



## On virtual reality: A thematic analysis from a dance movement therapy perspective

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### ABSTRACT

Virtual Reality (VR) is a technology composed of several integrated elements that allow simulation and interaction in an immersive environment. Various sensory and cognitive stimuli must be experienced through the human body to accomplish this phenomenon. For this reason, VR is studied and used more frequently in different therapeutic and socio-educational environments. Given its embodied, intersubjective, enactive, and emotive qualities, adjectives also used to describe dance movement therapy (DMT), it is necessary to develop a conceptual and theoretical approach from an embodied perspective. From a reflective standpoint, this article analyzes some important possibilities and precautions to evaluate the possible integration of VR in DMT and vice versa. The study of VR not only concerns DMTs but also different therapists and professionals interested in this type of technology. While DMT continues to expand its fields of action and methods, more research is still required on VR-assisted interventions. A wider exploration and training in the field are necessary to provide ethical and updated care according to the needs and problems of today's contemporary world.

### Introduction

Prensky (2001) first coined the term *Digital Natives*, referring to the generation born after 1980 during the information age and surrounded by technology. Digital natives comprised the generations of Millennials (1981–1996) and Gen Z (1997–2012). Today, many of them are parents and even grandparents of the Alpha generation (2010–2020), the latter being the generational block born entirely in the 21st century. Accordingly, generational and technological changes have brought new ways of moving in, understanding, and relating to the world. Following new paradigms, different academic and professional perspectives have considered possible scenarios regarding the future approach, care, and treatment of people's physical and mental health.

After the global COVID-19 pandemic, various digital tools have been frequently considered in psychology and psychiatry. In addition to lowering costs and reducing the possibility of absenteeism, remote therapy also provides an alternative for people who find face-to-face sessions difficult due to fear of feeling judged (Pedram et al., 2020). Röhrlich et al. (2014) describe different paradigms and perspectives in body therapies, including the possibility of a new clinical construction involving mixed realities, including virtual reality (VR). Many of the

protocols and results of VR interventions have yet to be determined. Some VR applications in clinical psychology have been documented in depression, anxiety, and phobias (Ciešlik et al., 2020; Riva, 2022), behavioral eating disorders (Cantone, 2023; Riva, 2022), children with autism and other neurodevelopmental disorders (Ciešlik et al., 2020; Riva, 2022), pain management, rehabilitation (Bohil et al., 2011; Riva, 2022; Warnier et al., 2020) and different psychiatric disorders, like the use of AVATAR therapy for the treatment of distressing voices in psychosis (Garety et al., 2024).

The virtual space in psychotherapy enables narrative, the enactive dramatization of fantasies, and the integration of denied or conflictive facets (Bigbee, 2021; Lemma, 2015). Besides the therapeutic and clinical contexts, several VR devices have been used for dance teaching and movement analysis (Lin et al., 2022; Sun et al., 2017). According to Piitulainen et al. (2022), in a study aimed at gaining a rich understanding of the dance experiences people are currently having in social VR, there is a growing interest in virtual social dance spaces: people can immersively explore dance as a personal and social experience, release stress, escape feelings of isolation, find a place that plays music that matches their mood and appreciates other people's dance. Embodiment processes occur whenever two people communicate, even without

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physical contact (Gallagher & Payne, 2015). As an approach that places the body experience at the core of clinical practice, dance movement therapy (DMT) cannot ignore this reality. The use of VR technology in DMT is still a brand-new, under-researched area. While more research on embodied technologies and their application in therapy becomes available, it is important to recognize the need to construct an up-to-date theoretical framework. From our experience as professional DMTs, this question arises: What are the main concepts and themes about VR that can be useful and relevant to the Dance Movement therapeutic practice? What basic knowledge could serve as a starting point for further integration of VR in DMT practice? This article aims to place DMT in the contemporary context under an embodied approach, employing a holistic and analytical perspective of immersive VR technologies.

