment, fashionable self-image and tendency to social comparison were rated on a seven-point Likert scale (1 = “strongly disagree”; 7 = “strongly agree”).

To mitigate the potential for Common Method Bias (CMB), we first implemented procedural (a priori) techniques designed to reduce response biases, including consistency motifs and social desirability effects. Participants were explicitly encouraged to provide honest responses and were offered an incentive for their participation. Furthermore, to address the impact of implicit theories, we ensured that questions related to the independent and dependent variables were presented on separate pages in the online survey (Podsakoff et al., 2003). Finally, to statistically control for potential CMB, we applied Harman's one-factor test (Harman, 1976). The results indicated that the

single factor accounted for 31.71 % of the variance in the data, well below the 50 % threshold recommended by MacKenzie and Podsakoff (2012).

4.3. Data analysis and results

To test the proposed model, we first assessed overall model fit using Confirmatory Factor Analysis (CFA) in AMOS 29.0. We then evaluated reliability and validity to confirm the robustness of the measurement model. Structural Equation Modelling (SEM) was employed to test H1-H4, and Hayes' PROCESS Model No. 7 (Hayes, 2017) was applied to examine H5 and H6.

4.3.1. Assessment of the measurement model

The CFA of the measurement items demonstrated an acceptable model fit, meeting the recommended thresholds proposed by Hu and Bentler (1999): $\chi^2 = 489.10$, $df = 202$, $\chi^2/df = 2.42$, CFI = 0.97, TLI = 0.96, IFI = 0.97, SRMR = 0.03, RMSEA = 0.075 [90 % CI = 0.067; 0.084]. To assess the robustness of the measurement model, we first examined internal consistency using Cronbach's α and assessed scale reliability using composite reliability, with all values exceeding the recommended threshold of 0.7 (Netemeyer et al., 2003). Second, we calculated the Average Variance Extracted (AVE), which ranged from 0.81 to 0.97, exceeding the 0.5 benchmark and supporting convergent validity (Fornell & Larcker, 1981) (Table 1). Third, we tested for multicollinearity by computing tolerance values and Variance Inflation Factors (VIFs). The results indicated that all tolerance values were above 0.70 and that VIFs were below 2, demonstrating no multicollinearity concerns (Pieters, 2017). Finally, discriminant validity was evaluated using the Fornell and Larcker (1981) criterion. The findings revealed that the square root of each AVE exceeded the corresponding inter-construct correlations, providing evidence of discriminant validity. Tolerance values, VIFs, and discriminant validity results are reported in Web Appendix A.

4.3.2. Hypotheses testing

4.3.2.1. The mediating role of wellbeing. To test hypotheses H1-H4, we employed SEM using AMOS 29.0, specifying a mediation model in which wellbeing mediates the effects of the four studied antecedents on readiness for the virtual event. The structural model exhibited acceptable fit, consistent with the CFA results and established fit criteria (Hu & Bentler, 1999). Regarding the direct effects (reported in Web Appendix B), attractiveness, self-congruence, and VFR design all exerted significant positive effects on wellbeing. In contrast, the direct effect of VFR enjoyment on wellbeing was not statistically significant. In addition, wellbeing showed a significant positive effect on readiness.

To formally examine the mediating role of wellbeing, we estimated the indirect effects specified in Hypotheses H1-H4. As reported in Table 2, wellbeing significantly mediates the paths from attractiveness, self-congruence, and VFR design to readiness. However, wellbeing does not mediate the effect of VFR enjoyment on readiness. Therefore, in a professional immersive setting, H1, H2, and H3 are supported, whereas H4 is not.

