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Integrating virtual realities and psychotherapy: SWOT analysis on VR and MR based treatments of anxiety and stress-related disorders

Lichen Ma[a*], Sonia Mor[b], Page L. Anderson[c], Rosa M. Baños[d,e], Cristina Botella[b,e], Stephane Bouchard[f], Georgina Cárdenas-López[g], Tara Donker[h,i], Javier Fernández-Álvarez[b,j], Philip Lindner[k], Andreas Mühlberger[l], Mark B. Powers[m], Soledad Quero[b,e], Barbara Rothbaum[n], Brenda K. Wiederhold[o] and Per Carlbring[a]

[a]Department of Psychology, Stockholm University, Stockholm, Sweden; [b]Department of Basic and Clinical Psychology and Psychobiology, Universitat Jaume I, Castellón, Spain; [c]Department of Psychology, Georgia State University, Atlanta, USA; [d]Department of Personality, Evaluation and Psychological Treatment, Universitat de València, Valencia, Spain; [e]Instituto Salud Carlos III, Madrid, Spain; [f]Department of Psychoeducation and Psychology, Université du Québec en Outaouais, Gatineau, Canada; [g]School of Psychology, Universidad Nacional Autónoma De México, Mexico City, Mexico; [h]Department of Clinical Psychology, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands; [i]Albert-LudwigsUniversität Freiburg, Freiburg, Germany; [j]Department of Psychology, Università Cattolica del Sacro Cuore, Milan, Italy; [k]Centre for Psychiatry Research, Karolinska Institutet & Stockholm Healthcare Services, Sweden; [l]Department of Psychology, Universität Regensburg, Regensburg, Germany; [m]Baylor University Medical Center, Dallas, USA; [n]Department of Psychiatry and Behavioral Sciences, Emory University, Atlanta, USA; [o]Virtual Reality Medical Institute, Brussels, Belgium

ABSTRACT

The use of virtual reality (VR) and mixed reality (MR) technology in clinical psychology is growing. Efficacious VR-based treatments for a variety of disorders have been developed. However, the field of technology-assisted psychotherapy is constantly changing with the advancement in technology. Factors such as interdisciplinary collaboration, consumer familiarity and adoption of VR products, and progress in clinical science all need to be taken into consideration when integrating virtual technologies into psychotherapies. We aim to present an overview of current expert opinions on the use of virtual technologies in the treatment of anxiety and stress-related disorders. An anonymous survey was distributed to a select group of researchers and clinicians, using an analytic framework known as Strengths, Weaknesses, Opportunities, and Threats (SWOT). Overall, the respondents had an optimistic outlook regarding the current use as well as future development and implementation of technology-assisted interventions. VR and MR psychotherapies offer distinct advantages that can overcome shortcomings associated with traditional therapy. The respondents acknowledged and discussed current limitations of VR and

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CONTACT Lichen Ma lichen.ma@psychology.su.se Department of Psychology, Stockholm University, Stockholm 106 91, Sweden

*With the exception of the first, second, and last author, authorship is listed in alphabetical order.

MR psychotherapies. They recommended consolidation of existing knowledge and encouraged standardisation in both theory and practice. Continued research is needed to leverage the strengths of VR and MR to develop better treatments.

Abbreviations: AR: Augmented Reality; MR: Mixed Reality; RCT: Randomised Controlled Trial; SWOT: Strengths, Weaknesses, Opportunities, and Threats; VR: Virtual Reality; VR-EBT: Virtual Reality Exposure-Based Therapy

Introduction

Nearly a decade ago, seventy mental health experts were asked to predict the trends in psychotherapy in the coming decade (Norcross et al., 2013). Out of the 45 interventions surveyed, "Use of virtual reality" was ranked the fourth most likely to increase in use. Virtual reality (VR) is defined as a computer-generated, three-dimensional synthetic environment that the user can immerse in and interact with (Riva, 2005). VR technologies offer exciting new possibilities for the treatment of psychological disorders, primarily because of their ability to generate any environment or stimuli imaginable (Baus & Bouchard, 2014). Combining elements of the virtual world and the real world can create a mixed reality (MR). For instance, augmented reality (AR) is a subset of MR, where the background environment is physical, with certain virtual elements projected or merged into view (Baus & Bouchard, 2014; Milgram & Kishino, 1994). For the purpose of discussion in the current paper, the term VR refers to environments and stimuli that are entirely artificially constructed. The term AR refers specifically to the projection of virtual elements into real world environments. The term MR encompasses any degree of mixing of real and virtual elements, inclusive of AR and other forms of combination (e.g. presenting real world images inside a virtual environment).

