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# Editorial: Virtual reality in paediatrics

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Editorial on the Research Topic
Virtual reality in paediatrics

Children and teenagers represent one of the most vulnerable and fragile age groups. In addition to pre-existing conditions, they are exposed to an increasing number of risk factors and stressors that negatively impact their mental health (Ryan-Wenger et al., 2005). Similar risks coexist with scarce and little scalable mental health services, enhanced during and after the global pandemic emergency (Inkster and Digital Mental Health Data Insights Group DMHDIG, 2021). There is thus the need for new tools and healthcare interventions able to fill the gap between the young population's needs and the current health system's limitations. In such a context, virtual reality emerges as a potential solution, enabling remote digital interventions, compelling content due to its immersive modality, and quantified experiences for delocalized patient tracking.

Virtual Reality allows for the exposure of individuals to controlled audiovisual sensory stimuli through dedicated interfaces known as VR headsets. As for their real-world counterparts, these inputs are processed by the individual's brain (Riva et al., 2017), compared with pre-existent experience and are able to trigger reactions and guide behaviours towards goals recognized as meaningful for a sector or intervention. As virtual stimuli clearly do not match the bodily perception, the brain tries to minimize such a sensory mismatch, activating compensation processes and stimulating its neuroplasticity dynamics. VR literally puts our "brains in motion," a process that can be partially guided thanks to the controlled nature of this digital technology. The virtual experience results in several types of applications in healthcare, ranging from pain relief (Hadjiat and Marchand, 2022) during invasive medical procedures, to stress management, training and cognitive evaluation (Zhao et al., 2022).

An interesting contribution to the present Research Topic was the study (Björling et al.) exploring the impact of nature-based virtual reality scenarios on stress management in adolescents. VR allows for nature-like landscapes to be brought into critical, indoor and artificial environments such as hospitals, or as self-administration mobile solutions to support relaxation. It is an example of the ability of VR to provide access to spaces on demand, tailored to specific goals and normally not available due to physical and time constraints of the surrounding environments.

Today's available technology does not limit itself to passive synthetic sensory stimulation, but enables individuals to actively take part in virtual events, interacting with the virtual environment including body movements both in terms of experience and data collection. From integrating virtual reality in fitness and exercise for stress management (Shaw et al.) to extending its application to intensive physical rehabilitation (Huang et al.), immersive

technologies introduce new holistic approaches to involve patients, increase engagement and motivation, and collect data to quantify their performance based on objective data.

The clinical use of virtual reality with neurodivergent people, such as those who have been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), has resulted in compelling initial findings. Specific to ADHD, distractibility can lead to difficulties with task completion, achievement, and interpersonal relationships difficulties. Stokes et al. used VR eye-tracking features to understand distractibility more thoroughly and collect data regarding patterns of distraction, the duration of distraction due to specific targets, and the types of events and objects which cause distraction. These initial findings inform two primary facets: 1) what types of objects are most distracting for a child with ADHD and 2) the sequence of the eye-gaze movements toward the presented distractors. Such information allows for customized and individualized interventions during treatment.

Applications of VR to support and train social skills are a continuously growing area of interest too, with evidence being collected in a range of environments, from lab-based delivery of controlled targeted practices to delivering interventions remotely, such as in-home settings. A recent paper by Johnson et al. reported initial findings using virtual technology to deliver social skill training remotely and found significant improvements in different social cognitive domains including emotion recognition, social inferencing, and social attribution. This study also showed no differences between remote and in-person treatment thus providing evidence supporting the idea that clinical benefits could be maintained in remote settings, which could help reduce barriers to care and support treatment in settings that are most ideal for young people and help support inclusive treatment for pediatric populations with neurodiverse backgrounds.

The articles in this Research Topic are focused on the application of VR as a digital and drug-free tool to support children and adolescents. They provide a snapshot of diverse, new evidence about how the specific tools of virtual reality can be integrated within traditional therapy and care interventions, also informing potential best practices and guidelines about what is still required to be improved in the sector.

As Editors of all these articles, we thank all the researchers that joined our endeavour in sharing their innovative work, and we would like to encourage the readers to take time to read these articles and expand their knowledge on these important Research Topic.

## Author contributions

Writing—original draft preparation: BI, VM, and JS. Writing—review and editing: BI, VM, and JS.

## Conflict of interest

Author VM was employed by Softcare Studios.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note



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