## Methodology

According to the Berry Picking approach (Bates, 1989), the information collection was gathered in a non-static and non-linear process, rather with an expansive, evolutionary approach in fragments as the research evolved. Keywords and topics such as: “Virtual Embodiment”, “Virtual Reality”, “Dance Movement Therapy”, “Phenomenology”, “Virtual Reality uses in Therapy”, “Dance and Virtual Reality”, “Avatar,” and “Virtual Aesthetics” were included and introduced using Mendeley, Web of Science, Scopus and Google Scholar search engines. Preference was given to articles from peer-reviewed academic publications under the search criteria: most relevant, most cited, and most recent (last ten years). These categories were not exclusive and also incorporated authors and works that defined fundamental concepts at an earlier date. Exclusion criteria were outdated information or themes not relevant to the research question. Of the total of 99 articles and books analyzed, 27 were excluded. Finally, 73 publications were analyzed, of which 67 were articles in peer-reviewed indexed journals.

A literature analysis was carried out following six stages: a broad, comprehensive search involving a preliminary analysis of titles and abstracts, a thorough review of the full-text manuscripts, organization and labeling of selected studies, identification of the frequency and relevance of themes, patterns, authors, and data specific to the research question, a back and forth thematic analysis that led to five thematic clusters and the interpretation and writing of the research findings.

## Results

### *Virtual embodiment*

Virtuality means something that exists in effect or essence but not in physical or tangible form. It can be defined as a complex human activity mediated through an intricate web of digital communications (Nardi, 2015). As Damasio (2006) and Merleau-Ponty (2012) stated, the phenomenological and embodied perspectives question the duality between mind and body. Haraway (1991) analyzes the myth of the cyborg from a feminist and postmodernist approach, criticizing the divisions and dichotomies of patriarchy, colonialism, and Western capitalism: the cyborg is defined as “a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction” (p. 149), situated in a transgressive reality in which borders become diffuse. In VR, dualism is challenged; digital networks are an extension of the real world rather than an alternative (Lemma, 2015). Thus, the virtual refers not only to simulation but to potentiality, which is intrinsic to the human experience (Krebs, 2023).

The phenomenological analysis proposes a paradigm that invites blurring the dividing lines of the different polarities, and the extremes are reconciled as the experience is placed as the object of study. From a Merleau-Pontian (2012) analysis, Du Toit and Swer (2021) argue that the experience of the virtual world is grounded on the body and the *lattice* of the flesh. “The virtual and the ‘real’ are the same in that they are both experienced by an embodied subject who perceives and

navigates within them through the employment of bodily frames of reference” (p. 27). Both body and experience constitute the primordial medium and phenomenon of perception and connection, whether in virtual or physical reality. Recognizing that there is a collective and contextual tendency of the virtual media to move toward the body, Biocca (1997) defines this process as progressive embodiment: “the steadily advancing immersion of sensorimotor channels to computer interfaces through a tighter and more pervasive coupling of the body to interface sensors and displays” (p. 5). According to Biocca (1997), there are three bodies in this virtual environment: the objective or physical body, the virtual body and the body schema or the mental/internal representation of the user’s body. It is necessary to include the conceptual approach made by Gallagher (2005) to define the latter, who defines the body schema as the system of sensory-motor abilities that function without consciousness or the need for perceptual monitoring.

According to the extended mind hypothesis (EMH) (Gallagher, 2023), the material mechanisms of cognition are not only composed of neurons; they also include the use of instruments or artifacts present in the environment, such as the use of technology in this case. Virtual reality challenges the phenomenological idea that our sense of bodily presence is essentially anchored to the physical body. It potentially expands our notion of what bodily presence can be, implying that the body has always been physical but has also been virtual (Harth et al., 2020; Vidolov, 2022).

### *Sensoriality and intersubjectivity*

Virtual reality is a reality based on perception (Baños et al., 1999; Diemer et al., 2015), integrating cognitive, behavioral, and experiential methods. Virtual reality induces a controlled sensory rearrangement, which, in turn, unconsciously modifies bodily awareness (Riva, 2005). As in the physical world, immersive virtual environments are places where vision and the other senses are intended to be active (Biocca, 1997). This stimulation is directed to the sensory channels and completely involves the sensorimotor system, increasing the potential to obtain psychological and behavioral responses (Bohil et al., 2011).