4.3.2.2. The moderating role of fashionable self-image. Hypotheses H5a, H5b, H5c, and H5d were tested using Hayes' PROCESS Model No. 7 with 5,000 bias-corrected bootstraps, with attractiveness, self-congruence, design, and enjoyment as separate predictors, wellbeing as a mediator, readiness as the dependent variable, and fashionable self-image as a moderator. The results indicate that the indirect effects vary across levels of fashionable self-image, as the moderated mediation confidence interval (CI) excludes zero: attractiveness \rightarrow wellbeing \rightarrow readiness, $b = 0.08$ ($SE = 0.02$), CI [0.05, 0.12]; self-congruence \rightarrow wellbeing \rightarrow readiness, $b = 0.03$ ($SE = 0.02$), CI [0.01, 0.07]; VFR design \rightarrow

Table 2 Results for direct and indirect effects – study 1.

Path	b (SE)	95 % Bias-Corrected Bootstrap Confidence Interval		Hypotheses Test
		LLCI	ULCI	
Perceived Attractiveness \rightarrow Hedonic Wellbeing \rightarrow Readiness for the Virtual Event	0.21 (0.09)	0.08	0.38	H1: S
Self-Congruence with Avatar Clothing \rightarrow Hedonic Wellbeing \rightarrow Readiness for the Virtual Event	0.37 (0.07)	0.22	0.48	H2: S
VFR Design \rightarrow Hedonic Wellbeing \rightarrow Readiness for the Virtual Event	0.13 (0.04)	0.07	0.21	H3: S
VFR Enjoyment \rightarrow Hedonic Wellbeing \rightarrow Readiness for the Virtual Event	0.05 (0.02)	-0.15	0.03	H4: NS

Notes: b, Coefficient; SE, Standard Error; LLCI, 95 % Lower-Level Confidence Interval; ULCI, 95 % Upper-Level Confidence Interval; S, Hypothesis Supported; NS, Hypothesis Not Supported.

wellbeing \rightarrow readiness, $b = 0.15$ ($SE = 0.02$), CI [0.11, 0.19]; and VFR enjoyment \rightarrow wellbeing \rightarrow readiness, $b = 0.17$ ($SE = 0.02$), CI [0.14, 0.21]. Therefore, in a professional immersive setting, H5a, H5b, H5c, and H5d are all supported.

4.3.2.3. The moderating role of tendency to social comparison. Hypotheses H6a, H6b, H6c, and H6d were tested using Hayes' PROCESS Model No. 7 with 5,000 bias-corrected bootstraps, with tendency to social comparison as a moderator. The results indicate that this tendency conditions the indirect effects such that their magnitude varies across different levels of the moderator: attractiveness \rightarrow wellbeing \rightarrow readiness, $b = 0.08$ ($SE = 0.02$), CI [0.04, 0.13]; self-congruence \rightarrow wellbeing \rightarrow readiness, $b = 0.04$ ($SE = 0.02$), CI [0.01, 0.08]; design \rightarrow wellbeing \rightarrow readiness, $b = 0.11$ ($SE = 0.02$), CI [0.07, 0.16]; and enjoyment \rightarrow wellbeing \rightarrow readiness, $b = 0.06$ ($SE = 0.02$), CI [0.02, 0.09]. Hence, in a professional immersive setting, H6a, H6b, H6c, and H6d are all supported. Web Appendix C provides detailed information on the moderated mediation analyses for Study 1.

4.4. Results summary

The findings reveal that in a professional immersive setting, wellbeing mediates the relationships between attractiveness, self-congruence, and VFR design on one hand, and readiness for the virtual event on the other. However, no significant mediation effect is observed for the relationship between VFR enjoyment and readiness.

The analysis of the moderating roles of the fashionable self-image and tendency to social comparison reveals that both factors significantly influence the conditional indirect effects, with these effects varying in magnitude and, in some cases, direction across levels of the moderators. Regarding fashionable self-image, the indirect effects of attractiveness and self-congruence on readiness, through wellbeing, remain positive across all levels, though they are more pronounced among participants with higher levels of fashionable self-image. Similarly, while the indirect effect of design on readiness through wellbeing is not significant for participants with lower levels of fashionable self-image, it becomes significantly positive for those with higher levels of fashionable self-image. Notably, the indirect effect of VFR enjoyment on readiness through wellbeing changes direction depending on the level of fashionable self-image, further supporting the presence of conditional indirect effects. Among participants with lower levels of fashionable self-image, enjoyment negatively affects wellbeing, leading to a decline in readiness. Conversely, among those with higher levels of fashionable self-image, enjoyment positively impacts wellbeing, which subsequently

enhances readiness.

