Embodying Compassion in Virtual Reality using Celebrity Avatars

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DClinPsy Thesis (Volume 1), 2022

University College London

UCL Doctorate in Clinical Psychology

Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Overview

Part 1: Conceptual introduction. An introduction to the research which outlines the key principles of compassion-based therapy and its application and efficacy as an intervention for mental health problems. The role and impact of self-compassion and self-criticism as transdiagnostic mechanisms in psychological wellbeing are considered. Fears and blocks to compassion are highlighted alongside their impact on therapeutic engagement and outcomes. Theoretical perspectives in understanding such barriers are discussed. The use of virtual reality in psychological research and psychotherapy is explored as a potential aid to overcoming such obstacles. In particular, the use of avatars and the perceptual illusion of embodiment and its effects are reviewed in the context of psychological interventions. Existing studies which utilise virtual technology to cultivate and facilitate self-compassion are summarised, considering gaps in the research and areas to further explore. Finally, drawing upon the psychological effects of virtual reality and compassionate therapy techniques, methodology and aims of the empirical study are summarised.

Part 2: Empirical paper. A research study exploring the effects of a virtual reality paradigm which uses embodiment (of compassionate or uncompassionate celebrity avatars) to facilitate the experience of self-compassion. It was found that a highly self-critical, non-clinical population reported significantly greater levels of self-compassion, self-reassurance and motivation to act compassionately as well as significantly reduced levels of self-criticism, self-attacking and fears of compassion following the intervention.

Part 3: Critical appraisal. An appraisal and reflection of the research, expanding and drawing upon theory to contemplate and justify decisions made and consequences of these. The appraisal focuses on the operationalisation and measurement of the proteus effect, the

identity and methodological design of avatars used in the study and ethical and personal considerations when undertaking the research.

Impact Statement

Academic. The results of the empirical study provide support for the effectiveness of a virtual reality paradigm facilitating self-compassion as they replicate findings from previous studies. In addition, the study found that the virtual reality intervention is effective in significantly reducing fears of compassion in a self-critical, non-clinical population after one virtual reality session, a result not previously found (possibly due to less statistical power and a smaller sample size).

This study explored the use of different avatars on the effects of the virtual reality intervention. It found that whether someone embodied a compassionate or uncompassionate person made no significant difference to the positive outcomes of the experience. This finding will help inform future use of and design of the intervention, particularly in an upcoming randomised control trial in a clinical setting where different avatar bodies will be considered. The study also highlighted gaps in the research which are important to be explored, for example the potential impact of embodying an avatar that represents the self in this context.

The study contributes towards existing literature exploring the proteus effect and shines some light upon potential mediators and moderators of the effect. It provides information which may help researchers further review and understand circumstances where the proteus effect does not take place as well as highlighting difficulties with operationalising and measuring the effect.

Clinical. This research highlights the importance of cultivating self-compassion in improving psychological wellbeing and reducing self-criticism (strongly associated with depression and other mental health problems). It also brings to attention the challenges that many people face with engaging in self-compassionate exercises and highlights the importance of finding new

and novel ways to overcome such blocks. The study offers promising support for the use of virtual reality as a tool to support existing compassionate psychological interventions.

For clinicians and therapists who may be wary and/or sceptical of the use of virtual reality in a therapeutic context, this study provides insight into and evidence of its beneficial effects. At the same time, the study highlights research areas worth further exploration and promotes caution of virtual reality interventions with clinical or vulnerable populations. For example, the study highlighted that individuals who are less securely attached experience less safe/warm emotions following the intervention.

The brief qualitative feedback, whilst not thematically analysed in this study, provides richer insight into the experience of embodiment in virtual reality interventions and highlights individual differences in experiences. This feedback may be of interest to clinicians using virtual reality in a therapeutic context, highlighting factors to hold in mind when working with patients.

Public Health. Finally, the research highlights the importance of and benefits of compassion and self-compassion for the general public, not as a response reserved only for clinical problems. Many people, as highlighted by the sample population of this study (who self-reported no mental health problems) can be excessively self-critical and struggle to turn compassion inwards. Interventions like this draw attention to the importance of compassion, as a universal, human need. The study provides evidence that negative attitudes towards self-compassion can be challenged and improved with one-off interventions and psychoeducation.

In the context of increasing popularity of virtual reality and expansion of commercially available products alongside a public interest in therapeutic self-help resources, this study provides promise for the use of virtual reality as a self-help tool in the future. This is particularly important in a social and economic context where demand for national mental

health services considerably exceeds capacity and waiting lists continue to grow. This research emphasises the need for further development of such programs and studies to establish its effectiveness and ensure its safety.

Table of Contents

Index of tables and figures

Part two: Empirical Paper

Part three: Critical Appraisal

Acknowledgements

Firstly, I would like to thank Dr John King, my research supervisor for making the task of completing a thesis the most stress-free it could possibly be. John has been extremely supportive, responsive, laid-back and reassuring and his supervisory approach has embodied compassion throughout. His feedback, experience and expertise have been so valuable, particularly his skills in avatar design and dressing up celebrities.

I would also like to thank my placement supervisor, Dr Toby Newson, who indirectly played a big role in my ability to complete this thesis. Having such a supportive and flexible supervisor on placement meant that transitioning between crisis team work and writing my thesis at the same time was far more manageable than I could have ever anticipated.

I would like to give a huge thank you to Nelly Canji. Without Nelly I don't think I would have been able to complete the intervention with so many participants. Nelly's knowledge of uncompassionate celebrities, ideas and feedback about the study and contribution towards psychoeducational materials were invaluable.

Thank you to my family, particularly my dad, for always being my biggest cheerleader. Whenever I doubted myself whilst writing up the thesis, I held in mind the fact that it could make absolutely no sense whatsoever and my dad would still think it was (and I am) fantastic, regardless.

I would like to thank all my friends (and course mates) for their empathy, understanding, laughter and much needed entertainment during respite periods. In particular, the VLBs (Charlotte, Jack, Fiona, Lois and Neil) who I can always rely upon for a healthy dose of cynicism, many witty remarks and a lot of love. The Bal Gals (Alice and Amrita) for the many, very much needed, walks, coffees, chats and procrastination opportunities. I would also like to thank Amrita for her endless supply of home-baked cookies and cake which have

fuelled late night writing episodes and for our seven-hour conversations. Finally, I would like to thank my fellow Fun Men, Adam (chill) and Zaariyah (popular), for their unconditional validation and incredible friendship. Without them, I may have not survived the Dclin Psy.

Finally, thank you to all the volunteers who took part in my study – without you, this thesis would not exist. It was a privilege to be able to facilitate the experience for everyone who took part and I was blown away by the compassionate responses that I observed. Two of my highlights when conducting the study were ‘hey, it’s okay, let’s get some ice cream and fried chicken’ and ‘try to remember a time when you felt at your strongest, what would that version of you do/say’. These are compassionate words I’ve held in mind and have personally helped me get through this thesis.

Part One

Conceptual Introduction

“Embodying Compassion: The potential use of virtual reality to overcome fears, blocks and resistances to compassion.”

Introduction

This research project is exploring the potential use and feasibility of Immersive Virtual Reality (IVR) in a therapeutic context. Specifically, the study aims to explore how a virtual reality paradigm focusing on the use of 'embodiment' (experiencing the illusion of ownership of a virtual avatar's body) may help cultivate and facilitate the experience of both giving and receiving compassion (and consequently, self-compassion). The potential benefits of using IVR technology in this way may be of particular relevance to individuals who are highly self-critical and who, for a number of reasons, struggle to be compassionate to themselves.

This conceptual introduction will begin by exploring the concept of compassion, how we understand compassion, why it is important and its application to therapy for mental health problems. It will then outline and define virtual reality and investigate some of the ways in which VR has begun to be used in a therapeutic context. It will consider how these two concepts could combine to create a therapeutic experience which attempts to overcome barriers to compassion. Finally, possible psychological processes underlying the potential benefits of such an experience will be considered.

Compassion

Defining compassion

Compassion is understood and defined in different ways, however there is a universal understanding that compassion is a prosocial expression or behaviour, linked to responding to and being sensitive to suffering. Compassion is recognised, valued and practiced in all major religions (Steffen & Masters, 2005). In Christianity and Judaism, God is spoken of as '*the Father of compassion'* whilst in Islam, 113 of the 114 chapters of the Quran begin with the verse '*In the name of Allah, the Compassionate, the Merciful*'. For hundreds of years

Buddhist traditions have practiced and exercised techniques to train the mind in compassion, recognising compassion as a skill that can be developed and enhanced. The Dalai Lama believes that promoting and fostering compassion is the *purpose* of religion:

'*Western civilizations these days place great importance on filling the human 'brain' with knowledge, but no one seems to care about filling the human 'heart' with compassion. This is what the real role of religion is.'* Dalai Lama.

Psychologists, such as Paul Gilbert and Kristen Neff, have taken inspiration from eastern Buddhist traditions to further highlight the importance of compassion (and self-compassion) in psychological wellbeing. They recognise that tuning into and cultivating our 'compassionate selves' is a powerful therapeutic tool. Neff (2011) defines compassion as "the recognition and clear seeing of suffering…feelings of kindness for people who are suffering, so that the desire to help - to ameliorate suffering - emerges… recognising our shared human condition, flawed and fragile as it is" (Neff, 2011, p10). Whilst Gilbert defines compassion as "a basic kindness, with a deep awareness of the suffering of oneself and of other living things, coupled with the wish and effort to relieve it" (Gilbert, 2009, p.84).

For the purpose of this paper, we will use the following definition of compassion taken from the Compassionate Mind Workbook (Irons & Beaumont, 2017) which encapsulates both Neff and Gilbert's definitions:

Compassion is:

"A sensitivity to the suffering of self and others (and its causes), with a commitment to relieve and prevent it.'

This definition highlights the two 'psychologies' of compassion outlined in compassion focused therapy (CFT) – engagement with distress and alleviation of distress. Compassion focused therapists believe that in order to practice compassion, we first need to turn towards suffering, to recognise it, pay attention to it and make a commitment to engage with it. They refer to this as 'sensitivity to suffering'. The second psychology of compassion is the alleviation and prevention of distress which can be worked towards by learning and utilising techniques in compassionate imagery, attention, sensory focusing, feeling, reasoning and behaviour. Therapists who practice CFT believe there are six core attributes which help people engage with distress and that these qualities can be developed and enhanced – sensitivity, care for wellbeing, non-judgment, sympathy, distress tolerance and empathy.

In Compassionate Mind Training (Irons & Beaumont, 2017), psychologists distinguish between the different 'flows' of compassion – compassion for others (recognising someone else's suffering, engaging with it and trying to do something to help), receiving compassion from others (the experience of someone being sensitive to your suffering and trying to prevent or alleviate it) and self-compassion. Many people who struggle with compassion find it most difficult to be compassionate towards themselves (Gilbert, 2011). Practicing compassion can be hard – some people struggle to turn towards distress in the first instance whilst others may currently lack the skills or ability to know how to alleviate it – or both. At the same time, often people are able to easily and effectively show compassion for others but have fears or blocks which get in the way of treating themselves in the same way. Therefore compassion-focused therapists recognise and highlight that practicing compassion requires courage, wisdom and commitment.

Self-compassion and wellbeing

The flow of compassion turned inwards, directed towards one's own struggles, is usually referred to as self-compassion. Neff (2003) describes three elements which interconnect to create a self-compassionate response to suffering; self-kindness over self-judgement, common humanity over isolation and mindfulness as opposed to over-identification.

There is growing evidence for the importance of being able to relate compassionately to oneself in both the promotion of psychological wellbeing (Zessin et al., 2015) and reduction of psychopathology and mental health symptomology (MacBeth & Gumley, 2012). An increased capacity to engage compassionately with one's own distress has been correlated with the experience of more positive and less negative emotions and an increased ability to cope with stress and suffering (Lutz et al., 2004; Neff & Vonk, 2009; Allen & Leary, 2010). A meta-analysis conducted by Zessin et al. (2015) found a strong positive relationship between self-compassion and wellbeing, this effect being strongest for psychological wellbeing, followed by affective wellbeing. In addition, they highlighted a number of studies which indicated a causal effect of self-compassion on wellbeing. Research has also found an important relationship between self-compassion and physical health (Skelton et al., 2020; Edwards et al., 2019). A recent meta-analysis (Sirois, 2020) investigated the relationship between self-compassion and people's self-reported physical health and found a significant positive correlation (r=.25). Importantly, this association was still significant (however reduced) when accounting for ratings of positive and negative affect.

Self-criticism

Given that the ability to be compassionate towards oneself is associated with better psychological wellbeing, it is perhaps unsurprising that excessive self-criticism is associated with a range of mental health problems (Löw et al., 2020), in particular, depression (Mcintyre et al., 2018). Self-criticism could therefore be defined as a transdiagnostic process which involves harsh and repeated scrutiny of the self, judging one's own behaviour critically and competitively, in particular struggling to derive satisfaction from achievement-related events (Zuroff & Mongrain, 1989) and punishing oneself for perceived mistakes (Blatt & Luyten, 2009). Psychologists have theorised that excessive self-criticism may be a vulnerability factor for depression (Beck, 1983; Blatt, 1974), a hypothesis supported by a large number of studies finding an association between self-criticism and symptoms of depression (e.g., Zuroff et al., 2005; McWilliams et al., 2004; Blatt, 1998). Self-criticism has also been found to be a predictive factor in the recurrence of depressive episodes (Mongrain & Leather, 2006) and an increase in depressive symptoms over time in a student population (Macintyre et al., 2018).

In addition to depression, studies have found individuals have higher levels of self-criticism alongside social anxiety (Cox et al., 2000; Iancu et al., 2015), borderline personality disorder (Kopala-Sibley et al., 2012), bipolar disorder (Francis-Raniere et al., 2006), post-traumatic stress disorder (Cox et al., 2004) and eating disorders (Dunkley & Grilo, 2007; Fennig et al., 2008). Elevated levels of self-criticism have also been shown to be a significant predictor of suicidality (Fazaa & Page, 2009) and increased suicide probability (O'Neill et al., 2021).

In studies investigating moderating factors in therapeutic outcomes, self-criticism has been identified as a significant predictor of poorer treatment outcomes (Low et al., 2020). Low et al.'s (2020) meta-analysis found this negative correlation to be strongest for people having treatment for eating disorders.

These findings highlight the importance of addressing self-criticism for individuals with a range of mental health problems across different therapeutic modalities. Several studies have found that targeting self-criticism in both cognitive behavioural interventions and psychodynamic therapy is effective in improving therapeutic outcomes. Cox et al., (2002) found that a reduction in self-criticism for individuals accessing CBT for social anxiety was significantly correlated with a more positive response to the intervention. Lowyck et al. (2016) similarly found that reducing self-criticism in psychodynamic therapy was associated with an increased reduction in symptoms of distress over time.

Whilst there is growing evidence highlighting the association between self-criticism and mental health symptomology and self-compassion and wellbeing, still relatively little is understood about how these transdiagnostic mechanisms work to impact people's mental health. A number of studies have shown that self-compassion may play a mediating role in the relationship between self-criticism and depression (Joeng & Turner, 2015; Zhang et al., 2019; Pedro et al., 2019). These studies highlight self-criticism as a precipitating and maintaining factor in depressive symptoms which higher levels of self-compassion may buffer and protect against. Whilst there is a clear relationship between these two transdiagnostic factors, it's important to note that researchers suggest that they are two distinct and independent ways of relating to the self, as opposed to opposite ends of a bipolar construct. This idea is supported by Falconer et al.'s (2015) finding that individual's levels of self-criticism and self-compassion measured by their separate scales do not correlate with one another.

Given the clear role of self-compassion in both promoting psychological wellbeing and buffering against risk factors for psychological distress, it is important to understand both when and why some people may struggle with compassion.

Fears, blocks and resistances to compassion

Whilst there is an abundance of evidence to demonstrate that compassion-focused interventions can be extremely beneficial for people amongst different populations struggling with a range of difficulties, many individuals still find engaging in compassionate practices extremely challenging and even distressing. There are many people who struggle with developing and practicing some of the therapeutic techniques, for example using imagery to cultivate self-compassion (Baldwin et al., 2020) or bringing to mind past experiences of receiving compassion to induce associated feelings. It is also true that these may be the people who could benefit the most from engaging with the compassionate part of themselves which they find so difficult – thus highlighting the importance of understanding the psychological causes and processes preventing them from doing so.

It is important to note that different individuals may struggle to engage with different flows of compassion (to others, from others and to the self) with different reasons behind each. For example, one person may feel easily able to be compassionate towards others however find it very challenging to turn this compassion inwards or may feel uncomfortable or vulnerable by the idea of someone else showing them compassion. Gilbert (2011) named these barriers the 'fears, blocks and resistances' to compassion (FBRs), referring to the different reasons people may find it hard. Fears of compassion refer to anxieties and beliefs that compassion may result in negative outcomes, for example "I fear that if I start to feel compassion and warmth for myself, I will feel overcome with a sense of loss/grief" or "I fear that if I become kinder and less self-critical to myself then my standards will drop" (Gilbert et al., 2011, p.3). Blocks refer to more practical reasons for not practicing compassion, for example people feeling that

they don't have time for self-care or that they have other demands higher up their priority list. Resistances might refer to avoidance techniques or 'safety strategies' that lead to less experience of receiving compassion, for example feeling that they do not trust others who show compassion and feel they might later 'take advantage' or abandon them. Often people who are depressed report that they don't want to seek help/compassion from others for fear of 'burdening' them (Bell et al., 2017). Although Gilbert defines FBRs as distinct difficulties, they are often collectively referred to by researchers as 'fears of compassion' and Gilbert highlights how the different reasons and beliefs people hold likely influence and/or reinforce one another.

For the purpose of this research, we will focus on fear of compassion flowing from others to the self and on self-compassion. Gilbert et al. (2011) found these to flows to be linked to one another and that increased fears of both are associated with increased self-criticism, self-coldness, stress, depression and anxiety. Fears of self-compassion and compassion from others have also been found to be positively correlated with an anxious attachment style (Gilbert et al., 2011). Attachment theory perhaps provides one of the most compelling arguments for understanding when, how and why some people may develop unhelpful fears and beliefs about compassion.

Attachment Theory

Bowlby's influential attachment theory (1958) recognises the importance, from birth, of reliable, compassionate care and research has highlighted lifelong effects of this on an individual. Bowlby proposes that babies display innate, evolutionary behaviours which help them form attachments to primary caregivers in order to ensure their needs are met. These

'proximity-seeking' behaviours displayed when in physical or emotional need or distress, invite care, protection, emotional responsiveness and *compassion* from caregivers. Mary Ainsworth (1970) developed this theory further to recognise the importance of consistent and responsive caregiving when an infant is in distress in helping a child to become 'securely attached'.

A securely attached child develops confidence in their 'secure base'/primary caregiver, allowing them to explore the world safely, knowing that if in distress, their needs will be met with sensitivity and care. This primary attachment relationship then serves as a working model of relationships so that securely attached individuals grow to be comfortable with both intimacy and interdependence. They are able to recognise and be effectively responsive to others distress whilst also trusting and expecting that others can be there for them – comfortably navigating both the need for interpersonal closeness and separateness in relationships.

Research has consistently demonstrated better outcomes for individuals who are securely attached compared to those who feel less securely attached in terms of their relationships, emotional wellbeing and ability to show compassion and tolerate distress in both themselves and others (Mikulincer & Shaver, 2012). Kunce and Shaver (1994) found that securely attached individuals described themselves in relationships as more responsive and sensitive to their partner's needs and more likely to provide compassion and emotional support than insecurely attached individuals. In an experiment by Mikulincer et al. (2001), it was found that individuals who self-reported as securely attached, as well as individuals who were primed to experience a sense of attachment security, reported higher feelings of compassion towards a person in trouble and distress in a story. Therapeutically, secure attachment has been positively correlated with the creation and maintenance of a stronger working alliance (Msetfi & Golding, 2010; Mallinckrodt & Jeong, 2014).

Insecure attachment and fears of compassion

Whilst a secure attachment style and positive working model of relationships is associated with an increased ability to feel comfortable both giving and receiving compassion, for individuals with adverse childhood experiences and inconsistent, neglectful and/or abusive attachment relationships, compassion can evoke a threat response (Rockcliff et al., 2011). Individuals whose relationships with primary caregivers are unpredictable, abusive or negligent may develop an internal model of relationships whereby they predict the same relational patterns in other close relationships. The development of such negative working models of attachment are usually categorised as either 'anxious' or 'avoidant' insecure attachment styles depending on an individual's expectations, beliefs and behaviours in close relationships, developed as a way of protecting themselves from the same experiences they previously had. Mikulincer & Shaver (2001, 2003) suggest that these working models usually operate outside of conscious awareness and are activated in response to the attachment system being stimulated – for example, through compassion.

Psychologists propose that for insecurely attached individuals, activation of the affiliative system triggers the working model of relationships which developed as a result of their early relational experiences (Mikulincer & Shaver, 2007). For example, for an individual who grew up with an alcoholic parent who was not able to consistently meet their emotional or physical needs, the activation of their affiliative system may lead to a prediction that others cannot be there for them and cannot be relied upon. For an individual who experienced extreme parental conflict or abuse, the activation of their attachment system could trigger the re-experiencing of such memories or associated feelings. Such experiences may cause

individuals to develop fears and resistances to both significant relationships with others but also affiliative relational experiences such as the giving and receiving of love and compassion. Mikulincer and Shaver (2003) found that when presented with attachment-related words, like 'love' and 'security', individuals with insecure attachment styles produced defensive, threat-based responses. Matos et al. (2017) found that fears of compassion, particularly from others and to the self were linked to memories of low parental warmth and experiences of shame. Additional literature (Mikulincer & Shaver, 2005, 2007) supports the hypotheses that anxiously attached individuals may fear both the affiliation with and subsequent abandonment of a person whom they receive compassion from.