One example of the successful integration of VR technology and psychotherapy is virtual reality exposure-based therapy (VR-EBT; also popularly known as VRET). VR-EBT has been used to treat a diverse range of specific phobias such as fear of spiders (Miloff et al., 2016), height (Emmelkamp et al., 2002; Rothbaum et al., 1995), driving (Wiederhold & Bouchard, 2014), and flying (Rothbaum et al., 2006; Wiederhold & Wiederhold, 2003). Other anxiety disorders successfully treated using VR-EBT include social anxiety disorder (Anderson et al., 2013), post-traumatic stress disorder (Botella et al., 2015; Cárdenas-López et al., 2013; McLay et al., 2011), and panic disorder (Botella et al., 2007). Meta-analyses have shown that VR-EBT is as effective as in vivo exposure-based therapy for the majority of these disorders (Carl et al., 2019; Kothgassner et al., 2019; Opriş et al., 2012; Wechsler et al., 2019). Some common limitations associated with in vivo exposures can be addressed or minimised by the use of VR technology, notably the need for logistic planning (i.e. time and location), accessibility and controllability of the environment/stimuli, and anonymity/confidentiality of the patient (Maples-Keller et al., 2017; Neudeck & Einsle, 2012). In fact, both patients and clinicians have criticised in vivo exposure as ethically inappropriate (Deacon & Farrell, 2013; Olatunji et al., 2009), and surveys indicate that VR-EBT is more likely to be accepted by patients compared to traditional exposure (Garcia-Palacios et al., 2007). Besides exposure-based therapy, other

forms of VR psychotherapies have been used in areas such as adjustment disorder (Quero, Molés et al., 2019; Quero, Rachyla et al., 2019), eating disorders (Riva et al., 2016), pain management (Kipping et al., 2012; Wiederhold, 2012), psychosis (Freeman et al., 2016), addictive disorders (Segawa et al., 2020), and neurological rehabilitation (Cuthbert et al., 2014).

Although not as commonly used as VR, mixed reality has its own advantages. For instance, augmented reality simultaneously preserves the realism of physical environments, and offers flexible presentation of virtual stimuli. This allows the patient to interact with the feared stimuli in realistic and natural settings, increasing the ecological validity of the therapeutic process (Baus & Bouchard, 2014). Studies suggest that AR-based exposure therapies can be as effective as VR-EBT or in vivo exposure (Suso-Ribera et al., 2019), and AR therapies have been successfully used to treat phobias in both single-case studies (Wrzesien et al., 2015) as well as randomised controlled trials (RCTs) (Botella et al., 2016).

The landscape of VR and MR is changing rapidly. The quality and realism of virtual environments are getting better with each generation of technology. The selection of consumer products is growing. Integration into devices such as personal computers and smartphones further increase the availability and accessibility of VR and MR in everyday life. All the while the cost of equipment is becoming more affordable. All these factors could benefit the development and implementation of VR and MR psychotherapies (Miloff et al., 2016). Nevertheless, it is important to acknowledge that limitations exist in both clinical research and practice, which may hinder the propagation and widespread use of technology-assisted psychotherapies (Mishkind et al., 2017; Page & Coxon, 2016).

This paper aims to explore the current state of VR and MR technology use in the treatment of anxiety and stress-related disorders. For this purpose, a survey was administered to selected experts who work with VR and MR psychotherapies. Their opinions on what factors could promote or hinder the effective use, development, and implementation of technology-assisted psychotherapies are synthesised and discussed. We hope that this paper can update existing information regarding the use of VR and MR in clinical psychology, and provide recommendations for how to develop and implement such therapies in the future.

Method

A group of researchers were invited to share their thoughts on the current state of VR and MR technology use in the treatment of anxiety and stress-related disorders. The group was conveniently sampled due to their extensive knowledge and experience in the application of VR and MR psychotherapies (in clinics and/or research projects). Fourteen respondents were invited to participate, and all respondents accepted. The group consisted of eight women and six men, with four from the United States, three from Spain, two from Sweden, and one each from Canada, Germany, Italy, Mexico, and the Netherlands. This study did not involve any intervention, patient data or personal information, thus no independent ethical review was warranted.