Regarding the moderating role of the tendency to social comparison, the positive indirect effects of attractiveness and self-congruence on readiness through wellbeing are more pronounced among individuals with higher levels of tendency to social comparison. Furthermore, for both VFR design and enjoyment, the indirect effects on readiness through wellbeing shift from being nonsignificant among participants with lower levels of tendency to social comparison to being positively significant among those with higher levels of tendency to social comparison.

5. Study 2

5.1. Research design and data collection

Study 2 was designed to test our hypotheses within an entertainment-focused context. It examines how the studied antecedents influence participants' readiness for a virtual party, with wellbeing as a mediator and fashionable self-image and tendency to social comparison as moderators. The virtual party was selected because it represents a socially immersive leisure activity in which users engage in playful self-expression and emphasize appearance-based social signaling (Grewal et al., 2019). Such settings provide a natural context for exploring how fashion and self-presentation dynamics interact with users' experiences (Hudson et al., 2019).

As in Study 1, the study used the "Style Me" VFR, but this time in a virtual party context. Participants dressed their avatars for an entertainment-focused event rather than a professional meeting, engaging in the same real-time VFR experience before completing the survey. Study 2 followed the same procedure as Study 1 to ensure participant engagement, including informing participants about the nature of the event, reminding them throughout the avatar customization task and questionnaire, and incorporating an open-ended avatar description task along with attention checks. A UK-based sample was recruited via Prolific, with exclusions for prior participation in Study 1, failures on attention checks, and concerns about response validity. To support cross-study comparisons, participants were aged 18 to 60, and all had prior experience with simulated environments.

Initially, 275 participants completed the study; however, 18 were excluded due to unrealistic avatar descriptions, excessively rapid survey completion times, or failure to pass attention-check questions. Furthermore, one response was excluded as an outlier based on the Mahalanobis distance *d*-squared test (Cohen et al., 2013). To ensure adequate sample size, as in Study 1, we conducted a power analysis (Faul et al., 2009), which confirmed that the final sample met the established thresholds (Cohen, 2013).

The final sample consisted of 256 participants ($M_{age} = 34.81$; Age range = 18–59; Female = 53.5 %; Male = 41.4 %; Non-Binary/Third Gender = 4.7 %; Prefer not to say = 0.4 %). All participants had a prior engagement with immersive experiences (VR or AR); 81.6 % reported having used VR applications for more than three months, and 71.8 % indicated moderate to high familiarity with virtual fashion items.

5.2. Scales and pretest

We used the same scales as in Study 1 for Study 2 (Table 1). The pretest conducted for Study 1 also informed Study 2, and the same procedures were employed to address CMB. Harman's one-factor test (Harman, 1976) indicated that a single factor accounted for 34.98 % of the variance, which is below the 50 % threshold (MacKenzie & Podsakoff, 2012), suggesting no significant risk of CMB.

5.3. Data analysis and results

To test the proposed model, and consistent with the procedure used in Study 1, we first assessed the overall model fit using CFA. The

robustness of the measurement model was further evaluated through a series of reliability and validity assessments. SEM was then employed to test H1-H4, while H5-H6 were examined using Hayes' PROCESS Model No. 7 (Hayes, 2017).