FBRs to compassion and therapeutic outcomes

Individuals' fears, blocks and resistances to compassion pose a challenge to both clients and therapists across therapeutic modalities and particularly, in compassion-based interventions. A randomised controlled trial on the effects of compassion focused therapy for patients with binge-eating disorder (Kelly & Carter, 2015) found that fear of self-compassion had a moderating effect on the intervention outcomes – higher fears of self-compassion prior to intervention led to less benefits from the therapy. Other research has found that individuals with higher fears of compassion experience greater anxiety during therapy (Gilbert & Procter, 2006) and experience physiological threat-based responses to compassionate imagery (Rockliff et al., 2008). Fears of compassion appear to increase people's vulnerability to mental health difficulties (see meta-analysis by Kirby et al., 2019) as well as act as a barrier to their recovery (Castilho et al., 2017). Pauley and Mcpherson (2010) found that for people with depression, developing compassion was seen as something of value however at the same

time felt like an impossible task due to their beliefs that they were undeserving of compassion. Similarly, Lawrence and Lee's (2014) qualitative study identified that individuals feared that being self-compassionate would lead to a loss of identity, negative outcomes as a result of giving up their self-criticism and viewed compassion as an 'alien' and 'untrustworthy' concept.

More recently, researchers have begun to identify and trial approaches which might help protect individuals from threat-based responses to compassionate therapeutic interventions and thus help overcome fears of compassion in order to benefit from the therapy. Baldwin et al. (2020) tested out the use of a 'secure attachment prime' technique in helping reduce insecurely attached individuals' threat response to a compassionate-imagery task. They used Mikulincer and Shaver's (2001) attachment prime technique which asks individuals to reflect upon a secure attachment relationship with the aim of triggering and making salient a healthier working model of relationships and attachment figure. They found that, as expected, insecurely attached individuals displayed a threat response (measured by decreased heart rate variability) to a compassionate exercise. However, if these individuals were primed for attachment security beforehand then their heart rate variability increased, suggesting that the compassionate imagery exercise led to their soothing system being activated, as opposed to their threat system.

Their research highlights the importance of recognising how insecurely attached individuals who may respond fearfully to compassionate therapy may benefit from extra support and interventions to help them overcome such barriers. Their finding provides some promise that techniques such as secure attachment priming may help individuals overcome their compassion-based avoidance. However, this area of research is currently considerably unexplored, highlighting the importance of and need for more research investigating new and innovative techniques for overcoming these obstacles.

Virtual Reality

Virtual reality (VR) is the use of computer-technology to create a sensory and psychological experience whereby an individual can interact with an artificial environment which may be similar or different to the real-world. Virtual reality is typically associated with gaming and entertainment purposes however in recent years researchers and psychologists have begun exploring the potential benefits of its use in the assessment and treatment of psychological problems.

Application to mental health settings

Benefits

As the virtual world continues to develop and technological advances allow for the creation of new features, researchers have become increasingly interested in how various elements of VR may enhance psychological assessments and interventions. VR offers researchers the opportunity to manipulate and reliably control features of an environment in ways that are not possible in real-world psychological experiments. This is particularly important in psychological research which aims to determine causal relationships between different variables. VR design enables manipulation of specific variables and control for other, extraneous variables, thus providing more robust methodological rigor. In addition to this, being able to tailor-make virtual environments and avatars (computer-generated representations of people/entities) means that VR experiences can be designed to match

individual needs, something particularly important in the context of psychological therapy. For example, Rizzo et al. (2010) developed customised VR simulations which mirrored combat situations experienced by soldiers with post-traumatic stress disorder (PTSD). Individuals were able to edit and adjust features of the combat environment which felt most relevant to them in relation to their trauma which aided exposure and reliving PTSD interventions.

VR technology is also able to efficiently and easily capture and record real-time data of participants' behaviours and interactions in a virtual environment. For example, eye-tracking software, which is a useful source of information in researching cognition and some psychological constructs, can be integrated into VR. Perhaps the most compelling benefit of VR in this field is the fact that for most individuals, it is a novel, exciting and engaging experience. In the context of mental health difficulties where many people struggle with motivation and poor concentration, VR may offer a more interesting, memorable and enjoyable experience in comparison to traditional psychotherapy. One study investigating the use of a VR attention-deficit/hyperactivity disorder (ADHD) assessment tool found that young people rated this process as significantly more enjoyable than an alternative, computerised measure of attention (Pollak et al., 2009).

Limitations

Whilst the use of VR in psychological assessment and treatment is exciting and promising, research is still limited and the existence of evidence-based interventions and appropriate virtual software and programs, even more limited. In their review on the clinical use of VR in the context of mental health, Bell et al. (2022) highlight the lack of commercially available, evidenced-based VR programs for use by clinicians in mental health settings. They point out

that programs which are available to buy are not safely tried and tested and there is limited available information regarding their effectiveness. Whilst VR has been available for a number of years now, it is still extremely costly. The price of new headsets is decreasing but the cost to design, implement and test new software may fall outside the budget of most mental health teams in the National Health Service, a concern shared by therapists (Segal et al., 2011).

Chung et al. (2022) conducted semi-structured qualitative interviews with multi-disciplinary clinicians in psychiatric care in Australia regarding their views on the implementation of virtual reality in this setting. Staff highlighted a number of possible barriers to implementation of VR including safety and ethical concerns, negative staff attitudes towards technology and the need for further staff training and clinical guidelines around the use of VR in psychiatric care. Similarly, Segal and colleagues' investigation of therapists' perceptions of virtual reality use in therapy found that they viewed cost as the biggest barrier to effective use, highlighting monetary costs, technical costs and cost and time of training clinicians to use equipment. The researchers note, however, that all of these costs are and should continue to reduce over time with advancements in technology and continued research in the area. Importantly, overall, therapists believed that the potential benefits of VR in psychotherapy outweigh the potential costs (Segal et al., 2011).

Current use of VR in psychological therapy

In the last three decades, although application is still very rare, research into the efficacy and feasibility of VR use in the assessment and treatment of psychological problems, continues to grow (see Emmelkamp & Meyerbroker, 2021 for a review). At present, VR use has been

explored for the assessment of ADHD (Areces et al., 2018), social anxiety disorder (Powers et al., 2013; Kampmann et al., 2018), obsessive compulsive disorder (Kim et al., 2010 & 2012), post-traumatic stress disorder (Dibbets & Schulte-Osterman, 2015; Schweitzer et al., 2018), psychosis (see Rus-Calafell et al., 2018), eating disorders (see De Carvalho et al,. 2017) and addictions (Segawa et al., 2020). In terms of treatment, the use of VR has been explored for cognitive and social skills training for individuals with neurodevelopmental disorders (Didehbani et al. 2016; Kandalaft et al. 2013; Bioulac et al., 2020), in psychosis (Du Sert et al., 2018), addictions (Lee et al., 2009), substance abuse and smoking (Mellentin et al. 2017; Park et al., 2014), eating disorders (Clus et al., 2018) and hoarding (St-Pierre-Delorme & O'Connor, 2016). Most research in this area however has been focused on anxiety disorders (Kampann et al., 2016) and in particular, exposure therapy for specific phobias (e.g., Campos et al., 2019; Gujjar et al., 2019).

Exposure therapy is the first line treatment for a range of anxiety disorders (Steinman et al., 2015), in particular, specific phobias (fear of a specific situation or entity over and above the objective level of threat). Exposure therapy involves an individual repeatedly exposing themselves, usually *in vivo* (in real life) to the situation or object that they fear, so that over time, their anxiety gradually decreases. Exposure therapy has a vast evidence-base and its effectiveness is supported by findings consistently showing large effect sizes (Böhnlein et al., 2020). Accepted psychological mechanisms underpinning the effect of exposure for reducing fear are habituation and extinction, modification of unhelpful beliefs and emotional processing (Clark, 1999). Despite its effectiveness however, some therapists and patients struggle with *in vivo* exposure as it can be time-consuming, costly and practically challenging (Neudeck & Einsle, 2012) depending on the specific fear someone has. For example, for patients with acrophobia (fear of heights), graded exposure to flying can prove unsurprisingly difficult.

Virtual reality exposure therapy (VRET) offers an alternative to *in vivo* exposure. VR allows for the individualised design and moderation of virtual environments, objects and scenarios feared by an individual. VRET has the advantage over *in-vivo* exposure therapy of continuous access to and control over an environment which may be more time-efficient and beneficial for this type of therapy. Patients frequently fear real life situations which they do not have control over and therefore graded and repeated exposure can be challenging. In VRET, a patient and their therapist can generate and manipulate feared stimuli, for example gradually bringing a feared animal closer to an individual, in a way which is not possible in the real world. A number of studies have found that VRET may be favoured over *in vivo* exposure for individuals with anxiety disorders and may have a reduced drop-out rate. For example, Garcio-palacios et al. (2017) found that when 150 individuals with specific phobias were offered both *in vivo* exposure therapy and VRET that 27% refused *in vivo* exposure therapy whilst only 3% declined VRET. Richard and Gloster (2007) found that therapists, similarly, viewed VRET as 'less aversive' than *in vivo* exposure for patients. VRET may be more appealing to anxious individuals as they fear exposure to the real stimuli more than an artificial environment. Importantly, randomised-controlled trials comparing in vivo exposure with VRET have found no significant differences in effectiveness (Carl et al., 2019). In addition, Opris et al. (2012) found that positive outcomes of VRET can be transferred to real life situations and show good stability over time.

Avatars, embodiment and the proteus effect

Avatars

Another important feature in the application of VR technology in psychotherapy is the use of avatars. Avatars are virtual representations of a person or identity and can be customised and individualised using a range of VR software. Avatars have long been used in the digital world, particularly in online gaming, however more recently researchers and clinicians have recognised how avatars can be used in ways which may aid mental health interventions. Online and commercially available avatar programs like *Second Life* (https://secondlife.com/) and *ProReal* (https://www.proreal.world/) have provided platforms by which individuals can create anonymous avatars which represent themselves in order to engage with peers as well as therapist avatars. Beard et al. (2009) found that in 2008, Second Life featured many health-related activities (68) and peer-support communities for people who felt marginalised by society in their 'first life' or struggled with mental health difficulties such as addiction problems and depression. They hypothesised that the online platform was popular as people could maintain anonymity through their virtual avatar whilst seeking support for sensitive and personal issues. Second Life and ProReal virtual environments have also been used by researchers to deliver online group therapy interventions in which both therapists and patients are represented by avatars. Examples of effective avatar-based interventions include a social skills training program (Kandalaft et al., 2013), acceptance-based behavioural therapy for social anxiety (Yuen et al., 2013) and a relaxation and mindfulness group (Hoch et al., 2012).

Rehm et al.'s (2016) review on the role of avatars in online mental health interventions suggest that there are several avatar functions which aid treatment engagement. They highlight how anonymity promotes treatment seeking in individuals who may struggle, for various reasons, to engage in traditional, face to face psychotherapy. The use of avatars in a virtual environment offer people with physical disabilities, social and communication difficulties and/or people who experience social anxiety a 'safe' platform from which they can explore and practice new skills and develop confidence. Leff et al. (2013) used avatar

technology to design a novel treatment for patients experiencing distressing auditory hallucinations to practice techniques which help them confront and address their voices in a safe and controlled environment. They had patients design avatar entities which represented their persecutory hallucinations which were then controlled and voiced by the therapist but with voice distortions. The therapist and patient were then able to engage in roleplay whereby the therapist acted as the persecutory voice whilst the patient practiced responding to their voice in more adaptive ways. The VR intervention resulted in patients reporting a reduction in the severity of their symptoms, with some reporting a complete remission of their voices.

The ProReal environment provides a space where individuals can explore their identity through the design of both their avatar and virtual environment, utilising creative, alternative methods to express themselves. Van Rijin et al. (2018) found that young people who accessed avatar-based counselling through ProReal reported that the platform enabled them to better express and communicate their feelings to others whilst also developing insight into their own experiences and fostering empathy for the experiences of others.

Embodiment

Another advancement in VR technology utilised in psychological research and therapy is the ability to 'embody' an avatar. Embodiment refers to the illusion in virtual reality that one has ownership over a specific virtual avatar/body – that it operates as your body in the VR. This illusion is achieved using a head-tracked, head-mounted display in which a person views, in first-person perspective, a virtual body in the same place that their body would be, when they look down. In addition to looking down and seeing a body, VR can also synchronise movements of the virtual avatar body (for example the head, hands and arms) with the actual movements of the individual, in real time, so it appears as though the avatar body moves as

their own. A number of VR paradigms also utilise the placement of a mirror in the virtual environment, so that the individual can watch their virtual avatar body move as they do. Slater et al.'s (2010) findings suggest that seeing a virtual body in first-person perspective alone can create the illusion of embodiment (as measured by participants' questionnaire responses and physiological response to threat of the avatar body). This illusion can be further enhanced by synchronised body movements (Kokkinara & Slater, 2014).

Embodiment is a powerful, immersive tool which can generate both physiological and psychological effects in the recipient, depending on the avatar that is embodied. Studies have shown that embodiment enhances personal identification and association with whomever the avatar represents, even when they are very dissimilar in a range of characteristics to the individual. Maister et al. (2014) found that embodying a member of someone's perceived 'outgroup' can lead to a significant reduction in implicit biased attitudes towards that group. Similarly, Peck et al. (2013) found that embodying a black-skinned avatar led to a significant reduction in implicit racial bias in white-skinned participants. Martini et al. (2014) and Matamala-Gomez (2020) found that manipulating the features of virtual limbs that individuals embody can modulate their pain responses whilst Falconer et al. (2013) found that adults who embody the virtual body of a child overestimate the size of objects around them.

One area of research which has increasing interest is the use of embodiment for enhancing the treatment of eating disorders, in particular in people with anorexia nervosa (AN). Keizer et al. (2014 & 2016) found that fully immersing patients with anorexia in the avatar of a female with a healthy body weight significantly reduced the extent to which they over-estimated their own body size. Alongside body image dissatisfaction, a key feature and maintaining belief in anorexia nervosa is the fear of gaining weight. Therapeutic interventions, such as CBT, address this fear using exposure-based techniques including mirror exposure and imaginal exposure (Reilly et al., 2017). Porras-Garcia et al. (2020) used

VR to create an exposure-therapy treatment for a patient with AN who underwent a series of embodiment sessions whereby they were gradually exposed to a simulation of their own body increasing in BMI until a healthy weight was reached. They found that for this patient, the VR exposure intervention led to a significant decrease in their fear of gaining weight and eating disorder symptoms. In 2021, the same researchers conducted a randomised-controlled trial using the same VR intervention alongside treatment as usual for AN (CBT + nutritional rehabilitation). They found that patients who underwent the VR sessions in comparison to the treatment-as-usual patients had significantly larger decreases in their fear of gaining weight and body image dissatisfaction following treatment and at follow up.

The proteus effect

One explanation for some outcomes of avatar embodiment is the proteus effect. The proteus effect describes the phenomenon whereby individuals take on the characteristics (beliefs, attitudes and behaviours) of their avatar, both in and outside of the virtual setting. Yee et al. (2007, p.274) argue that in the virtual world, 'the avatar is the primary identity cue'. They suggest that avatar users derive cues about how they might be expected to act based on the appearance and identity of their avatar. The proteus effect has elicited a range of attitudes and behaviours from a diverse mix of avatar identities in different virtual contexts. Pena, Hancock and Merola (2009) conducted two experiments where they found participants who controlled avatars dressed in Ku Klux Klan (KKK) outfits subsequently developed more aggressive intentions and behaviours than participants who controlled avatars dressed as doctors. Another study found that when individuals embodied older adult avatar bodies, they took significantly longer to walk a set distance following the VR session than people who embodied younger avatars, regardless of their actual age or characteristics (Reinhard et al.,

2019). Amongst other effects, avatar self-representation has been found to influence dating choices (Yee & Bailenson, 2009), dietary decisions (Sah et al., 2017), physical activity (Pena & Kim, 2014), financial risk-taking (Hershfield et al., 2011), racial bias (Peck et al., 2013) and body image (Jih-Hsuan, 2021). A meta-analysis of studies investigating the effect concluded that it is a reliable phenomenon with a relatively consistent effect size (.22 - .26), accounting for variance (Ratan et al., 2019).

Theoretical Underpinnings

Jeremy Bailenson and Nick Yee, researchers at Standford University's Virtual Human Interaction Lab, were the first to coin the proteus effect in their seminal paper in 2007. They draw upon self-perception theory (Bem, 1972) to explain the phenomenon. Self-perception theory suggests that people develop their opinions and attitudes based on observing their own behaviour, as if from a third-party point of view and thus infer what they might believe, based on their actions. Yee and Bailenson argue that a similar process may take place when a person's self-representation changes in the context of their avatar in a virtual environment and that this process might be heightened due to deindividuation. In Zimbardo's (1969) famous prison experiment, we see how anonymity may lead individuals to behave in ways which are increasingly dissimilar to their own beliefs or characteristics as they draw more heavily on identity cues (e.g., prisoner versus guard uniform) to determine how they might be expected to act. They suggest that deindividuation may occur in digital environments where people remain anonymous or represented only by their avatar. In such a scenario, an avatar is not only a uniform which is worn but instead represents an entire identity and becomes the primary cue of which to infer identity (and associated beliefs and behaviours).

Pena et al. (2009) suggest that the proteus effect takes place as a result of priming. They argue that people, without conscious awareness (Bargh et al., 1996), automatically draw on schemas and stereotypes to determine what attitudes or behaviours their avatar might exhibit and act in accordance with these. Ratan et al. (2019) propose a compelling explanation which considers both self-perception theory and schema activation. They suggest that users go through a process of comparison/association between the views and behaviours of themselves and those expected of their avatar's identity. They argue that someone is more likely to act in accordance with the characteristics of their avatar identity, the closer they feel to their avatar (through personal identification, embodiment, self-presence etc.). Their theory is supported by studies which have found the proteus effect is stronger or moderated by factors such as matching physical characteristics of self and avatar (Ratan & Dawson, 2016; Navarro et al., 2022) and personal customisation of avatar (Ratan & Sah, 2015).

Embodying compassion in virtual reality

As described above, the various features and subsequent effects of virtual reality provide promising possibilities for its use in addressing challenges faced by both therapists and patients in traditional psychotherapy interventions. In particular, the ability to manipulate the virtual environment and the components within it (including avatars) as well as the interactive, novel experience which VR offers, are compelling factors which add to its appeal. Based on this, it seems logical that the use of virtual reality in tackling the aforementioned obstacles to compassion is an area worth exploration.

One group of researchers have begun to explore the potential use of virtual reality, specifically embodiment, in targeting self-compassion and self-criticism. Falconer et al.

(2014) created an immersive virtual reality paradigm whereby individuals gave compassion and then received the same compassion back, for themselves. They recruited 43 healthy female undergraduates who scored highly on a measure of self-criticism and assigned them randomly to one of two conditions for the VR scenario. All volunteers were given psycho-educational material concerning compassion and supported to learn a three-step, compassionate response which included validation, redirection of attention and positive memory activation. Volunteers then entered into a virtual environment where they sat on a chair opposite a small child, embodied in an adult avatar body. In this environment, the child became distressed and began crying and the volunteers were instructed to use their compassionate script to respond to and reassure the child, at their own pace. As they did this, their responses, including their voice and body movements, were recorded and the child was programmed to gradually appear less distressed. In the final stage of the scenario, volunteers in one condition (the first person-perspective condition) were then re-embodied in the child's body, sat opposite their original adult avatar body. In the other condition (third person perspective condition) the volunteers observed, from a third-party perspective, the child and adult avatar bodies sat opposite one another. From the volunteers' new perspectives, the recording of them giving compassion was then replayed, thus creating an indirect experience of self-compassion.

The researchers found that following the experiment, all volunteers reported a significant reduction in self-criticism. For the volunteers who received compassion from a first-person perspective, embodied in the child's avatar body, they also reported significantly increased feelings of self-compassion and safety following the intervention. Falconer et al. (2016) replicated the study on a clinical population of patients with depression, with all participants experiencing compassion when embodied in an avatar body. In this study, fifteen adult patients, recruited from an NHS psychological therapy service, experienced three repetitions

of the IVR scenario at one-week intervals. Following the intervention, patients reported a significant decrease in depressive symptoms and self-criticism as well as a significant increase in self-compassion (between baseline and at a four-week follow-up).

The studies demonstrate promising results for the potential future use of VR in this way for clinical populations who are highly self-critical and struggle with self-compassion. However, given that we currently know little about the use of VR in this context, further replication and exploration of the intervention is important. The studies thus far have used the same generic avatars which all volunteers have been embodied in and whilst embodiment appears to enhance the positive effects of the study, little is known about the impact of different avatar bodies, appearances, or identities in this context. As discussed, it has been identified that there are strong positive correlations between people with an insecure attachment style and difficulties with self-compassion as well as high levels of self-criticism amongst those diagnosed with an eating disorder. Such difficulties make this population appropriate candidates to benefit from a compassionate VR intervention but at the same time poses additional risks and vulnerabilities. Although speculative, it is possible that highly self-critical people and/or those with body image concerns may have adverse reactions to embodiment of certain avatars. It therefore seems important to explore the potential use of different avatar identities on the outcomes of the compassionate VR intervention, initially in a non-clinical, healthy population.

Cultivating compassion with the proteus effect

The current study aims to investigate if, in line with the proteus effect, embodying different avatar identities affects people's ability to be compassionate and subsequently impacts outcomes of the virtual reality intervention. Often in compassion-focused interventions,

people are encouraged to get into the role of their 'compassionate self'. Therapists support people to think about the key qualities and traits of compassion and use guided imagery techniques to support people to embody such a person or such a part of themselves. When people struggle with this, as they do, they might also be encouraged to use a 'fake it 'till you make it' type of approach. To hold in mind a person they see as compassionate, who embodies and emulates compassion and use acting techniques to play the role of this person and how they might expect them to act.

It is possible that embodying a compassionate person in virtual reality may provide a more appealing 'short-cut' to achieving the same outcome. For example, one recent study (Osimo et al., 2015) investigated the use of 'body-swapping' in virtual reality to create a self-counselling experience, whereby participants alternated between the position of 'therapist' and themselves to self-counsel. They found that when embodied in the counsellor position in an avatar of Sigmund Freud as opposed to an avatar that represented themselves, there was a significant improvement in their mood following the experience.

