Behind the Veil: Exploring Anonymity's Effect in Emerging Metaverse for Mental Health Therapy

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Abstract

The metaverse, a virtual reality-based platform, offers unique opportunities for immersive and interactive therapeutic sessions. With the ability to remain anonymous, it enables a greater sense of openness and honesty during their therapeutic sessions. However, the impact of anonymity on patient's intention to use the metaverse for therapeutic purposes remains unclear. Thus, we conducted a quantitative study encompassing a sample of 147 participants to investigate the relationship between anonymity and the intention to use the metaverse for therapeutic sessions. The results provide insights into how anonymity influences users' attitudes and motivations regarding the use of the metaverse for therapeutic purposes. Understanding the role of anonymity may contribute to the design and implementation of more effective therapeutic interventions in the metaverse.

Keywords: Metaverse, Anonymity, Mental Health

1. Introduction

Rising healthcare costs, substantial infrastructure expenses, rapidly aging populations, and shortages of healthcare workers have demonstrated that healthcare systems are not sustainable for the future. In particular, the COVID-19 pandemic has compelled healthcare providers and innovators to seek for solutions for treating patients outside traditional physical settings (Chengoden et al., 2023) Therefore, it is crucial to develop solutions that shift healthcare delivery from physical environments such as hospitals or medical offices to patients' homes. With the advent of modern technologies, telemedicine and remote care have made it feasible to consult with physicians without being physically present in the same room. Furthermore, the rapid development of digitization and automation has accelerated growth in the healthcare sector, giving rise to new models that offer more cost-effective treatment options (Bhuiyan et al., 2021). One technology domain benefiting significantly from advancing digitalization is the metaverse. The metaverse, an emerging digital technology, holds immense healthcare potential by providing realistic experiences for both patients and physicians. It integrates various technologies, including artificial intelligence (AI), virtual reality (VR), augmented reality (AR), the internet of medical devices, robotics, and others, to create new avenues for delivering high-quality healthcare treatments and services (Chengoden et al., 2023). The fusion of these technologies offers immersive, intimate, and personalized patient care. Moreover, the metaverse provides adaptive intelligent solutions that remove barriers between healthcare providers and patients. Its most significant advantage lies in eliminating geographic restrictions. Once a person enters the virtual world, their physical location becomes irrelevant, and they are no longer tied to a specific place. The metaverse can facilitate doctor visits in virtual offices, enabling patients and doctors to meet in a three-dimensional (3D) hospital or other locations, such as a medical office (Zahedi et al., 2022). Initially, metaverse applications are found in areas such as surgical simulations, diagnostic imaging, patient care management, rehabilitation, and healthcare administration. Furthermore, AR headsets are also employed to modify users' psychological experiences in treating addictions and phobias (Freitas et al., 2021). The potential benefits of the metaverse could also prove fruitful in the field of psychotherapy. The popularity of video therapy has already surged significantly due to the COVID-19 pandemic. However, the two-dimensional (2D) technology creates a sense of distance between therapist and patient, which can be considered disadvantageous. The metaverse can mitigate this effect by offering a realistic 3D experience, thereby enhancing the effectiveness of teletherapy. For instance, various phobias have been successfully treated through exposure therapy, and virtual environments could gradually expose patients to their fears within a safe setting. Such therapeutic strategies could also be applied to other conditions, such as obsessive-compulsive disorders, anxiety disorders, or depression, by crafting tailored virtual experiences. The potential collaborative power of the metaverse could enable therapists or patient-led support groups to connect easily and convene in a more engaging environment than a text-based support group (Wiring & Riese, 2022).

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Users primarily interact in a virtual world through their avatars. Essentially, avatars are representations of users in a virtual world interacting with each other. According to Davis et al., (2009), the unique aspect of avatars' ability to interact with each other and provide immediate feedback on others' behavior within their environment, which can enhance coordination. In addition to interacting, avatars should also possess abilities such as walking, talking, sitting, standing, and teleporting. In the medical application domain, one of the terms used is "medical avatars", which defines a "real avatar" as a representation reflecting a patient's real-time health data (Zahedi et al., 2022)

Anonymity in virtual worlds is maintained by allowing users to create names for their avatars or select from a limited number of available names. In newer virtual worlds, individuals can create intricate in-world representations for themselves and their environment (Bainbridge, 2007). When an individual is anonymous online, they may communicate more boldly than in a face-to-face situation, a phenomenon known as the online disinhibition effect (Clark-Gordon et al., 2019). Therefore, anonymity may be particularly relevant because individuals with mental health problems are likely to report barriers to care and hold stigmatizing beliefs. Moreover, recent studies have demonstrated that users tend to speak more openly and honestly about mental problems, such as eating disorders, when they remain anonymous (Warner et al., 2011).