5.3.1. Assessment of the measurement model

The CFA of the original measurement items demonstrated an acceptable model fit, meeting the recommended thresholds proposed by Hu and Bentler (1999): $\chi^2 = 626.59$, $df = 202$, $\chi^2/df = 3.10$, CFI = 0.95, TLI = 0.94, IFI = 0.95, SRMR = 0.05, RMSEA = 0.091 [90 % CI = 0.083; 0.099]. Both Cronbach's α and composite reliability values exceeded 0.7 (Netemeyer et al., 2003), confirming the internal consistency and reliability of the measures. AVE values ranged from 0.88 to 0.95, surpassing the 0.5 benchmark and supporting convergent validity (Fornell & Larcker, 1981) (Table 1). Multicollinearity diagnostics indicated no concerns, with all tolerance values above 0.59 and all VIF values below 2 (Pieters, 2017). Finally, discriminant validity was assessed, confirming that the square root of each AVE exceeded the corresponding inter-construct correlations, providing evidence of discriminant validity. Tolerance values, VIFs, and discriminant validity results are reported in Web Appendix D.

5.3.2. Hypotheses testing

5.3.2.1. The mediating role of wellbeing. To test H1-H4, SEM was employed. The structural model exhibited an acceptable level of fit, consistent with the CFA results and fit criteria (Hu & Bentler, 1999). Regarding the direct effects (reported in Web Appendix E), attractiveness and VFR design showed significant positive effects on wellbeing. In contrast, the direct effects of self-congruence and VFR enjoyment on wellbeing were not significant. In addition, wellbeing showed a significant positive effect on readiness.

To formally examine the mediating role of wellbeing, we estimated the indirect effects. As reported in Table 3, wellbeing significantly mediates the paths from attractiveness and VFR design to readiness. However, wellbeing does not mediate the effects of self-congruence or VFR enjoyment on readiness. Therefore, in an entertainment-focused immersive setting, H1 and H3 are supported, whereas H2 and H4 are not.

5.3.2.2. The moderating role of fashionable self-image. Hypotheses H5a, H5b, H5c, and H5d were tested using Hayes' PROCESS Model No. 7 with 5,000 bias-corrected bootstraps, with attractiveness, self-congruence, design, and enjoyment as separate predictors, wellbeing as a mediator,

Table 3
Results for direct and indirect effects – study 2.

Path	<i>b</i> (<i>SE</i>)	95 % Bias-Corrected Bootstrap Confidence Interval		Hypotheses Test
		LLCI	ULCI	
Perceived Attractiveness → Hedonic Wellbeing → Readiness for the Virtual Event	0.24 (0.08)	0.06	0.42	H1: S
Self-Congruence with Avatar Clothing → Hedonic Wellbeing → Readiness for the Virtual Event	0.07 (0.09)	-0.41	0.01	H2: NS
VFR Design → Hedonic Wellbeing → Readiness for the Virtual Event	0.15 (0.08)	0.01	0.30	H3: S
VFR Enjoyment → Hedonic Wellbeing → Readiness for the Virtual Event	0.01 (0.06)	-0.10	0.10	H4: NS

Notes: *b*, Coefficient; *SE*, Standard Error; LLCI, 95 % Lower-Level Confidence Interval; ULCI, 95 % Upper-Level Confidence Interval; S, Hypothesis Supported; NS, Hypothesis Not Supported.

readiness as the dependent variable, and fashionable self-image as a moderator. The results indicate that fashionable self-image moderates three indirect paths: attractiveness → wellbeing → readiness, $b = 0.13$, $SE = 0.02$, CI [0.09, 0.16]; self-congruence → wellbeing → readiness, $b = 0.10$, $SE = 0.02$, CI [0.06, 0.15]; and VFR enjoyment → wellbeing → readiness, $b = 0.07$, $SE = 0.02$, CI [0.03, 0.11]. However, fashionable self-image does not moderate the indirect path: design → wellbeing → readiness, $b = 0.02$, $SE = 0.03$, CI [-0.03, 0.07]. Therefore, in an entertainment-focused immersive setting, H5a, H5b, and H5d are supported, while H5c is not.