Aims of empirical study

This study aims to explore the potential impact of embodying different avatar identities on people's experiences of compassion in an adapted replication of Falconer et al's immersive virtual reality paradigm. The study will use the same protocol as before, with two experimental conditions. In one condition, participants will be embodied in the avatar of someone they view as highly compassionate and in the other condition they will embody someone they view as uncompassionate. The study will invite participants to identify celebrities to embody whom they personally perceive as compassionate, given that

compassion means different things to different people. Avatars will then be individually designed to match participants' chosen compassionate or uncompassionate identity. The dependent variables will be measures of self-criticism and self-compassion, fears of compassion, compassionate engagement and action scales and mood (different forms of positive and negative affect). The study will also investigate whether or not participants' attachment style moderates any experimental effects. Aims are further operationalised in the empirical paper (see chapter 2 of this thesis) and specific hypotheses are outlined.

Based upon previous research findings and in line with the proteus effect, the study aims to investigate the following research questions:

1. Can the immersive virtual reality (IVR) intervention reduce self-criticism and increase self-compassion?

2. Can indirect exposure to self-compassion through the IVR intervention reduce people's fears of compassion?

3. Can the IVR intervention increase people's positive emotions and reduce negative emotions?

4. Will embodying a compassionate celebrity trigger the proteus effect, making it easier to engage in a compassionate exercise and thus enhance the positive outcomes of the intervention?

5. Will the IVR compassionate intervention be harder for people with an insecure attachment style and lead to less positive emotions following the experience?

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Part Two

Empirical Paper

"Embodying Compassion in Virtual Reality using Celebrity Avatars"

Abstract

Objective

The study aimed to investigate the use of a virtual reality paradigm in facilitating self-compassion for self-critical people, embodied in compassionate or uncompassionate celebrity avatars. Specifically, the study explored if this intervention could help reduce people's self-criticism, negative affect and fears of compassion and increase self-compassion, motivation to act compassionately and positive affect. It was predicted that embodying the avatar of a compassionate celebrity would trigger the proteus effect and thus enhance the positive outcomes of the intervention.

Method

Forty-eight participants who scored highly on a measure of self-criticism were randomly assigned to embody either a celebrity they perceived as highly compassionate or uncompassionate. They were given psycho-educational material concerning compassion and were supported to write a compassionate script. Participants then engaged in a virtual reality scenario where, embodied as a celebrity, they gave compassion to a distressed child before a recording of this compassion was played back to them whilst re-embodied as the child. All participants completed measures of compassion, self-criticism and positive and negative affect before and after the virtual reality intervention.

Results

Following the intervention, participants in both conditions reported significantly reduced fears of compassion and self-criticism and significantly increased self-compassion, self-reassurance and motivation to be compassionate to themselves and others. Contrary to predictions, there was no significant difference in outcomes between participants who embodied a compassionate or uncompassionate celebrity. There was no significant change in

positive and negative affect following the intervention however an insecure attachment style was predictive of experiencing less relaxed and safe/warm emotions following the compassionate scenario.

Conclusion

The study provides promising results for the application of a virtual reality intervention in helping self-critical people cultivate compassion for themselves and reduce their fears of compassion. This area of research however is in its infancy and further studies investigating the longer-term use of the intervention in clinical populations is important. Researchers and clinicians should hold in mind that for people with attachment difficulties, the use of VR in this context should be proceeded with additional support and sensitivity. The findings suggest that the identity of the embodied avatar (compassionate or not) does not impact the positive outcomes of this intervention. Possible explanations for failure to evidence the proteus effect are discussed.

Introduction

The psychological process of excessive self-criticism is known to be a key factor in the vulnerability to and maintenance of a range of mental health problems (Hewitt & Flett, 2002). Conversely, the capacity to positively relate to oneself and respond to one's own suffering with self-compassion is associated with increased positive affect, reduced negative affect and an increased ability to tolerate distress (Lutz et al., 2004; Neff & Vonk, 2009; Allen & Leary, 2010). It therefore makes sense that there is growing evidence for the effectiveness of therapies which aim to increase individuals' capacity for compassion (to the self, from and to others) in reducing mental health symptomology (Craig et al., 2020).

Compassion-focused therapy (CFT) draws upon eastern Buddhist traditions where compassion is seen as central to psychological wellbeing and something which can be developed and practiced. This therapeutic approach recognises that tuning into and cultivating our 'compassionate selves' is a powerful therapeutic tool. CFT helps individuals engage with, turn towards and tolerate distress through a range of techniques including mindfulness, compassionate thought challenging and imagery. A recent meta-analysis of compassion-based therapeutic interventions found that this approach is effective in improving self-compassion and reducing depression and anxiety in clinical and subclinical populations (Wilson et al., 2019).

There are, however, many people who struggle with developing and practicing some of the therapeutic techniques, for example using imagery to cultivate self-compassion or bringing to mind past experiences of receiving compassion to induce associated feelings. For some people, limited exposure to or experience of compassion in the past, negative beliefs about

compassion and feeling underserving or fearful of compassion can block them from the potential benefits of these interventions (Gilbert et al., 2011).

Gilbert coined these difficulties the 'fears, blocks and resistances' to compassion (FBRs). Fears of compassion refer to when people would like to be compassionate but are afraid of possible negative consequences of doing so, such as 'I will become weak; people will take advantage of me'. Blocks are things that get in the way of someone being compassionate such as being 'too busy to practice self-compassion' or having other competing demands on time. Resistances are when people are not fearful or blocked but make a decision that they do not want to engage in compassion, for example feeling that someone (or themselves) does not deserve compassion. Although Gilbert defines FBRs as distinct difficulties, he acknowledges that they frequently overlap and influence one another.

As compassion can 'flow' in three different directions (to the self, to others and from others), some people find that they have more difficulty with different flows. Gilbert et al. (2011) found that fears of self-compassion and compassion from others are positively correlated with an anxious attachment style. This fits with attachment literature (Mikulincer & Shaver, 2005, 2007) which suggests anxiously attached individuals may fear both the affiliation with and subsequent abandonment of a person whom they receive compassion from. For individuals with histories of abuse and/or neglect, receiving compassion (from themselves or others) can 'switch on' the affiliative system associated with these traumatic and painful memories and trigger a threat response (Rockliff et al., 2008). This is particularly relevant for individuals who may have experienced developmental, relational trauma and may have learnt that others cannot be relied upon to give compassion or compassion is tied up with experiences of abuse. As a result, they may have developed negative beliefs about compassion as an understandable protective strategy, but one which no longer serves them. It is therefore important for the

continuous development of new and alternative therapeutic techniques which might help individuals overcome such blocks.

The use of Virtual Reality (VR) in the assessment and treatment of mental health problems continues to grow and there is increasing evidence that it can be an effective alternative or addition to existing therapeutic interventions (e.g., Freeman et al., 2018). Falconer et al. (2014, 2016) were interested in whether VR could be used to facilitate the experience of self-compassion. They created an immersive virtual reality (IVR) paradigm which used embodiment (experiencing the illusion of ownership of a virtual avatar's body) to create a scenario in which volunteers both gave compassion and received self-compassion.

In this scenario, volunteers embodied an adult avatar and were taught a compassionate script which they used to reassure a distressed child who appeared sat in front of them. Following this, the volunteers then embodied the child and were played a virtual video recording of themselves as the adult (sat opposite them) offering compassion. This virtual experience of self-compassion resulted in reduced self-criticism and increased self-compassion in both a clinical and non-clinical population as well as inducing feelings of safety and reducing severity of depressive symptoms. These findings suggest that IVR could provide a promising alternative intervention for cultivating self-compassion, particularly for individuals who struggle to use imagery-based techniques.

One of the key aspects of compassion-focused therapy is the cultivation and development of one's 'compassionate self' (Irons & Beaumont, 2017) in which compassion is seen as an identity. People are encouraged to think about the key qualities and traits of compassion and use personal memories of compassion alongside acting techniques to help get into the 'role' of their compassionate selves. Again, whilst many people benefit from these therapeutic techniques, there are some who struggle to implement them and their FBRs to compassion

can undermine their efforts. The use of embodiment through virtual reality could provide an alternative to 'acting' in which individuals are able to embody a compassionate person and potentially take on their compassionate traits (with minimal effort or acting skill).

'The Proetus Effect' describes the phenomenon whereby an individual acquires the attitudes, beliefs and behaviours of their virtual avatar, in some cases regardless of how similar or different they perceive this avatar to be to their actual self (Yee & Bailenson, 2007). For example, embodying a stereotypically attractive avatar made people more confident interacting with others (Messinger et al., 2008), whilst controlling an avatar dressed in a Ku Klux Klan outfit generated more aggressive thoughts (Peña & Kim, 2014). Osimo et al. (2015) used IVR to recreate a 'self-counselling' paradigm and found that when volunteers embodied the avatar of Dr Sigmund Freud (compared to a self-representation avatar) their mood improved. It therefore seems plausible that the proteus effect could provide an aid for individuals who struggle to be compassionate, if they were to embody a person they perceived as compassionate.

As Falconer et al.'s (2014; 2016) compassionate virtual reality intervention has shown promise for both non-clinical and clinical populations, it is important to explore the potential impact of different avatar identities on individuals, should this be implemented in future use of the intervention. This study will use an adaptation of Falconer's IVR paradigm to investigate if embodiment of someone *perceived as compassionate* by the individual could help cultivate 'the compassionate self' and thus facilitate self-compassion. The study will invite volunteers to choose a celebrity whom they perceive as highly compassionate and use VR technology to create a virtual avatar of this person which the volunteer embodies. Volunteers will either be embodied in a celebrity they have chosen as highly compassionate, or a celebrity they perceive as uncompassionate. It is predicted that the proteus effect will be

more likely to take effect if volunteers embody avatars which represent extremities of compassion.

This study hopes to replicate and provide support for current findings that the compassionate IVR intervention can increase self-compassion and reduce self-criticism. Falconer's (2016) study in a clinical population showed that over time, there was a linear reduction in people's fears of compassion, however this did not reach significance. This study will investigate if this effect might be found in a larger, non-clinical sample. In addition, it will investigate if the intervention can additionally affect an individual's motivation to act compassionately (to the self and others) using the compassionate engagement and action scales (CEAS). The study will also investigate if embodying different avatars has any effect on the outcomes of the intervention for participants. Based on the proteus effect, it is predicted that participants who embody a celebrity whom they perceive as compassionate, will benefit significantly more from the intervention than those in the body of an uncompassionate person. In addition, the study will investigate whether or not participants' attachment style moderates any experimental effects. It is predicted that individuals who report ideologies associated with a secure attachment style, as measured by the adult attachment questionnaire, will experience more positive emotions following the intervention. Specifically, attachment style may moderate participants' reporting of safe/warmth affect following the intervention, given that this emotion is associated with the affiliative system and activated through the experience of compassion (Gilbert, 2020).

To summarise, the following study outcomes are predicted:

Hypothesis 1: Following the virtual reality intervention, participants ratings of self-compassion, compassionate engagement and action and self-reassurance will significantly increase.

Hypothesis 2: Following the virtual reality intervention, participants ratings of self-criticism, forms of self-criticising/attacking and fears of compassion will significantly decrease.

Hypothesis 3: Following the virtual reality intervention, participants different types of positive affect will increase and negative affect will decrease.

Hypothesis 4: The above predicted changes will be moderated by the experimental condition the participant is in. Participants embodied in a compassionate avatar will experience significantly more positive changes following the intervention than those embodied in an uncompassionate avatar.

Hypothesis 5: Changes in participants' affect following the intervention will be moderated by their attachment style. Specifically, attachment style will have the biggest impact on changes in participants safe/warmth affect (associated with the attachment system).

Method

Participants and experimental design

The study used a mixed-model experimental design where measures of interest (e.g., self-criticism) were compared over time (pre and post IVR intervention) between two conditions. The between subjects condition was the type of avatar the participant was embodied in throughout the VR experience – either a celebrity/public figure they perceived as compassionate (condition 1) or a celebrity they perceived as not compassionate (condition 2). The dependent variables were measures of self-criticism and self-compassion, fears, blocks and resistances to compassion, forms of self-criticising/attacking and self-reassurance,

compassionate engagement and action scales and mood (both positive and negative affect). As the study partially replicated Falconer's (2014) study design and IVR paradigm, 18 participants per group were deemed sufficient to detect a large effect size (Cohen's f = 0.35, alpha = 0.025, beta = 0.2). The study therefore aimed to recruit 24 participants in each condition to allow for errors.

Participants were recruited from a university Psychology Department subject pool using the Sona database and were offered either financial reimbursement or course credits for their participation in the study. As in Falconer's study, participants were first asked to complete the forms of self-criticising/attack and reassuring (FSCSR) scale online. If they met the high self-criticism criteria (scoring above 20 on the Inadequate Self subscale of the FSCSR they were invited to take part in the study. Self-report of current treatment for a mental health problem, physical mobility disabilities, epilepsy (or other neurological conditions) and a history of motion-sickness were all exclusion criteria.

Forty-eight participants participated in the study (mean age = 22.6 years, *SD*=6.4). Thirty-seven participants identified their gender as female and eleven participants identified as male. Sixteen participants identified their ethnicity as Chinese, twelve identified as White, eight Indian, three mixed (White and Asian), three 'Asian', two European, two Hong Kong and one Black African. Participants were randomly assigned into one of the two conditions – twenty-five participants completed the compassion avatar condition and twenty-three participants completed the non-compassionate avatar condition.

Measures

Self-Compassion and Self-Criticism Scale (SCCS). The SCCS (see Falconer et al., 2013, Manuscript S1) was used to measure state self-compassion and self-criticism. The scale comprises of five scenarios which are potentially self-threatening and could elicit different

degrees of self-criticism or self-compassion (e.g., “you have just received a failed test result”). Participants are instructed to imagine, as vividly as possible, that these scenarios are happening to them at the current moment and rate on 7-point Likert scales (1 = not at all to 7 = highly) the extent to which they would react to themselves in a Harsh, Contemptuous, Critical, Soothing, Reassuring, and Compassionate manner in relation to each imagined scenario. The scale is separated into two subscales. Positive items are summed across scenarios to generate the Self-Compassion Scale (range 15–105) and negative items are summed to generate the Self-Criticism Scale (range 15–105). The scale has good internal reliability with Cronbach’s alphas of.91 and.87, respectively.

International Positive and Negative Affect Schedule, Short Form (I-PANAS-SF; Karim, 2011). The 10-item I-PANAS-SF is a cross-culturally reliable and briefer version of the original PANAS. It was used to measure positive and negative affect. Participants rate how strongly they are currently experiencing a particular emotion on a 5-point Likert scale (1 = not at all to 5 = very much so). Cronbach’s alphas for the PA and NA scales are.78 and.76 respectively [27].

Three Forms of Positive Affect Scale (TFPAS; Gilbert et al., 2008). The TFPAS was used to measure positive affect. The scale measures the extent to which participants experience 18 different positive emotions. Factor analysis has revealed three potential forms of positive affect: Active Affect (e.g., energetic, excited), Relaxed Affect (e.g. relaxed, calm) and Safe Affect (e.g. content, warm). This scale allows for a better approximation of affect systems which are associated specifically with self-compassion. Participants rate on a 5-point Likert scale (1 = not at all to 5 = very much so) how strongly they are experiencing these emotions at the current time. There are 4 Safe Affect items (range 4–20), 6 Relaxed Affect items (range 6–30), and 8 Active Affect items (range 8–40). The authors reported a Cronbach’s alpha of.83 for Active and Relaxed Affect, and.73 for Safe Affect.

Forms of Self-Criticizing/Attacking & Self-Reassuring Scale (FSCRS; Gilbert et al., 2004). The FSCRS [25] was used to measure self-criticism and self-reassurance. Participants indicate on a 5- point Likert scale the extent to which various statements are true of themselves (0 = not at all like me to 4 = extremely like me). The scale comprises three subscales: inadequate self (IS, range 0–36; e.g. ‘‘There is a part of me that feels I am not good enough’’), hated self (HS, range 0–20; e.g. ‘‘I stop caring about myself’’), and reassured self (RS, range 0–32; e.g. ‘‘I find it easy to forgive myself’’). The scale has high internal reliability, with Cronbach’s alphas of.90 for IS, and.86 for HS and RS scales. The scale has been validated in both healthy and clinical populations (Gilbert et al., 2004).

Fears of Compassion Scales (FCS; Gilbert et al., 2011). The Fear of Compassion Scales were used to measure participants fears and blocks to compassion (to self, from others, to others). Three related scales assess traits consisting of fear of experiencing compassion for oneself (15 items: e.g., ‘I fear that if I am more self-compassionate I will become a weak person’), fear of receiving compassion from others (13 items: e.g., ‘When people are kind and compassionate towards me I feel anxious or embarrassed’) and fear of experiencing compassion for others (10 items: e.g., ‘People will take advantage of me if they see me as too compassionate’). All items are rated on a 5-point scale from 0 (‘don’t agree at all’) to 4 (‘completely agree’). High internal reliability (coefficient alpha 0.78–0.85) and validity data have been reported (Gilbert et al., 2011).

Compassionate Engagement and Action Scales (CEAS; Gilbert et al., 2017). The compassionate engagement and action scales were used to measure participants motivation to compassionately engage with suffering and to take compassionate action (to the self, to others or from others). The questionnaire consists of three scales with two sections: (1) Engagement: questions to measure motivation to engaging with pain/distress (paying attention to and making sense of) and (2) Action: questions to measure compassionate and helpful responses

aimed at alleviating distress. Participants rate items on a 10-point Likert scale from 1 to 10, where 1 is “never” and 10 is “always”. Cronbach´s alpha for the different subscales reported as 0.72-0.94.

Revised Adult Attachment Scale (RAAS; Collins, 1996). This 18-item scale measures three attachment dimensions. ‘Close’ measures ease of getting close to others, ‘Depend’ measures abilities to depend on others, and ‘Anxious’ measures degree of worry about abandonment. Respondents are asked to rate on a Likert scale 1–5 how characteristic each statement is of them. In an undergraduate sample, the Cronbach's alphas were .77, .78, and .85 for close, depend, and anxiety subscales, respectively.

Open-ended Qualitative Question. Participants were asked the following question after the virtual reality intervention and were required to provide a response with a minimum of 100 characters. “Please describe your experience of compassion after taking part in the virtual reality activity”.

Virtual Environment

The virtual reality scenario was delivered using an Oculus Quest headset (Meta Platforms Iinc.) running software specifically developed for the task by Virtual Bodyworks S.L., Barcelona. Avatars were created using Character Creator 3 with the Headshot plugin (Reallusion Inc.) and public domain photographs of the celebrities taken from Google Image Search.

Ethics Statement

All procedures and materials were approved by the University College London Psychology and Language Sciences ethics committee (CEHP/2021/587, see appendix. A). Written

informed consent was obtained from all participants (see appendix. B, C & D for participant information sheet and consent forms, respectively). Participants were made aware that they could withdraw from the study at any time, and all data was managed according to UCL policies and the Data Protection Act 2018.

Procedure and Materials

As noted above, participants who met the high self-criticism criterion (above 20 on the Inadequate Self subscale of the FSCSR) were invited to take part in the virtual reality study. Participants who signed up to participate in the study were then randomly allocated to one of the two experimental conditions – embodying a celebrity avatar they perceived as compassionate (condition 1) or embodying a celebrity avatar they perceived as not compassionate (condition 2).

Condition one (compassionate celebrity) – participants assigned to this condition were emailed the following question: '*Please could you think of a public figure/famous person who you think of as highly compassionate?* Please choose a person who has the same gender that you identify with*'.*

Condition two (non-compassionate celebrity) – participants assigned to this condition were emailed the following question: '*Please could you choose the celebrity below who you think is the least compassionate?* Please choose a person who has the same gender that you identify with.' They were given the following list of people in the public eye, selected through informal community discussions: Priti Patel, Kanye West, Johnny Depp, Kendall Jenner, Tom Cruise, Justin Bieber, Jackie Chan, Will Smith, Simon Cowell, Margaret Thatcher, Gwyneth Paltrow and Naomi Campbell.

See figures 1- 4 for example celebrity avatars from each condition.

All participants were also emailed additional information about the study, consent forms and safety information. Upon arrival, participants provided written informed consent and then completed the TFPAS, IPANAS-SF, SCCS, CEAS, FSCRS, FCS and the RAAS (see appendix. E for all questionnaires used).

Participants were then asked to watch a psycho-educational PowerPoint presentation (with audio commentary) concerning compassion from a compassion-focused therapy perspective (see appendix. F). The PowerPoint provided definitions of compassion, qualities of 'the compassionate self' and examples of what compassion may look like. Following the presentation, participants were given both verbal and written instructions about the virtual reality task and what to expect. Participants were given a written worksheet (appendix. G) which outlined a staged approach to offering compassion and reducing distress from a compassion focused therapy perspective. They were encouraged to use this worksheet to write their own 'compassionate script' which they would then recite in the VR simulation.

Participants were introduced to three essential stages for giving a compassionate response:

1. Validation: *The aim of this stage is to acknowledge that the other person is upset, that you do not judge them for this, and that it is perfectly acceptable for them to react in this way.* *This stage could be compared to 'sensitivity to suffering in self and others' in the definition of compassion – choosing to recognise how someone is feeling and turn towards that suffering.*

2. Redirection of Attention: *The aim of this stage is to direct the other person's attention towards something that is more positive, soothing, and comforting.*

3. Memory Activation: *The aim of this stage is to suggest that the person could try to recall a memory of a person who loves or is kind to them. This memory is supposed to instil more positive feelings of warmth, comfort, and safety.*

Participants were given suggested example sentences which corresponded to each of these three stages however were encouraged to write responses in their own words. They were then instructed to memorise their compassionate script as best as they could to deliver to the child in a soft, slow, compassionate manner, trying to embrace their 'compassionate self'. Participants were informed that the distressed child in the VR stimulation was able to hear what they were saying and would react accordingly however could not talk back or answer any questions such as 'what's wrong?'. Participants were offered the opportunity to practice their lines with the researcher if they wished.

After this, participants were fitted with the VR headset and headphones and guided through the intervention at their own pace. The first stage of the VR session (see figure 1 & 2) gave participants the time to become accustomed to the virtual environment and their body using an embodiment exercise. This exercise guided the participants through a series of movements including moving their upper body around, waving their hands, looking down at their body and watching themselves in the mirror to become accustomed to themselves as the celebrity avatar they were embodied as. This stage lasted roughly three minutes.