In particular, no theoretical framework exists that embeds the adoption process of a metaverse in healthcare and supports it with empirical evidence. Furthermore, limited knowledge exists regarding how the ability to mask or make anonymous a person's out-world persona affects their self-disclosure during mental health counseling. Recent studies have called for further research on the metaverse in the healthcare context (e.g., Dwivedi et al., 2022). Thus, our study aims to answer the following research questions *(RQ1): Which factors do affect the intention to use the metaverse from an individual's perspective in therapeutic mental sessions?* and *(RQ2): How does the patient's ability to make oneself anonymous influence interaction during therapeutic mental sessions?* To address these RQs, we have developed a quantitative study based on a metaverse scenario to explore individuals' behavioral intention to use the metaverse in healthcare. We have chosen a mental health counseling session for the following reasons: Firstly, the scenario encompasses multiple roles, including the patient and therapist. Secondly, the nature of mental health counseling necessitates the disclosure of sensitive information. Thirdly, we can assess the influence of patients' anonymity on their willingness to provide more information. Our research is built upon the unified theory of acceptance and use of technology (UTAUT) model, which is a widely utilized theoretical framework in Information Systems (IS) research for explaining technology acceptance and usage behavior (e.g., Venkatesh et al., 2003). In doing so, we make a novel contribution by expanding the UTAUT model to incorporate perceived anonymity, telepresence, and time convenience. The paper is organized as follows: Initially, the background and context of the topic are presented. Subsequently, the relevant literature is reviewed by describing the research works, theories, and concepts. The subsequent section outlines the methods and design employed in the study, elucidating the data collection, analysis, and interpretation techniques used. The following section presents and deliberates upon the study's outcomes, highlighting their contributions to the research field and practical applications. Finally, a concluding section summarizes the study's key findings and discusses the significance of the results for future research.

2. Theoretical Background

This section presents relevant terms for understanding this work and provides a theoretical background about the metaverse, virtual worlds and anonymity in metaverse context. In addition, we describe the UTAUT, which serves as the theoretical foundation for our model development.

2.1. Metaverse and its potential usage in context of healthcare

One definition proposed in the literature describes the metaverse as the layer between individuals and reality. It is defined as a 3D virtual shared world where all activities can be carried out with the help of augmented and virtual reality services. The metaverse is described as three-dimensional virtual worlds in which people interact as avatars with each other and with software agents (Davis et al., 2009). Users can experience the metaverse using immersive technologies such as virtual reality (VR) or augmented reality (AR) (Dwivedi et al., 2023). The significance of virtual worlds lies in their ability to create a digital world without physical limitations, enabling new forms of human interaction and communication (Davis et al., 2009).

The metaverse has the potential to improve access to and experience of several services in education, entertainment, manufacturing, e-commerce and healthcare (Dwivedi et al., 2022). There are several application areas for metaverse in healthcare (Thomason, 2021). Before the COVID-19 pandemic,

