

Letting It Go: Four Design Concepts to Support Emotion Regulation in Virtual Reality

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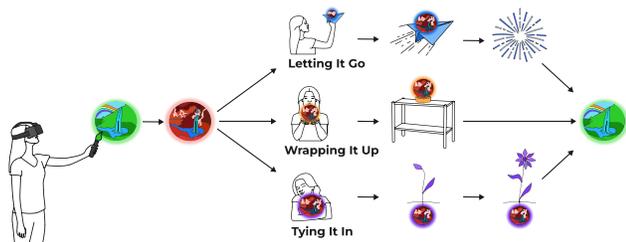


Figure 1: Schematic representation of the four design concepts. The "Full Circle" encompasses framing the processing of negative emotions in positive experiences, "Letting It Go" depicts seeing them off, "Wrapping It Up" refers to setting them aside, and "Tying It In" represents accepting them as fertile ground for something new.

ABSTRACT

Depicting emotions, both in reality (e.g. art therapy) and in virtual reality (VR), is an established method for emotion regulation (ER), promoting reflection, behaviour change and mental well-being. However, the specific ways in which users engage with and process negative emotions in VR remains unclear. In this study, we conducted expert interviews with psychotherapists and collaboratively identified design requirements for VR interventions that support the processing of negative emotions. Our findings highlight the potential of VR to facilitate the transition from negative to positive experiences. Based on these findings, we propose specific design concepts for using VR as positive technology for emotion regulation.

Index Terms: Human-centered computing—Human computer interaction (HCI)—Interaction paradigms—Virtual reality

1 INTRODUCTION & MOTIVATION

Regulating negative emotions can prevent negative thought cycles (i.e. rumination) and positively impact well-being [5,6]. In brief, this regulation is called emotion regulation (ER), which encompasses all (un-)conscious processes that affect one's emotional responses in order to achieve a more appropriate mode of functioning [1, 6]. Most ER strategies either focus on modifying (the perception of) a troubling situation, e.g. reappraisal, or on the suppression and modulation of an emotional response [1, 5]. They can be learned through various methods, including extensive training [1] and artistic expression (drawing or role-play) [8]. However, those often rely on skill sets such as self-reflection, planning, and goal setting, which can be challenging to master without external support. While psychotherapy can provide such support, it can be challenging to

access therapeutic services, e.g. because of stigma [10] or limited availability [3]. At the same time, individuals who do not require professional therapy might want to learn these strategies as well. Thus, many turn towards digital solutions for autonomous mental health management [3]. Although they cannot substitute treatment by experts, technologies can provide a first access point for well-being support [3]. VR technologies seem particularly promising for this, especially as a proven affective medium that can evoke emotional states and responses similar to reality [8,9]. Further, VR "seals" the user off from outside distractions and offers the unique benefit of using dynamic elements in a 3D space around the user, creating unique spaces for therapeutic artistic expression [14] through which users can physically move to explore different perspectives [12]. While previous work has explored the potential of VR to teach ER methods, especially in exposure therapy (e.g. [10]), through changing virtual settings (e.g. [9]), and playing serious games (e.g. [11]), few papers have investigated the design space of VR applications that specifically cater to users looking for digital support in processing negative emotions. One notable example is by Grieger et al. [4], who empower users to punch and trash negative textual messages to generate a positive shift in one's thoughts and emotions. Still, prior HCI research emphasises the need to carefully design interventions for such a sensitive topic, thus avoiding to re-introduce trauma and mitigating the risk of rumination (e.g. [13]). To that end, we identified design requirements and concepts to support emotion regulation and processing of negative emotions using VR. We contribute the following: i) expert interviews with psychotherapists (N=5) to support independent self-care in VR, ii) design requirements for such VR applications, such as supporting bodily movement and individual solutions, and iii) four design concepts on how to address and implement those design requirements when transitioning from a negative emotional experience to a positive one in VR.

