SELF-ATTACHMENT THERAPY IN VIRTUAL REALITY

A VIRTUAL REALITY PLATFORM FOR ADMINISTERING SELF-ATTACHMENT THERAPY.

THE MENTAL HEALTH PROBLEM

- 1 in 6 people in the UK aged 16 or over exhibit symptoms of depression.
- It is projected that, by 2030, mental health problems, particularly depression, will be the leading cause of mortality and morbidity globally.
- Increased demand for mental health services = long waiting times

SELF-ATTACHMENT THERAPY (SAT)

- A self-administrable intervention for chronic anxiety and depression
- Attachment Theory: Insecure childhood attachment results in reduced capacity for emotional regulation. This increases vulnerability to mental illness.
- Goal: Create secure attachment between patient's adult self and inner child.
- 4 Stages:
  - Stage I: Introduction to Self-Attachment Therapy
  - Stage II: Connecting with the Inner Child
  - Stage III: Falling in love with the Inner Child
  - Stage IV: Developmental re-training and re-parenting the Inner child

THE IMAGINATION PROBLEM

- Patients had difficulty imagining their inner child
- Significant barrier to accessing Self-Attachment Therapy
- Virtual Reality (VR) proposed as a solution.
- Patients could perform Self-Attachment Therapy with a virtual inner child.

THE SOLUTION

- A VR platform that:
  - Cohesively brings together all 4 stages of SAT into a **single platform**
  - Converts the protocols of each stage into **VR compatible activities**
  - Supports the **self-administration** of SAT with instructive guides throughout
  - Is designed for **accessibility**

PLATFORM DESIGN

HOW WAS SELF-ATTACHMENT THERAPY ADAPTED FOR A COHESIVE VR ADMINISTRATION?

THE INNER CHILD

- Used instead of happy and sad photos
- A (virtual) physical representation of the patient's inner child.