healthcare primarily relied on physical interactions between patients and medical professionals. However, the healthcare landscape has undergone slight transformations during and after COVID-19. The global pandemic has drawn significant attention to telehealth, primarily driven by the necessity to adopt virtual platforms and implement stay-at-home measures (Jabbarpour et al., 2021). In response to the pandemic, individuals increasingly opted for teleconsultations and home-based healthcare to avoid potential exposure to COVID-19 in dedicated healthcare facilities. As a result, remote healthcare services have become an integral part of healthcare provision, with a notable increase in healthcare facilities offering remote treatment to patients rising from 43% before 2020 to 95% (Marr, 2022). In the healthcare and medical domain, the metaverse presents the potential to reshape the landscape of digitally oriented healthcare services (Suh et al., 2023). The metaverse presents an innovative platform that can benefit patients and healthcare professionals in various ways. In the metaverse, medical students and professionals have the opportunity to engage in practice sessions and acquire new skills without any associated risks. By leveraging virtual reality technology, learners can enter the metaverse and conveniently access educational resources and training materials regardless of their location or the time of day. Furthermore, the metaverse provides virtual reality surgical simulations that incorporate haptic feedback, replicating the tactile sensations of actual surgical instruments. This enables trainees to enhance their proficiency in a secure environment (Chen et al., 2022; Sandrone, 2022). The metaverse enables remote surgery by harnessing augmented reality and advanced robotics, facilitating surgeons to conduct surgical procedures on patients in distant areas (van Leeuwen & van der Hage, 2022). The metaverse also assists individuals with mental health conditions like social anxiety or depression, who may encounter challenges when participating in social interactions in the physical realm. The metaverse serves as a platform for these individuals to establish connections with therapists by providing a secure environment. Previous research has shown the efficacy of exposure-based treatments using VR in reducing symptoms of anxiety disorders and its potential for treating stress-related disorders, obesity, eating disorders, pain control, addiction, and schizophrenia (Jerdan et al., 2018; Pallavicini et al., 2022). VR is considered a valuable tool for provoking realistic reactions to feared stimuli, managing pain, and simulating real-life scenarios. It has been identified as a psychological intervention tool, providing immersion, engagement, and enjoyment for individuals with mental health problems (O'Connor et al., 2022).

2.2. Anonymity in metaverse

Anonymity can be defined as "the extent to which a communicator perceives the source of a message to be unknown and unspecified" (Scott, 1998). When individuals perceive themselves as unidentifiable and believe they will not reencounter the stranger again, they are more inclined to disclose personal information to unknown individuals. This tendency towards self-disclosure to strangers is considered an expected outcome of anonymity (Clark-Gordon et al., 2019). In virtual environments, participants typically can customize the appearance of their avatars, including their physique and clothing. This allows players to personalize their avatars to resemble themselves and reflect their personalities. Conversely, they can also manipulate their virtual representations in the same manner. The virtual realm is often associated with a significant level of anonymity, as users can assign distinct names to their avatars or even switch between multiple avatars (Ante et al., 2023). Previous work on anonymity in virtual worlds has examined the effects of anonymity during therapy sessions. Anonymity is particularly important in the field of stigmatized psychiatry (Jengić et al., 2016). In interviews with 48 participants, Robinson et al. (2023) reported that one of the advantages of cognitive-behavioral therapy in the virtual world is anonymity (Robinson et al., 2023). Health-related research in the virtual world has shown that anonymity and avatar representation can encourage discussion of sensitive topics (Keelan et al., 2015). In particular, the study by Dilgul et al. (2021) showed that patients liked the idea of remaining anonymous through an avatar during group therapy in virtual reality. In addition, both patients and therapists indicated that the anonymity provided by avatars could increase patients' willingness to make disclosures in order to speak more freely and honestly, which could increase participation and lead to better group cohesion (Dilgul et al., 2021). The effects of anonymity in foreign language interactions in virtual worlds have also been investigated. The anonymity provided by virtual worlds has shown positive effects on certain students, leading to increased self-confidence and reduced nervousness, as reported by them (Yu et al., 2020). Further research delves into the potential influence of anonymity experienced during virtual world interactions on participants with varying affective profiles. Additionally, the findings reveal a robust correlation between self-efficacy beliefs and the influence of anonymity (Melchor-Couto, 2017).

2.3. Unified Theory of Acceptance and Use of Technology (UTAUT)

The Technology Acceptance Model (TAM) explains how users adopt digital technologies based on factors identified in the Theory of Reasoned Action (TRA). TAM addresses challenges in identifying beliefs across different contexts. The Unified Theory of Acceptance and Use of Technology (UTAUT) builds on TAM and includes four key constructs: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). These constructs significantly influence users' behavioral intention (BI). UTAUT builds upon and expands the TAM framework and was developed by Venkatesh et al. (2003). UTAUT has been extensively applied in various contexts, including healthcare, education, e-commerce, and others (Abbad, 2021; Alqudah et al., 2021; Tomić et al., 2023). The framework has also examined adopting new technologies in virtual environments (Teng et al., 2022) UTAUT2 was later developed for consumer contexts, adding additional predictors such as hedonic motivation (HM), habit, and price value, while omitting voluntariness as a predictor for consumer settings (Venkatesh et al., 2012).

