



HAL
open science

Virtual Reality (VR) in Forensic Psychology: Interests and issues in Research and Practice

Luca Tiberi, Xavier Saloppé, Thierry H. Pham

► **To cite this version:**

Luca Tiberi, Xavier Saloppé, Thierry H. Pham. Virtual Reality (VR) in Forensic Psychology: Interests and issues in Research and Practice. 20th Annual Conference of the International Association of Forensic Mental Health Services (IAFMHS), Jun 2021, Virtual Conference, France. hal-04302637

HAL Id: hal-04302637

<https://hal.univ-lille.fr/hal-04302637>

Submitted on 22 Jan 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Virtual Reality (VR) in Forensic Psychology: Interests and issues in Research and Practice

Tiberi L.A.¹, Saloppé, X.^{2,3,4}, & Pham, T.H.^{1,2,5}

¹Forensic Psychology Department, University of Mons (UMONS), Belgium
²Center of Research in Social Defense (CRDS), Belgium
³Univ. Lille, CNRS, UMR 9193 - SCALab - Sciences Cognitives et Sciences Affectives, F-59000 Lille, France
⁴Service de Psychiatrie, Hôpital de Saint-Amand-les-Eaux, France
⁵Philippe Pinel Institute, Canada

Contact : luca.tiberi@umons.ac.be

VR in mental health

Although there is not a standardized nor consensual definition of VR (Kardon-Edgren et al., 2019), the most common conceptualisation involves the use of computer to create a 3D interactive environment in which the patient acts with consequences, providing a sense of reality close to real world (Lopreiato et al., 2016). In contrast to life, all aspects of this interactive environment and the constituent objects are under the control of practitioners or researchers. However, this new technology lacks an integrated conceptual framework, thus challenging research (Benbouriche et al., 2016; Kardon-Edgren et al., 2019). The use of diverse methodologies hinders results comparisons. In order to overcome this issue, Cant et al. (2019) propose a typology based on **immersion**, one of three central characteristics of VR with **fidelity** and **patient depiction**. The three levels of immersion: low, moderate and high, depend on the presence of devices in real world. Thereby, the use of joystick, mouse or even communication of instructions from the experimenter is categorized as low immersion in contrast to head-mounted display, considered as high immersion.

The use of this technology in mental health has increased for the last decades (Bogossian et al., 2017; Srivastava et al., 2014). It has been considered as an efficient approach for psychological treatments of anxiety disorders, schizophrenia or alcohol dependence (Fodor et al., 2018; du Sert et al., 2018; Eichenberg, 2011; Lidner et al., 2017; Trahan et al., 2019; Valmaggia et al., 2016).

Objective: Review literature concerning the interests and issues of VR in forensic psychology research and practice.

VR in forensic research and practice

The use of VR in forensic research is sparse, despite its utility for **diagnosis**, **risk assessment** and **therapy** (Fromberger et al., 2018).

Psychiatric **diagnoses** are still largely based on clinical interviews or on self-questionnaires (van Bennekom et al., 2017). Semi-structured interviews allow the in-depth investigation of diagnoses through a clinical relationship. However, they present the disadvantages of requiring a prior training (Lewis-Beck et al., 2004), and being sensitive to memory bias or to clinician's perception concerning the nature and severity of diagnosis (van Bennekom et al., 2017). Self-questionnaires present advantages: they are quick and convenient to administer, even in an expertise framework, and require less interpretation, few training, limited costs (Lewis-Beck et al., 2004). However, they should only be used when research objectives are simple and limited (Lewis-Beck et al., 2004). Moreover, clinical interviews and self-questionnaires are also limited by potential interviewees manipulation, social desirability and low ecological validity (van Bennekom, et al., 2017). In order to overcome these limitations, new methodologies are needed.

VR brings both ethical and practical benefits to **risk assessment**. On the ethical side, a major pitfall of inaccurate risk assessment stems from the superficial environments (prison, forensic hospital) in which the offender is evaluated (Fromberger et al., 2018). It would be unethical to confront a child sexual offender with a victim for the purpose of assessing its self-regulation abilities following a therapeutic program. But the use of VR allows us to assess abilities in close-to-real 3D environments without resorting to ethically questionable or even dangerous processes. On the practical side, VR also present the benefit of the variety of scenarii (Meyer et al. 2017). In combination with eye-tracking device, VR assesses realistic situations (Figure 1) without exposition to uncontrolled environment (Trottier et al., 2014). VR validates the assessment of paraphilic interests (Renaud et al., 2014), empathy (Figure 2; Hamilton-Giachritsis et al., 2018), or emotions decoding (Figure 3; Cigna et al., 2015; Seinfeld et al., 2018).