In the second stage of the VR session, participants were informed that the girl sat on the stool in front of them was going to soon become distressed and start crying. At this point, participants were aware that their responses to the child would be recorded and were encouraged to slowly recite the compassionate script they had prepared to try to soothe the child in distress. Participants did this at their own pace. The researcher programmed the child to respond positively to the participants' compassionate responses by gradually becoming visibly and audibly less distressed. For example, at first the child was hunched over, crying loudly into their hands. Next, the child began to move their hands away from their face and to slowly sit up straight, appearing to listen to the participant. The child then began to cry less, sniffling rather than sobbing as they took in the compassionate words from the participant.

Finally, the child sat up straight, was no longer crying and was nodding to show that they heard the words they were being told.

In the third stage of the VR experience, participants were switched ("re-embodied") into the avatar of the young girl and sat opposite the celebrity avatar they had previously embodied (see figure 3 & 4). As before, participants were given time to become accustomed to their new body and completed the three-minute embodiment exercise, now from the perspective of being in the girl's body.

Finally, the participants were then played back the recording of themselves being compassionate to the distressed girl in the celebrity avatar body from their new perspective as the child. The recording was a real-time replay of their original adult avatar delivering compassion; including their own body movements and voice delivering the compassionate script they had prepared. Participants were instructed to sit, look and listen so that they could experience the same compassion they had given the girl, for themselves.

Participants then exited the VR and completed the SCCS, IPANAS-SF, TPAS, CEAS, FSCRS and FCS again. In addition, participants were asked to describe their experience of compassion after taking part in the virtual reality activity in at least 100 words. Participants were given the opportunity to talk to the researcher about their experience if they wished, ask any questions and were fully debriefed and reimbursed for their participation (see appendix. H).

Figure 1. *Stage 1-Embodying Aleksandr Solzhenitsyn in the 'compassionate avatar' condition*

Figure 2. *Stage 1-Embodying Priti Patel in the 'uncompassionate avatar' condition*

Figure 3. *Stage 3-Reembodied as the child listening back to recording of compassion*

Figure 4. *Stage 3- Reembodied as the child listening back to recording of compassion*

Results

Differences between conditions at baseline

Independent t-test analyses showed that there were no significant differences between the two groups (in condition 1 or 2) at baseline across all measures (iPANAS, TFPAS, FOC, SCCS, CEAS & FSCRS). There were no significant differences amongst participants who identified as either male or female at baseline across all measures.

Convergent validity checks

Correlations at baseline with attachment scales

See Table 1. for Pearson's correlations between attachment subscales, 'close', 'depend' and 'anxiety' and measures of compassion.

In line with existing research (Gilbert, 2011), there was a strong positive correlation between fear of self-compassion and receiving compassion from others with the anxiety about relationships subscale of the adult attachment questionnaire ($r(46) = -.52$, $p < .001$; $r(46) = -.61$, $p < .001$). Fitting with this, there was a strong negative correlation between fear of compassion to self and from others and 'close' and 'depend' attachment subscales which measure comfortableness with closeness with others and depending on others. Negative correlations between fear of self-compassion and receiving compassion from others with 'close' subscale of attachment were $r(46) = -.52$, $p < .001$ and $r(46) = -.66$, $p < .001$, respectively. Negative correlations between fear of self-compassion and receiving compassion from others with 'depend' subscale of attachment were $r(46) = -.7$, $p < .001$ and $r(46) = -.68$, $p < .001$, respectively.

In addition, and as expected, fear of compassion *for* others was negatively correlated with comfortableness with closeness and dependence on others ($r(46) = -.35$, $p = .016$; $r(46) = .45$,

p = .001) but had no significant correlation with anxiety about relationships. This again fits with Gilbert's (2011) findings that people with an avoidant attachment style may have fears, blocks and resistances to giving compassion to others.

For the compassionate engagement and action scale (CEAS) and forms of self-criticising/attacking and reassuring (FSCRS) the same pattern was found but in the opposite direction, as expected given these scales measure motivation *for* compassion as opposed to fear. Please see table 1. for Pearson's correlations.

The self-compassion scale was significantly positively correlated with the 'depend' subscale of attachment. The self-criticism scale was significantly negatively correlated with comfortableness depending on others and strongly positively correlated with anxiety about relationships.

All correlations fit with the current literature that people with anxious attachment styles struggle more with self-compassion and receiving compassion from others, however, do not struggle to give compassion to others (no correlation between anxiety subscale and compassion *for others*). People with avoidant attachment styles struggle with giving compassion *to others* and those who are securely attached have less trouble with all flows of compassion.

Table 1.
Correlations between attachment subscales and measures of compassion and self-criticism at baseline

Pearson's Correlations

Variable		Close	Depend	Anxiety
Self-criticism scale	Pearson's r	-0.257	-0.292	0.646
	p-value	0.078	0.044	< .001
Self-Compassion scale	Pearson's r	0.224	0.325	-0.186
	p-value	0.127	0.024	0.206
Compassionate engagement and action to self	Pearson's r	0.417	0.517	-0.566
	p-value	0.003	< .001	< .001
Compassionate engagement and action for others	Pearson's r	0.319	0.325	0.044
	p-value	0.027	0.024	0.764
Compassionate engagement and action from others	Pearson's r	0.335	0.528	-0.416
	p-value	0.02	< .001	0.003
Inadequate self	Pearson's r	-0.318	-0.496	0.575
	p-value	0.028	< .001	< .001
Hated self	Pearson's r	-0.428	-0.358	0.545
	p-value	0.002	0.013	< .001
Reassured self	Pearson's r	0.565	0.511	-0.551
	p-value	< .001	< .001	< .001
Fear of compassion to self	Pearson's r	-0.522	-0.698	0.521
	p-value	< .001	< .001	< .001
Fear of compassion to others	Pearson's r	-0.345	-0.452	0.074
	p-value	0.016	0.001	0.615
Fear of compassion from others	Pearson's r	-0.656	-0.679	0.612
	p-value	< .001	< .001	< .001

Table 2.

Mean and standard deviations of dependent variables at baseline and following the VR intervention for participants in each condition

	Which condition? *Compassionate Avatar (1) or Non-Compassionate Avatar (2)*	Baseline (pre-VR intervention)	Post VR Intervention
SCCS Self-compassion	1	41.4 (18.64)	54.48 (20.38)
	2	42.39 (18.64)	58.09 (25.27)
SCCS Self-criticism	1	69.92 (19.27)	54.76 (24.22)
	2	71 (13.36)	58 (24.38)
Fear of compassion to self	1	39.04 (13.27)	35.44 (14.18)
	2	32.57 (11.28)	29.3 (11.47)
Fear of compassion to others	1	30.32 (9.7)	26.12 (9.93)
	2	29.78 (9.6)	24.12 (10.42)
Fear of compassion from others	1	33.4 (11.69)	29.24 (12.66)
	2	30.39 (8.72)	28.7 (8.25)
Compassionate engagement and action to self	1	59.52 (17.65)	66.68 (18.17)
	2	64.3 (12.8)	67.78 (17.49)
Compassionate engagement and action to others	1	72.32 (15.12)	78 (16.03)
	2	71.17 (15.41)	75.35 (19.54)
Compassionate engagement and action from others	1	25.92 (7.51)	27.24 (8.08)
	2	26.22 (8.33)	26.96 (9.05)

All pre and post dependent measures (iPANAS positive and negative affect, SCCS, TFPAS, SCCS, FCS, CEAS and FSCRS) were analysed using separate 2x2 mixed analyses of variance (ANOVA) where time (pre and post VR intervention) was the within-subjects factor and avatar type (compassionate or non-compassionate avatar) was the between-subjects factor. Table 2. Above shows participants' mean scores (in each of the two conditions) on all measures at baseline and following the VR intervention.

Self-compassion and self-criticism scales (SCCS)

The analysis found that there was no significant effect of avatar type (compassionate or non-compassionate) on self-criticism scores, $F(1, 46) = .158$, $p = .693$, $\eta_p^2 = .003$ and no interaction between avatar type and time, $F(1, 46) = .172$, $p = .68$, $\eta_p^2 = .004$. There was a large significant effect of time on self-criticism scores, $F(1, 46) = 29.22$, $p < .001$, $\eta_p^2 = .388$. Self-criticism scores significantly reduced for participants in both conditions following the VR intervention.

Similarly, the analysis found that there was no significant effect of avatar type on self-compassion scores, $F(1, 46) = .173$, $p = .679$, $\eta_p^2 = .004$ and no interaction between avatar type and time, $F(1, 46) = .357$, $p = .553$, $\eta_p^2 = .008$. There was a large significant effect of time on self-compassion scores, $F(1, 46) = 43.23$, $p < .001$, $\eta_p^2 = .484$. Self-compassion scores significantly increased for participants in both conditions following the VR intervention.

The data suggests that the compassionate virtual reality intervention had a significant impact on how compassionately and/or critically people would respond to themselves irrespective of whether or not they experienced this intervention in the body of someone they perceived as compassionate or non-compassionate.

Compassionate engagement and action Scales (CEAS)

As with the self-compassion and self-criticism scales, there were no significant effects of avatar type on all subscales of the CEAS (to self, to others, from others), $F(1, 46) = .545$, $p = .464$, $\eta_p^2 = .012$, $F(1, 46) = .171$, $p = .681$, $\eta_p^2 = .004$, $F(1, 46) = .139$, $p = .711$, $\eta_p^2 = .003$ respectively. There were also no significant interactions between avatar type and time across all subscales of the CEAS, *to self*, $F(1, 46) = 1.40$, $p = .242$, $\eta_p^2 = .030$, *to others*, $F(1, 46) = .305$, $p = .583$, $\eta_p^2 = .007$ and *from others*, $F(1, 46) = .662$, $p = .42$, $\eta_p^2 = .014$.

Whilst scores on the compassionate engagement and action *from others* subscale increased for both groups following the VR intervention (see table 1 for means), this difference did not reach significance, $F(1, 46) = 2.47$, $p = .128$, $\eta_p^2 = .05$.

There was a significant main effect of time on compassionate engagement and action *towards the self*, $F(1, 46) = 11.72$, $p = .001$, $\eta_p^2 = .203$ and *towards others*, $F(1, 46) = 13.06$, $p < .001$, $\eta_p^2 = .221$. As with the SCCS, following the compassionate VR intervention, participants scored higher on measures of compassionate engagement and action towards the self and towards others, irrespective of the avatar they had been embodied in.

Fears of compassion scales (FCS)

As with the SCCS and CEAS, participants' fears of compassion scores were not affected by the avatar type (compassionate or not compassionate) that they were embodied in during the VR intervention, indicated by the lack of significant effect of avatar type on all subscales of the FCS, *to self*, $F(1, 46) = 3.36$, $p = .07$, $\eta_p^2 = .068$, *to others*, $F(1, 46) = .217$, $p = .643$, $\eta_p^2 = .005$ and *from others*, $F(1, 46) = .381$, $p = .540$, $\eta_p^2 = .008$. There were also no significant interactions between avatar type and time across all subscales of the FCS, *to self*, $F(1, 46) = .019$, $p = .892$, $\eta_p^2 = .0004$, *to others*, $F(1, 46) = .617$, $p = .436$, $\eta_p^2 = .013$ and *from others*, $F(1, 46) = 1.43$, $p = .238$, $\eta_p^2 = .03$.

There was a significant main effect of time on participants' fear of compassion scores *towards the self*, $F(1, 46) = 7.66$, $p = .008$, $\eta_p^2 = .143$, *towards others*, $F(1, 46) = 28.4$, $p < .001$, $\eta_p^2 = .382$ and *from others*, $F(1, 46) = 8.07$, $p = .007$, $\eta_p^2 = .149$. Following the compassionate VR intervention, participants fears of compassion significantly reduced on all subscales of the FCS, irrespective of the avatar they had been embodied in.

Forms of self-criticising/attacking & self-reassuring scale (FSCRS)

Following the same pattern as the SCCS, CEAS and FCS, participants' self-critcising/attacking and self-reassuring scores were not affected by the avatar type (compassionate or not compassionate) that they were embodied in during the VR intervention, indicated by the lack of significant effect of avatar type on all subscales of the FSCRS, *inadequate self*, $F(1, 46) = .401$, $p = .53$, $\eta_p^2 = .009$, *hated self*, $F(1, 46) = .463$, $p = .5$, $\eta_p^2 = .01$ and *reassured self*, $F(1, 46) = .32$, $p = .574$, $\eta_p^2 = .007$. There were also no significant interactions between avatar type and time across all subscales of the FSCRS, *inadequate self*, $F(1, 46) = .352$, $p = .556$, $\eta_p^2 = .008$, *hated self*, $F(1, 46) = .164$, $p = .687$, $\eta_p^2 = .004$ and *reassured self*, $F(1, 46) = 1.29$, $p = .261$, $\eta_p^2 = .027$.

There was a significant main effect of time on participants' self-criticising/attacking and self-reassuring scores on all subscales, *inadequate self*, $F (1, 46) = 17.7$, $p = < .001$, $\eta_p^2 = .278$, *hated self*, $F (1, 46) = 14.2$, $p < .001$, $\eta_p^2 = .235$ and *reassured self*, $F (1, 46) = 8.76$, $p = .005$, $\eta_p^2 = .16$. Following the compassionate VR intervention, participants were significantly less critical and attacking of themselves and significantly more reassuring, irrespective of the avatar they had been embodied in.

Changes in affect

International Positive and Negative Affect Schedule, Short Form (I-PANAS-SF)

The analyses showed that the VR intervention did not have a significant impact on affect as measured by the IPANAS positive affect and negative affect scales. For participants' *positive affect* scores, there were no significant main effects of time (pre and post VR intervention), $F(1, 46) = 1.84$, $p = .182$, $\eta_p^2 = .038$ or avatar body type (compassionate or non-compassionate), $F(1, 46) = .627$, $p = .433$, $\eta_p^2 = .013$.

There was a significant interaction of time and avatar body type on participants' positive affect scores, $F(1, 46) = 5.65$, $p = .02$, $\eta_p^2 = .109$. As indicated in Figure. 5, the direction of change of affect scores was different for participants in each condition. Participants mean positive affect scores decreased following the VR intervention if they were in the body of a celebrity they perceived as not compassionate and increased if they were in the body of a compassionate celebrity, however these changes in scores were not independently significant.

For participants' *negative affect* scores, there was no significant main effect of avatar body type, $F(1, 46) = .194$, $p = .662$, $\eta_p^2 = .004$. and no significant interaction between time and body type, $F(1, 46) = 1.88$, $p = .177$, $\eta_p^2 = .039$. Participants' negative affect scores reduced following the VR intervention, however this effect fell short of significance, $F(1, 46) = 3.72$, $p = .06$, $\eta_p^2 = .075$.

Figure 5.

Participants' positive affect scores pre and post the VR intervention for both conditions

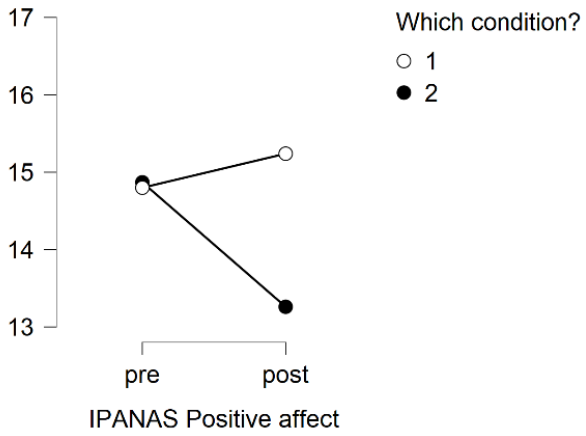
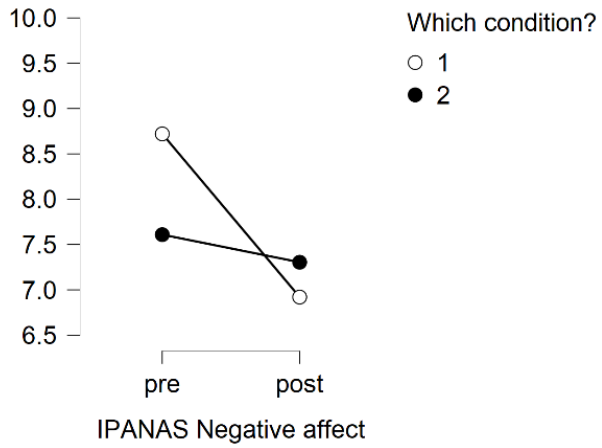


Figure 6.

Participants' negative affect scores pre and post the VR intervention for both conditions



Three Forms of Positive Affect Scale (TFPAS)

The analyses showed that participants' positive affect was not impacted by the VR intervention as no significant effects of time, avatar body type or interactions were found across all three subscales of positive affect (safe/warmth affect, relaxed affect and active affect).

Multiple linear regression was conducted to investigate the predictive effects of the attachment subscales on change in safe/warm affect scores. The model explained 20% of the variance (adjusted R-sq) and was significant overall ($F(3,44)=4.93$, $p=.005$). Of the three predictors, Depend was independently significant (standardized beta = .403, $p=.017$).

In addition, predictive effects of attachment subscales on change in relaxed affect scores were investigated with multiple linear regression. The model explained 18% of the variance (adjusted R-sq) and was significant overall ($F(3,44)=4.5$, $p=.008$). Of the three predictors, Depend was independently significant (standardized beta = .38, $p=.024$).

The depend subscale of the AAS measures the extent to which people feel that others can be relied upon to be available when needed. Results showed that participants' safe/warmth affect

and relaxed affect increased more following the VR intervention the higher their 'depend' scores on the AAS.

The adult attachment subscales did not significantly predict any other changes following the VR intervention.

Qualitative feedback

Due to practical limitations, it was beyond the scope of this thesis to conduct a formal analysis on the data from the open-ended question about the experience of compassion in virtual reality and therefore no conclusions will be drawn from this data. All qualitative responses can be found in appendix. I. Feedback from participants is used to supplement the discussion and add depth to quantitative findings. Specific quotes are used to help illustrate points discussed and support possible explanations for quantitative results. As no formal coding procedure or thematic analysis has taken place, it is recommended that the use of qualitative feedback in the discussion should be viewed and digested tentatively.

Discussion

Key Findings

The most important finding of this study is that healthy participants (who are highly self-critical) can benefit from the compassionate virtual reality intervention, evidenced by a significant reduction in self-criticism, fears of compassion, criticising/attacking the self and a significant increase in self-compassion, compassionate engagement and action to self and others and reassuring the self. Secondly, these positive effects occurred for all participants, regardless of which physical avatar they were embodied in when giving and receiving self-

compassion. Finally, qualitative feedback showed that overall, participants had a 'strange' but positive experience which, after one VR session, led to a change in how they thought about compassion (again, irrespective of their avatar). One person likened the experience to 'feeling like a therapy session'.

Contribution to existing research

The significant reduction in self-criticism scores and increase in self-compassion scores on the SCCS following the intervention mirror the results of Falconer's (2014) study. In addition, in this study, the intervention had a significant impact not only on how people compassionately relate and act towards themselves, but also to others (as indicated by a significant reduction on all subscales of fears of compassion). Falconer's (2016) study, in which a clinical population of patients with depression took part in the VR intervention once a week for three weeks, did find a linear reduction in fears of compassion, however this reduction did not reach significance.

One possible reason for this difference could be that this study had more statistical power (48 participants compared to Falconer's 15) and that a larger sample would have resulted in a statistically significant change in the clinical sample. Another possibility is that the VR compassion intervention is more effective in creating immediate change in people who are not currently experiencing a mental health problem (as was exclusion criteria for this study).

From a cognitive perspective, one of the key underlying mechanisms responsible for maintaining depression is rigid/fixed thinking and negative cognitive distortions (Beck, 1967). For this reason, a key aspect of cognitive behavioural therapy for depression is helping individuals both recognise and challenge negative thinking patterns and beliefs (Beck, 1983). However, doing so takes time, and therefore it is not surprising that the VR intervention leads

to less change in beliefs towards compassion (fears of compassion) for individuals with depression compared to a healthy student population. In addition, ACT (acceptance and commitment) therapists postulate that psychological inflexibility (central to processes like rumination and resistance to change) is a key maintaining feature of depression (Nolen-Hoeksema et al., 2008; Kashdan & Rottenberg, 2010). Again, making it unsurprising that a depressed population may require more time to benefit from the intervention.

Having said that, this study recruited a highly self-critical population (a psychological mechanism associated with depression) whose fearful attitudes towards compassion significantly reduced after just one VR intervention, which shows promise for the application of the intervention in a clinical population. In addition, the study did not measure for symptoms of depression so the possibility that some participants were depressed at the time of the study cannot be ruled out.

Another explanation for the difference in results in this study compared to Falconer's (2016) study could be the use of additional psycho-educational material – the PowerPoint presentation with audio narration (see appendix.). The presentation highlighted the definition of compassion (what it is and is not) as well as noting the compassionate qualities and attributes, in particular courage and wisdom. Many participants commented on the psycho-educational content of the study in their qualitative feedback and the impact this had on their experience of the VR intervention and their attitudes towards compassion. For example, one participant reflected that:

"It kind of changed a bit how I feel about compassion… the definition of compassion to me before is it is just being soft and it might make you an easy target. But after this activity I understand that compassion should be a strength rather than just someone with a soft spot"

Another participant attributed the 'training' to their success in being effectively compassionate:

"*Having gone through all the materials about compassion and the training work, I managed to be compassionate towards the girl and then when it worked for her, I felt relieved as well. When I got to be the little girl and listened to my own words again, I felt like I had fully understood what being compassionate was about. Now when I encounter any similar situation, I can recall the definition of compassion and it certainly will help myself and others."*

Mechanisms of change

One limitation with the study is that there are no control groups, making it difficult to identify what aspects of the intervention may be more or less responsible for participants' changing approaches towards compassion.

The brief qualitative feedback collected suggests that different aspects of the intervention were more or less important for different people, some highlighting the importance of the virtual reality scenario and others discussing 'compassionate theory'. Many participants seemed to benefit from the combination of psycho-education, followed by the behavioural, interactive experience, a process which might mirror a longer-term, therapeutic intervention in a clinical population. The following statement demonstrates the emotional impact of the interactive aspect of the intervention as well as the learning process:

"It was quite intriguing to listen back to your own compassionate statements and it was nice to be on the receiving end of it. It created a feeling that things were going to be fine. Also, having been briefed on what compassion really is and how to deliver it effectively was helpful in achieving this."