3. Research Model

Prior research has extensively investigated the opportunities and challenges of utilizing metaverse technology in therapy sessions. Notably, its viability and positive user reception in the context of remote psychotherapy have been emphasized (Matsangidou et al., 2023). Although specific studies have examined the potential of virtual reality (VR) in mental health interventions tailored to specific demographics, such as children and young individuals (Harith et al., 2022), further research is needed on how patients will accept this advanced metaverse platform. Considering that the metaverse platform also functions as an information system, the UTAUT could be employed to comprehensively elucidate the factors influencing patient acceptance of the metaverse. Venkatesh et al. (2003), developed the initial UTAUT model, comprising four key constructs: PE, EE, SI, and FC.

EE is the degree of ease associated with using systems, as defined by several studies have directly examined the relationship between EE and system use. Studies of the same relationship in the context of telemedicine adoption also shows a significant relationship (Rouidi et al., 2022). Examining how the components of information services influence the potential adoption of such services by patients also finds a significant influence of EE. Since our application case involves mental therapeutic sessions between the therapist and the patient, and the metaverse supports easier communication and interaction between therapist and patient, information on the metaverse platform is easily understood. Furthermore, EE is an ideal predictor of technology acceptance; if patients feel they can use it easily and with minimal effort, their satisfaction and intention to accept will be stronger. Therefore, we hypothesized: ***H1:*** *Effort expectancy (EE) positively affect patient satisfaction.*

According to Venkatesh et al. (2003), PE encompasses an individual's perception of the potential benefits of utilizing a specific technology. In the case of psychotherapy sessions, leveraging immersive virtual reality technology enables patients to immerse themselves in a vivid 3D virtual world that traditional 2D media cannot provide. Previous modeling studies have consistently demonstrated that PE is the most influential factor in predicting an individual's intention to use technology (Kohnke et al., 2014). The perceived PE of psychotherapy sessions in the metaverse directly influences the likelihood of patients utilizing them. The technology facilitates accurate and efficient communication between patients and therapists within the metaverse, resembling face-to-face interaction. This increased accuracy and speed in communication foster mutual understanding between therapists and patients during psychotherapy sessions, enabling effective management of mental health issues. Consequently, this enhanced communication can potentially improve patients' healing process. Therefore, we propose the following hypothesis: ***H2:*** *Performance expectancy (PE) positively affect patient satisfaction.*

In our context, SI pertains to the degree to which individuals connected to the user believe that the user should utilize the metaverse for psychotherapy sessions. According to the UTAUT framework, the SI construct encompasses the implicit or explicit understanding that people's behavior is influenced by how they perceive others, such as their close friends or relatives within our context, who would view them after adopting the technology (Venkatesh et al., 2003). In general, individuals' actions are influenced by their social circles. They tend to select products and technologies that they perceive as aligning well with their identity and reflecting how they wish to be perceived by others (Teng et al., 2022). Therefore, we propose our next hypothesis: ***H3:*** *Social influence (SI) could affect patient satisfaction.*

Guo & Poole (2009), argue that a person's intrinsic motivation and enjoyment of their interactions with a task lead to the logical outcome of immersion or flow. When individuals experience higher levels of enjoyment during interactions, they are more inclined to direct their attention toward the presented stimuli (Nadkarni & Prügl, 2021). As defined by Venkatesh et al. (2012), HM

encompasses the enjoyment and pleasure users derive from using technology and aligns with the constructs of hedonic benefits or perceived enjoyment in other technology acceptance models. When technology is perceived as enjoyable and pleasurable to use, users are more likely to experience satisfaction from its usage. Therefore, we hypothesize: ***H4:*** *Hedonic Motivation (HM) could affect patient satisfaction.*