2 METHOD

We conducted semi-structured expert interviews of 1 hour on average (*min* : 40 : 55*min*, *max* : 1h16*min*) with $N = 5$ licensed psychotherapists ($M = 44.8$ years, *min* : 27, *max* : 70, 5 female). Four therapists had no prior VR knowledge, while one had used it < 5 times. The interviews addressed the therapists' conceptualisation and used methods of coping with negative emotions. Then, therapists were presented with three storyboards, created based on prior literature about ER methods. These were used as the basis for an in-depth discussion of how ER methods could be translated into VR. Based on the interviews, we derived design requirements and developed four design concepts. The interview protocol can be found in the supplementary material. For the analysis, we used a six-step process of reflexive thematic analysis with daily feedback cycles between two co-authors [2].

3 DESIGNING FOR EMOTION REGULATION IN VR

Therapists acknowledged the potential of and were excited about VR being used for supporting the processing of negative emotions. Also, VR should engage patients synchronously on a physical and mental level, as physical exertion can support cognitive engagement. Further, therapists highlighted that archetypal images can success-

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fully represent and induce an emotional journey, which is why VR should accommodate different landscapes, weather scenarios and stereo-typical objects, e.g. benches symbolising relaxation. However, there is also the need to empower users to individually interpret metaphors, which is why they suggest having the possibility to freely draw, create their own virtual world and add personal pictures, e.g. of pets. Although some related works focus on autonomous creation in VR [7, 14], there is still a need to identify ways for increased personalisation. Thus, the design requirements are i) to engage users physically and mentally, and ii) to empower users to create an individualised experience. Based on our analysis, we conceptualised four design concepts (see Figure 1).

Full Circle: At first, therapists create a calming setting by building rapport with their patients. As this is not possible in self-care settings, they recommend translating the method 'focusing' or 'centering' to VR. It aims to support people in finding "an envisioned, calming place, for instance a meadow, [where they feel] untroubled" (P4) before confronting negative experiences. Further, it is important that "patients leave therapy with a positive feeling" (P3), that they can "let the soul dangle a little so that resting takes place after re-experiencing negative emotions" (P2). The VR experience should be rewarding and create a positive lasting impression. Thus, VR applications aiming to support coping with negative emotions should be conceptualised as a full circle system, beginning and ending with users being in a positive space.

Letting It Go: This concept describes the notion of focusing on a closing gesture when coping with negative emotions. The idea is based on therapeutic interventions and ER methods in which users externalise negative thoughts and then distance themselves from them, e.g. "you write something on a balloon and then let the balloon rise into the sky" (P3). However, therapists would prefer a more repetitive motion in VR, such as the relatable action of throwing away paper planes, as "that's what you do in face-to-face work too, that you keep mirroring and repeating things and bringing up issues and resolving them, several times" (P3). Consequently, VR applications could translate common activities into repetitive movements so that users become actively and physically engaged in dealing with their emotions.

Wrapping It Up This design concept focuses on packaging up negative emotions and storing them at a specific (hidden or openly visible, imagined or real) place. Here, negative emotions are not left behind completely but remain accessible for future further exploration to "create appropriate distance, to take a few steps back to look at it from afar" (P2) and to "keep it until you don't need it anymore, or until we can really throw it in the bin" (P2). Consequently, VR applications could identify metaphors that pack or convert negative emotions in(to) virtual 3D objects.

Tying It In: This concept emphasises the appreciation of all emotions, because negative emotions can also have positive and helpful functions. Therapists discussed that "the negative connotation is only socially shaped, and this should be overcome by not teaching people to distance themselves, but to welcome all emotions" (P4). Negative emotions would be seen as fertile ground for something new to arise, also symbolising personal growth and self-reflective development, as "a positive thing comes out of something negative" (P3). Consequently, VR applications could focus on visualising positive transformation and growth.

4 CONCLUSION

We identified design requirements and four design concepts of VR applications that strive to support the active processing of negative emotions through expert interviews with psychotherapists (N=5). We found that VR applications should provide individual solutions, and engage users with repetitive physical movements. Further, it is recommended to frame the coping process with positive experiences in a full circle concept. Together with the therapists, we developed

three precise visions of how manipulating visual representations of negative emotions in VR could provide symbolic moments of transformative growth. This paper presents the groundwork for future research implementing and evaluating the design concepts.

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