5.3.2.3. The moderating role of tendency to social comparison. Hypotheses H6a, H6b, H6c, and H6d were tested using Hayes' PROCESS Model No. 7 with 5,000 bias-corrected bootstraps, with tendency to social comparison as a moderator. The results indicate that tendency to social comparison moderates three indirect relationships: attractiveness → wellbeing → readiness, $b = 0.15$ ($SE = 0.02$), CI [0.12, 0.19]; self-congruence → wellbeing → readiness, $b = 0.15$ ($SE = 0.02$), CI [0.12, 0.19]; and design → wellbeing → readiness, $b = 0.14$ ($SE = 0.02$), CI [0.10, 0.18]. However, the tendency to social comparison does not moderate the indirect path: enjoyment → wellbeing → readiness, $b = -0.01$ ($SE = 0.02$), CI [-0.03, 0.03]. Therefore, in an entertainment-focused immersive setting, H6a, H6b, and H6c are supported, while H6d is not. Web Appendix F provides detailed information on the moderated mediation analyses for Study 2.

5.4. Results summary

The findings suggest that during the preparation phase for an entertainment-focused immersive experience, wellbeing mediates the relationships between two key factors – perceived clothing attractiveness and VFR design – and readiness for the virtual event. However, the results indicate that wellbeing does not significantly mediate the effects of self-congruence or VFR enjoyment on readiness.

Regarding the moderating roles of fashionable self-image and tendency to social comparison, the results reveal that both factors significantly moderate several of the examined relationships. Specifically, fashionable self-image moderates the paths from attractiveness, self-congruence, and VFR enjoyment to readiness through wellbeing. For participants with lower levels of fashionable self-image, these effects are not significant, whereas for those with higher levels of fashionable self-image, they become significantly positive.

Tendency to social comparison moderates the indirect effects of attractiveness, self-congruence, and VFR design on readiness through wellbeing. These effects exhibit a directional shift: for participants with lower levels of tendency to social comparison, the relationships between these factors and readiness through wellbeing are negative. However, for those with higher levels of tendency to social comparison, these effects become positive, underscoring the role of social comparison in shaping readiness.

6. Discussion and conclusion

This study investigated how perceived clothing attractiveness, self-congruence with avatar clothing, VFR design, and VFR enjoyment influence users' readiness for the virtual event, through hedonic wellbeing. Drawing on SDT, we argued that the studied antecedents contribute to users' psychological needs (autonomy, competence, and relatedness), thereby fostering wellbeing and readiness. We also examined how fashionable self-image and tendency to social comparison, grounded in SCT, moderate these relationships.

Our results support the hypothesized model. Specifically, across two different immersive contexts – a virtual work meeting and a virtual party – attractiveness and VFR design positively influenced readiness through wellbeing. Self-congruence also showed this indirect effect, but was

significant only in the professional setting. A possible explanation is that in work-oriented scenarios, individuals may be more concerned with projecting professionalism and credibility, making them more likely to align their avatar's clothing with their internal self-concepts so that they appear competent and appropriate. In contrast, the informal and playful nature of virtual parties may diminish the salience of self-congruence, as individuals may focus more on aesthetics or creativity than on identity alignment (Chang & Cortina, 2024). In this vein, our study advances theoretical understanding by empirically validating that hedonic wellbeing – a short-term affective evaluation of the experience – serves as a psychological mechanism linking digital customization to downstream psychological responses. This supports recent work emphasizing wellbeing as both an outcome and a driver in immersive experiences (e.g., Frost et al., 2022).