The controlled virtual environment also allows to investigate the criminogenic needs (e.g.: (sexual) self-regulation, offense supportive cognitions, interpersonal functioning) highlighted as main **therapeutic** focus (Ward et al., 2006). Furthermore, VR (Figure 4) better transposes skills developed in therapy to day-to-day life (Joyal, 2019). Additionally, it has been showed that patients improve their test scoring (e.g.: WSCT) after cognitive remediation sessions but fail to transpose it (e.g.: cognitive flexibility) to real situations. In comparison to classical therapy, the VR-based therapy has shown better ($g = .73-.88$) or equal ($g = -.007$) results for treatment of anxiety, depression, phobia or even schizophrenia (Carl et al., 2019; Fodor et al., 2018; Rus-Calafell et al., 2014; Wechsler et al., 2019). However, meta-analysis or systematic review concerning the clinical efficiency of VR is still missing.

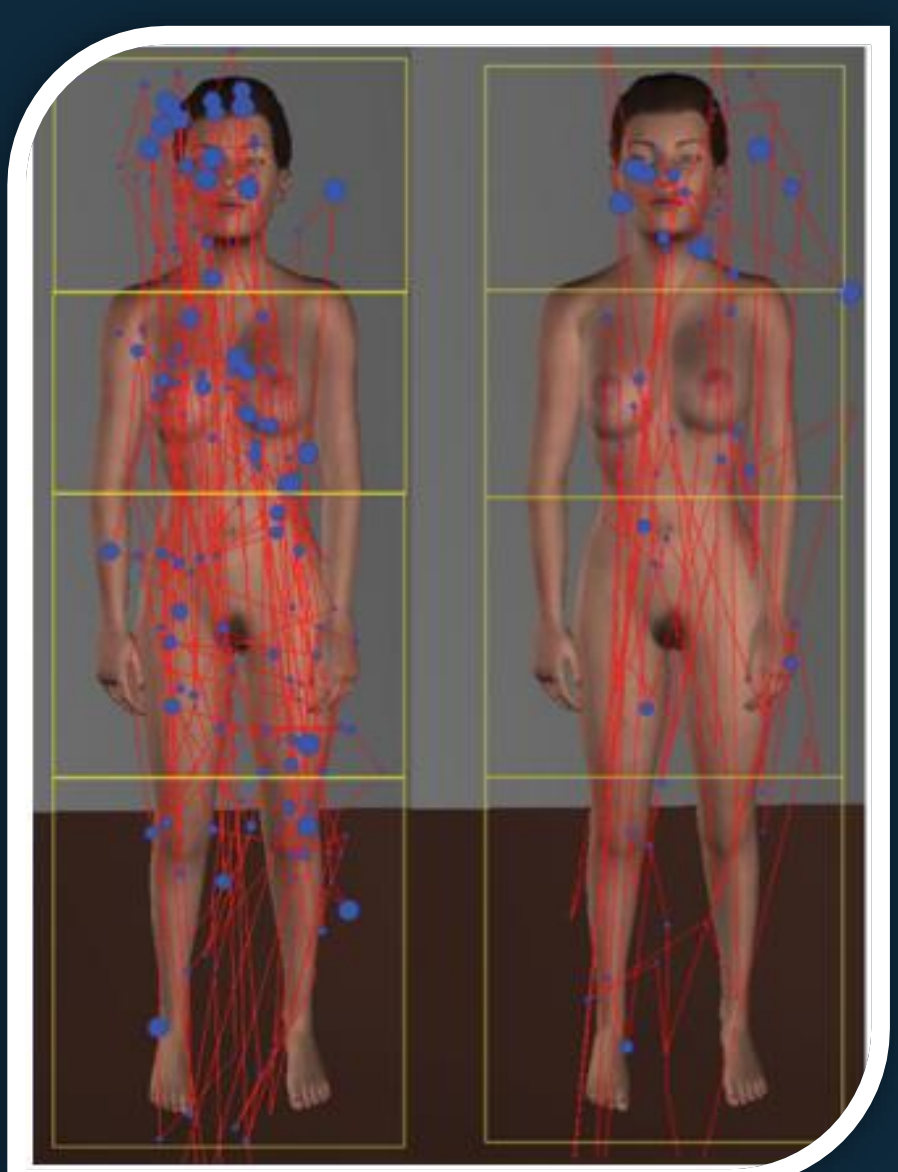


Figure 1 – Combined use of VR and eye-tracking (Trottier et al., 2014)



Figure 2 – VR use for empathy enhancing (Hamilton-Giachritsis et al., 2018)



Figure 3 – Emotion recognition 3D stimuli (Cigna et al., 2015)

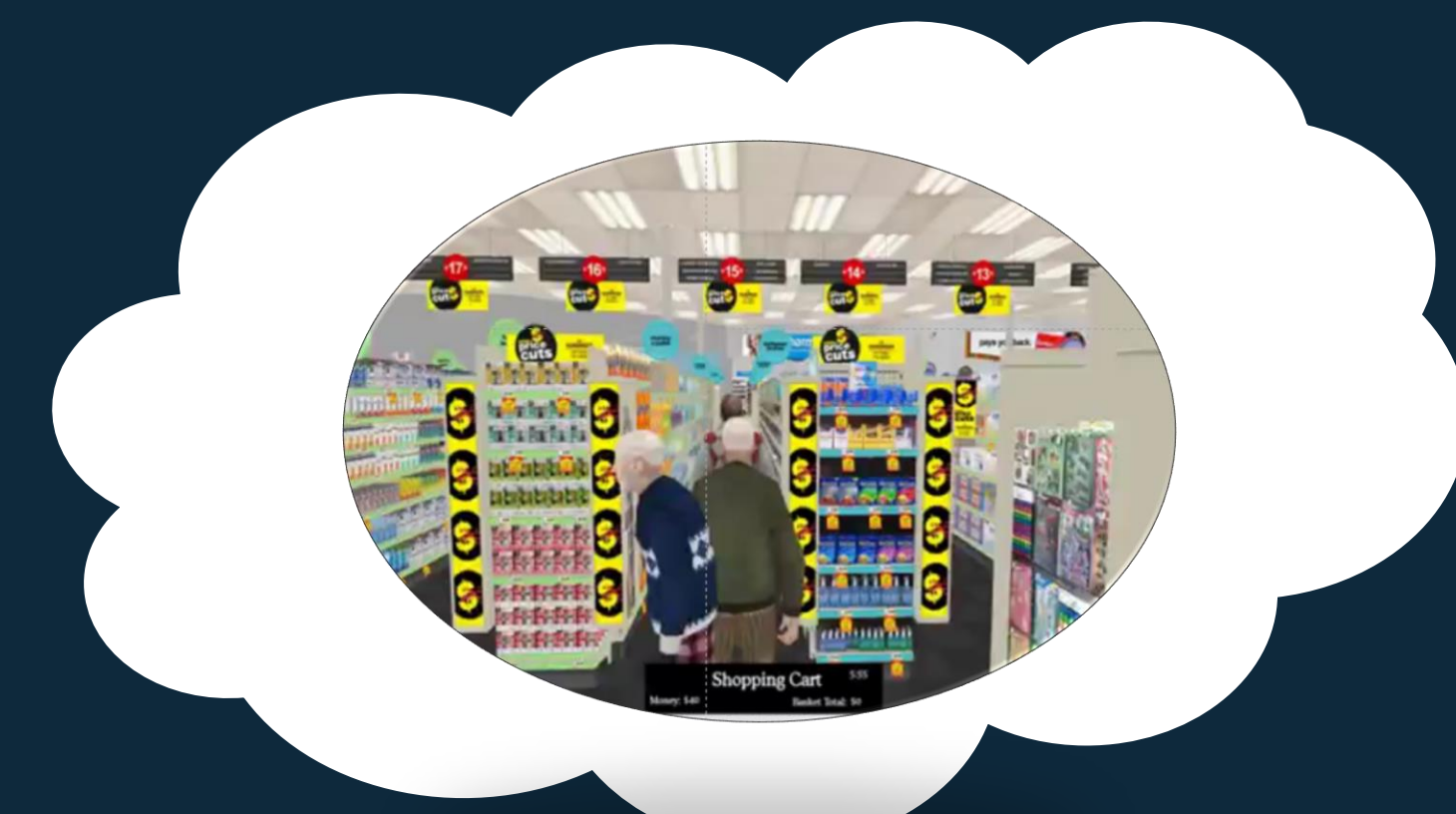


Figure 4 – Virtual shopping environment (Parsons, 2012)