Several technological components allow the possibility of coupling and integration of the immersive experience: sensors and haptics that vibrate and stimulate touch, aroma diffusers or essences that activate olfactory perception, special shoes or walking treadmills designed to involve lower body locomotion, microphones, and headphones that allow or cancel auditory exchange and headsets or viewing goggles that constitute the main entrance that connects and allows access to VR. The body is the access point of any perception and the “standard of measurement” (Hoel & Carusi, 2017). This ground zero is modified simultaneously by interacting with the virtual body, which does not perceive or feel (Incao & Mazzola, 2021).

In the study known as the rubber hand illusion, Botvinick and Cohen (1998) hypothesize that an illusory construction operates mainly between vision, touch, and proprioception. After some synchronized tactile and visual stimuli, several participants could attribute a rubber hand as their own. Multisensory, perceptual, synchronized and congruent simulations produce a subsequent illusion of ownership, operability, and agency of an external body, in this case, the virtual body: “intermodal matching can be sufficient for self-attribution” (Botvinick & Cohen, 1998, p. 1). Some authors call this phenomenon *body ownership illusion* (Harth et al., 2020) or *sense of embodiment* (Döllinger et al., 2022a; Kilteni et al., 2012). While both concepts refer to the illusion of ownership, the term *sense of embodiment* is further defined as “SoE toward a body B is the sense that emerges when B’s properties are processed as if they were the properties of one’s own biological body” (Kilteni et al., 2012, p. 375).

On the area of visual perception, VR provides the existing possibility for participants to respond to different scenarios, and the study of complex behaviors or situations which can be impractical, dangerous, or ethically questionable to be created in real life. The use of VR include the

need for an accurate understanding of the perceptual information presented via the headset and several important technological obstacles can pose significant differences in the perception when compared to reality (Baggs et al., 2024; Wilson & Soranzo, 2015).

The VR phenomenon relies on the stimulation and reaction of the organic and sensitive body. Still, aside from being an embodied and sensory technology, it also constitutes a social and intersubjective channel. Virtual reality is a space resulting from interactivity that depends significantly on how it effectively produces user emotions (Diodato, 2022). The continuous advancements of the devices necessary for VR connection expand its demographic and social reach: lighter, smaller, more sensors, better resolution, and more affordable. In the social environment of virtual immersive dance clubs, VR allows the investigation of complex social interactions, and dance itself offers extensive potential to examine non-verbal communication and expression (Piitulainen et al., 2022). There is a potential use of virtual and interactive technologies to evaluate the effects of different sensory channels, specifically the role of touch in modulating the feeling of social presence and interpersonal connection (Della Longa et al., 2022). From an intersubjective approach, it can be said that the degree of perceived reality and immersion depends on the internal and behavioral logic of the virtual experience (Skarbez et al., 2017) and the user's capacity for social cognition. Social cognition integrates the mental processes involved in perceiving, attending to, remembering, thinking about, and finally making sense of the people around us (Calabrò & Naro, 2019). Virtual reality's relational and interactive dynamics enable an exchange of stimuli and responses using bodies and machines as ends and means. However, human consciousness and presence are the factors that enable intentionality and meaning-making.

### The sense of presence

According to Riva (2005), what distinguishes VR from other communications systems is the sense of *presence*, a concept that refers to the *feeling of being there* (Biocca, 1997; Diemer et al., 2015; Sanchez-Vives & Slater, 2005). According to Skarbez et al. (2017):

Presence (a shortened version of the term “telepresence”) is a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience (p. 96).

People connected to VR recognize the division between the physical and virtual worlds. There is an awareness of virtual places and events and, simultaneously, the awareness of the non-existence of these places or events in the physical world. At some level or degree, perceptions overlook the knowledge of using technology, and environments are perceived as if there is no technological mediation (Skarbez et al., 2017). Sanchez-Vives and Slater (2005) consider that factors influence the reported presence in virtual environments: display parameters, visual realism, sound, haptics, virtual body representation, and body engagement. It could be argued that the degree of physical stimulation that affects the sensory systems, called *sensorimotor immersion*, plays an important role in this set of factors (Bohil et al., 2011). “The degree of immersion is, therefore, an objective property of a system that, in principle, can be measured independently of the human experience it engenders. Presence, however, is the human response to the system” (Sanchez-Vives & Slater, 2005, p. 4). Considering that the possibility of VR occurs through technology and the body, the sense of presence manifests itself as a subjective phenomenon with clear psychological components. It allows the user's ability to self-locate and perceive the virtual world while evoking and provoking meaningful emotional responses.