To facilitate discussion in a practice-oriented manner, the survey was constructed following the analytical framework known as Strengths, Weaknesses, Opportunities, and Threats (SWOT). SWOT is an effective tool for situation analysis and strategic planning (Gürel, 2017), taking both internal (strengths and weaknesses) and external

(opportunities and threats) factors into consideration. SWOT evaluates favourable and unfavourable variables, and contextualises these variables in the development and implementation of projects. SWOT analysis helps to identify ways that strengths can be leveraged to create opportunities, and how weaknesses can be overcome to minimise threats (Helms & Nixon, 2010). This method is easy to use, and the practice-oriented nature makes it well-suited to highlight information relevant to the development and implementation of VR and MR psychotherapies. The SWOT framework has been successfully employed to evaluate other practices in clinical psychology (Rizzo & Kim, 2005; Rozental et al., 2014).

An online survey was sent to the respondents, using the guidelines in SWOT to facilitate discussion (see Appendix). The survey was anonymous in order to prevent social inhibition and risk of conformity. Once the survey was completed by all respondents, the answers were compiled and sent out again to all respondents so they could discuss and comment on each other's views (anonymously). After the second round of comments, the responses were examined to identify recurring themes and summarized in a final draft, which was checked by the respondents before being submitted for potential publication. Respondents were free to add any information at any stage of this process, or make revisions in relation to previous statements. The outcome of this analysis is presented below.

Results

Strengths

Adaptability

One of the core advantages of VR is the possibility to simulate any stimuli inside the virtual environment, even those that are difficult or impossible to access in real life. This means that VR and MR therapies can be adapted to treat a wide range of psychological disorders. Since virtual environments are not bound to physical locations, treatments can be delivered to populations residing in remote areas with little access to mental health care. As VR technology becomes more commonplace and affordable, VR and MR treatments can potentially be more economical compared to seeing a therapist face to face, especially for exposures to situations such as flying.

Control

Virtual reality technology allows for the precise control over everything that occurs inside the virtual environment, such as what stimuli the patient encounters, the exact properties of the stimuli (valence, intensity, frequency, and duration), and the conditions of stimuli onset/removal (e.g. timing; behavioural triggers etc.). This makes it possible to tailor the treatment to meet the therapeutic needs of individual patients (Baños et al., 2009). Under these controlled conditions, the patient can progress through the treatment safely and gradually without being exposed to scenarios that they are not yet ready to tolerate. This gives the patient a sense of control, and can potentially increase their self-efficacy (Boeldt et al., 2019; Riva, 2005). Confidentiality is better protected as the treatment can take place in a private space. The increased sense of control, security, and confidentiality make virtual treatments more acceptable for some patients compared to in vivo exposure (Guillén et al., 2018; Quero et al., 2014). Furthermore, automated therapy procedures result in standardised treatments

that are consistent in quality and delivery, which cannot be guaranteed in traditional settings. In terms of scientific research, standardisation of therapy procedures facilitates systematic measurement and quantification of clinical outcomes, which makes it easier to identify mechanisms of change and maximise effective therapeutic elements (Botella et al., 2017). The methodological control is particularly useful in testing drug effects (Ressler et al., 2004).

Ecological validity

Several tools and strategies can be used in psychotherapy to work with stressed or anxious patients, from role playing job interviews to watching videos. However, these tools often fail to encapsulate the richness and complexity of real-life situations. VR provides contexts that can be more ecologically valid and representative of real-world settings and contexts. The immersive nature of VR and MR induces a stronger sense of presence than traditional media such as desktop computers. Presence refers to the feeling of "being there" inside the virtual world when the user is not physically there (Milgram & Kishino, 1994). High levels of presence have been found to positively associate with task performance, enjoyment, flow, and motivation (Lombard & Ditton, 1997; Price & Anderson, 2007; Sanchez-Vives & Slater, 2005; Witmer & Singer, 1998). The concept of presence is especially relevant to the application of VR in psychotherapy (Diemer et al., 2015; Oh et al., 2018). Treatments such as exposure-based therapy often trigger anxiety to achieve therapeutic goals. A strong sense of presence ensures that the experiences and responses generated in the virtual environment are as similar to those from the real world as possible (Sanchez-Vives & Slater, 2005). AR technology can potentially achieve even higher ecological validity since the patient can interact with the virtual stimulus while remaining in the physical world (Baus & Bouchard, 2014).