The proteus effect - possible mediators and moderators

An important finding of this study is that participants' attitudes towards compassion and how they compassionately relate to themselves, improved regardless of which avatar body they were in. It was predicted that participants embodied in the avatar of a person they perceived as compassionate would benefit significantly more from positive outcomes of the VR intervention, however this was not the case. There could be a number of reasons why this effect was not found in the current study. One possible reason could be that the study did not have sufficient power for the effects observed to reach significance, as the result found there was a difference (in the direction expected) between conditions, but it was not significant. Another possible factor could be the quality of avatars and how accurately participants felt they represented the celebrity they were supposed to. During the study, some participants commented that they did not feel the avatar looked like the celebrity they had chosen.

Another reason for the lack of significant effect could be due to the fact that in this study, there was a large emphasis on participants embracing their own compassionate self, for example writing a personal script which reflected what they might like to hear in distress. In addition, in the VR scenario, whilst participants embodied an avatar, they spoke with their own voice and they heard this voice played back to them, which could again mean that they are connecting more with themselves than the avatar they are embodied in.

It is possible that all these factors played a role in the outcome of the study, which would be supported by the findings of Ratan et al.'s (2020) meta-analysis of studies investigating the proteus effect. Whilst their analysis supported the existence and validity of the proteus effect, they found that most significant effect sizes were small-medium at most. They also found that there are a number of studies which have been unable to replicate the effect (Kaye et al., 2018; Sylvia et al., 2014). They note individual characteristics (Ratan & Sah, 2015; Bian et

al., 2015), situational factors (Bian et al., 2015) and user-avatar closeness (Yee & Bailenson, 2009; Yoon & Vargas, 2014) as potential moderators of the effect.

User-avatar closeness

Of particular relevance is user-avatar closeness. Ratan and colleagues theorised that when the proteus effect takes place, individuals experience an association between themselves and their avatar. They draw upon both self-perception theory (Bem, 1972) and schema activation (Peña et al., 2009) to explain what happens during embodiment. They suggest that individuals may go through a process where they evaluate similarities and differences between their perception of themselves and their perception of the avatar they are embodied in. They say that people do this particularly when asked to perform a task as they have to determine how their avatar may act in this scenario (in contrast to how they might act). They argue that based on this, the proteus effect and how much an individual acts in accordance with the characteristics of their avatar, will be greater the closer the individual feels to that avatar. This idea has been supported by studies which found that the proteus effect was stronger when an individual was more closely aligned to their avatar, such as through matching characteristics like gender (Ratan & Dawson, 2016).

Whilst participants in this study were matched to their avatar based on gender identity, they were not instructed in the VR session to act in accordance with the character they were embodied in, and they had already rehearsed their compassionate script before being embodied. This could have meant that they did not go through the process of self-perception and schema-activation to think about how their avatar may act in this scenario or if they did, they may have only been inclined to act in accordance with their avatar if they perceived them to be compassionate (as was required of them in the task) or if they felt ‘close’ to their

avatar in some way. Qualitative feedback from participants below shows some support for this hypothesis, however as this was not experimentally manipulated or measured, future studies would be required to further investigate.

"I think the fact that I had an avatar that resembled someone i know to be compassionate and sympathetic to the struggles of others meant I channelled that character to feel more compassionate."

"Being Priti Patel was very strange, because I'm pretty sure she wouldn't have said those things if she was in that situation."

"Seeing the little girl crying, it felt almost second nature to comfort her in distress… having the three-step guideline definitely helped in structuring my speech… While I felt this comfort in speaking, there was a sort of dissonance every time I reminded myself that I was Margaret Thatcher, which would almost break the illusion or feeling that I wanted to comfort this person."

"It was very nice, I felt comfortable and confident in giving as well as receiving compassion. The fact that I was Emma Watson helped in building up the confidence and made me believe that I knew what I was saying and that it would be helpful to the upset girl."

'Wishful Identification' and Behavioural Compensation

Another possible explanation for the above findings comes from Praetorious and Gorlich (2020). In their meta-analyses of the proteus effect, they argue that whilst greater user-avatar closeness is an influential factor, rather than making the proteus effect more likely to occur, it simply enhances the effect in circumstances where it will or does occur. In other words, Ratan et al. (2020) appear to view user-avatar closeness as a mediator whilst Praetorious and

Gorlich suggest it is a moderator. They draw upon Van Looy's three-factor model of avatar-identification to explain this hypothesis. Van Looy, similarly to Ratan and Dawson, note that embodiment and self-similarity are important factors in determining how closely a person identifies with their avatar, however they also suggest that 'wishful identification' plays an important role. Wishful identification refers to how people may be more likely to take on the traits and characteristics of an avatar which they perceive as desirable. Furthermore, the situational context and/or task of the user in their avatar body may also influence what characteristics or traits are deemed desirable. In the context of this study, compassionate beliefs and behaviours are likely to be desired traits of the participants given what the scenario asks of them (to comfort a crying child).

Praetorious and Gorlich further argue that when embodying an avatar which is perceived as having undesirable traits, that people may act in ways which counteract or compensate for this. They suggest that wishful identification and behavioural compensation may provide an explanation for studies which have failed to produce the proteus effect. For example, Sherrick et al. (2014) found that participants who held strong gender stereotypes were less likely to act in accordance to these stereotypes when embodied in an avatar of the opposite gender they identify with (male-female, female-male). In another study, participants either embodied the avatar of Kim Kardashian (a celebrity they suggest is known for narcissistic behaviour and a lavish lifestyle) or a generic avatar of similar appearance and asked participants to engage in a shopping task. They found that participants in Kim Kardashian's body, contrary to what might be predicted by the proteus effect, were more likely to purchase non-luxury brands and also scored lower on a measure of narcissism following the experiment.

Similarly to these findings, it is possible that participants embodied in the avatars of uncompassionate celebrities may have overcompensated for their avatar's characteristics.

This behavioural compensation could provide an explanation for the lack of significant difference in outcomes between participants in compassionate versus uncompassionate avatar bodies in this experiment. Again, participants' qualitative feedback offers some support for this idea as participants reported feeling more 'confident' and more able to be compassionate when embodying celebrities they admired whilst those who embodied uncompassionate celebrities reported either being able to or attempting to 'ignore' the body they were in and act compassionately regardless. Again, further research with a control 'generic avatar' condition could help to provide support for or against this hypothesis. Please see Chapter 3 (critical appraisal) of this thesis for further exploration of Praetorious and Gorlich's theoretical model of the proteus effect and the influence of avatar characteristics.

Body ownership is important but whose body is not

"Even though I was Kendell Jenner, when I was talking, I forgot I was her and acted as me"

Falconer's (2014) study found that participants reported a significantly more self-compassionate approach to themselves following the VR intervention if they received the compassion they had given embodied in the girl's avatar compared to just witnessing the compassion from a third-person perspective. This is consistent with Ratan et al.'s (2020) finding from their meta-analysis that the proteus effect is more reliable when embodiment is taken into account. These findings together indicate that in the context of this particular task, receiving compassion in the body of someone is important but whose body this is, may not be. One participants' feedback suggests the possibility that simply being in the body of someone else (regardless of who it is) might make it easier to give and receive compassion for someone who typically struggles or feels uncomfortable with compassion:

"It was a strange feeling being given my own compassion back felt slightly abnormal, but being delivered my own words back to me made me realise that it is okay to allow myself to feel compassion from myself and others, and it is not as selfish as I generally feel it is. However, I think it was easier to communicate because it was through another person, and it still felt a little awkward to be spoken to in that manner."

This idea is supported by findings of a series of studies conducted by Aymerich-Franch et al. (2014). They found that anxious public speakers showed less anxiety when engaging in a public speaking task in VR when embodied in dissimilar looking avatars compared to avatars that resembled themselves.

This highlights how the virtual reality set-up, in replacement for a real-life scenario (such as talking to oneself compassionately in the mirror) may make it easier for people to begin to show and receive compassion. Exposure to compassion and self-compassion can be triggering for individuals with neglectful or abusive histories as it can activate the affiliative system associated with such memories (Rockliff et al., 2008), thus highlighting the importance of the indirect, VR intervention as a safer way to practice and engage in exposure to compassion.

This idea is supported by this study's finding that the higher participants scored on the 'depend' subscale of the adult attachment questionnaire, the greater their feelings of warmth/safe and relaxed affect following the intervention. Warmth/safe affect is linked to the experience of attachment and social safeness and is negatively correlated with depression, anxiety, self-criticism and insecure attachment (Gilbert, 2008; 2009). The depend subscale measures the extent to which people feel they can depend and rely upon others to be there for

them when needed and typically low scores on this scale may be indicative of an insecure attachment style. This finding suggests that individuals who do not feel they can confidently rely on others to provide effective compassion may experience fewer positive emotions associated with attachment and social safeness following the VR intervention.

Implications for virtual reality use in compassion-focused interventions

This study has added to growing literature looking at the potential use of virtual reality to enhance and aid compassion-focused therapy interventions in a clinical setting for individuals who may struggle with a range of mental health problems. The study suggests that individuals' negative perceptions of compassion and fears about how they compassionately relate to themselves can be challenged and improved by engaging in the interactive, VR scenario. Given that self-criticism and fears of compassion are associated with a range of mental health symptomatology and less positive outcomes in therapy (Low et al., 2020; Kelly & Carter, 2015), finding new ways of reducing these psychological processes is important.

The results of this study add to current findings which indicate embodiment of an avatar in a VR scenario may play a key role in changes taking place however avatar type/characteristics may not be of importance in the context of this particular, compassionate VR intervention. Further research is required to better understand and investigate what underlying mechanisms might be responsible for changes and to separate out potential mediating and moderating factors in the outcomes found (e.g., the role of psycho-educational material, individual differences, embodiment, user-avatar closeness and avatar desirability). In addition, longer-term studies with different clinical populations (individuals with attachment/relational difficulties, depression, anxiety and other mental health problems) would help us further

understand potential positive impacts of the compassionate VR intervention. Finally, the use of this intervention with these populations, in particular for individuals who may have traumatic or abusive relational histories, should be progressed with caution and sensitivity, holding in mind the possibility of triggering a fragile affiliative system.

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Part Three

Critical Appraisal

Introduction

In this critical appraisal, I am focusing on the use of avatars in the study and the role and impact of avatar identity. I will reflect on the decision-making process around which avatar characteristics were manipulated and controlled for, how this was done and why. In doing so, I will talk about the factors which influenced my decisions as well as the potential consequences of my choices. I explore a theoretical framework of the proteus effect and discuss potential mediators and moderators of the effect and their role in the design and outcomes of the study. Finally, I will discuss challenges surrounding measurement and operationalisation of different variables and conditions in the study. Throughout this appraisal, I will be expanding upon limitations noted in the empirical paper and reflecting on the practical constraints and ethical dilemmas I encountered.

Establishing Avatar Identities

Celebrity or friend

In order to help individuals cultivate compassion in the virtual reality intervention, it was decided that one condition would involve people being embodied in an avatar of someone they deemed highly compassionate. Originally, I intended to invite participants to choose any person they perceived as compassionate, with the suggestion that this could be a friend, a loved one, a family member or a celebrity. Initially, I referred to this person as 'the ideal compassionate other'. Following the submission of my research proposal, it was rightly and very helpfully pointed out that real people and real relationships are complex and that 'the ideal compassionate other' may not exist in human form. Given that one of the fundamental principles of compassion and self-compassion is recognising our 'humanness' - that we are

flawed, imperfect and make mistakes (in all aspects of our lives and particularly, in our relationships with others) - this felt like a considerable oversight of mine.

On reflection, I considered how, whilst compassion could be seen as an identity, it is also understood as just one part of ourselves, one aspect of our identity. In imagery exercises designed to cultivate 'the ideal compassionate other', people are guided to focus on the qualities and traits of compassion and supported to create a fictional compassionate companion. Whilst the fictional aspect of this intervention poses a considerable challenge to people, it is important given that, as noted, real relationships with others are complex, they feature conflict, and for some, neglect and abuse. Compassion may be a part of someone or an aspect of someone we experience in a relationship, but it will not be the only memory or experience we have with that person. For some people, the person or people whom their strongest attachments with are also the same people who may trigger their threat system, particularly in relationships where neglect, abuse and violence feature (Riggs, 2010). Part of the reason people are asked to create a fictional compassionate other is because this means they have control over how this person reacts and responds to their distress. If people were to embody a person they know in VR, they do not have control over which aspects and qualities of that person's identity show up or come to mind in the situation.

Choosing a real life person whom someone has a relationship with felt like a risk, both in terms of lack of experimental control and possible extraneous variables but also in terms of safety and the potential for stimulating the threat system. Choosing real life figures to embody and then receive compassion from in the VR scenario felt too emotionally charged and unpredictable. These concerns were discussed with my supervisor and we both felt that choosing celebrities to embody felt more reliable. Public figures may be known well enough to be perceived as compassionate and to embody these traits without the additional catalogue of memories and complexities generated by having a personal attachment to someone.

In addition to this, creating celebrity avatars was, practically speaking, easier. The avatar creation software requires a clear, passport-like portrait photo to generate the face. The avatar designer is then required to adjust the body size and clothing of the avatar, something which is a lot easier when a quick google search generates a wealth of photographic material of someone in the public eye. Of course, not coming from a professional background in VR avatar design meant the avatars created for the study were inevitably going to have to be 'good enough' in terms of accurately resembling their intended person. I hypothesised that people might be more forgiving of a less than perfect model of Taylor Swift than their own mother.

There is a phenomenon in the world of robotics and VR, coined over 40 years ago by a Japanese roboticist, called 'the uncanny valley' (Mori, 1970/2005). The uncanny valley refers to a space avatars or robots sometimes fall within where they appear particularly human-like (more so than a cartoon or animation) but are imperfect and clearly distinguishable from real humans. For example, an avatar may appear physically very real however some of their features might be unrealistic, like unnatural breathing or body movements. Some researchers suggest that when avatars fall into the region of the uncanny valley, this creates a sense of unease and even revulsion for the person embodying or interacting with this humanoid. It's possible that the avatars used in this study fell into this category. Whilst participants benefitted from the study, many commented in the qualitative feedback that the experience was 'weird', 'awkward' and 'strange'. Again, I wondered if this sense of discomfort and unease might have been even stronger for people embodying someone they personally know and are close with.

Finally, I queried the ethics around generating an avatar of a real person and using photographs of them when they are not a fully informed, consenting or debriefed participant in the study. In this case, it would have been necessary to obtain additional consent from the

people participants chose, which would have been a laborious task in the context of an already time-limited project.

Matching physical characteristics of avatars with participants' identity

Another dilemma which came up when designing the study was deciding whether or not to try to match aspects of participants' identity with the compassionate or uncompassionate avatar they were embodied in. We considered the possibility of matching participants with avatars in terms of ethnicity, gender and age as these felt like pertinent factors in terms of visible aspects of identity. When making this decision, I tried to consider the extent to which embodying an avatar with very different physical characteristics may be a distraction from or moderating factor on the influence of the compassionate qualities of the avatar's identity. Given that the main task in the VR scenario was speaking compassionately and listening back to this recording, it felt important that the mismatch between the person's real identity and avatar identity was not so great that hearing their voice coming out of the avatar felt jarring or strange to the extent that it distracted them from the experience of self-compassion. However, we had no objective evidence or measure to help determine what level or type of mismatch may create this outcome. We therefore had to go by our own personal assumptions of what it would feel like in such a scenario.

In addition to this, practical considerations and the challenges associated with matching on gender, age and ethnicity were factored into the decision. For example, asking someone to choose a celebrity whom they perceive as highly compassionate who is also the same gender they identify with, same age and same ethnicity felt like a lot to ask of participants. It also felt as though these factors could end up being prioritised over the identification of a highly compassionate person. I did not want to create a scenario where participants struggled to

identify a compassionate celebrity with matching characteristics to them and therefore opted for someone who doesn't represent especially compassionate attributes as a result.

This decision, however, did not feel easy given that recent research has highlighted that user-avatar similarity and the strength of the user-avatar 'bond' may enhance the proteus effect in some circumstances. In meta-analyses investigating the effect, both Ratan et al. (2020) and Praetorious and Gorlich (2020) highlight that user-avatar closeness is an influential factor in determining if behavioural or attitudinal change takes place. Ratan et al. (2020) suggest that factors which strengthen user-avatar closeness include physical similarity between user and avatar, if users can personalise or manipulate the avatar in some way and physical embodiment of the avatar.

In this study, participants in the 'compassionate avatar' condition were able to personally choose the celebrity whom they embodied. Whilst they did not play any role in the creation or customisation of the avatar, this could, loosely, be seen as an aspect of 'personalisation'. The participants were also embodied in the celebrity avatars in this study, as opposed to simply observing their avatars from a third person perspective, which again may have contributed to the strength of the 'user-avatar bond' according to Ratan et al. (2020). Participants were matched on gender but no other physical characteristics. It is difficult to know if matching on gender was enough to strengthen the user-avatar bond or if the other differences in identity between avatar and user meant that the user-avatar bond was in fact, quite weak, reducing the likelihood of or extent to which the proteus effect would take place. Ultimately, due to the considerations noted above, it was not possible to match participants with additional aspects of identity to their compassionate or uncompassionate avatar. Further studies which match different aspects (or many) of physical identity between participant and avatar could help determine if this has any influence on the proteus effect taking place in this context.

Theoretical framework for the proteus effect

As discussed in the empirical paper, in Praetorious and Gorlich's (2020) review of the proteus effect and their theoretical framework of influencing factors (see figure. 2), they argue that the user-avatar bond only serves to enhance the proteus effect in circumstances where it was already going to take place. They draw upon Van Looy's (2012) model of avatar-identification (see figure. 1) to support their rationale. Van Looy's model proposes that there are three factors which affect the extent to which people identify with their avatar - self-similarity, embodied presence and wishful identification. Of particular importance and in contrast to Ratan et al.'s (2020) theory is the aspect of wishful identification. Wishful identification refers to the idea that people will only acquire the aspects or traits of their avatar which they find desirable, in terms of personal preference but also, according to Praetorious and Gorlich, with regard to what may be perceived as desirable by others.

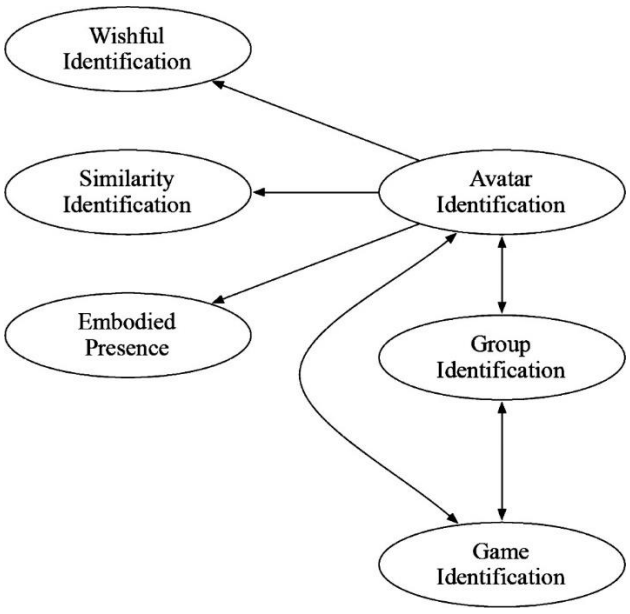

Figure 1. Model of Avatar Identification Factors (Van Looy, 2012)

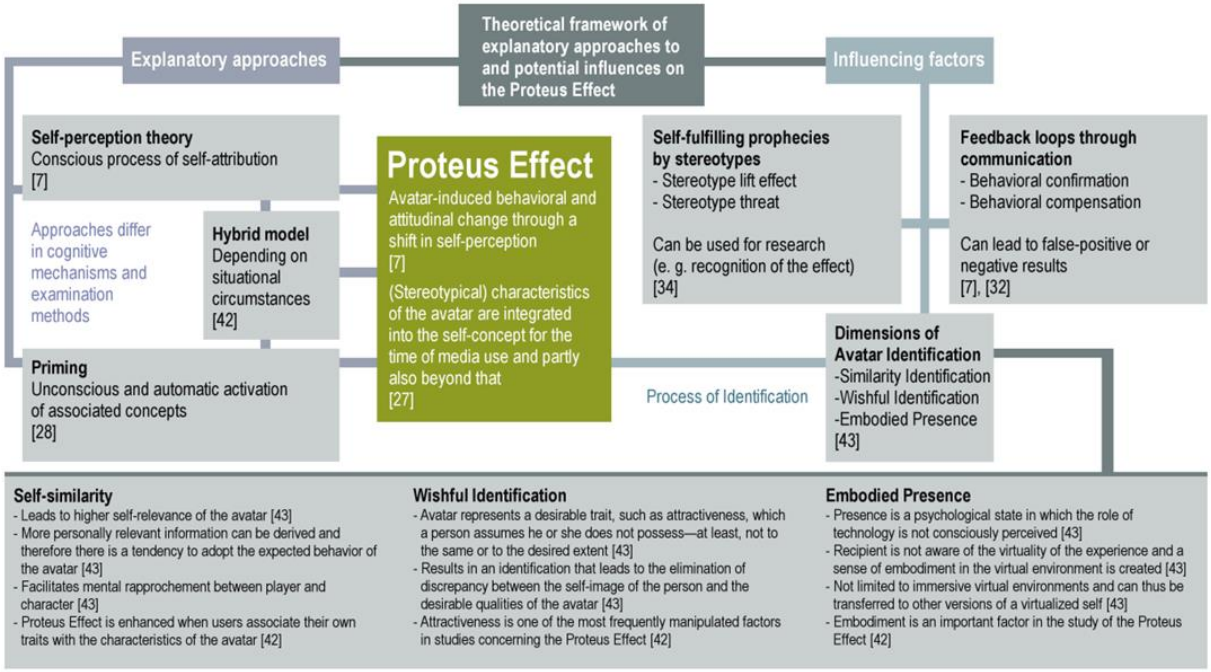

Figure 2: Theoretical framework of explanatory approaches to and potential influences on the Proteus Effect.