According to Skarbez et al. (2017), co-presence is defined as the feeling of being together with another or others in space. Co-presence differs from the concept of social presence, which refers to a more

elaborate presence where there is an awareness of co-presence and an interaction in which the psychological state of an individual is affected by another and vice versa. The use of the terms *illusion of social presence* and the *illusion of co-presence* is more accurate in the case of virtual or mediated spaces.

### Avatar and identity

Virtual reality systems use avatars as graphic representations of individuals (Cantone, 2023; Wienrich & Gramlich, 2020), allowing interaction between users and the immersive virtual space. Yee and Bailenson (2007) assert, “The avatar is not simply a uniform that is worn, the avatar is our entire self-representation” (p. 274). The ability to choose and modify its appearance is fundamental to the experience (Davis & Chansiri, 2019). Not only does the avatar change the mental model of the user's body image (Biocca, 1997), but the virtual body has social meaning and is adaptable to the circumstances within the virtual and cultural environment in which it interacts. The avatar imitates and transfers stereotypes, expectations, biases, and roles from the physical world (Balsamo, 1996; Biocca, 1997; Davis & Chansiri, 2019; Yee & Bailenson, 2007). Balsamo (1996) reflects on the virtual body, defining its transformation into “the very medium of cultural expression itself, manipulated, digitalized, and technologically constructed in virtual environments” (p. 131). Despite the transgressive ideal, Balsamo (1996) argues that the virtual body still represents the dominant narratives of power, beauty, and sexual desire.

The avatar is the first identity signal in virtual environments, significantly impacting how we behave online (Yee & Bailenson, 2007). In a study carried out by Yoon and Vargas (2014), which aimed to understand whether or not a certain type of avatar could promote some pro or antisocial behaviors, several participants were given the option of virtually adding chocolate or chili sauce to the next participant's plate being represented by a heroic, neutral or villainous avatar: those who played the heroic avatar served more chocolate than those who played the villainous or neutral avatar, while those who played the villainous avatar served more chili sauce than those who played heroes and neutral avatars. Virtual environments allow users to infer a new identity from their avatar and, at the same time, adjust their behavior to what they believe others would expect them to have based on their appearance (Ratan et al., 2020). Yee and Bailenson (2007) named this phenomenon the *proteus effect*.

The avatar plays an important role in social interaction and the relationship with the self. It permits the embodiment of one's potentiality or desire. The possibility of virtuality can free users from physical, social, and emotional barriers, as well as open up new opportunities for people with disabilities (Davis & Chansiri, 2019), the neurodivergent spectrum, different gender identities, and expressions, and in general, to all the people active in virtual environments in which mediation allows space for physical and social activity where they can enjoy a fantastic and idealized avatar (Piitulainen et al., 2022).

In a study on body image and VR, Döllinger et al. (2022b) found a shift toward a positive relationship between self-reported body awareness and the dimensions of humanness and attractiveness. These results indicated that a rating of the virtual body as more human or attractive could be related to higher perceived body awareness. It is necessary not only to have a positive correlation between the stimulus and the sensory response for the avatar's sense of embodiment to be effective but also for the virtual body to have congruence and personal meaning for the person inhabiting it. It is important to note that the choice of the avatar will serve purposes inherent to the person who incarnates it and the cultural environment and social role in which it operates. Consequently, the avatar can be considered a dynamic and flexible identity unit. The use of realism, as proper technology provides, will depend on the objective of the virtual encounter, avoiding, as much as possible, effects such as the *uncanny valley* in which, faced with an appearance that is not yet completely human, a feeling of repulsion is generated instead of a

feeling of empathy (Mori et al., 2012). Self-perception and self-representation are key concepts in studying the avatar as an expression of identity. It can be stated that the visual and imaginal spaces that help to simulate reality and reproduce desires and expectations about the image of the virtual body involve relational, emotional, and aesthetic elements.