Although previous research has not explicitly examined how VFR experiences contribute to readiness for the virtual event through wellbeing, our findings are consistent with prior empirical findings. For instance, attractiveness has been shown to positively influence wellbeing and social evaluations (Diener et al., 1995; Gupta et al., 2016), while self-congruence has been linked to enhanced confidence and identity reinforcement (Malär et al., 2011; Pavot et al., 1997). Similarly, visual design elements in digital and physical environments have been shown to improve emotional responses and desired outcomes (Hagtvedt, 2025). Our results also complement more recent research in virtual fashion and immersive technology. For example, Elmashhara et al. (2024a) found that fashion styles influence perceptions of attractiveness, which in turn predict VFR attitudes and satisfaction. Franke et al. (2023) and Yuan et al. (2021) highlight broader effects of fashion-related aesthetics on experiential value. Moreover, Javornik et al. (2021) demonstrated that self-congruence in digital fashion environments enhances confidence and engagement, while Bleier et al. (2019) and Krasnikolakis et al. (2018) confirmed the emotional power of interface design in virtual spaces. Taken together, these findings provide strong empirical grounding for our model and reinforce our claim that the psychological impact of avatar design in VFRs is both theoretically and practically significant. Our results further align with recent evidence that user preferences for VFR features (e.g., design and presentation style) may differ across social settings (Pizzi et al., 2020), which helps explain the variations in the strength of effects across the two immersive contexts.

Our findings also clarify the role of individual traits in shaping the effectiveness of VFRs. For users with high levels of fashionable self-image, the indirect effects of the studied antecedents on readiness through wellbeing were stronger. These individuals were more responsive to attractiveness, self-congruence, design, and enjoyment, suggesting that their sense of identity and self-expression amplified the psychological benefits of avatar customization. In Study 1, users with low levels of fashionable self-image even showed negative effects of VFR enjoyment, possibly because they were more focused on the professional event itself rather than the avatar-dressing experience. However, the effect was positive for those with higher levels of fashionable self-image, as engaging in and enjoying fashion-related activities more closely aligned with their personality. Our findings regarding fashionable self-image are consistent with Klesse et al. (2019), who demonstrated a similar moderating effect of this trait in the context of fashion customization and perceived fashionability.

Finally, participants with high levels of tendency to social comparison exhibited stronger indirect effects between the studied antecedents and readiness through wellbeing. These individuals may have internalized social visibility cues more deeply, even in solitary settings, thereby amplifying the psychological value of avatar presentation. Among those with low levels of tendency to social comparison in the entertainment setting, several indirect effects were nonsignificant or negative, perhaps because appearance was less personally meaningful in that context. Our findings align with Bearden and Rose (1990), who identified the tendency to social comparison as a key moderator in the relationship

between normative influences and behavioral intentions. They are also consistent with prior research in immersive and digital environments. Hudson et al. (2019) found that social comparison in virtual settings shapes satisfaction and engagement, while Song and Kim (2006) showed that individuals with stronger tendencies to compare are more inclined to adopt avatars and participate in virtual communities.

6.1. Theoretical implications

This study contributes to research on immersive experience, well-being, and user psychology in three key ways: First, it addresses an underexplored question: how does the VFR, as an early immersive stage, influence readiness for the virtual event? By conceptualizing readiness as a state that emerges from hedonic wellbeing, this study advances a novel mechanism for understanding psychological preparedness in virtual environments. Second, we embed this mechanism within SDT, demonstrating how immersive interfaces may support, or fail to support, users' core psychological needs: autonomy, competence, and relatedness. This provides a stronger theoretical foundation by moving the discussion beyond descriptive effects and by positioning the studied antecedents as a vehicle for psychological empowerment. These two contributions are particularly significant because they align with calls to develop customer experiences (Kranzbühler et al., 2020), especially immersive ones (Anaya-Sánchez et al., 2024; Hennig-Thurau et al., 2023), that account for users' emotional satisfaction and overall wellbeing.

Finally, we extend research on self-perception traits, showing that fashionable self-image and tendency to social comparison moderate the psychological influence of digital customization. Rather than treating individual differences as noise, we integrate them theoretically through SCT, offering a model that accounts for individual variation in how VFR experiences are internalized. This contribution expands the literature emphasizing the importance of incorporating personality profiles into user research models and analyses (De Cicco et al., 2025).