- Low long-term cost of ownership
- Ecological validity
- Safety – Controllability of situation
- Mobile
- Ludic
- Automatic data collection
- Proximity to real environment
- Replicability of social situations
- Variety of scenarii – Adaptability to patients' profile and needs

- Initial investment
- Specific skills set and resources – Training, development of scenarii and environment
- Scenarii misuse
- Extensive data analysis
- Inadequacy to some populations
- Lack of standardized research framework
- Use of Augmented Reality (AR) as alternative

References

- Benoist, M., Rimey, P., Pellerin, J.P., & Du Loan, P. (2016). Applications de la réalité virtuelle en psychiatrie légale. *L'Encephale*, 42(6), 540-546. DOI:10.1016/j.encep.2016.12.001
- Bogossian, F., Cooper, S., Kelly, M., Smith-Jones, T., McDaniel, L., Smith, J., & Sison, M. (2017). Best practice in virtual simulation education – An evidence-based survey of simulation in Australian and New Zealand pre-registration nursing education. *Collegian*, 25(2), 327-334. DOI: 10.1016/j.colleg.2017.09.003
- Cant, R., Cooper, E., Smeets, K., & Bogossian, F. (2019). What's in a Name? Clarifying the Terminology of Virtual Simulation. *Clinical Simulation in Nursing*, 27, 26-30. DOI: 10.1016/j.cnsn.2018.11.003
- Carl, E., Chen, H., Lohr, C., A. Pappas, R., Hartman, D., Emswiler, J., & Emswiler, J. (2019). Virtual reality exposure therapy for anxiety and related disorders: A meta-analysis of randomized controlled trials. *Journal of Anxiety Disorders*, 61, 1-17. DOI: 10.1016/j.janxdis.2018.06.003
- Cigna, M.M., Quay, J.P., & Renaud, P. (2017). Psychiatric rates and their relation to face affect recognition. *Personality and Individual Differences*, 117, 210-216. DOI:10.1016/j.paid.2017.08.014
- Di Bari, C.P., Pavia, S., Izzo, G., De Santis, L., Lanza, M., Basso, G., Lanza, G., Pizzanelli, G., Cazzullo, C., Pizzarello, P., & Cazzullo, C. (2019). Virtual reality therapy for auditory verbal hallucinations in schizophrenia: A pilot clinical trial. *Schizophrenia Research*, 197, 178-181. DOI: 10.1016/j.schres.2018.02.021
- Eichenberg, C. (2011). Application of Virtual Reality in Psychotherapy: Possibilities, Limitations and Effectiveness. In J.J. Kim (Ed.), *Virtual Reality* (pp. 469-484). Rijeka (Croatia): InTech.
- Fodor, G., Cserny, C.S., Csizsar, P., Székely, S., Darda, G., & Csizsar, L.A. (2018). The effectiveness of virtual reality based interventions for symptoms of anxiety and depression: A meta-analysis. *Scientific Reports*, 8, 1-13. DOI: 10.1038/s41598-018-28113-4
- Fromberger, P., Jochim, K., & Miller, J. L. (2018). Virtual reality applications for diagnosis, risk assessment and therapy of child abuse. *Behavioral Science & the Law*, 36(2), 235-244. DOI: 10.1002/bsl.2332
- Hamilton-Giachritsis, C., Renaud, D., Garcia-Dominguez, M., Chouinard, C., & Smeets, K. (2018). Reducing risk and improving mental preparation and empathy using virtual environment. *Scientific Reports*, 8(1), 1-13. DOI:10.1038/s41598-018-21030-z
- Joyal, C.C. (2019, 30 September). Utilisation de la Réalité Virtuelle en neuro-psychologie expérimentale de l'Université de Moncton (UMON). Retrieved from <https://www.researchgate.net/publication/342111114>