### The aesthetic experience

The production of images, aesthetic consumerism, and the currently ubiquitous phenomenon of the *aestheticizing of reality* have already been analyzed by Sontag (2005). As VR technologies bring enhanced high-definition graphic quality to the screen, increasing attention is paid to digital visual identities (Davis & Chansiri, 2019). The somatic practice has representational experiential dimensions and rewards: the sensual appreciation of beauty and art is captured through our bodily senses, producing and experiencing different emotional states, externally and internally, including proprioception (Shusterman, 2006). The author coined the term *somaesthetics* to define this emerging field of study. Virtual reality allows a space of simultaneous observation and interaction for the user, whom Diodato (2022) defines as a *subject-spectator-actor*; the distance that is traditionally attributed to aesthetic realization is replaced by a feeling of inclusion within the scene: “The voyeuristic drive is replaced by a drive for inclusion, for unlimited intervention, for omnipotence inhibited only by the limits of the program” (p. 7).

Depending on the image, the environment, and the virtual body, the design must be integrated and navigated easily. Wienrich and Gramlich (2020) assert:

The umbrella term *user experience* covers the perception and behavior while interacting with products or technical systems including, among others, the functionality, the content, and the aesthetics of a product, the context of use, and the user’s perception of and emotions towards the product (p.104).

Hedonic qualities are taken into account, such as the user’s joy during the experience, the momentary pleasure derived from the use of technology and its value to achieve and participate in experiences of self-empowerment and personal growth (Döllinger et al., 2022b; Wienrich & Gramlich, 2020). The graphic-aesthetic components and the simplicity and intuitive attributes of the technological tool enable recreational and therapeutic uses (Hacmun et al., 2021; Imus & Young, 2023; Kaimal et al., 2019). In VR-art therapy interventions, *embodied visual expression* refers to the creative expression involving movements of the whole body or some of its parts, reducing inhibitions, improving mood, and inviting creative play exploration between participants (Kaimal et al., 2019). The aesthetic experience in VR involves the body as an active part of the work of art, enhancing the intensity of the connection with reality concerning the traditional aesthetic experience (Incao & Mazzola, 2021). Imus and Young (2023) define *aesthetic mutuality* as the relational call-and-response process informed by aesthetic sensibilities, preferences, and values manifesting patterns of attraction and bond within a therapeutic relationship.

The optical experience refers to the concept of body image. Pylvänäinen (2003) proposes a tripartite model that defines body image as the interrelationship of three dimensions: image-properties, i.e., the perceived appearance of one’s own body together with the associated social and cultural attitudes; the body-self, that is, the body-based interactive, experiencing and emotional core self, and the body-memory which stores the lived experiences and serves to evaluate the present ones. Although there is a body image that is in the user’s mind and that is virtually and visually represented through the avatar, Pylvänäinen (2003) warns that if image properties are emphasized over the concept of body image, it can become one-dimensional and superficial, making it susceptible to changes due to social purposes and suggestions, limiting a person’s authentic body perception.

### Implications with DMT

It can be said that VR and DMT are found in some of the adjectives that describe them: both are intersubjective, enactive, and embodied. Integrating VR into DMT practices involves critically addressing their similarities and differences (Patel, 2024). They involve cognitive and emotional processes while integrating and enabling an expressive component. The relationship between DMT and digital and virtual technologies is a field that is still incipient but not unexplored. The pandemic and post-pandemic years have motivated the use of online therapy by adjusting the possibilities and limits of the therapeutic framework. In the case of webcam DMT intervention, Yariv et al. (2020) explore their experiences and limitations: the screen as a mirror appears in the frame, transitions as the entrance and exit to the room, from the vertical to the horizontal plane, and the movement from the revealed body to the hidden body cannot be witnessed. The patient uses the ability to *annihilate* parts of her/his/their body, editing them from the camera’s eye, consciously or unconsciously. One of the concerns of online therapy is the modification of the environment of intimacy and emotional containment: the therapist’s body is no longer *there*, there is no way to offer therapeutic materials, and some patients do not have a safe space to talk, plus the risk of being hacked or stalked online (Carroll, 2021; Yariv et al., 2020). In the case of the possible VR interventions in DMT, the most evident and important change is the absence of real body perception, which is always provided by in-person and video meetings. In VR therapy, there is a “lack of accurate facial/body language feedback in their therapist’s avatar” (Pedram et al., 2020, p. 5), and there is a loss of subtle body signals, which precisely help to appreciate mood changes and at the same time contribute significantly to social communication (Madary & Metzinger, 2016). Döllinger et al. (2022b) observed that during the required scanning process, participants expressed feelings of *being watched* and *left alone*. The use of VR in therapy requires a large component of therapist-patient verbal communication. However, this dynamic interferes with the sense of presence.