Individuals who derive pleasure from novel experiences are more willing to explore alternative medical care options. These individuals possess an elevated perception of telepresence (TP). Studies indicate that TP heightens the sense of enjoyment. Individuals approach the experience with positive anticipation and curiosity, intensify their immersion within the metaverse and active interaction involvement (Lee & Park, 2014). Consequently, the patient's active participation fosters increased engagement with the therapist, resulting in higher satisfaction levels with the therapist's services (Zahedi et al., 2022). Hence, we hypothesize: ***H5:*** *Telepresence (TP) positively affect patient satisfaction.*

Following the COVID-19 pandemic, healthcare authorities have emphasized telehealth as a viable and convenient alternative to prevent the pandemic. In our specific scenario, time convenience plays a pivotal role by eliminating the need for patients to travel to access psychotherapy sessions, depending on their geographical location. Consequently, patients perceive time convenience as a significant advantage when utilizing the metaverse for psychotherapy sessions (Zahedi et al., 2022). Previous research has demonstrated that patients' perception of convenience directly influences their satisfaction with the quality of care they receive (Fortney et al., 2011a). Thus, we hypothesize: ***H6:*** *Time convenience positively affect patient satisfaction.*

Perceived anonymity (PA) refers to how much personal identity information users believe has been revealed (Hite et al., 2014). Anonymity could promote negative online behavior. Despite this, recent studies have shown that anonymous surveys clearly increased reporting of eating disorder symptoms (Lavender & Anderson, 2009). Supportive results prove the positive relationship between anonymity and reporting mental disorder behavior in virtual communities (Warner et al., 2011). In our scenario, patients ensure anonymity by using their self-created avatar in the metaverse environment. This anonymity, in turn, allows them to engage in more open discussions with their therapist regarding their mental health issues. Thus, we hypothesize that: ***H7:*** *Perceived anonymity positively affect patient satisfaction.*

Based on previous research examining user behavior in information systems, it has been observed that satisfaction leads to the development of various positive behavioral intentions. As the metaverse falls within the category of information systems, users who experience satisfaction while utilizing these platforms tend to form positive behavioral intentions. Within our context, patients who find satisfaction in using the metaverse in their psychotherapy sessions express a desire to continue their positive experiences and maintain their service usage. Moreover, when patients in the metaverse express satisfaction, they tend to share their positive experiences with friends, increasing positive word-of-mouth intentions. Hence, we hypothesize that: ***H8:*** *Patient satisfaction could positively affect the behavioral intention to use the metaverse for therapeutic mental sessions;* ***H9:*** *Patient satisfaction could positively affect the word- of-mouth intention to use the metaverse for therapeutic mental sessions.*

4. Methodology

4.1. Description of scenario-based survey

Our research approach followed the scenario- based method recommended by Rosson and Carroll (2002), which is widely employed in IS research. A therapeutic conversation is an intricate procedure grounded in trust, transparency, and empathy. It demands specific sensitivity and flexibility to address effectively the patient's unique needs and issues (Martin & Chanda, 2016). Exploring how the metaverse can support these conversations can enhance their effectiveness and impact. This was a crucial aspect of our study since we aimed to investigate the intention to accept the metaverse in the context of therapeutic mental sessions between a therapist and a patient. During the survey, we showed the participants a video of a therapy session between a patient and a therapist in the metaverse. The scenario presented to the two groups in the video was as follows: The patient participating in the therapeutic mental sessions in the metaverse explained that she was under a lot of stress due to pressures at work and problems in her relationships. Problems such as working very long hours and the boss constantly giving her more and more tasks affected the patient psychologically and made her unhappy. The videos shown to the two groups differed at this point. In the video of the therapeutic interview with the metaverse shown to "Group A: Without anonymity", the patient's avatar had her exact physical characteristics, and the patient told her therapist personal information such as her name, surname, occupation, company, and age. In the video shown in "Group B: With anonymity", the patient created an avatar completely different from his physical characteristics, and the therapist was informed about it.

It was impossible to access personal information about the patient, such as age and occupation. In the scenario, the participant of therapeutic mental sessions can decide to join with their natural or anonymous avatar to the session. The survey participants watched the video, and after that, we asked them to imagine that they were in the patient's place in the scenario and answer the questions.

4.2. Data Sample Collection Analysis Process

In our study, we incorporated the constructs and items from prior research on technology acceptance, adapting them to align with the context of therapeutic mental sessions in the metaverse. The dependent variables in our study focus on gauging user satisfaction when utilizing the metaverse in therapeutic mental sessions. Furthermore, we considered age and gender as control variables to mitigate the potential impact of unforeseen factors.