Idle

Happy

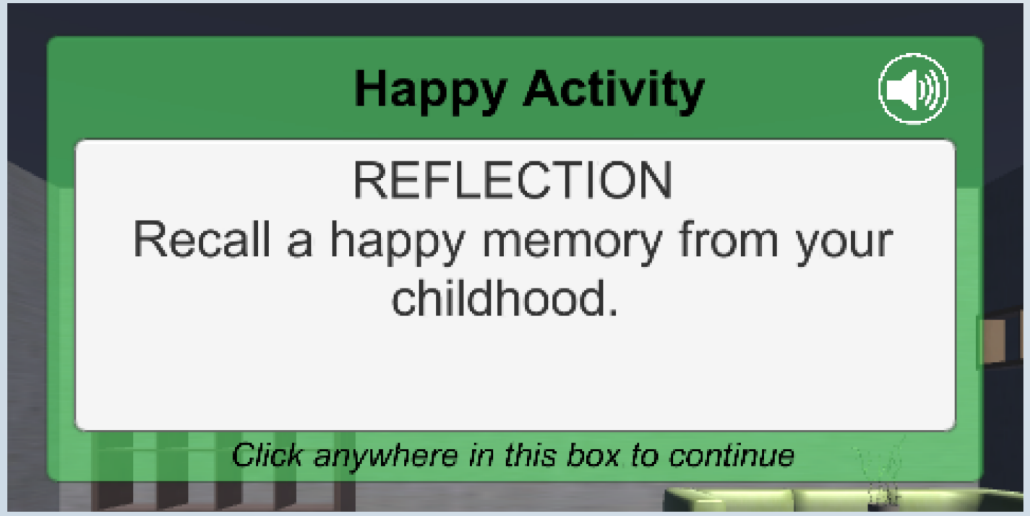
Sad

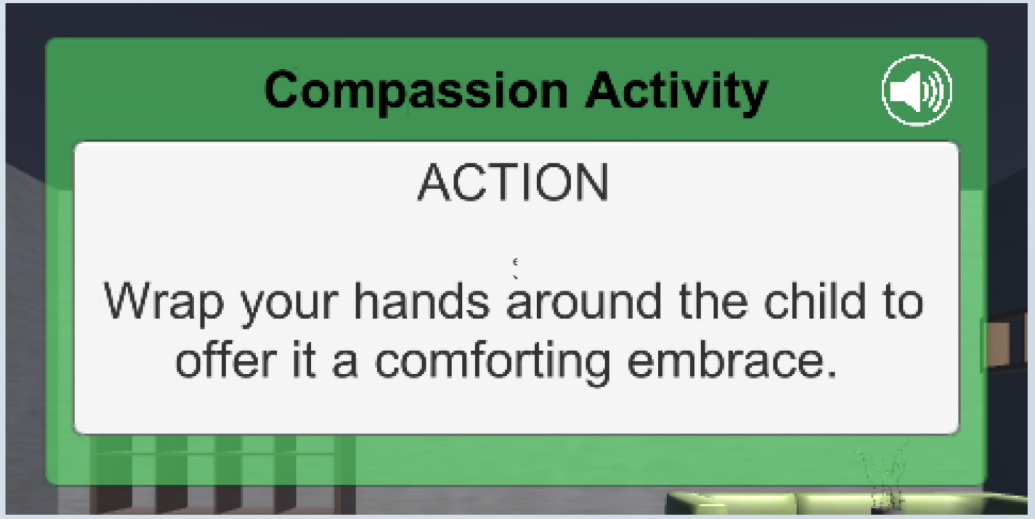
Scared

Dance

INSTRUCTION SETS

- General structure of protocols involve some reflection on the past, sometimes followed by an interaction with the inner child.
- Instruction sets specially designed to map SAT to VR.
- Reflection questions, or specific directions guide reflection
- Also provide background on the purpose of the protocol





PHYSICAL INTERACTIONS IN VR

CUDDLING

- Used to offer the child physical compassion
- Detects cuddle motion as when user's hands are near the child.
- Occurs in multiple protocols

MIRRORING

- Used to create child embodiment illusion
- Uses motion detection to allow virtual child to mirror user's actions
- Stage IV Protocol Type C

ACCESSIBILITY

- **Speech Recognition:** Reduce need for controllers to navigate, a more natural interaction medium.
- **Text to Speech:** Reduce need for users to read vast amounts of text.
- **UI:** Larger buttons increase accessibility to the less able bodied e.g. shaking hands.
- **Stationary Experience:** Reduce need for mobility, platform can be used standing or sitting, inner child comes to you.