(Praetorious & Gorlich, 2020)

For example, Sherrick et al. (2014) found that male participants who embodied female avatars were less likely to act in stereotypically female ways (based on choices they make in a narrative exercise) the greater their gender-stereotyped beliefs were. The authors propose that participants who hold strong gender-stereotyped beliefs may be choosing to act in opposition to their beliefs as a way to 'behaviourally compensate' and to avoid negative evaluation by others. This finding directly contradicts the 'priming' explanation of the proteus effect outlined by Pena et al. (2009). According to the priming argument, participants who hold stronger gender-based stereotypes would be more likely to automatically act in accordance with this when they embody a male or female avatar. Interestingly, however, the researchers found that participants' awareness of the possible effects of their embodied avatar's identity on their behaviours and choices had no impact on the results. This latter finding suggests that whilst the process of self-perception and avatar identification is taking

place, people are not consciously aware that they are behaviourally compensating for their stereotypical beliefs. At the same time, as the authors note, it could be that participants are aware that they compensated for their stereotypes in the choices they made and are therefore claiming to have not been aware in order to again avoid negative judgement.

With regard to the current study, Praetorious and Gorlich's (2020) theoretical model of influencing factors on the Proetus effect is perhaps the most fitting explanation for the results. As noted in Chapter 2, there were no significant differences found between participants who embodied a highly compassionate or uncompassionate avatar. According to their model, participants who embodied an uncompassionate avatar may have overcompensated for their avatar's identity as being 'uncompassionate' was not a desirable quality, particularly in the situational context of the study and the task that was required of them. However, given that there was no control condition and no clear operationalised measure of 'the proteus effect', it is ultimately difficult to know what underlying processes were taking place for participants and whether or not those who embodied a compassionate celebrity, or some of them, were influenced by this.

Study variables and lack of 'control' condition

In the design of the study, another dilemma was whether or not to have a control and/or alternative condition/s. For example, I considered the possibility of a 'generic avatar' condition, a self-representation avatar condition and deliberated over the inclusion/exclusion of psycho-educational materials and compassionate script writing across different conditions. If I were able to recruit a large enough sample, the separation of these different factors across conditions would have helped to explore and understand better whether or not the proteus effect was playing a role and which different factors in the intervention are more or less

important in generating change. Having said this, as mentioned before, practical limitations, time and likelihood of recruiting a large enough sample meant that including additional conditions would have been very difficult. In addition to this, it felt important to replicate Falconer's previous studies as much as possible, changing only one factor (the avatars) to avoid further ambiguity around the results.

After the inclusion of a number of different measures, a psycho-educational powerpoint presentation and the preparation of a compassionate script, the study took over an hours' time for most participants. In hindsight and if I were to repeat the study, I would lose one or two of the measures, perhaps the forms self-criticising/attacking and reassuring scale (FSCSR). During the intervention, some participants commented that the questionnaires took 'a long time' and were 'a bit repetitive'. Whilst it was helpful to see that the results of the intervention were consistent and significant across a number of measures of self-criticism and compassion, some of these measured similar constructs – for example the self-criticism scale and the FSCSR.

Measuring the proteus effect

For many studies, determining whether or not the proteus effect takes place is arguably an inherently biased process. It relies upon researchers' assumptions and stereotypes as to what behaviours and/or attitudes are expected based on different avatar identities and characteristics. These stereotype-based predictions are then used as a measure as to whether or not the proteus effect has taken place. For example, Sherrick et al. (2014) presented participants in their study with a series of choices which they had already assigned as either stereotypically 'male' or 'female' behaviours. If a male (embodied in a female avatar) chose to 'pick up the bowl of batter and start stirring by hand' as opposed to opting to 'take apart

and fix the electric mixer' they would be deemed as acting in line with the proteus effect, as, 'stereotypically', '*women are more likely to bake and have culinary skills*' and '*men are more likely to fix machines and have mechanical skills'*. Similarly, if a male (embodied in a female avatar) were instead to choose to 'demand they give you more information' rather than 'ask politely for more information' this would be interpreted as behavioural compensation for stereotyped beliefs, contrary to proteus effect predictions, as, 'stereotypically', '*women are more gentle and sensitive'* and '*men are more forceful and aggressive'*.

Similarly, McCain et al. (2018) conclude that their study did not generate the proteus effect when participants embodied in the avatar of Kim Kardashian bought less 'luxury items' and reported less narcissistic beliefs than participants who had embodied a generic avatar. Lee et al. (2014) concluded that the proteus effect *was* responsible when participants who embodied male avatars performed significantly better in a computer-based maths task. Whilst the proteus effect is founded upon self and other schemas and beliefs, often also is the measurement of it and the conclusions drawn by researchers. I think, herein lies a strength of the current study. Rather than attempting to identify stereotypically compassionate and uncompassionate celebrities or embodying participants in the same single compassionate or uncompassionate avatar, participants were able to choose who they embodied based on their own perceptions of compassion. Whilst creating individual avatars for each participant was a more time-consuming aspect of the study design, it felt important given that who may be deemed a compassionate person will likely vary considerably for different people.

Another consideration in attempting to operationalise the proteus effect is deciding whether or not to measure participants changes in behaviour, attitudes or both. When the proteus effect was originally coined by Yee and Bailenson in 2007, they refer to the effect specifically as *behavioural* conformity to a 'transformed self-representation'. As already

discussed, they draw upon Bem's (1972) self-perception theory to help explain the effect, arguing that attitudes are inferred from behaviours. In Ratan et al.'s (2020) meta-analysis of the proteus effect, they choose to analyse only behavioural outcomes, not attitude change. They argue that behaviours are a more valid representation of the proteus effect, highlighting self-perception theory and also Ajzen's (1991) theory of planned behaviour. Based upon the theory of planned behaviour, they claim that by only measuring behavioural outcomes, they are being more conservative in their assessment of the proteus effect, as "behaviours are determined by multiple contributors in addition to attitudes (e.g., self-efficacy), and so media factors (such as avatars) are generally less capable of affecting behaviours than attitudes" (Ratan et al., 2020, p.659).

One limitation of the current study was that there was no measure of compassionate behaviour. All participants took part in the same virtual reality scenario and were equally supported in writing a compassionate script and delivering this to the distressed child in a compassionate manner. Whilst the participants ability to be compassionate to the distressed child may have impacted their subsequent experience of self-compassion (as they received the same compassion back for themselves), their compassionate approaches to the child were not measured in any way. In addition, there was no self-report measure of participants' experience of being embodied and how this impacted their compassionate behaviours in the VR scenario, aside from one, open-ended qualitative question. Instead, the existence of the proteus effect was determined by way of changes in participants' beliefs and attitudes towards compassion.

The uncompassionate avatar condition

Another limitation of the study was the fact that a different method was used for choosing which avatars participants embodied in the 'uncompassionate avatar' condition compared to the compassionate condition. In this condition, rather than asking participants to choose a celebrity whom they view as highly uncompassionate, it was decided that we would instead offer a 'celebrity line-up' to choose from. One of the reasons for doing this was again due to capacity and time constraints, however the main reason was due to some anxiety I had around the famous people that participants might choose and the possible consequences of this. I felt that it was highly likely that, given the choice, people would choose people in the public eye who have acted in unethical, discriminatory, abusive or even criminal ways. In addition to this, people might be likely to choose public figures who have displayed derogatory or discriminatory views and actions towards people based on identity characteristics that they, or people close to them, identify with.

I held in mind the links between self-criticism, fears of compassion and the triggering of the threat system in response to compassion (Rockliff et al., 2008) as well as the possible reactivation of distressing and traumatic memories for some people with adverse early life experiences. This made me concerned about the possible impact embodying and experiencing compassion from a person who represents mistreatment, abuse or prejudice could have on participants, particularly a highly self-critical population. Madary and Metzinger (2016) highlight the potential effects of embodiment in VR as 'one of the main motivations' behind their investigation into the risks of VR research and application. They proposed an ethical code of conduct for researchers and public use of VR, referring to examples of the proteus effect causing anti-social behaviours or attitudes and emphasising the 'plasticity of the human mind' in the potential for long lasting psychological effects.

Given these concerns, I felt that, on balance, participant safety and wellbeing was more important in this instance than the robustness of the experimental design of the study.

Possible ‘uncompassionate’ celebrities were then selected through discussion with my research supervisor and voluntary research assistant. Whilst the three of us differ on a range of identity characteristics including age, gender, ethnicity and religion, it still felt like a biased decision-making process and aspect of the study design. We attempted to select a diverse mix of celebrities however ultimately, we would have inadvertently projected our own views about compassion into the ‘uncompassionate line-up’.

Conclusions

As discussed, there were major limitations in the experimental design and control of this study in respect to accurately and reliably measuring the proteus effect. Practical limitations - the time and capacity I had amidst clinical training and my freshly developing skills in the design and application of virtual reality technology – were primary obstacles to me effectively addressing methodological shortcomings. Ultimately, I had to weigh up the importance of replicating the therapeutic benefits of the intervention over discovering more about the underlying mechanisms behind the effects but at the possible cost of the participants’ positive experience. For me, whilst ambiguity remains around the existence and influence of the proteus effect in the context of this compassionate IVR paradigm, it feels most important to have discovered that no harmful effects emerge from the use of uncompassionate avatars in this scenario. Whilst I have not clearly determined why or how, I feel pleased that highly self-critical participants were able to overcome their fears of compassion and benefit from the intervention, even in the body of Priti Patel.

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Appendices

Appendix A: Ethical Approval

A4 **Approval from the Departmental Ethics Committee**

(Approval cannot be given by the principal researcher of this project – if necessary the application must be sent to an Ethics Officer from a different Research Department, or to the College Ethics Committee, for approval)

Declaration by the Research Department Ethics Chair:

2

I have reviewed this project and I approve it. **X**

The project is registered with the UCL Data Protection Officer and a formal signed risk assessment form has been completed.

Allocated Departmental Project ID Number for the approved application:

__CEHP/2021/587_____

Name of the Research Department Ethics Chair (type in):	Jean-Baptiste Pingault
Date:	15/07/2021

Appendix B: Participant Information Sheet

Participant Information Sheet For Adults

This study has been approved by X Research Department's Ethics Chair [Project ID: CEHP/2021/587]

Title of Study: Experiencing self-compassion through embodiment of a compassionate other within virtual reality
Department:

Name and Contact Details of the Researcher(s):
Amy Barrington (Trainee Clinical Psychologist)
University College London
amy.barrington.18@ucl.ac.uk

Name and Contact Details of the Principal Researcher:
Dr. John King , Research Department of Clinical, Education and Health Psychology
University College London
+44 (0)20 7679 5993
john.king@ucl.ac.uk

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1. **Invitation to take part in a research study**
   We would like to invite you to take part in our research study. You should participate only if you want to do so. Before you decide whether to take part, we would like you to understand why the study is carried out, what you would be asked to do, and how the study will be conducted. Please take some time to read this sheet thoroughly, and to discuss it with other people if you wish. One of our team will go through the information sheet with you and answer any questions you have. Please feel free to ask any further questions about the study, or if you find anything on this sheet unclear.

2. **What is the project's purpose?**
   We are interested in the effects of experiencing self-compassion through a virtual reality paradigm. We are particularly interested in the potential beneficial effects of this experience for individuals who are high in self-criticism and who may find it harder (for a variety of reasons) to be compassionate to themselves.

3. **Why have I been chosen?**
   You are a healthy adult and you have volunteered to take part in this study. There will around 50 participants in this study.

4. **Do I have to take part?**

No. Your participation in the study is entirely voluntary. It is your choice whether or not you would like to participate. If you do give consent to take part in the study, you are still free to leave the study at any point, without giving a reason. If you leave, any information for the research that we have already collected from you will be destroyed.

5. What will happen to me if I take part?

If you agree to participate, you will be asked to attend a session at Torrington Place. We will go through this Information Sheet and answer any questions you might have about the study. If you decide to take part, you will be asked to sign a consent form.

- You will complete some questionnaires and take part in a virtual reality experience where you are guided through both giving and receiving compassion. Below is a summary of what the study will entail from start to finish:
- You will randomly allocated to one of two conditions: you will experience self-compassion when you are embodied in virtual reality as a celebrity you do not perceive as particularly compassionate OR you will experience self-compassion when you are embodied as the avatar of someone you perceive to be compassionate (a public figure/celebrity).
- You will be asked to complete a number of questionnaires which look at your relationship to compassion, different emotions you experience and your feelings about relationships with others.
- The researcher will then give you information about compassion based on current psychological knowledge and practice in compassion focused therapy. The researcher will give you task instructions and guide you through reading a 'compassionate script'. You will have opportunities to ask questions and practice lines to ensure you feel comfortable expressing yourself.
- You will then take part in the virtual reality experience where you will embody a celebrity avatar and will experience both giving and receiving compassion.
- Finally, we will ask you to complete a number of the same questionnaires again.

At the end of the session, the study researcher will conduct a debriefing and address any other questions or concerns you may have. The duration may vary from person to person, but we don't expect it to take more than an hour.

6. What are the possible disadvantages and risks of taking part?

Immersive VR can induce disorientation and, in very rare cases, nausea. We advise that you do not drive any vehicle immediately after taking part, including riding a bike. These problems, however, are unlikely to occur during this study as we are using a set-up in which the virtual and physical movements are always synchronised. Although it is very rare, there have been some reports that virtual reality can induce visual disturbances, flashbacks and epileptic seizures (in those who have photosensitive epilepsy) and therefore we ask that you do not take part in the study if you have epilepsy and/or any neurological condition or you feel you might be at risk. We recommend speaking with your neurologist/GP or other health professional prior to taking part. We will support you if you become upset or distressed during the study. You will be given time at the end of the study to be fully debriefed with a member of the research team.

7. What are the possible benefits of taking part?

Previous studies using a similar immersive virtual reality intervention have found positive effects for participants who have been involved – participants have reported a significant increase in positive emotions and a reduction in negative emotions following the experience. It has also

been found that the experience has led to a decrease in self-criticise and an increase in self-compassion. We hope that one possible effect of this experience could be a change in people's attitude towards compassion. The experience also provides psychological education around concepts of compassion and a stepped approach to providing a compassionate response to someone in distress.

8. **What if something goes wrong?**
   If you have further questions or concerns regarding participation in this research study you may contact one of the researchers detailed on this form. If you are unhappy with how you have been treated or if you have been injured whilst participating in this study please contact the Principal Investigator (John King). If you feel your complaint has not been handled in a satisfactory way (by a researcher or Principal Investigator), you should contact the Chair of the UCL Ethics Committee (ethics@ucl.ac.uk).

9. **Will my taking part in this project be kept confidential?**
   All the information that we collect about you during the course of the research will be kept strictly confidential. The data collected from you will be pseudonymised and stored on a UCL password protected computers. You will not be able to be identified in any ensuing reports or publications.

10. **Limits to confidentiality**
    Confidentiality will be respected unless there are compelling and legitimate reasons for this to be breached. If this was the case we would inform you of any decisions that might limit your confidentiality.

11. **What will happen to the results of the research project?**
    The data will be used only for the purpose of informing the research questions in this study and will only be accessed by the research team. The results may be published in scientific journals, but you will in no way be identifiable. We would be happy to send you a copy of any publications arising from the research or a summary of the main findings. The data will be retained for at least 5 years and may be accessed in the future by the research team for comparison with future data. Dr. John King is custodian of the data.

12. **Data Protection Privacy Notice**
    The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at data-protection@ucl.ac.uk

    This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice:

    For participants in health and care research studies, click here

    The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

    The lawful basis that will be used to process your personal data is 'Public task' for personal data.

Your personal data will be processed so long as it is required for the research project. If we are able to anonymise or pseudonymise the personal data you provide we will undertake this, and will endeavour to minimise the processing of personal data wherever possible.

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk.

If you remain unsatisfied, you may wish to contact the Information Commissioner's Office (ICO). Contact details, and details of data subject rights, are available on the ICO website at: https://ico.org.uk/for-organisations/data-protection-reform/overview-of-the-gdpr/individuals-rights/

13. Contact for further information

For questions and further information, please contact the researcher (detail above) or the principal investigator (details above). You should give the participant a contact point for further information. This can be your name, address and telephone number or that of another researcher in the project (if this is a supervised-student project, the address and telephone number of the student's supervisor). Please see information below regarding how to access mental health support services if necessary.

You will be provided with a copy of this information sheet to take away with you.

Thank you for reading this information sheet and for considering to take part in this research study.

How to access Mental Health Support

Mental health services are free on the NHS and support is also available at UCL –

https://www.ucl.ac.uk/students/support-and-wellbeing/wellbeing

There are some mental health services that allow people to refer themselves online and, in some cases, you'll need a referral from your GP to access them.

Search for NHS mental health support online:
For local support and information services near you, you can search for:
-Mental health support services
-Mental health support services for young people
-Talking Therapies/IAPT service

If you have concerns about your mental wellbeing, you'll find lots of tips and advice on dealing with stress,
anxiety and depression in the MoodZone at https://www.nhs.uk/conditions/stress-anxiety-depression/

You can also try the mood assessment quiz, which is designed to recommend resources to help you better
understand how you feel at https://www.nhs.uk/conditions/stress-anxiety-depression/mood-self-assessment/. This quiz uses questions that GPs often use to assess whether someone is anxious or depressed. It also includes links to useful information and advice on mental wellbeing.

You can compare mental health service providers using the services near you search tool. Enter the name of the mental health service or the service provider and your postcode at https://www.nhs.uk/service-search. This includes therapies like cognitive behavioural therapy (CBT) for common problems like stress, anxiety, depression, OCD and phobias.

You can refer yourself directly to a psychological therapies service without seeing your GP at https://www.nhs.uk/service-search/find-a-psychological-therapies-service/Face-to-face

You can also make an appointment with your GP. You may like to take a printout of your mood assessment

quiz results along, but bear in mind that your GP won't be able to use them to make a diagnosis. A GP will assess your circumstances and offer appropriate advice or treatment. They can also refer you to a psychological therapy service or a specialist mental health service for further advice or treatment.

In an emergency
If you have had thoughts of self-harming or are feeling suicidal, contact someone you can trust immediately, such as a GP or a friend or relative. A mental health emergency should be taken as seriously as a medical emergency.

Examples of mental health emergencies include thinking you're at risk of taking your own life or seriously
harming yourself and needing immediate medical attention.

Call 999 if you or someone you know experiences an acute life-threatening medical or mental health
emergency.

You can go to A&E directly if you need immediate help and are worried about your safety.

You can call NHS 111 if you or someone you know needs urgent care, but it's not life threatening. For example:

• if you have an existing mental health problem and your symptoms get worse
• if you experience a mental health problem for the first time
• if someone has self-harmed but it does not appear to be life threatening, or they're talking about wanting to self-harm

If you want to talk to someone, the NHS mental health helpline webpage has a list of organisations you can
call for immediate assistance at https://www.nhs.uk/conditions/stress-anxiety-depression/mental-healthhelplines/. These are helplines with specially trained volunteers who'll listen to you, understand what you're going through, and help you through the immediate crisis. Whether you're concerned about yourself or a loved one, these helplines and support groups can offer expert advice.

The Samaritans helpline is available 24 hours a day, 365 days a year, for people who want to talk in confidence. Call **116 123** (free).

Appendix C: Consent Form

CONSENT FORM FOR ADULTS

Please read the statements below after reading the information sheet.

Experiencing self-compassion through embodiment of a compassionate other within virtual reality

Institute of Cognitive Neuroscience

Researchers: Amy Barrington (Trainee Clinical Psychologist)

Principal Researcher: Dr John King, *UCL Senior Lecturer* john.king@ucl.ac.uk

Data Protection Officer: Lee Shailer data-protection@ucl.ac.uk

This study has been approved by the UCL Research Ethics Committee (Project ID Number: CEHP/2021/587)

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

		Tick Box
1.	I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction	
2.	I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified. Data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications.	
3.	I understand that my information may be subject to review by responsible individuals from the University for monitoring and audit purposes.	

4.	I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason. I understand that if I decide to withdraw, any personal data I have provided up to that point will be deleted unless I agree otherwise.	
5.	I understand the potential risks of participating and the support that will be available to me should I become distressed during the course of the research.	
6.	No promise or guarantee of benefits have been made to encourage me to participate	
7.	I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
8.	I understand that I will be compensated for the portion of time spent in the study	
9.	I agree that my anonymised research data may be used by others for future research. [No one will be able to identify you when this data is shared.]	
10.	I hereby confirm that: (a) I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher; and (b) I do not fall under the exclusion criteria.	
11.	I am aware of who I should contact if I wish to lodge a complaint.	
12.	I voluntarily agree to take part in this study.	
13.	Use of the information for this project will be held up to the end of the experiment and up to a maximum 5 years from the end of it. I would be happy for the data I provide to be archived at the Institute of Cognitive Neuroscience under machines secured with passwords. I understand that other authenticated researchers will have access to my anonymised data.	
14.	**Overseas Transfer of Data** I understand data will not be transferred outside the EEA.	

If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.

	Yes, I would be happy to be contacted in this way	
	No, I would not like to be contacted	

_____ _____ _____

Name of participant Date Signature

(If applicable)

_____ _____ _____

Researcher Date Signature

Appendix D: Covid-19 Information Sheet and Consent Form

Participant Information Sheet concerning additional COVID-19 procedures

Name, Address and Contact Details of Investigators: **Amy Barrington (amy.barrington.18@ucl.ac.uk)**

This information sheet details the procedures and adjustments put in place to reduce risks related to COVID-19 transmission during the experimental procedure. We are following UCL and Government guidelines and will update these procedures regularly as the situation evolves.

We have implemented strict controls and regulations, because your safety, and the safety of the experimenters are our highest priority. Therefore, things may differ from any previous visit you may have made.

After reading this information sheet, you can contact the researchers to ask any questions you may have about participation in the study, and to ask for more information if anything is unclear.

The proposed set of procedures is designed to minimize the known risks of COVID-19 infection, but cannot abolish all risks. We encourage you to consider your participation carefully. It is up to you to decide whether or not to take part. If you choose not to participate, you won't incur any penalty or loss of benefits to which you are otherwise entitled. If you do decide to take part, you will be asked to read and answer a series of consent questions in order to document your agreement to participate.

The purpose of this document:

This document should be read together with the additional information sheet detailing the procedures specific to the experiment in which you are participating. Here we will focus on COVID-19 related procedures. The other document will explain procedures specific to the research study.