Regarding the data collection process, we used Prolific, a recently established online subject recruitment platform. By using Prolific, we were able to effectively target our intended group suffering from depression through the use of predefined screeners. In the study, a total of N=160 users participated. We implemented attention and a manipulation check to ensure the high quality of our study results (Meade & Craig, 2012). We excluded all participants who failed at least one check, answered the questionnaire too quickly or had never heard the term metaverse or could not imagine what it meant. After the exclusion, n_A =73 and n_B=74 participants remained. The distribution of control variables, such as gender, age, employment status, online psychotherapy session experience, and VR/Metaverse experience, can be found in Table 1. The collected data were analyzed with a well-established method for analyzing such models, namely structural equation models, implemented in SmartPLS (Qureshi & Compeau, 2009). This approach is suitable for theories in their early stages like ours (Mesbah et al., 2021). Demographic and behavioral characteristics were analyzed in two groups of study participants: "patients with anonymous avatars" and "patients without anonymous avatars". The sample size was equally divided between males and females. Most respondents in both groups work as employees (61.4%) and (67.1%), respectively. Additionally, most of the study participants in both groups have online psychotherapy experience, and most participants have VR or metaverse experience in a gaming context.

Table 1. Descriptive statistics

Variable	Content	With anonymous avatar	Without anonymous avatar
Age	18-33	54.3%	51.4%
	34-44	24.3%	24.3%
	>45	21.4%	24.3%
Gender	Male	50%	50%
	Female	50%	50%
Employment Status	Employed	61.4%	67.1%
	Unemployed	38.6%	32.9%
Online psychotherapy Experience	Yes	79.6%	
	No	20.4%	
VR/Metaverse Experience	Yes	58.5%	
	No	41.5%	

5. Results

We analyzed the measurement model to assess the convergent and discriminant validity of the research model (Hair et al., 2014). Convergent validity ensures that items within the same construct exhibit statistical similarity. To confirm convergent validity, we examined item loadings, Cronbach's α, composite reliability (CR), and the average variance extracted (AVE) for each construct (Xu et al., 2012). The item loadings can be found in Table 2. We observed that all items demonstrated loadings higher than the recommended threshold of 0.7, as advised by Hair et al. (2014), indicating satisfactory reliability. Table 3 shows that, across all constructs, both Cronbach's α and composite reliability surpass the threshold of 0.7, while the AVE values exceed 0.5 (Hair et al., 2014).

Table 2. Item loadings

Item	Item Loading	Item	Item Loading
BI1	0.986	ST1	0.949
BI2	0.988	ST2	0.940
BI3	0.988	ST3	0.922
EE1	0.900	SI1	0.954
EE2	0.911	SI2	0.974
EE3	0.887	SI3	0.949
HM1	0.961	TP1	0.923
HM2	0.949	TP2	0.943
HM3	0.936	TP3	0.934
HM4	0.966	TC1	1.000
PA1	1.000	WoMI1	0.975
PE1	0.974	WoMI2	0.973
PE2	0.974		

Table 3. (Cr. α), (CR), (AVE)

Construct	Cronbach'α	CR	AVE
BI	0.987	0.987	0.974
EE	0.883	0.901	0.809
HM	0.966	0.969	0.908
PE	0.946	0.946	0.948
ST	0.930	0.931	0.878
SI	0.956	0.958	0.920
TP	0.926	0.929	0.871
WoMI	0.946	0.947	0.948
PA	1.000	1.000	1.000
TC	1.000	1.000	1.000

To determine discriminant validity, we assessed the extent to which measurements of different constructs diverge. To establish discriminant validity, we examined the cross-loadings and calculated the square root of the average variance extracted (AVE) for each construct in the model (Fornell & Bookstein, 1982). As indicated in Table 4, the square roots of the AVE for all constructs exceed their correlations with other constructs. This finding confirms the discriminant validity of the model. Thus, the measurement model satisfies both convergent and discriminatory validity requirements.

