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

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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 and specifies 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.

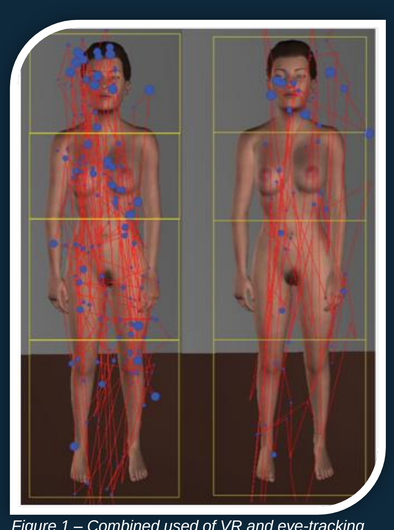

Figure 1 – Combined used of VR and eye-tracking (Trottier et al., 2014)

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

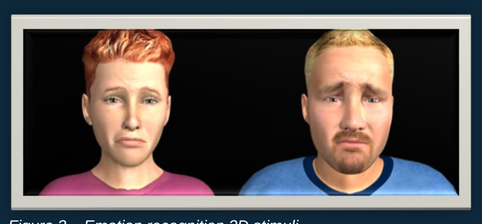

Figure 3 – Emotion recognition 3D stimuli (Cigna et al., 2015)

Figure 4 – Virtual shopping environment (Parsons, 2012)

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- 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

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- 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

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