It has been previously stated that in virtual environments, the realistic and physical representations of the self are replaced by the potential of the avatar, enabling the expression of the inner world and its conscious and unconscious fantasies. Lemma (2010, 2015) argues that cyberspace is not a homogeneous space. As a therapeutic tool, VR offers the potential for psychic elaboration, the staging of the body, and the experimentation of new, denied or conflictive facets. As VR constitutes both a place and an experience filled with meaning and possibility, the author raises some concerns, such as the psychic dominance of the virtual over the non-virtual, the discrepancy between the body image and the avatar, and the individualistic and narcissistic approach expanded by the sense of omnipotence. The virtual space can be used as a defense or evasion mechanism, neglecting and using the physical body solely as an instrument in the search for states of gratification, reassurance, and comfort.

Thomas (2021, 2022) addresses the topic of VR, exploring its potential and limitations from a dance-somatic sensitivity. The ocularcentric perspective requires a process of bodily attunement in which somatic processes and sensitive and embodied attention are in relationship instead of occupying a restricted role in the service of vision. This approach highlights the need for a transition phase to enter and experience the virtual environment. It has been observed that some users and patients can experience emotional distress, disorientation or cybersickness after browsing in immersive environments and require time to readjust to the physical world (Bigbee, 2021; Bohil et al., 2011; Kaimal et al., 2019; Patel, 2024). Some accommodations are needed to ensure the use of user-friendly technology for individuals with varying levels of tech proficiency (Radanliev, 2024). The use and study of embodied technology require critical and sensitive body knowledge and constructing a therapeutic relationship of care, safety, and trust (Young, 2017).

An initial exploration regarding the use of VR in DMT interventions

with young adults was carried out by Bigbee (2021). Some emerging topics were the importance of creating a safe, simulated space, using narrative and mindfulness in virtual therapy, self-exploration through the avatar, and the potential of immersion to evoke positive emotions and memories. This intervention model requires a progressive introduction and closure of the use of VR during the sessions. The mediated integration requires a learning curve and a feeling of familiarity and trust for the parties involved in the therapeutic process. According to the author, the use of VR in DMT serves as therapeutic support that provides joy and freedom of movement, promotes empathy, enables group and pair interventions with peers or with artificial intelligence (AI) programmed avatars and offers easy access to the use of music during sessions. The collaborative nature of VR in DMT can nourish the therapeutic relationship, promoting themes such as presence, space, time, and creativity (Young, 2017).

### Ethical considerations

Virtual reality interactions can lead to fundamental changes on psychological and biological levels. Accordingly, there is a concern about the possible influence and manipulation of people through real-time feedback of the avatar's facial and eye movements using the automatic and unconscious responses modulated by mirror neurons (Rizzolatti & Craighero, 2004). According to Madary & Metzinger (2016), there are several recommendations regarding the research ethics of VR (the limits of experimental environments, informed consent, clinical risks, dual-use, online research, and limitations of a code of conduct for research) and recommendations for the use of VR by the general public (long-term immersion, neglect of embodied interaction and the physical environment, risky content, and privacy issues). There are significant concerns regarding data privacy. Mental health information is personal and sensitive and should be employed considering people's privacy and autonomy, data should be correctly gathered, analyzed and stored in a process that represents the values of inclusivity, representativity, respectfulness and intersectionality (Radanliev, 2024).