Table 4. Construct correlations

Construct	BI	EE	HM	PA	PE	ST	SI	TP	TC	WoMI
BI	**0.987**									
EE	0.562	**0.899**								
HM	0.770	0.545	**0.953**							
PA	-0.527	-0.403	-0.441	**1.000**						
PE	0.754	0.613	0.763	-0.491	**0.974**					
ST	0.880	0.589	0.796	-0.521	0.841	**0.937**				
SI	0.601	0.368	0.554	-0.241	0.553	0.571	**0.959**			
TP	0.774	0.521	0.724	-0.523	0.733	0.796	0.483	**0.933**		
TC	0.555	0.412	0.531	-0.262	0.462	0.535	0.348	0.457	**1.000**	
WoMI	0.854	0.605	0.788	-0.534	0.843	0.874	0.598	0.778	0.562	**0.974**

We present the outcomes of the research model through a bootstrapping procedure involving 5,000 re-samples (Kushary et al., 2000), as illustrated in Figure1. The model's fit, indicated by the standardized root mean square residual (SRMR) value of 0.034, demonstrates a good fit as it falls below the threshold of 0.08 (Hu & Bentler, 2009). Table 5 shows the results for the construct behavioral intention for the two groups: patients without anonymous avatars and patients with anonymous avatars, from the structural model analysis, along with the estimated path coefficients.

Table 5. Results of the Structural Model

Construct	Groups	EE	PE	SI	HM	TP	TC	PA	BI	WoMI
Satisfaction	Group A: Without anonymity n_A=73	-0.054	0.444	0.066	0.126	0.305	0.114	0.002	0.864	0.858
	Group B: With anonymity n_B=74	0.073	0.291	0.119	0.275	0.129	0.104	0.177	0.894	0.891
										p < .05

A multigroup analysis was conducted to identify potential differences between the two groups. This analysis aimed to determine the extent of significant differences between the models of "Group A: Without anonymity", and "Group B: With anonymity" (Hair et al., 2017). Firstly, H1 (p_A = 0.553 p_B= 0.286) was not supported in either group, suggesting that EE does not significantly impact patient satisfaction and the intention to use the metaverse in therapeutic mental sessions. Furthermore, hypotheses H3 (p_A = 0.485, p_B = 0.053) and H6 (p_A = 0.184, p_B = 0.106) were not supported in Group A and Group B, indicating that SI and TC do not significantly influence patient satisfaction. Hypothesis H4 was supported in Group B but not in Group A. Moreover, Hypothesis H2 (p_A = 0.000, p_B = 0.000) was supported in both Group A and Group B, suggesting that PE significantly influences patient satisfaction and the intention to use the metaverse in therapeutic mental sessions. Hypothesis H5 (p_A = 0.01, p_B = 0.168) was only supported in Group A, while no significant relationship between TP and Satisfaction was found in Group B. Hypothesis H7 (p_A = 0.976, p_B = 0.001) was supported by Group B, indicating that PA significantly impacts patient satisfaction. Lastly, Hypotheses H8 (p_A = 0.000, p_B = 0.000) and H9 (p_A = 0.000, p_B = 0.000) were supported in both groups, showing that satisfaction significantly influences intention to use and word-of-mouth intention to use the metaverse in therapeutic mental sessions for both Group A and B.

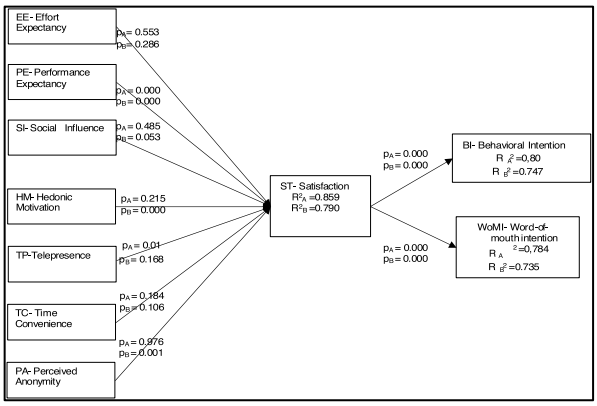

Figure 1. Result of structural model testing (p<0.05)

