Empathy at the Boundary: Sustainable HCI Research Practice in Sensitive Contexts

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Abstract

Virtual reality exposure therapy (VRET) enables flexible and cost-effective trauma treatment. For severe and multiple traumatization, effective exposure requires highly individualized calibration, motivating close collaboration between therapists and developers. Embedding developers directly in exposure sessions accelerates technical iteration but also exposes them to intense traumatic narratives. While empathic engagement can foster trust, patient openness, and meaningful design refinement, it is associated with risks such as secondary stress, vicarious traumatization, cognitive strain, and burnout. Drawing on experiences from a feasibility study on VRET for severe trauma, this paper discusses empathy as both an enabler and a risk factor in interdisciplinary research. We argue that empathy is not inherently opposed to objectivity but requires deliberate and sustainable integration into research practice. We propose two directions: structured risk awareness through preparatory training and the normalization of reflective debriefing. This perspective advances emotional sustainability as a core component of responsible HCI research in trauma therapy contexts.

Keywords

PTSD, empathy, exposure therapy, trauma

Virtual Reality (VR) is increasingly recognized in trauma exposure therapy for its ability to immerse patients in scenarios that are not feasible in vivo. In many cases, VR exposure is more cost-effective and offers greater flexibility in scenario design and adaptation. Although numerous studies have demonstrated the feasibility and effectiveness of VR exposure therapy (VRET) [1], comparatively little work has examined its technical efficiency. Importantly, VR exposure itself is not responsible for therapeutic outcomes; rather, these outcomes depend on the therapeutic processing of traumatic memory recollections elicited by the exposure. Accordingly, adjustments to exposure levels have primarily been achieved through therapist–patient communication, while technical grading has largely been limited to level-based increases in sensory or dynamic complexity. Because these approaches proved effective, there has been little incentive to systematically explore ecosystem and scenario design for finer-grained exposure calibration.

Most existing studies have focused on individuals with post-traumatic stress disorder (PTSD) resulting from a single traumatic event. For more severe trauma involving multiple events, VRET was long considered too demanding [2, 3]. However, recent work suggests that VRET is also feasible for more severe trauma presentations [4, 5].

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In contrast to standard cases, this clientele requires highly individualized exposure gradation. Trauma triggers tend to be more specific and can provoke stronger physiological and emotional reactions, necessitating more experience-based technical design and calibration. Identifying optimal exposure levels that support therapeutic work while avoiding excessive strain is complex and requires both technical and clinical expertise. Interdisciplinary research between human-computer interaction (HCI) and psychiatry and psychotherapy, therefore, holds significant promise. While a traditional design process, in which scenarios are pre-developed and executed by therapists, is possible, integrating technical expertise into the therapy session enables significantly faster iteration and the direct discussion of technical possibilities.

However, this approach introduces challenges and risks. Developers are typically not trained for therapeutic settings, and therapists undergo specialized training to manage emotionally intense situations. Without preparation, exposure to traumatic narratives and emotions can negatively affect well-being. Potential consequences include emotional fatigue, reduced attention, burnout, and secondary or vicarious traumatization. Secondary traumatization (STS) and vicarious traumatization (VT) are well-documented risks associated with exposure to others' trauma, affecting healthcare workers, interpreters, and even family members [6, 7, 8, 9]. STS refers to stress resulting from helping traumatized individuals [10], whereas VT involves cognitive shifts in worldview following repeated exposure to traumatic experiences [11, 12]. Both are linked to adverse outcomes such as depression, anxiety, substance abuse, and reduced service quality [12, 13]. Empathy - *"the ability to comprehend another's feelings and to re-experience them oneself"* [14] - has been shown to positively correlate with STS and VT [15]. Intense empathy with others' traumatic experiences, particularly over a longer period of time, was found to increase the risk of PTSD-like symptoms [16]. More empathic individuals were found to be more prone to VT and STS [17]. And such high levels of empathy are associated with even more negative outcomes, including empathic pain, internalizing disorder, and emotional over-involvement [15].

Given the need for experiential insight into the effects of technology on VRET's effectiveness for severe trauma, this arguably raises the question of whether it is ethically justifiable to involve developers in exposure sessions to accelerate the iteration cycle [18]. Arguably, for a justifiable risk-benefit ratio, the risks associated with empathy must be minimized. This paper, therefore, discusses the benefits, challenges, and risks of empathy in VRET research involving developers. Drawing on the author's experiences from a feasibility study on VRET for severe trauma [4], it addresses the following research question:

RQ *How can we materialize empathy to enable sustainable HCI research in trauma therapy?*

This work contributes a perspective on the sustainable materialization of empathy in HCI research within trauma exposure therapy [19].

1. Experiences as a Developer in Exposure Therapy: A Retrospective of the First Author

In 2023, I worked as a developer on a feasibility study of VRET for PTSD following multiple traumatizations [4]. I collaborated closely with two therapists and attended exposure sessions to iteratively adapt scenarios until they supported effective therapeutic work. Although I had studied PTSD and been briefed by the therapists, I had no prior psychotherapy experience.

Patients' stories and visible tension affected me deeply. I felt strong empathy and was struck by their openness toward someone they did not know. Initially, I hesitated to express this empathy because I saw myself as "only the developer." Later, I learned that appropriate empathic responses can support both therapy and research engagement by encouraging openness.