Efficacy

Technology-assisted psychotherapies can be highly efficacious. VR-EBT is regarded as an effective treatment option for specific phobias and anxiety disorders in its own right. The high adaptability of virtual environments is well suited for exposure-based therapy. A growing body of literature has shown that VR-EBT is superior to wait-list control and exposure by imagination, and can be as effective as the "gold standard"—namely in vivo exposure (Carl et al., 2019; Emmelkamp et al., 2020; Wechsler et al., 2019). The legitimacy of VR based therapies is also reflected by the increasingly positive attitudes that clinicians have towards the use of VR technology in the treatment of anxiety disorders (Lindner, Miloff, Zetterlund et al., 2019). The development of other MR treatments is at a relatively early stage, thus warrants further investigation. Currently, the majority of studies comparing the efficacy of VR-EBT and in vivo therapies have applied exposure in the same way as in vivo therapy. However, exposure could be conducted in VR in ways that enhances effectiveness, such as by increasing the variety of exposure contexts, by augmenting exposure with fear antagonistic actions, or by maximising inhibitory learning.

Weaknesses

Practical weaknesses

Although respondents were optimistic about the future of VR and MR therapies, there is a consensus that currently these treatments remain relatively inaccessible in general clinical practices. VR technologies are increasing in popularity, but are not yet an average household device. The investment needed to build basic infrastructure for treatment in the clinic can be prohibitively expensive, let alone scaling for mass dissemination. The rapid evolution of the VR technology landscape increases the risk of hardware quickly becoming obsolete. The scarcity of readily available, empirically validated treatment protocols or virtual environments means that VR programmes need to be designed from scratch, further increasing the development cost. Furthermore, there are relatively few standardised training courses available, so clinicians lack proper channels to learn about VR and MR psychotherapies even if they show interest. Many of these practical barriers can be overcome as consumer versions of VR technology become increasingly affordable and accessible (Donker et al., 2019; Lindner, Miloff, Hamilton et al., 2019; Wiederhold & Riva, 2019).

Clinical and theoretical weaknesses

The potentials of VR and MR therapies are well recognised, as evidenced by the fast proliferation of research on the topic in recent years. However, despite the promising results from many RCTs, the majority of these studies were conducted within an academic context. Different research groups have developed separate treatment protocols and virtual environments. This lack of standardisation makes it difficult to compare studies. It also complicates decision-making for clinicians who want to try out these treatments. Most of the research focus has been on symptom reduction, but research on the mechanisms of action remain relatively scarce. For instance, concepts such as sense of presence seem to play an important role in successful VR-EBTs (Lombard & Ditton, 1997; Price & Anderson, 2007), but it is not routinely measured in clinical studies. The commonly used term "exposure therapy" can also be misleading. It overemphasises a single (albeit important) component of a complex and dynamic therapeutic process. Studies have showed that the main predictors of treatment outcome in exposure-based therapies are the reduction in the strength of dysfunctional beliefs and the increase in self-efficacy (Côté & Bouchard, 2009; Tardif et al., 2019)

The interplay between technology and treatment also warrants careful examination. The use of a headset during therapy may create a barrier between the therapist and the patient, potentially affecting the development of therapeutic alliance (Meyerbröker & Emmelkamp, 2008), although this concern has been addressed in previous research (Ngai et al., 2015). The quality of the virtual environment, and the use of virtual avatars can affect sense of presence and immersion (Schwind et al., 2017), which in turn can influence therapeutic outcome. Automated treatments without direct therapist supervision might require the use of artificial intelligence to guide and interact with the patient during therapy sessions. If the algorithms are too rudimentary, the resultant simplistic interaction between the patient and the environment could reduce immersion and engagement. In order to overcome the clinical and theoretical shortcomings of virtual

psychotherapies, we need further research to better elucidate their mechanisms of action. Quality RCTs in clinical settings are needed to validate treatment effectiveness. Standardisation of programs and procedures can facilitate the routine use of VR and MR based psychotherapies.