- Kardon-Edgren, K., Fennell, S.L., Altier, G., & Mahoney, P. (2019). A Call to Action: The Importance of Virtual Reality. *Clinical Simulation in Nursing*, 31, 28-36. DOI: 10.1016/j.cnsn.2019.02.006
- Lewis-Beck, M.S., Byrnes, A., & Filling-Lima, T. (2004). The SAGE Encyclopedia of Social Science Research Methods. California (USA): SAGE Publications.
- Lidner, D., Meyer, A., Hartmann, V., Kowalski, L., Anderson, C., Pappas, R., & Sison, M. (2018). Creating a sense of the self: The potential of virtual reality exposure therapy for mental health research and training. *Journal of Virtual Reality and Teleoperators*, 1(1), 1-10. DOI: 10.1016/j.jvrt.2018.01.001
- Meyer, S., Fromberger, P., Jochim, K., & Miller, J. L. (2017). Verbalisierungs- und Kognitionstraining durch VR-gestützte Gedächtnisübungen: Ein Pilotstudie zur Validierung von VR-gestützten Kognitionstraining-Übungen. *Zeitschrift für Psychiatrie und Psychotherapie*, 63(1), 39-47. DOI:10.1007/s00127-016-0229-8
- Rus-Calafell, M., Gilman-Martinez, J., & Roca-Sabat, J. (2014). A virtual reality-based program for improving social skills in patients with schizophrenia: A pilot study. *Journal of Behavioral Therapy and Experimental Psychology*, 45(1), 81-89. DOI:10.1016/j.jbtep.2013.09.002
- Seinfeld, S., Fromberger, P., Benbouriche, G., Renaud, P., Smeets, K., & Sison, M. (2018). Effects of virtual reality on the social skills of patients with schizophrenia: A pilot study. *Journal of Behavioral Therapy and Experimental Psychology*, 58(1), 1-10. DOI: 10.1016/j.jbtep.2017.09.002
- Shimamura, K., Dai, R.C., & Chaudhury, S. (2014). Virtual reality applications in mental health: Challenges and perspectives. *International Psychology Journal*, 23(2), 83-88. DOI: 10.4103/0272-8748.131666
- Trottier, D., Renaud, P., Smeets, K., & Sison, M. (2018). Virtual Reality Exposure Therapy for Anxiety and Phobia: A Systematic Review. *Research on Social Work Practice*, 28(1), 1-10. DOI:10.1177/10497315177082073
- Trottier, D., Renaud, P., Smeets, K., & Sison, M. (2018). Using Eye Tracking to Identify Faking Attempts During Penile Plethysmography Assessment. *The Journal of Sex Research*, 55(1), 86-95. DOI:10.1080/00220091.2017.1321333
- Valmaggia, L., Lee, J., Kwon, P., & Sison, M. (2016). Virtual reality in the psychological treatment of mental health problems: An evidence-based review of current evidence. *Psychology Research*, 234, 158-175. DOI:10.1016/j.psychres.2016.01.015
- Van Bennekom, M. J., de Koning, P., & Deyens, D. (2017). Virtual Reality Objectives for Diagnosis of Psychiatric Disorders: A Literature Review. *Frontiers in Psychology*, 8, DOI:10.3389/fpsyg.2017.00163
- Ward, T., Vess, J., Gidycz, M., & Coker, T. A. (2008). Risk management of sexual predators: The relationship between approach and outcome goals in treatment for sex offenders. *Aggression and Violent Behavior*, 13(4), 375-381. DOI:10.1016/j.avb.2008.01.001
- Woolfson, T. P., Kimpfers, F., & Mühlberger, A. (2019). Intensity or Even Superiority of Virtual Reality Exposure Therapy in Phobias? – A Systematic Review and Quantitative Meta-Analysis on Randomized Controlled Trials Specifically Comparing the Efficacy of Virtual Reality Exposure to Gold Standard in Vivo Exposure in Agoraphobia, Specific Phobia, and Social Phobia. *Frontiers in Psychology*, 10, DOI:10.3389/fpsyg.2019.01772