The experiential potential of VR introduces new forms of mental and behavioral manipulation, which not only respond to the exploration of human potential but also imply different agendas of a capitalist, political, religious, and governmental nature (Balsamo, 1996; Du Toit & Swer, 2021; Madary & Metzinger, 2016). This also makes necessary regulations at supranational levels that do not currently exist (Riva & Wiederhold, 2022). Both scientific support and training, oriented to developers and users, can promote awareness of the ethical implications, possible advantages, and dangers that may arise due to interpersonal exchanges in multisensory virtual reality (Della Longa et al., 2022).

Regarding the use of VR in clinical practice, it is recommended as a support tool but not a replacement for traditional treatments (Ciešlik et al., 2020). In a qualitative study about the potential of VR art therapy (VRAT) with expert art therapists, all the participants of the study believed that "the medium should only be included in therapeutic sessions after the therapeutic relationship has been established" (Hacmun et al., 2021, p. 5). It is important to emphasize that for some users, the cost of VR systems does not provide equitable access and that factors and difficulties such as accessibility and/or lack of technological training can prevent or discourage their use (Bigbee, 2021; Patel, 2024; Radanliev, 2024). Some reviewed studies show similar effectiveness when VR therapy is compared with conventional treatments: there is still no evidence of a substantial difference in its use, but it is observed that it constitutes a playful and novel element in the setting, which has the potential to provide a component of motivation and understanding, especially in the field of pediatric neurorehabilitation (Ciešlik et al., 2020; Lin et al., 2022; Warnier et al., 2020). However, from a clinical perspective, several concerns about addictive behaviors toward the virtual environment and experience must be addressed, as well as the avoidant behaviors toward the embodied self (Lemma, 2010). In the case of autism, the accessibility provided by VR could generate

dependency (Kaimal et al., 2019). Additionally, there is a need to incorporate training, clinical support, and supervision for professionals considering the incorporation of VR into their clinical practice. Therapists should be aware of the contexts and content of virtual environments and provide an evidence-based and culturally sensitive practice, maintaining professionalism and clear boundaries in the virtual setting (Patel, 2024).

The embodied avatar experience and its subsequent extension of the self require exhaustive ethical and legal consideration (Aymerich-Franch & Fosch-Villaronga, 2020). Further research is required on the impact of body image modification (Döllinger et al., 2022a), its influence on children (Piitulainen et al., 2022), and the possible exacerbation of existing behaviors, attribution of false responsibility, hacking, racism, and sexual harassment (Aymerich-Franch & Fosch-Villaronga, 2020; Piitulainen et al., 2022). A human, integrated, multidisciplinary approach is needed in the face of a transformative technology capable of influencing people's attitudes and behavior (Riva & Wiederhold, 2022). According to the training guidelines of the European Association of Dance Movement Therapy (2017) and the American Dance Movement Therapy Association (2015), DMT professionals are required to "invest in ongoing professional development and engage in continuing education to refine skills and maintain currency with new knowledge in the field as necessary to enhance therapeutic effectiveness" (P. 10).

### Discussion

In addition to being a set of sophisticated technologies, from a psychological point of view, VR is simultaneously a simulative, cognitive, and embodied technology (Riva, 2022). When carrying out a conceptual exploration of VR from the perspective of DMT, this research found topics and concepts concerning the two fields: virtual embodiment, the role of sensory channels in the construction of the enactive and intersubjective reality, the sense of presence, the virtual body and its implications on identity, the aesthetic experience and, the exploration of VR as a support tool in DMT interventions. At the same time, embodied therapies can contribute to this technology's sensitive and responsible development and use.

Virtual technologies and their subsequent impact on people's physical, mental, and emotional well-being are the main reasons for the elaboration and analysis of this study. Virtuality promotes the exploration of new bonding dynamics while enhancing an environment of connection in which the limits of the body, time, and space seem to be modified. Virtual reality allows flexibility and dynamism in interpersonal relationships and the virtual therapeutic setting. However, despite VR's sensory stimuli, this encounter takes place to the detriment of direct visual and tactile human contact in a post-pandemic society, already deprived of these (Della Longa et al., 2022). Despite the potential for connection and relationship that virtual mediation represents, it lacks *interaffectivity*, the bodily resonance that creates the basis for a primary empathic understanding (Fuchs, 2021).