Opportunities

Technological advancements

VR and MR technologies are advancing at a rapid speed. Technological advancements increase the quality of the virtual environment and stimuli. Lower equipment cost and higher market penetration of commercial products can increase the accessibility and reach of virtual therapies. Development in multisensory integration means that VR is no longer restricted to visuospatial stimuli only. Integrated multisensory virtual environments can further enhance realism and immersiveness (Chau et al., 2017). Combining VR and other technologies can potentially improve the treatment experience. For instance, better artificial intelligence algorithms allow for the virtual environments to appropriately respond to participants' behaviours (Dingli & Bondin, 2019). Integrating biosensors can provide physiological data, which can be correlated to behavioural and self-reported measures to provide a more comprehensive understanding of treatment effects (Kritikos et al., 2019). Biofeedback can also be utilised as a complementary psychophysiological intervention. Introducing gamification elements to virtual therapies could also promote treatment engagement and adherence (Nixon & Howard, 2013). In these cases, it is important that gamification is designed in a way to minimise the risks of fostering avoidance. In other words, it should serve as a motivator to increase task engagement, but not distract the patient from learning that feared stimuli are not threatening (Hoffman & Chu, 2019).

Clinical opportunities

The high adaptability of virtual treatments means that a centralised platform (e.g. a virtual clinic) can provide care for a range of different disorders concurrently. The highly flexible nature of virtual environments enables certain therapeutic strategies, such as introducing variable contexts and stimuli to maximise benefits from exposure (Baños et al., 2009; Shiban et al., 2015). Fully automated, technology-assisted treatments can be self-administered at home (Donker et al., 2019). The privacy and confidentiality that virtual treatments provide make them more acceptable to individuals who are reluctant to seek help from traditional therapy (Deacon & Farrell, 2013; Neudeck & Einsle, 2012). In light of the success of VR-EBT, researchers are branching out to explore how VR and MR can be applied to other forms of treatments. For instance, VR-based cognitive interventions have been considered to treat depression (Lindner, Hamilton et al., 2019). Beyond treatment, VR technologies have also been incorporated into preventative or rehabilitative interventions. Examples include VR-based mindfulness training for spinal injury (Flores et al., 2018); social cognition training for autism (Manju et al., 2018); stress inoculation training for first responders and other occupations at high risk of burnout (Gaggioli et al., 2014); and aggression prevention training for patients with psychiatric disorders (Klein Tuente et al., 2018).

Threats

Quality assurance

The development of effective virtual therapies relies on the interdisciplinary integration of the theoretical knowledge from academia, the technological know-how from industries, and the appropriate implementation from clinicians (Boeldt et al., 2019). However, while academics and clinicians aim to develop the most effective treatments, companies often focus more on the business aspects of product development and consumption. Adding to this divergence of interest, there is also a stark contrast between the speed at which technologies are developing and the time it requires to conduct high-quality, evidence-based clinical research. Therefore, one major threat to VR and MR psychotherapies is quality assurance. For instance, currently there is little regulation and standardisation surrounding the development and dissemination of mobile applications that purportedly ameliorate symptoms of various disorders. The effectiveness of these applications is often not backed by empirical evidence (Portelli & Eldred, 2016). Not only do these products deliver little to no therapeutic effect, they can potentially be harmful when used inappropriately. The negative reputation generated by these pseudoscientific applications can hinder the implementation of legitimate, evidence-based virtual treatments.

Barriers to implementation

As stated above, the development of an effective treatment involves extensive research, an interdisciplinary development process that translates theory into practice, and an effective implementation strategy that maximises treatment efficacy. All of these crucial steps can drive up the costs associated with VR and MR psychotherapies, making them less competitive or economically infeasible. Putting aside the cost associated with research and development, implementing virtual treatment necessitates a minimum infrastructure investment (i.e. the hardware), which may prove to be a barrier depending on the affordability of the technology used. Furthermore, clinician-administered treatments would require therapist training and education to adopt VR technology into routine care. As a result, clinician attitude and competence regarding technology could impact the successful implementation of virtual treatments (Becker & Jensen-Doss, 2013; Lindner et al., 2020).

Side effects

The potential side effects associated with novel technologies can pose a threat to treatments utilising VR or MR tools. There are ongoing debates regarding whether certain VR technologies can evoke side effects that make them unsuitable for certain populations. For instance, concerns about VR induced motion sickness (Kim et al., 2018) or photosensitive seizures (Tychsen & Thio, 2020) warrant comprehensive research to assess the risks associated with VR-based therapies. Technological optimisation to improve the synchronisation of user movement and visuospatial cues from the VR environment can potentially reduce VR intolerance. Standardised safety and hygiene protocols (Bouchard et al., 2012) are needed to minimise the likelihood of exposing patients to negative side effects induced by VR technology, or health risks associated with sharing equipment.