Personal details:

when you sign up to participate in this experiment you will be required to provide your contact details including your address, mobile phone number and email address. We will use this information to contact you for a health screening prior to the experiment. We may also share these details with government officials if contact-tracing becomes necessary, according to current Public Health regulations. This information will be kept

secure, adhering to General Data Protection Regulation (2018) requirements and will be safely deleted after an appropriate amount of time (currently 3 weeks after the date of your visit to the lab).

Before your appointment:

We will contact you 24 hours before your appointment to go over the details of your visit and to confirm your current state of health using the NHS COVID-19 symptom questionnaire

(https://www.nhs.uk/conditions/coronavirus-covid-19/symptoms/). If you fall within an at-risk group, as defined by the NHS, or are sharing a household with an at-risk individual, we encourage you to consider carefully before participating.

Arrival at the research facility:

Please make sure to arrive on time, but no earlier than 5 minutes before the appointment time. This is important to minimize interaction with other building visitors and to avoid crowding in communal areas. Please see attached a document explaining the current procedures for entering the building.

The usual participant comfort items (e.g. snacks or drinks) will not be available. Please make sure to bring your own water bottle and snacks if needed.

On arrival:

- You will be met by the experimenter and briefed with further instructions about building regulations.
- You will be provided with a face mask, or if appropriate, another face covering that you will be required to wear during your visit.
- You will be required to sanitize your hands regularly as instructed by the experimenter.

During the experiment:

We have adjusted the experimental procedures to minimize face-to-face interaction and maximize social distancing. Therefore:

- It will be important that you stay in the experimental room. You may not roam freely around the building.
- We will ask you to minimize toilet trips by encouraging you to use the toilet before arrival at the building. Toilet facilities remain available at ICN only if urgently required.

- Strict disinfection procedures will be followed before, during, and after the experimental session.
- Instructions and explanation will be delivered by computer or video rather than face-to-face, where possible.
- If the experimenter's presence in your vicinity is required, they will try to position themselves behind you to minimize face-to-face contact, and will maintain social distancing where possible.
- Talking will be minimized, focusing on the necessary instructions and answering questions about the procedure. But please do not let this deter you from asking for further information if anything is unclear, or if you have concerns.
- Even when not physically present, the experimenter will be available for the remainder of the session in case you need them. You will always be able to communicate with the experimenter by appropriate means (e.g. video chat, intercom)
- You will be asked not to leave the room unaccompanied. Nevertheless, instructions for exit in case of an emergency will be provided to you in advance.

Your responsibility:

- As part of the informed consent procedures we will be asking you to formally confirm that you understand and will adhere to these regulations.
- You must let us know if you test positive for COVID-19 within 1 week of your visit to the lab, so we can trace and inform any contacts that you may have had during your visit, such as the experimenter(s).

Potential risks:

Immediate risk:

The procedures we have set up are designed to minimize the risk of COVID-19 infection. However, a certain level of risk is unavoidable. If you fall within an at-risk group, as defined by the NHS, or are sharing a household with an at-risk individual, we encourage you to consider carefully before participating.

Secondary Considerations:

- You will be required to wear appropriate PPE for the duration of your visit to the research institute. You may find this uncomfortable.
- Your contact information will be shared with the Government contact tracing service if required.
- If you choose to travel to and from the site using public transport you must consider the risk of COVID-10 through exposure to other passengers.

Appendix E: Measures

Self-compassion and Self-criticism Scale

Please take time to imagine, as vividly as possible, that the following scenario is happening to you right now.

1. A third job rejection letter in a row arrives in the post
2. You arrive after walking to a meeting to find that you are late and the doors are closed.
3. You arrive home to find that you have left your keys at work.
4. You have just received a failed test result
5. You have just dropped and scratched your new smart phone

To what extent would you be likely to react to yourself in the following manners in relation to this scenarios?

1 Not at all likely 2 3 4 5 6 7 Highly Likely

	1 Not at all likely	2	3	4	5	6	7 Highly likely
Harshly	○	○	○	○	○	○	○
Contemptuously	○	○	○	○	○	○	○
Critically	○	○	○	○	○	○	○
Soothingly	○	○	○	○	○	○	○
Reassuringly	○	○	○	○	○	○	○
Compassionately	○	○	○	○	○	○	○

The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF)

Thinking about yourself and how you feel at the moment, to what extent do you feel:

Very slightly or not at all 1	A little 2	Moderately 3	Quite a bit 4	Extremely 5

	1	2	3	4	5
Upset	○	○	○	○	○
Hostile	○	○	○	○	○
Alert	○	○	○	○	○
Ashamed	○	○	○	○	○
Inspired	○	○	○	○	○
Nervous	○	○	○	○	○
Determined	○	○	○	○	○
Attentive	○	○	○	○	○
Afraid	○	○	○	○	○
Active	○	○	○	○	○

TYPES OF POSITIVE AFFECT SCALE

Below are a series of words that describe different positive emotions. Some of these emotions relate to feeling lively, energised and excited, whereas others relate to feelings of being relaxed, calm and peaceful. We are interested in the degree to which you are experiencing these feelings in the present moment.

On the left hand side of the emotion words we would like you to rate the degree to which you are experiencing these feelings in the present moment by using the following scale:

Very slightly or not at all 0 **A little 1** **Moderately 2** **Quite a bit 3** **Extremely 4**

	0	1	2	3	4
Secure	○	○	○	○	○
Calm	○	○	○	○	○
Active	○	○	○	○	○
Laid back	○	○	○	○	○
Lively	○	○	○	○	○
Energetic	○	○	○	○	○
Serene	○	○	○	○	○
Eager	○	○	○	○	○
Dynamic	○	○	○	○	○
Safe	○	○	○	○	○
Warm	○	○	○	○	○
Content	○	○	○	○	○
Excited	○	○	○	○	○
Adventurous	○	○	○	○	○
Tranquil	○	○	○	○	○
Peaceful	○	○	○	○	○
Enthusiastic	○	○	○	○	○
Relaxed	○	○	○	○	○

THE FORMS OF SELF-CRITICISING/ATTACKING & SELF-REASSURING SCALE (FSCRS)

When things go wrong in our lives or don't work out as we hoped, and we feel we could have done better, we sometimes have negative and self-critical thoughts and feelings. These may take the form of feeling worthless, useless or inferior etc. However, people can also try to be supportive of them selves. Below are a series of thoughts and feelings that people sometimes have. Read each statement carefully and circle the number that best describes how much each statement is true for you.

Please rate how well each item describes you:

		Not at all like me	A little bit like me	Moderately like me	Quite a bit like me	Extremely like me
1	I am easily disappointed with myself.					
2	There is a part of me that puts me down					
3	I am able to remind myself of positive things about myself					
4	I find it difficult to control my anger and frustration at myself					
5	I find it easy to forgive myself.					
6	There is a part of me that feels I am not good enough.					
7	I feel beaten down by my own self-critical thoughts.					
8	I still like being me					
9	I have become so angry with myself that I want to hurt or injure myself.					
10	I have a sense of disgust with myself					
11	I can still feel lovable and acceptable.					
12	I stop caring about myself.					
13	I find it easy to like myself.					
14	I remember and dwell on my failings.					
15	I call myself names.					
16	I am gentle and supportive with myself.					
17	I can't accept failures and setbacks without feeling inadequate.					
18	I think I deserve my self-criticism					
19	I am able to care and look after myself.					
20	There is a part of me that wants to get rid of the bits I don't like					
21	I encourage myself for the future.					
22	I do not like being me.					

FEARS OF COMPASSION SCALES

Different people have different views of compassion and kindness. While some people believe that it is important to show compassion and kindness in all situations and contexts, others believe we should be more cautious and can worry about showing it too much to ourselves and to others. We are interested in your thoughts and beliefs in regard to kindness and compassion in three areas of your life:

1. Expressing compassion for others
2. Responding to compassion from others
3. Expressing kindness and compassion towards yourself

Below are a series of statements that we would like you to think carefully about and then circle the number that best describes how each statement fits you.

SCALE

Please use this scale to rate the extent that you agree with each statement

Don't agree at all **Somewhat agree** **Completely agree**
0 1 2 3 4

Scale 1: Expressing compassion for others

1.	People will take advantage of me if they see me as too compassionate	0	1	2	3	4
2.	Being compassionate towards people who have done bad things is letting them off the hook	0	1	2	3	4
3.	There are some people in life who don't deserve compassion	0	1	2	3	4
4.	I fear that being too compassionate makes people an easy target	0	1	2	3	4
5.	People will take advantage of you if you are too forgiving and compassionate	0	1	2	3	4
6.	I worry that if I am compassionate, vulnerable people can be drawn to me and drain my emotional resources	0	1	2	3	4
7.	People need to help themselves rather than waiting for others to help them	0	1	2	3	4
8.	I fear that if I am compassionate, some people will become too dependent upon me	0	1	2	3	4
9.	Being too compassionate makes people soft and easy to take advantage of	0	1	2	3	4
10.	For some people, I think discipline and proper punishments are more helpful than being compassionate to them	0	1	2	3	4

Scale 2: Responding to the expression of compassion from others

1.	Wanting others to be kind to oneself is a weakness	0	1	2	3	4
2.	I fear that when I need people to be kind and understanding they won't be	0	1	2	3	4
3.	I'm fearful of becoming dependent on the care from others because they might not always be available or willing to give it	0	1	2	3	4
4.	I often wonder whether displays of warmth and kindness from others are genuine	0	1	2	3	4
5.	Feelings of kindness from others are somehow frightening	0	1	2	3	4
6.	When people are kind and compassionate towards me I feel anxious or embarrassed	0	1	2	3	4
7.	If people are friendly and kind I worry they will find out something bad about me that will change their mind	0	1	2	3	4
8.	I worry that people are only kind and compassionate if they want something from me	0	1	2	3	4
9.	When people are kind and compassionate towards me I feel empty and sad	0	1	2	3	4
10.	If people are kind I feel they are getting too close	0	1	2	3	4
11.	Even though other people are kind to me, I have rarely felt warmth from my relationships with others	0	1	2	3	4
12.	I try to keep my distance from others even if I know they are kind	0	1	2	3	4
13.	If I think someone is being kind and caring towards me, I 'put up a barrier'	0	1	2	3	4

Scale 3: Expressing kindness and compassion towards yourself

1.	I feel that I don't deserve to be kind and forgiving to myself	0	1	2	3	4
2.	If I really think about being kind and gentle with myself it makes me sad	0	1	2	3	4
3.	Getting on in life is about being tough rather than compassionate	0	1	2	3	4
4.	I would rather not know what being 'kind and compassionate to myself' feels like	0	1	2	3	4
5.	When I try and feel kind and warm to myself I just feel kind of empty	0	1	2	3	4
6.	I fear that if I start to feel compassion and warmth for myself, I will feel overcome with a sense of loss/grief	0	1	2	3	4
7.	I fear that if I become kinder and less self-critical to myself then my standards will drop	0	1	2	3	4
8.	I fear that if I am more self compassionate I will become a weak person	0	1	2	3	4
9.	I have never felt compassion for myself, so I would not know where to begin to develop these feelings	0	1	2	3	4
10.	I worry that if I start to develop compassion for myself I will become dependent on it	0	1	2	3	4
11.	I fear that if I become too compassionate to myself I will lose my self-criticism and my flaws will show	0	1	2	3	4
12.	I fear that if I develop compassion for myself, I will become someone I do not want to be	0	1	2	3	4
13.	I fear that if I become too compassionate to myself others will reject me	0	1	2	3	4
14.	I find it easier to be critical towards myself rather than compassionate	0	1	2	3	4
15.	I fear that if I am too compassionate towards myself, bad things will happen	0	1	2	3	4

THE COMPASSIONATE ENGAGEMENT AND ACTION SCALES

Self-Compassion

(same scales for compassion to and from others)

When things go wrong for us and we become distressed by setbacks, failures, disappointments or losses, we may cope with these in different ways. We are interested in the degree to which people **can be compassionate with themselves.** We define compassion as “a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it.” This means there are two aspects to compassion. The first is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The second aspect of compassion is the ability to focus on what is helpful to us. Just like a doctor with his/her patient.

Below is a series of questions that ask you about these two aspects of compassion. Therefore read each statement carefully and think about how it applies to you if you become distressed.

Please rate the items using the following rating scale:

Never									**Always**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Section 1 – These are questions that ask you about how motivated you are, and able to engage with distress when you experience it. So:

When I'm distressed or upset by things…

1. I am *motivated* to engage and work with my distress when it arises	○	○	○	○	○	○	○	○	○	○
2. I *notice*, and am *sensitive* to my distressed feelings when they arise in me.	○	○	○	○	○	○	○	○	○	○
3. I avoid thinking about my distress and try to distract myself and put it out of my mind.	○	○	○	○	○	○	○	○	○	○
4. I am *emotionally moved* by my distressed feelings or situations.	○	○	○	○	○	○	○	○	○	○
5. I *tolerate* the various feelings that are part of my distress.	○	○	○	○	○	○	○	○	○	○
6. I *reflect on* and *make sense* of my feelings of distress	○	○	○	○	○	○	○	○	○	○
7. I do not tolerate being distressed	○	○	○	○	○	○	○	○	○	○
8. I am *accepting*, *non-critical* and *non-judgemental* of my feelings of distress.	○	○	○	○	○	○	○	○	○	○

Section 2 – These questions relate to how you actively cope in compassionate ways with emotions, thoughts and situations that distress you. So:

When I'm distressed or upset by things…

	1 Never	2	3	4	5	6	7	8	9	10 Always
1. I direct my *attention* to what is likely to be helpful to me.	○	○	○	○	○	○	○	○	○	○
2. I *think* about and come up with helpful ways to cope with my distress.	○	○	○	○	○	○	○	○	○	○
3. I don't know how to help myself.	○	○	○	○	○	○	○	○	○	○
4. I take the *actions* and do the things that will be helpful to me.	○	○	○	○	○	○	○	○	○	○
5. I create inner feelings of *support, helpfulness and encouragement.*	○	○	○	○	○	○	○	○	○	○

Revised Adult Attachment Scale (Collins, 1996)- Close Relationships Version

The following questions concern how you ***generally*** feel in ***important close relationships in your life***. Think about your past and present relationships with people who have been especially important to you, such as family members, romantic partners, and close friends. Respond to each statement in terms of how you ***generally*** feel in these relationships.

Please use the scale below by placing a number between 1 and 5 in the space provided to the right of each statement.

1----------2----------3----------4----------5
Not at all characteristic of me — **Very characteristic of me**

1)	I find it relatively easy to get close to people.	_____
2)	I find it difficult to allow myself to depend on others.	_____
3)	I often worry that other people don't really love me.	_____
4)	I find that others are reluctant to get as close as I would like.	_____
5)	I am comfortable depending on others.	_____
6)	I don't worry about people getting too close to me.	_____
7)	I find that people are never there when you need them.	_____
8)	I am somewhat uncomfortable being close to others.	_____
9)	I often worry that other people won't want to stay with me.	_____
10)	When I show my feelings for others, I'm afraid they will not feel the same about me.	_____
11)	I often wonder whether other people really care about me.	_____
12)	I am comfortable developing close relationships with others.	_____
13)	I am uncomfortable when anyone gets too emotionally close to me.	_____
14)	I know that people will be there when I need them.	_____
15)	I want to get close to people, but I worry about being hurt.	_____
16)	I find it difficult to trust others completely.	_____
17)	People often want me to be emotionally closer than I feel comfortable being.	_____
18)	I am not sure that I can always depend on people to be there when I need them.	_____

Appendix F: Compassionate Script Worksheet

Experiencing self-compassion through embodiment of a compassionate other within virtual reality

Compassion: sensitivity to suffering in self and others, with the commitment to try to alleviate and prevent that suffering.

Intervention scenario: You will be introduced to a distressed crying child and be given the task to help reduce her distress by using a compassionate approach. We would like you to take some time to think about how you would like to respond compassionately in this scenario and to prepare some lines of what you might say.

There are three essential stages for giving a compassionate response which will be detailed below. This worksheet is just a guide to get you thinking and practicing these stages! You will be able to practice with the researcher to get you comfortable expressing yourself. Below are some examples of generic sentences that can correspond to each stage *but it's important to use the practice time to generate your own and think about how you would genuinely approach this task. There are no right or wrong answers!*

Stage 1 Validation: The aim of this stage is to acknowledge that the other person is upset, that you do not judge them for this, and that it is perfectly acceptable for them to react in this way. This stage could be compared to 'sensitivity to suffering in self and others' in the definition of compassion – choosing to recognise how someone is feeling and turn towards that suffering.

Example: "*It's not nice when things happen to us that we don't like. It's really made you feel bad about yourself, hasn't it?"*

What you will say:

Stage 2 Redirection of Attention: The aim of this stage is to direct the other person's attention towards something that is more positive, soothing, and comforting.

Example: "*Sometimes when we feel bad about ourselves it's helpful to think of someone who loves us and believes in us."*

What you will say:

Stage 3 Memory Activation: The aim of this stage is to suggest that the person could try to recall a memory of a person who loves or is kind to them. This memory is supposed to instil more positive feelings of warmth, comfort, and safety.

Example: "*Can you think of someone who loves you and believes in you? What might they say to you now that would make you feel a bit better about yourself?"*

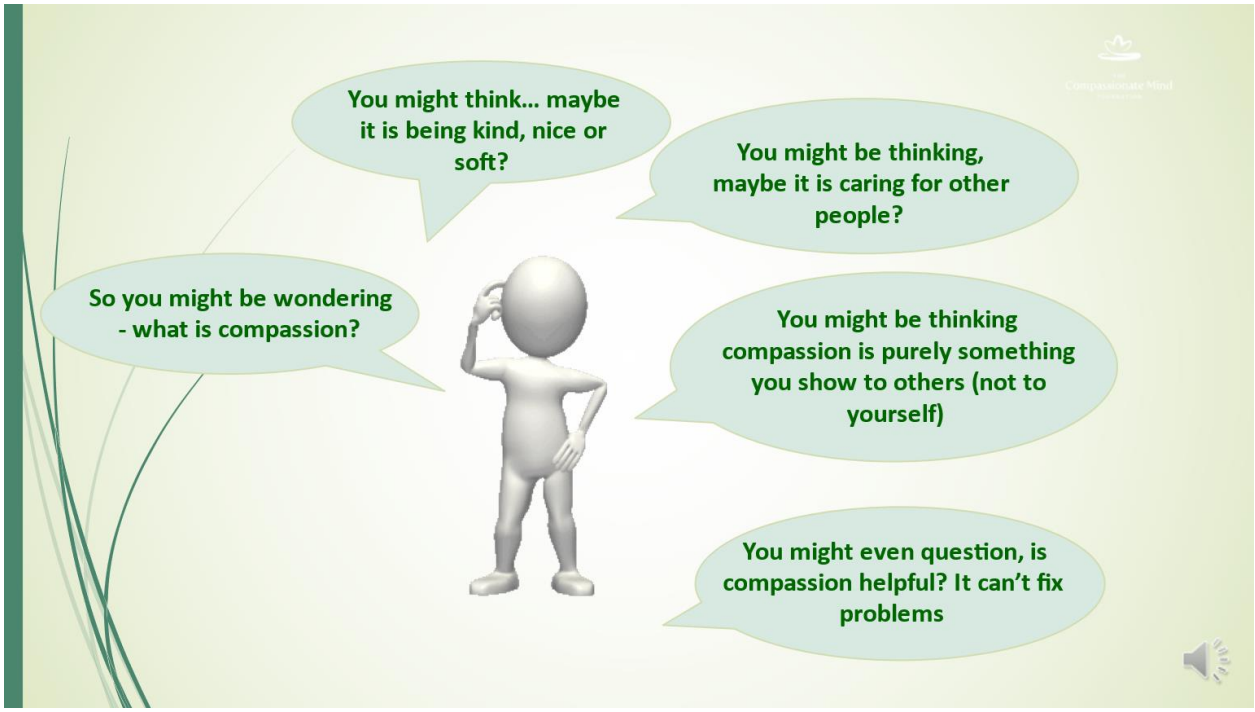
What you will say:

Appendix G: Psychoeducational PowerPoint about Compassion

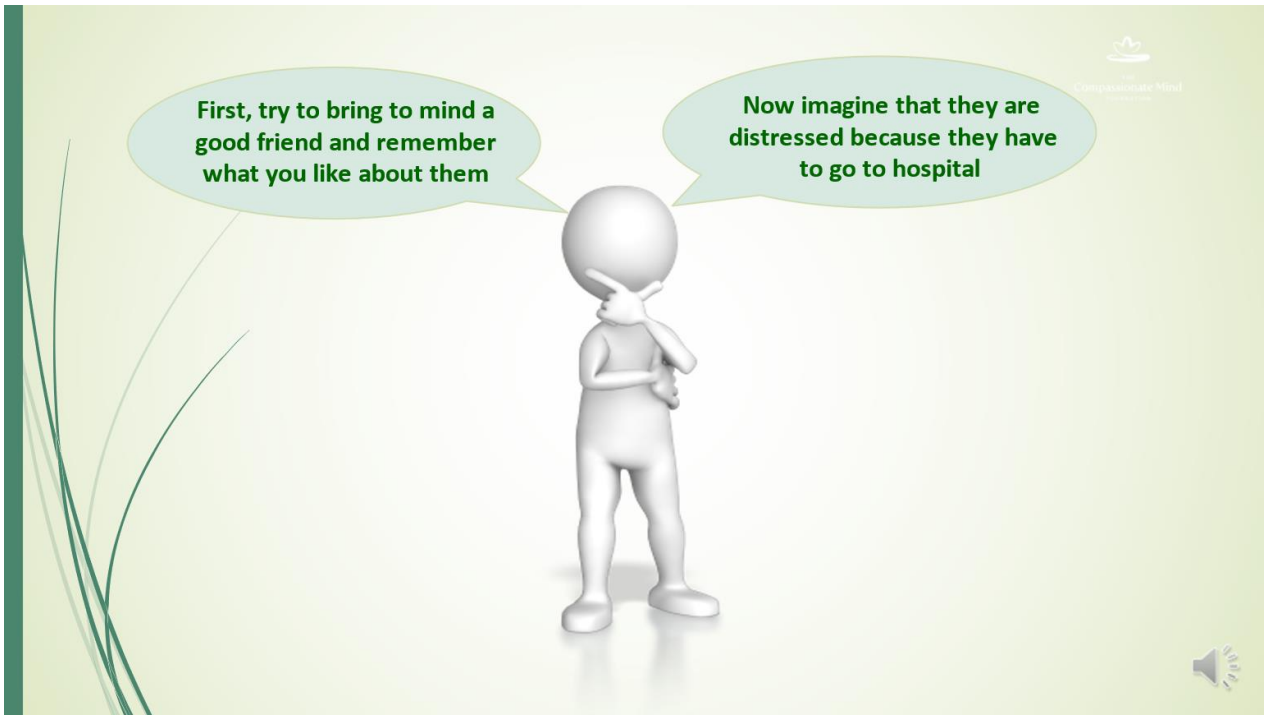
What is compassion?