Several questions and possibilities about the use of VR in the field of DMT arise and vice versa: further investigation of different techniques of DMT in virtual therapeutic spaces, research concerning the sense of presence in the therapeutic setting, and the use of grounding techniques to connect with the physical present in the face of the addictive and/or evasive potential that immersive environments offer. While VR and Avatar embodied therapies can vividly express and complete the subconscious inner expression of individuals and their beliefs and desires, somatic transference and countertransference in VR, therapeutic settings are still facing a significant amount of research aiming to understand the complexity of the mirroring or reflecting experiences through other person's avatar (Gorrindo & Groves, 2012).

Within the clinical and therapeutic context, different applications of VR have yet to be developed and evaluated. However, these circumstances imply a careful and controlled setting. Due to the VR potential

for change and expansion of the different relational dynamics and the still-existing educational and legal gaps, several concerns can be found regarding its use. Further study is required on constructing virtual social ties, virtual immersion uses, habits, and the possible implications on body image, identity, and authenticity. Faced with the panorama of a technology heading toward a progressive embodiment and the continuous stimulation of perceptive channels, a careful and informed approach to body integration, over-stimulation, and sensory fatigue is needed.

In addition to the work carried out in clinical and therapeutic settings, there is great potential for the active involvement of DMT professionals in interdisciplinary teams in the design, ethics, and intervention of virtual experiences. The current reality requires approaches that promote a healthy body in children and young people. At the same time, there is a need for pedagogical work among technology professionals that incorporates the body perspective and digital and virtual literacy programs for health professionals.

Considering everything, it is necessary to remember that VR also has a physical body (*hardware*). There is great concern about the increase in energy consumption required by the maintenance and use of different information technologies (Morley et al., 2018), the rapid growth rate of electronic waste (*E-waste*), and the serious risk it poses to the environment and human health (Ghulam & Abushammala, 2023). According to Carroll (2021), “There is both therapeutic and political urgency to enhancing our embodied awareness of living within a complex ecosystem” (p. 5). An enactive and holistic psychotherapeutic approach is required under an ecological and integrative framework (Röhrich et al., 2014).

### Limitations of the study

This literature review has some limitations. It is not a systematic review, which may have left out studies of interest in the field. The authors aim to objectively present the possibilities and limitations of using VR from the perspective of DMT professionals. However, their lack of expertise in the VR field may have introduced some biases in the analysis conducted. Authors Cieslik et al. (2020) and Lu et al. (2022) also found limitations in systematic revisions on the use of VR in Parkinson’s rehabilitation and other psychiatric disorders, with significant inconsistencies and great heterogeneity concerning the method. The evaluation of the VR experience is still in its infancy (Wienrich & Gramlich, 2020). DMT is also in a learning and understanding phase before the implementation and integration of VR in the therapeutic setting. Further research and pilot studies about the implications of using VR in different therapeutic and socio-educational settings are required to achieve more reliable and consistent results.

### Conclusions

Given its similarity in fields of study and experience, as well as its medical and psychosocial applications, the study of VR as a medium and phenomenon is relevant to the field of DMT. Due to the vast potential of virtuality, various approaches and themes are expected to be brought more frequently into the therapeutic setting. A literature review using the Berry Picking approach was carried out during this study. Its conceptual, theoretical, and ethical analyzes constitute an approach and invitation to consider future research and implementations that expand the understanding and use of VR in DMT.

This research aims to situate DMT within the current context of a technological society, demonstrating the relevance of its practice as an embodied approach, given that intercorporeality cannot be entirely replaced by virtuality. The application of VR in DMT has an immense potential that we have yet to glimpse in different populations that will require critical awareness and professional development. Guidelines for DMT interventions incorporating VR, suitability and efficacy assessment, and ethical issues such as patient data privacy and security could

be themes for future studies. According to the findings of the literature, it can be stated that an ethical and updated practice is required, moving to an integrative approach that overcomes the dualism between the real and virtual, seeking to adapt to the reality of future population settings and experiences.

### Declaration of Competing Interest

We have nothing to declare.

### Data availability

No data was used for the research described in the article.

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