Discussion

The aim of this study was to explore the use of virtual technology in the treatment of anxiety and stress-related disorders. A group of experts in this field provided their opinions on the strengths and weaknesses associated with existing VR and MR psychotherapies. Obstacles and challenges that might arise in the development and implementation of future virtual therapies were identified and discussed.

All experts included in this study agreed that VR and MR technologies have become a valuable tool for clinical psychology. Efficacious treatments for a variety of disorders have been demonstrated using virtual treatments such as VR-EBT. VR and MR therapies can overcome some fundamental limitations associated with in vivo exposure, notably the accessibility and controllability of the environment and stimuli, and the high expense associated with extended sessions. VR technologies can ensure a portable, controllable, and consistent therapeutic environment, be it in the clinic, hospital, or home setting (Lindner, Miloff, Fagernäs et al., 2019). Integration of VR and MR into common digital devices such as smartphones can result in widespread dissemination of virtual therapies (Fairburn & Patel, 2017), reaching those who lack access to traditional face-to-face interventions. Furthermore, the extensive control offered by virtual technologies can help implement and deliver the therapy using recommended techniques (Craske et al., 2014) in a consistent manner, maximising the effect of treatment.

From a methodological perspective, the extensive control over the virtual environment or stimuli can be an important asset in elucidating therapeutic mechanisms. Researchers can systematically vary elements in the virtual environment to assess their impact on outcome (Shiban et al., 2013). Standardised delivery of stimuli also minimises noise from environmental confounds (Rothbaum, 2009). Unfortunately, the current reality is that standardisation is lacking, both in terms of VR development as well as in treatment protocols. This makes direct comparisons between studies difficult, since different labs may have used different VR hardware, software, or therapeutic procedures. Moreover, the majority of research on the efficacy of VR and MR therapies have been conducted in an academic context. As a result, the effectiveness of VR and MR psychotherapies in natural settings is still unclear, which contributes to clinicians' reluctance in adopting such novel treatments in their routine practice (Becker & Jensen-Doss, 2013). Luckily, some studies are introducing virtual therapies in primary care or at-home settings with promising results (Donker et al., 2019; Navarro-Haro et al., 2019).

The high cost of novel technology, especially high-end VR equipment, is often a barrier to the development and implementation of virtual therapies. However, as VR and MR technologies continue to mature and proliferate, simpler and more immersive systems are being offered at a much lower price (Valmaggia et al., 2016; Wiederhold & Riva, 2019). The affordability of virtual technologies is a double-edged sword, and presents itself as both an opportunity and a threat to virtual therapies. On the positive side, cheaper hardware promotes accessibility and usage, which means broader coverage of people who may benefit from virtual therapies. On the negative side, this also creates economic incentives to develop products that appeal to the masses, potentially leading to the dissemination of "treatments" that are not evidence-based nor effective (Chandrashekar, 2018; Portelli & Eldred, 2016).

In sum, the experts expressed their overall optimistic outlook regarding the future development and implementation of VR and MR psychotherapies. The unique strengths offered by VR and MR technologies can be leveraged to address limitations associated with traditional therapies. The advancement in technology is expected to eliminate some of the existing problems that virtual therapies face, but also create opportunities for better, more sophisticated treatments. Our experts acknowledged the weaknesses that VR and MR therapies currently suffer. They alluded to how these weaknesses could become potential threats, and cautioned against interventions that are not evidence-based. They recommended consolidation of existing knowledge surrounding VR and MR therapies, and encouraged standardisation both in theory and practice.

Several limitations need to be considered. Firstly, the number of experts included was relatively small, meaning that the results presented were limited in scope and some important aspects may not have been discussed. Secondly, although geographical aspects were considered at the time of respondent selection, all experts reside in Europe or North America. Therefore, cultural diversity in perspectives was missing in the results. It is not well understood whether behavioural responses to VR are uniform across cultures (Gorini et al., 2009; Qu et al., 2013). Differing cultural norms and socioeconomic realities can also impact opinions on the feasibility of VR and MR psychotherapies. Given the increasing number of RCTs carried out in regions such as Asia (Ali et al., 2019), a more geographically diverse sample of experts could provide valuable insights on these issues. Thirdly, all respondents have experience working with VR and MR psychotherapies. This convenient sample ensured extensive knowledge of the topic, but may have introduced biases in the results. We acknowledge the importance of addressing ethical concerns stemming from the use of novel technologies, especially in areas such as the long-term effects associated with VR usage, its effects on children's development, and its regulation (Kenwright, 2018). Lastly, the responses were not coded or analysed using systematic qualitative methodology (e.g. thematic analysis). The analysis was summarising in nature, designed to combine and consolidate opinions from different respondents. Furthermore, there was overlap in the respondents' answers to the positive categories (strengths and opportunities) and negative categories (weaknesses and threats), indicating unclear delineation between internal and external factors.