How do I show compassion – to others and to myself?

What does that look like?




Let us look at an example together to help illustrate our definition of compassion.
Well actually, compassion, particularly self-compassion, can be tough and help us be brave when we need to face difficult things.
We would like you to hold in mind this definition of compassion for the study today and do your best at engaging with the compassionate parts of yourself.


First, try to bring to mind a good friend and remember what you like about them
Now imagine that they are distressed because they have to go to hospital


Oh No! I just received a letter to say that I have to go to hospital
I'm so frightened!


I'm so frightened
I CAN'T go to hospital
What can I do?!
I can understand that you are really upset because going to hospital can be frightening
Sensitive to their suffering
How can I be helpful? Maybe I could come with you
Working out ways to be helpful. Giving courage
© 2020 Prof Paul Gilbert

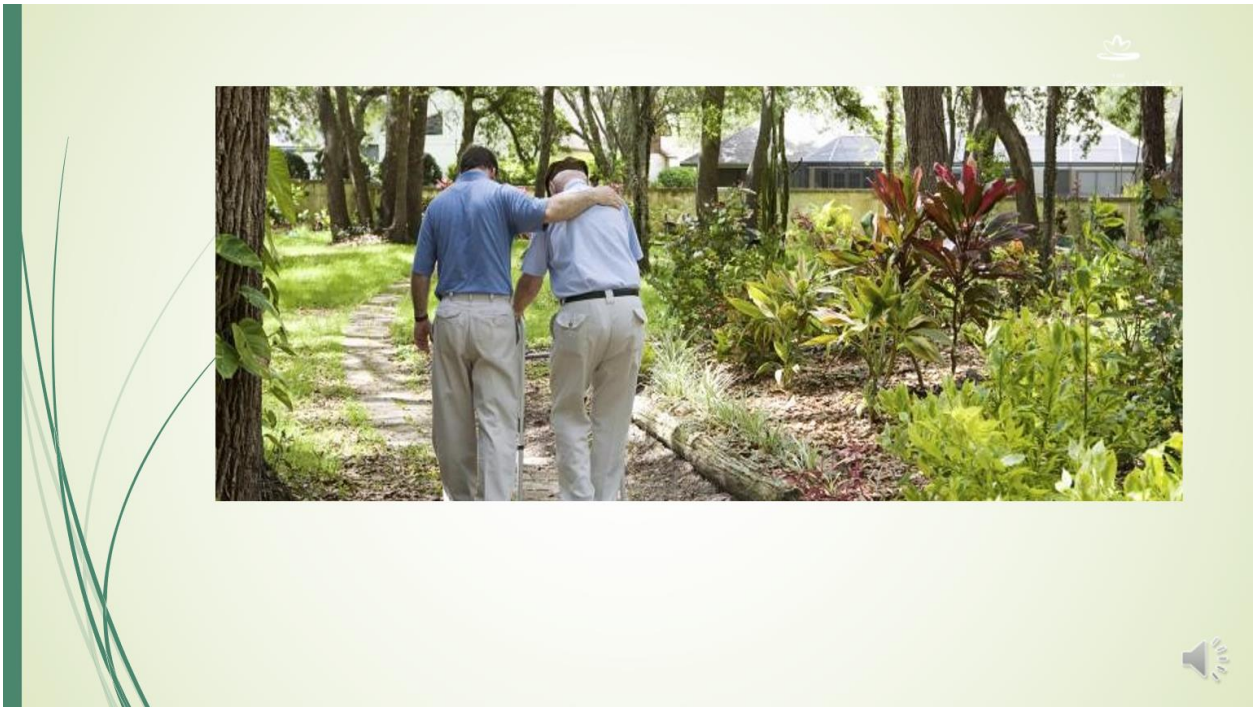

Very upset this has happened
Part 1 (sensitive to suffering) We listen and try to understand. We are sensitive to their suffering.We show that it is okay to feel the way we do because as humans we all suffer and this is expected at times.
Part 2 (trying to do things to alleviate the suffering):We then try to work out ways to be helpful and to give support– not necessarily to fix problems but to try to soothe distress.


So when we are being compassionate we are sensitive to distress and upset.Even though sometimes we might want to avoid or turn away from suffering because it's hard and painful, we do the opposite of this – we turn towards the suffering.Then we try to work outthe most helpful next steps.
So compassion to others and also towards yourself requires many skills but most importantly courage.
Compassion is: being sensitive to suffering in self and others and trying to alleviate and prevent it


We may consider how we would want someone to respond to us if we were in distress. We may want to show sensitivity by using a calm, soft tone of voice and to speak slowly.
So… to show compassion to others and to ourselves we need to try to embody compassion. We need to think about not just what we would say but how would it look and sound.
We may lean in towards someone in distress with our body to show our interest and engagement with their suffering.


So compassion isn't exactly a walk in the park is it..?
So there are three core qualities central to the compassionate self…
Wisdom
Caring-commitment
Strength and courage


Thank you for taking part in this study.
I invite you to use your qualities of wisdom, care and courage to bring your compassionate self into virtual reality!



Appendix H: Self-Compassion Debrief Information

What is Self-Compassion?

To define **self-compassion**, we really need to start with what is **compassion**. **Compassion** is an attitude that involves a certain set of feelings, thoughts, motives, desires, urges, and behaviours that can be directed towards any living thing (i.e., ourselves, another person, a group of people, a society, animals, the environment, etc.).

When we talk about **self-compassion**, we are specifying that this attitude is being directed internally towards ourselves.

The two leading figures in the area of self – compassion to improve mental health and well – being are: **Paul Gilbert & Kristen Neff.**

Kristen Neff defines compassion as:

"The recognition and clear seeing of suffering…feelings of kindness for people who are suffering, so that the desire to help – to ameliorate suffering – emerges… recognizing our shared human condition, flawed and fragile as it is" *(Neff, 2011, p10)*

Paul Gilbert defines compassion as:

"a basic kindness, with a deep awareness of the suffering of oneself and of other living things, coupled with the wish and effort to relieve it" *(Gilbert, 2009, p. xiii)*

Both definitions emphasis four key things.

Awareness

Being attentive or sensitive to the fact that some sort of 'suffering' is occurring. Now suffering could mean some distressing struggle with emotional pain, mental pain, physical pain, or all of the above

Normalising

Recognising that experiencing this sort of pain is universal, we all experience pain at some point to varying degrees. The fact that we experience pain isn't a fault or failing of ours, we are not to blame for our pain, and we are not alone in our pain.

Kindness

Not shying away from or ignoring the pain, but meeting this pain with feelings of kindness, care, warmth, and concern.

Alleviation

Focusing our energy on ways to alleviate the pain, which may be via providing further comfort and caring actions, providing a helpful perspective regarding whatever the trouble is, or having the strength and courage to take other necessary actions to address the problem being faced.

So self-compassion is about doing all of these four things for ourselves when we are struggling. That is, being aware of our own pain, whatever that may be. Understanding that whilst feeling this pain is hard, this is a normal human experience, not a failing on our part, and we are not alone. It then involves directing feelings of kindness and care towards ourselves, just as we might to someone else, we care about who is struggling. And finally, focusing our attention and energy on how we might improve our own pain and move through the struggle we are facing.

Why is Self-Compassion important?

Mental Health and Well Being Benefits

Research has shown that self-compassion is strongly linked to our mental health and well-being. Studies have found that those who are more compassionate towards themselves tend to have less mental health problems, like depression, anxiety, and stress. These people also tend to have a better quality of life, a greater sense of well-being, and less problems in relationships. Compassion is linked to the hormone oxytocin, often called the "love" hormone. This is a hormone that promotes bonding and closeness, and therefore is particularly active at childbirth, during physical affection, during sex, when parents play with their children, when people play with their pets, etc. It is suggested that directing compassion inwards can equally trigger the release of oxytocin, and the calming benefits it brings. In essence, self-compassion goes hand in hand with general life contentment, something we could all do with a dose of.

Recommended resources if you are interested in looking further into compassion!

Gilbert, P. (2009). *The Compassionate Mind.* Constable: London, UK.

Gilbert. P. (2010). *Compassion Focused Therapy: Distinctive Features*. Routledge: East Sussex, UK

Gilbert, P. & Choden. (2015). *Mindful Compassion: Using the Power of Mindfulness and Compassion to Transform Our Lives.* Robinson: London

Irons, C., & Beaumont, E. (2018). *The Compassionate Mind Workbook: A step-by-step guide to developing your compassionate self* (Workbook ed.). Robinson.

Neff, K. (2011). *Self-Compassion: The Proven Power of Being Kind to Yourself.* William Morrow: NY.

Neff, K. (n.d.). *Self – Compassion Website*. https://self-compassion.org/

Kristen Neff's Ted talk & Videos: https://www.youtube.com/watch?v=IvtZBUSplr4 & https://www.youtube.com/watch?v=11U0h0DPu7k&t=33s

Appendix I. Responses to Qualitative Question

Feedback from participants in condition 1 (compassionate avatar)

Please describe your experience of compassion after taking part in the virtual reality activity:

"would love to say something or express my compassion to others and happy to see they stop crying. when i heard my voice, first it sounds weird, but later found that really felt being cured by myself. maybe should say sth good to myself and take care of myself."

"Before this experience, I found that I do have the ability to comfort others. But at the same time, I often doubt that it won't make any change to others because the emotional encouragement cannot fundamentally work out the problems in reality. And also, even other's compassion can let me feel better because I know there are someone really care about me but I clearly know that bad things still need to resolved by myself, so I often don't take other's caring seriously. But for this time, I found that even I think my words may not help, but it do help others! I felt myself was really trusted and believed in by others, this feeling makes me so good. And also I found that actually, I do have the ability to comfort myself as the way I comfort others. I was really moved by this fact."

"I learned more about what being compassionate entails, and some things we can say to demonstrate it. It was quite difficult to begin with but once the conversation gets going it becomes easier."

"Learning the definition of compassion and breaking down the elements of compassion has helped me understand how I can be compassionate towards someone in distress but validating their emotions, redirecting their attention to something positive like a game or offering a reward and then reminding them of their strength and how proud everyone is of them. The VR experience made me realise that kind, reassuring words are really useful to hear because often I can be self-critical so hearing someone speak in a positive way to me is nice because we often tend to be harsher on ourselves than others."

"It was a little disorienting hearing my own words coming from another body, but it was nice to hear words of support from 'another person' that was actually myself regardless. I've never been in this situation before so I was uncertain how to react, but I would imagine that I'd like to hear such things from myself or someone else if I were in a similar situation in real life."

"It is a very nice experience for me to revisit what is the meaning of compassion and what is the feeling of being compassionated. This also gave me a clearer idea of what I can say if I want to show my compassion to others. Of course I know I have to make changes depends on the situation, but it's good to have a framework at least."

"I really actively engaged to search words that carry actual meaning and power for the recipient, and when the role switched and I heard those words back, for a moment it made me wanna cry because it touched on some soft spot on my heart. I think what I learned from this experience is that effective emotional support is really largely a function of non-judgmental, attentive and meaningful communication that concerns the predicaments of the person, rather than mere pale encouragements."

“it feels unreal, seen my role model been animated so detailly. Its quite strange but in a good way, i think listening to my own recording helped me to feel more compassionated.”

“I had better understanding about compassion and how to express it in a more structured and logical way.”

“I found it more difficult than I thought it would be to produce a genuine reaction at first. I started to get anxious when it began because I thought I was going to do it wrong, but it was a very interesting experience.”

“it is important to think of how you would want other people to show compassion to you when soothing others. It may be difficult but trying to understand how the other person's feelings helps.”

“It was a strange feeling as being given my own compassion back felt slightly abnormal, but being delivered my own words back to me made me realise that it is okay to allow myself to feel compassion from myself and others, and it is not as selfish as I generally feel it is. However, I think it was easier to communicate because it was through another person, and it still felt a little awkward to be spoken to in that manner.”

“It kind of changed a bit how I feel about compassion, I didn't realize that compassion means understanding other people, the definition of compassion to me before, it is just soft, and it might make you easy been targeted. But after this activity, i understand that compassion should be a strength rather then just someone with a soft spot.”

“It was very nice, I felt comfortable and confident in giving as well as receiving compassion. The fact that I was Emma Watson helped in building up the confidence and made me believe that I knew what I was saying and that it would be helpful to the upset girl.”

“It was real. I felt for the little girl and i wished i could have done something to make her life a bit better or easier. It was like i was in the same room with the little girl”

“I feel it is a nice chance to listen to yourself, to assess the value of your words. For me, being in the princess D appearance did not play a big role cos i was trying to help from my side rather than taking someone's emotional or internal state (and think that its me). Generally, very nice experience. In the future it can be played in two other scenarios like having a particular situation how do you respond on comment and what you expect, and i believe mostly ppl cannot undersatnd others bc they have not feel the same yet.”

“I was slightly embarrassed when I saw my responses and wanted to help her more, I just wanted her to feel comfortable.”

“eye opening activity. to see both sides of the spectrum. the 3d scenario made it more life like. made compassion a bigger topic for me than previously”

“It was a reflective experience. It makes you realise what you want and need to hear. Whether that be for myself or others. It has made me consider the reflective steps that I perhaps need to take more for myself and when being compassionate to others. It has made me more self-aware of compassion and being self-compassionate more pro-actively.”

“The experience was amazing. I was feeling sensitive to the distressed girl's emotions . Amy was very sweet and calm.”

“It was very surreal to feel a body that is not quite my own and to respond as somebody else, but I found it very calming. It really made me think about the ways I usually express compassion and how important tone of voice and the position of your body really are.”

“It's really weird to do the comforting things in the VR world, but it would also be a good chance for me to see how I actually reacted when my friends were suffering from pain, and also helped me to systematically learned what is compassion and how it works in half-reality. It was sad to see some people crying, but I am glad that upset people are welcoming my comforting and seeking helps from me.”

"I felt that I had a need to offer support as I was the only one in the room besides the crying girl, also i think the fact that I had an avatar that resembled someone i know to be compassionate and sympathetic to the struggles of others I channelled that character to feel more compassionate.

When the situation was reversed and I was receiving the compassionate words I felt a little uncomfortable and maybe underserving of that compassion."

“It was quite intriguing to listen back to your own compassionate statements and it was nice to be on the receiving end of it. It created a feeling that things were going to be fine. Also, having been briefed on what compassion really is and how to deliver it effectively was also helpful in achieving this.”

Feedback from participants in condition 2 (non-compassionate avatar)

Please describe your experience of compassion after taking part in the virtual reality activity:

“I found it awkward when she continued crying even after I tried displaying compassion to her, as I did not know anything else to say. I affirmed that I will be by her sitting and waiting for her to cry it out before opening up to me. I felt like I did badly, until I saw my recording and realised I did pretty okay. I felt assured myself.”

“It is a nice way to teach self-compassion because sometimes it is easier to give advice to someone rather than yourself. When you listen back to it, you might listen to the advice you gave which is a starting point.”

“It was difficult to try and balance being sensitive to her suffering while also not promising it will get better as I know i can't do that. I tried to be compassionate in a way that showed her i was here for her rather than trying to help as i was unsure why she was upset. When i was her i could tell the voice was quite sympathetic and caring but that i hadn't moved around a lot - leaning forward did show that i was there to listen and so felt compassionate.”

“Much stronger. I am not sure how I might describe it, but I feel much better. If I were given that same questionnaire right now, I may give higher scores for a number of questions.”

"I realised that when I thought I have compassion, I might not express it as well as I think I am able. For example, it didn't seem natural for me to pat the girl on the shoulder when she was crying but then the first thing I thought of was to pat her or gently speak to her so that she would relax a bit. I also seemed lost for words and froze during the moment because I get nervous around

people who are distressed. I just feel that I might not be helping them or I worry that if i say something wrong or stupid then they may feel worse and even hate me rather than the situation they are facing."

So I know what compassion means and how I should behave, but when it comes to acting compassionately I don't feel it's natural and I really need to think it through. This includes self compassion."

"I felt like I was able to conjure feelings of compassion when the study told me to, especially when asked to think about a friend that I would feel compassionate towards. I think the writing exercise reminded me of the steps involved in compassion, but I guess saying them out loud to the girl in the VR felt a bit forced, especially since I was almost regurgitating what I had just written. Being Priti Patel was very strange, because I'm pretty sure she wouldn't have said those things if she was in that situation. I think the VR experience made me feel less compassionate. I think if it had been a real crying girl and I was myself, I would have said a lot more and it would have come from a place of genuine care. I did feel immersed in the VR, but the playback of myself didn't feel convincing."

"It was difficult taking to the girl without knowing what was wrong. Also , listening back to myself made me realize how un-compassionate I sounded ."

"I can see how the 3-stage compassion technique gradually smoothed the distressed feeling other others in a VR situation. Also, when I was in the condition being comforted by someone using this strategy, I feel relieved to a large extent."

"It was relatively easy to ""become"" someone else and get used to the virtual reality. The perspectives were very realistic and I feel like that helped a lot."

"I initially thought I did not say anything really useful to the girl crying, but when I heard the recording back I realised that sometimes you do not need to provide solutions, but that reassurance and compassion can really help too. I also understood that, although I tend to solve problems on my own, people's advice can seem useful to show you a brighter perspective and perhaps a different way to address your emotions that you might not have been able to think of in a distressed state. It is easier to solve the problem when you see it from the perspective of someone who is outside of the situation and really cares about you."

"Being virtual reality, it was not emotionally accurate interacting with a graphic representation of a person, but giving the situation basic question of sympathy "are you OK, do you want me to call someone for" had to suffice with no response form the graphic representation, a feeling of being lost with no interaction."

"Although at the beginning it was awkward to talk to someone who couldn't respond, it got easier to speak naturally and show compassion in a way I normally would after I felt more integrated with the persona. Thinking what to say when writing the script helped me think more deeply about the types of things that would be compassionate and comforting to hear, and putting it to practice felt more realistic. I felt good about saying such comforting things to the crying girl.

Being in the crying girl's position, it felt strange to be looking at the ""least compassionate"" celebrity talk, but it made me think about how words can make a difference to other's feelings."

"It was an interesting and delightful experience! I enjoyed learning more about compassion as it seemed to have put into words and theory what I had been feeling about compassion myself.

The VR experience was rather effective in creating the realistic feeling of being put into that situation of having to comfort someone. It could possibly have been better if there was some cause provided about the distress as I personally feel that compassion is best shown when targeted to a certain problem. Additionally, being able to move around may help as body language seems to be how I show compassion a lot of the time as well."

"It is not a easy process especially when you are trying to comfort someone who's not responding with words. I had to infer the feelings and changes from the body language and facial expression which make compassion more difficult. Of course, seeing the girl started to calm down made me happy."

When act as the girl and listened to the recording of my own words, it was awkward at the first place, but I felt warmth and patience from my voice."

"It felt weird but it was very interesting. I really felt like I was in the scene and was immersed in it. It was weird listening to how I spoke but it did comfort be a bit when I was listening to it."

"It was a new feeling for me to be able to hear my own thoughts and my own way of acting compassionately towards someone. it felt good and a bit relaxing thinking that, if i feel this way about someone's distress, maybe i can feel the same about my own."

"It was a little bit strange at first but all in all definitely an exciting experience. The VR was very engaging and being Simon Cowell was definitely weird. At first, when the girl started to cry I panicked for a split second, not knowing what to do due to the novelty of the situation. However, having gone through all the materials about compassion and the training work, I managed to be compassionate towards the girl and then when it worked for her I felt relieved as well. When I got to be the little girl and listened to my own words again, I felt like I have fully understood what being compassionate was about. Now that when I encounter any similar situation, I can recall the definition of compassion and it certainly will help myself and others."

"The VR experience made me embody the strategy of compassion and how my attitude being directed towards the child, was a representation of self-compassion that involves personal thoughts of how I would approach another human being."

"While I thought that the guidelines for expressing compassion were very helpful, I personally did not like the compassion I ''displayed''. I felt that the words were empty and did not mean anything. I am not sure if they would have actually helped anyone. I am not sure if compassion truly has the potential to make someone feel better in the long run, although I can see how it would be useful as an immediate reaction to distress."

"Very strange experience but I did not feel like compassion was portrayed as there was little response from the child and it seemed like a strange scenario where you would be the sole person for consoling a crying child. I also did not feel a lot of compassion as the child since the adult body seemed very intimidating."

"i think that the experience really got me thinking about how i should be more kind to myself sometimes. i am usually compassionate towards people but find it harder to be compassionate about myself. i think that this experience helped me think what i can do and remind myself of people who will support me."

"I now see that compassion could apply to others as well as to myself. Hearing supportive comments when you are distressed could really help alleviate or at least reduce the distress felt."

“It was a bit weird trying to impersonate myself talking to an avatar but I said what I would normally say to a friend, so it wasn't too difficult. Even though I was Kendell Jenner, when I was talking I forgot I was her and acted as me. The experience made me realize the importance of being compassionate but at the same time, I believe it's also important to give realistic and genuine comments to the person we are talking to.”

“I felt that compassion in practice from myself was almost involuntary when enacted in the context of others. Seeing the little girl crying, it felt almost second nature to comfort her in distress, although having the three step guideline definitely helped in structuring my speech, and gave me a greater understanding of what was needed in compassion which I felt strengthened my own desire to help this girl. While I felt this comfort in speaking, there was a sort of dissonance every time I reminded myself that I was Margaret Thatcher, which would almost break the illusion or feeling that I wanted to comfort this person. On the other hand, hearing myself talk was more relaxing than I expected, as I usually feel discomfort at my own voice. It felt like a therapy session almost.”