Another lesson was the importance of acknowledging my own emotional reactions. Some sessions affected me for hours, yet I avoided seeking guidance, worrying about professionalism. In retrospect, I

would act differently. Since the study, I have spoken with various researchers and learned that others have had similar experiences, and that some even canceled their studies because of the emotional impact. Although this is acknowledged in practitioner exchanges, it is rarely addressed systematically in peer-reviewed research. One possible explanation is that researchers may fear that acknowledging emotional impact could be perceived as compromising their professionalism or objectivity. It is important to recognize that clinical practitioners are typically trained to manage and integrate such emotionally intense encounters, and that empathy itself does not contradict principles of objectivity [20]. Yet without adequate reflection and processing, unresolved emotional strain may gradually compromise research rigor and decision-making.

2. Benefits of Empathy

The effectiveness of exposure therapy is contingent on patients' engagement in the process. If patients are not open about experiences and avoid the recollection of traumatic memories, the targeted learning process will not occur [21]. Similarly, the value of collaborative technical design explorations depends on patient engagement. The more transparent patients are about the effects of different designs, the more likely it is that nuanced experience-based calibration of exposure will be feasible in the long term. Traumatized people are often used to be misunderstood by others, with the result that individuals concerned often close themselves off to others [22]. To promote engagement, therapists typically begin exposure therapy with psychoeducation and the establishment of a trusting relationship. As these sessions may involve sensitive information and intense emotions, the inclusion of the developer at this point could cause unwanted concealment and risk the effectiveness of the therapy. As a result, developers will likely only join the exposure sessions. The effect is that an unknown developer will enter a deliberately created trusted space between therapist and patient. Sharing empathy can be a way for developers to show patients that they are not misunderstood or judged for their honesty, which can compensate for potential negative effects through developers' presence and engagement [4]. This is also supported by the empathy literature, which discusses the positive effects of psychological safety and describes the perceived consequences of taking interpersonal risks in a particular context [23]. It is suspected to positively influence the willingness to take creative risks and share novel ways of thinking [24, 23]. Empathy can further promote a deeper sense of purpose [25]. In trauma therapy, focusing on positive change can further promote psychological change and can give patients the feeling that overcoming the trauma was "not in vain", described as posttraumatic growth [26].

3. Risks of Empathy

Trauma exposure is typically associated with intense physical and emotional reactions in patients. High levels of empathy provoke the transfer of this distress to others [27, 28]. Psychotherapists are typically trained for multiple years to mitigate this risk in therapy. For stakeholders who are typically not trained for such situations - such as dolmetchers, family members, or caregivers - research found increased susceptibility to diverse mental risks [15]. Reasons include an inferred ability to differentiate between one's own and others' emotions [29]. Aside from crucial mental risks, this can affect work performance. Research found that highly empathic individuals may deliver feedback more effectively but feel less attentive and experience greater distress [30]. It can further reduce working memory and patience for subsequent tasks [31]. Other risks discussed by Breithaupt [32] are self-loss and the confusion between empathy and altruism. The susceptibility to such risks was found to depend on different factors such as empathic ability [16] or gender [33].

Consequently, individuals have to choose wisely how much empathy they can share in relation to their own resilience. Crane [24] describes it as follows: *"The remedy is not less empathy but more deliberate empathy, with the recognition of the potential costs and risks [...]"*. Furthermore, coping strategies such as voluntarily regulated breathing practices (VRBP) can already help to orchestrate stress responses and

promote innate healing processes at an early stage [34]. Also, retrospective discussions with others about experiences may help address them sustainably.

Developers' participation in exposure therapy, who are typically not trained to cope with the typical emotional intensity, is associated with risks. While ethics reviews primarily ensure that research procedures do not impose unjustifiable harm on participants, potential risks to other stakeholders are rarely scrutinized. Yet developers and other involved personnel may also face substantial emotional strain and possible adverse effects.

From a sustainable research perspective, it is therefore essential to implement complementary safeguarding measures that extend beyond participant protection. Such measures should explicitly acknowledge the risks arising from interdisciplinary collaborations, communicate them transparently, and foster awareness and preparedness among all stakeholders involved in the research process. Stakeholders from other disciplines should receive standard preparatory training in self-regulation, such as mind-body practices.

4. Directions for Sustainable Empathy Materialization

The diverse advantages and risks of empathy highlight the importance of a reflective empathy materialization tailored to the researcher's resilience. Although empathy may promote engagement and a valuable research outcome, researchers should prioritize their personal well-being for sustainable research practice. This work highlights two directions for the sustainability of empathy materialization in HCI research in the context of trauma therapy:

1. *Risk awareness.* Researchers should be informed about the challenges and potential risks of empathy in emotionally intense settings before consenting to participate in such studies. Similar to standard practice in psychology, it should be normalized for interdisciplinary researchers to undergo preparatory training that raises awareness of these risks and equips them with appropriate coping strategies.
2. *Openness.* Transparency about emotional challenges arising from empathic engagement in such settings should be encouraged and freed from stigma, so that others can learn and avoid similar difficulties. It is important to recognize that psychologists typically undergo years of training to prepare for emotionally demanding work. Likewise, researchers should feel comfortable seeking post-session debriefings with therapists to support reflection and emotional processing.

5. Conclusion

Empathy is a key component of ethical and sustainable human–computer interaction (HCI) research, particularly in emotionally demanding contexts. While empathic engagement can entail risks such as distress, burnout, and vicarious traumatization, it is also vital for building trust and generating meaningful insights. A central challenge is maintaining a level of empathy that supports participants while preserving researchers' emotional well-being. Researchers should therefore be informed about the risks of unbalanced empathic involvement and take part in preparatory self-regulation training and retrospective discussions. Open discussion of emotional responses, even when they appear to conflict with good research practice, should be encouraged. This work calls for greater transparency and reflection within the HCI community to support more sustainable research practices.

Declaration on Generative AI

During the preparation of this work, the authors used ChatGPT-4 and DeepL for Grammar and spelling checks to identify any errors the authors might have missed. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the publication's content.

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