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Declarations of Interest

SB is president of, and own shares in, Cliniques et Developpement In Virtuo, a company that distributes virtual environments, and potential conflict of interest are managed under UQO's conflict of interest policy.

TD has co-developed the VR application ZeroPhobia, which is intended for commercial release.

PL has received consulting fees from Mimerse but holds no financial stake in the company.

AM is a stakeholder of a commercial company that develops and sells virtual environment research systems.

BR receives royalties from Oxford University Press, Guilford, APPI, and Emory University and received advisory board payments from Genentech, Jazz Pharmaceuticals, Nobilis Therapeutics, Sophren, Neuronetics, and Aptinyx. BR is a consultant to and owns equity in Virtually Better, Inc. that creates virtual environments. The terms of these arrangements have been reviewed and approved by Emory University in accordance with its conflict of interest policies.

PC is an unpaid member of the scientific advisory board of PsycReality.

ORCID

Lichen Ma https://orcid.org/0000-0003-3817-2572
Sonia Mor https://orcid.org/0000-0001-9182-2613
Page L. Anderson https://orcid.org/0000-0002-3811-9088
Rosa M. Baños https://orcid.org/0000-0003-0626-7665
Cristina Botella https://orcid.org/0000-0001-8783-6959
Stephane Bouchard https://orcid.org/0000-0002-5995-340X
Georgina Cárdenas-López https://orcid.org/0000-0003-4569-1944
Tara Donker https://orcid.org/0000-0002-7470-8234
Javier Fernández-Álvarez https://orcid.org/0000-0002-2516-8809
Philip Lindner https://orcid.org/0000-0002-3061-501X
Andreas Mühlberger https://orcid.org/0000-0002-8352-0946
Mark B. Powers https://orcid.org/0000-0001-7898-073X
Soledad Quero https://orcid.org/0000-0002-8973-1250
Barbara Rothbaum https://orcid.org/0000-0002-8793-7124
Brenda K. Wiederhold https://orcid.org/0000-0002-3320-0303
Per Carlbring https://orcid.org/0000-0002-2172-8813

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Appendix

Survey

Write your response to the following questions about what we are currently doing well with regard to using mixed realities in the treatment of anxiety and stress-related disorders, what could we improve upon, what opportunities exist that may help in future challenges, and what threats can be identified that might limit or prevent this particular line of intervention. You can be as brief or elaborate as you wish, and you are free to discuss research findings as well as your own theoretical opinions and clinical and methodological experiences.

1. Strengths: What are the advantages of using mixed realities in the clinical field? What are the advantages of using mixed realities in the treatment of anxiety disorders and stress-related disorders? How does the treatment of these disorders benefit from its use? What are we doing well in terms of using mixed realities in the treatment of anxiety disorders and stress-related disorders? How is it helpful for the patient and the therapist? What are the issues, events, or trends that positively impact the field right now (e.g. at a societal level, at an institutional level, or at a disciplinary level)?

2. Weaknesses: What are the current problems and what could we improve in the use of mixed realities for the treatment of anxiety and stress-related disorders? What are we doing poorly in terms of using mixed realities in the treatment of anxiety and stress-related disorders? What factors might be seen as limitations? Is there anything we are missing in our treatment, research, or implementation in this field? What are the issues, events, or trends that negatively impact the field right now (e.g. at a societal level, at an institutional level, or at a disciplinary level)?

3. Opportunities: What opportunities are currently available when using mixed realities within the anxiety and stress-related disorders field? What trends could we take advantage of? Are there any identified strengths that we could turn into opportunities? What is the main opportunity for

this field right now? And in the future? Opportunities can refer to needs that are not yet addressed or must be acted upon.

4. Threats: What threats could limit or become an obstacle to research, treatment, and/or implementation of using mixed realities to treat anxiety and stress-related disorders? Are there any identified weaknesses that might become threats? What is the main threat to this field right now? And in the future?

5. Additional question: Anything you would like to add and/or clarify?