6. Conclusion

Our objective was to develop and assess a theoretical model that explains individuals' intention to use the metaverse in the healthcare domain. We responded to the call to expand the growing research field of metaverse (Dwivedi et al., 2022) by addressing in the context of a real-world use case. Based on UTAUT model, we empirically tested both "Group A: Without anonymity", and "Group B: With anonymity", and the results demonstrated significant support for the proposed model in both groups. However, the findings from the two groups exhibited differences. In Group A, the study found that only performance expectations and telepresence significantly impacted satisfaction, behavioral intention, and word-of-mouth intention to use the metaverse for therapeutic mental sessions. In contrast, in Group B, performance expectations, hedonic motivation, and perceived anonymity held significant explanatory power in determining behavioral intention and word-of-mouth intention to use the metaverse for therapeutic mental sessions. Our study provides several theoretical contributions: **First**, we expanded the UTAUT model by introducing telepresence and time convenience constructs to augment its predictive capacity in the metaverse context, as demonstrated in our investigation of therapeutic mental sessions. Telepresence in the metaverse pertains to the perception of co-presence with others in a shared virtual realm, blurring the boundaries between the virtual world and reality. The metaverse

offers an immersive environment that prioritizes telepresence, ultimately enhancing the user's overall experience using avatars. The level of telepresence is influenced by factors such as technological quality, the authenticity of the virtual environment, and user engagement (Nah et al., 2011; Qiu & Benbasat, 2005). Thus, it is essential to integrate this construct into the UTAUT model for the metaverse. Furthermore, time convenience encompasses the reduction of travel time required to access medical services, considering the patient's location. As a result, time convenience is perceived as a benefit by each patient utilizing the metaverse. Previous studies have demonstrated that patients' perception of convenience significantly impacts their satisfaction with the healthcare they receive (Fortney et al., 2011b). Therefore, it is vital to integrate this aspect into the UTAUT model for the metaverse. **Second**, perceived anonymity is a crucial factor influencing the acceptance of metaverse in the healthcare domain (Robinson et al., 2023). Perceived anonymity and hedonic motivation are significant predictors of behavioral intention to use the metaverse among patients, which extends the UTAUT model to a healthcare context. Therefore, incorporating perceived anonymity into the UTAUT model could improve generalizability. The metaverse especially enables patients to have open and transparent discussions about their mental health problems through anonymity (Dilgul et al., 2021). In our study, we ensured patients' anonymity by using avatars. In our scenario, a patient who wished to remain anonymous during the session deviated from their self- determination by manipulating the outward appearance of their avatar before the session began. The rules defining patients' anonymity in healthcare are a critical topic for future research. Additionally, the metaverse enables the gathering of additional data, e.g., on patients' mimic and gesture behavior, further increasing the volume of data collected. When combined with AI technologies, this data can be used to provide patients with personalized physical and psychological solutions (Ali et al., 2023). This progression towards utilizing a metaverse for therapeutic mental sessions bring various **practical contributions** as well. Firstly, with the help of a rigorous theoretical background, our research demonstrates the wide range of applications for metaverse consultation if medical professionals and healthcare providers prioritize the development of patient-friendly virtual environments. Secondly, our study emphasizes the significant impact of perceived anonymity on patients' acceptance of the metaverse for therapeutic mental sessions. Lastly, this research contributes to a deeper comprehension of the factors that influence the acceptance of metaverse-based therapeutic mental sessions, offering valuable insights for medical professionals and healthcare service providers to enhance its acceptance. However, our contributions are also subject to **limitations**. Firstly, incorporating a mixed methods approach that combines quantitative and qualitative methods would have allowed for a more comprehensive understanding of the phenomenon. Furthermore, potential moderating factors such as age and gender could be examined in future studies. Secondly, despite efforts to recruit participants with VR experience, a limitation of this study is that not all participants had actual exposure to the metaverse. This impacted their ability to comprehend the potential benefits and drawbacks of the technology entirely. **Future research** should address this limitation by conducting authentic experiments in a metaverse environment involving participants already familiar with the technology. Additionally, future studies, research, and practice endeavors need to adopt further strategies to ensure that this technology can offer equitable healthcare delivery. Lastly, given the rapid development of the metaverse in recent years and its potential to enhance healthcare accessibility, future research should critically examine the sustainability aspects of the technology. Moreover, investigations on metaverse adoption in healthcare should emphasize design considerations that facilitate widespread adoption.

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