6.2. Managerial implications

As organizations increasingly adopt immersive technologies for diverse purposes, designing effective entry points into these experiences becomes increasingly important. Our study positions the VFR as a critical preparatory stage in which users begin to form emotional, cognitive, and identity-based foundations that support deeper engagement in virtual events. Several actionable insights emerge from a design perspective.

First, designers should prioritize psychological resonance in VFR interfaces. Our findings show that when virtual clothing is perceived as attractive, aligns with the user's self-image, and is presented within an aesthetically pleasing, intuitive interface, users experience enhanced hedonic wellbeing. This wellbeing, in turn, enhances their psychological readiness for the virtual event. Thus, VFRs should be designed not merely to display fashion but to deliver emotionally rewarding and meaningful experiences.

Second, designers should tailor VFR experiences to different audience profiles. Users differ in how they benefit from VFRs based on their self-perception traits. For instance, individuals with higher levels of fashionable self-image respond more positively to environments that allow for visual self-expression and style alignment. For these users, offering customization features, rich aesthetic options, and expressive design can yield high returns in terms of readiness. Similarly, users with higher levels of tendency to social comparison benefit more from polished, socially resonant environments that support favorable self-presentation. These users gain more from a VFR experience that simulates visibility and social feedback. To accommodate such differences, designers may identify user traits in smaller-scale settings through familiarity or, in larger-scale applications, through short onboarding surveys or segmentation tools.

Finally, designers should remain sensitive to contextual variation when implementing VFRs. Although our findings suggest that the underlying VFR-readiness mechanism holds across contexts, the salience of specific factors may differ. For example, self-congruence with avatar clothing was more influential in professional settings, such as virtual work meetings, where users are more concerned with credibility and alignment with their internal self-concept. In contrast, design and enjoyment were more central in entertainment-focused settings, such as virtual parties. Designers should therefore remain context-aware, adjusting the VFR experiences depending on whether the broader immersive context is formal or informal, even when using the same platform structure.

6.3. Limitations and future research

Despite its contributions, this study has limitations that suggest valuable avenues for future research. First, although we examined four antecedents in our model, additional factors – such as clothing style, the popularity or coolness of displayed items, brand visibility, background music, or other interface features – may also shape user perceptions and wellbeing. Exploring these additional factors could provide a more comprehensive understanding of how different VFR components influence user experiences and enhance VFR effectiveness.

Second, although we focused on two self-perception traits as moderators, future studies could investigate additional variables that may moderate VFR effectiveness. For instance, digital literacy may influence how comfortably users navigate VFR environments, while time pressure could shape engagement patterns, such as differences between users who customize avatars leisurely and those who do so under time constraints. Additionally, cost-related aspects, such as free versus paid customization options, may influence perceived value and subsequent wellbeing.

Third, while this study enhanced generalizability by examining two broad immersive contexts (professional and entertainment-focused), future research could explore variation within each category. For example, does self-congruence matter more in a routine virtual team meeting than in a high-stakes client presentation? Or, in the entertainment domain, does avatar presentation differ when preparing for a casual gathering with close friends versus a public social event with unfamiliar participants? Examining such within-context nuances could inform more fine-grained VFR design strategies.

Finally, this study was conducted with UK participants. However, cross-cultural differences in avatar preferences, fashion norms, and social presentation styles may shape how users perceive and respond to VFR experiences. Future comparative studies across diverse cultural markets could enhance the generalizability and cross-market applicability of our findings.

Data Availability Statement

The data are available from the corresponding author upon reasonable request.

CRediT authorship contribution statement

Maher Georges Elmashhara: Writing – review & editing, Writing – original draft, Validation, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Marta Blazquez:** Writing – review & editing, Methodology, Conceptualization. **Jorge Julião:** Writing – review & editing, Methodology, Funding acquisition.

Declaration of AI and AI-assisted technologies in the writing process

The authors used *Grammarly* and *ChatGPT* to enhance the

manuscript's readability and language. Following their use, the authors thoroughly reviewed, verified and edited the text as needed.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendices A - F. Supplementary data

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