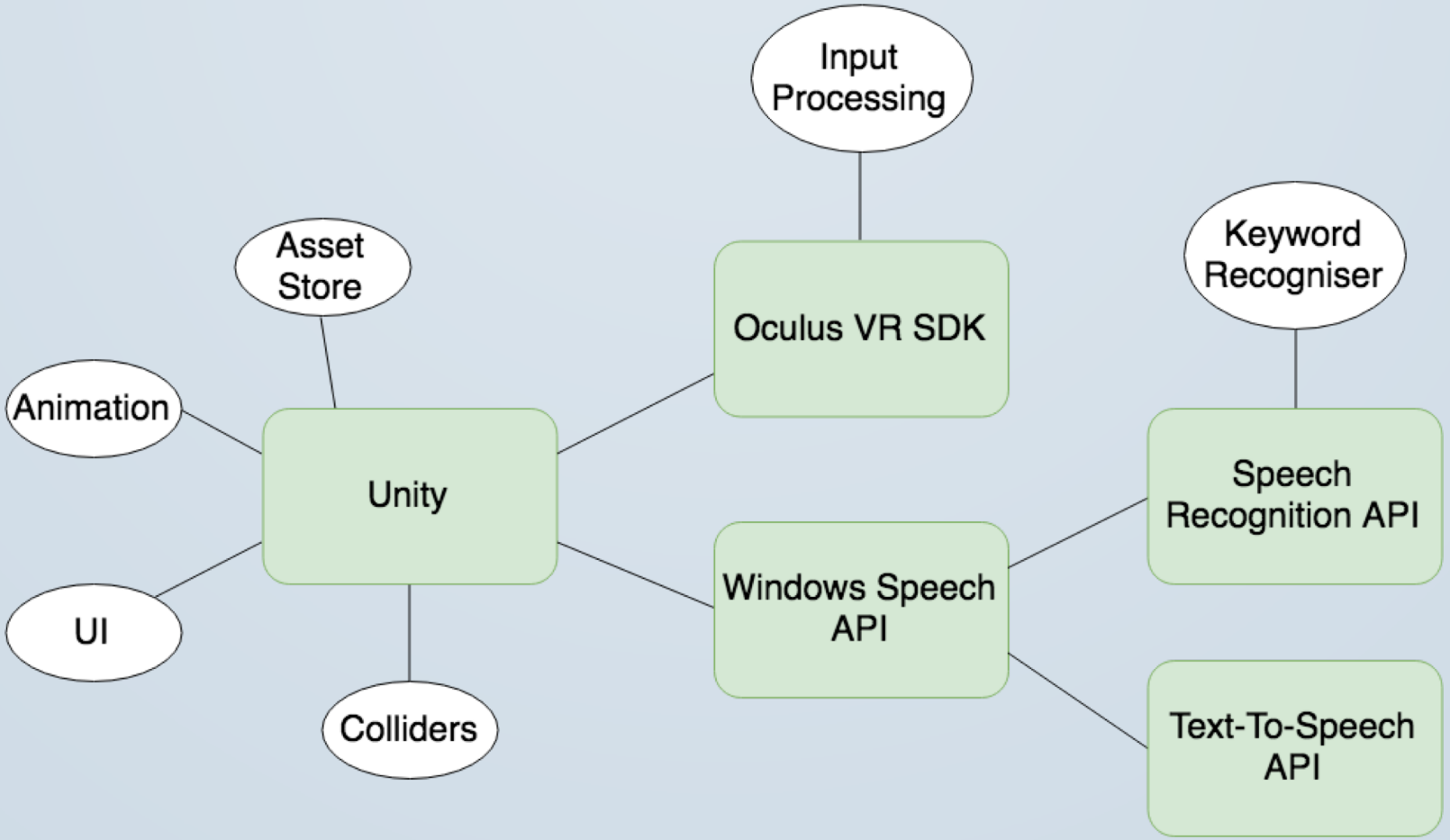
DEMONSTRATION

- Stage I: Introduction to Self-Attachment Therapy + Onboarding
- Stage II: Connecting with the Inner Child
- Stage III: Falling in love with the Inner Child
- Stage IV: Developmental re-training and re-parenting the Inner child
  - Type A: Processing Past Trauma
  - Type C: Create Zest for Life
  - Type D: Gestalt Therapy

KEY IMPLEMENTATION CHALLENGES

WHAT WERE THE INTERESTING TECHNICAL BITS?

TECHNICAL OVERVIEW

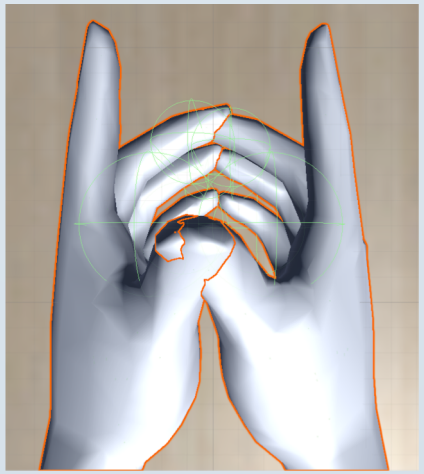


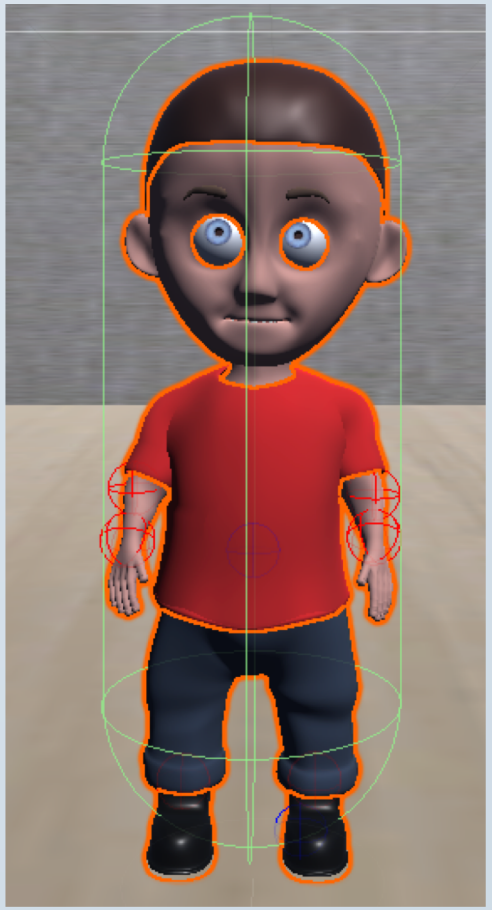
INPUT PROCESSING

- Cursor Interaction System
  - Dynamic Cursor Positioning
  - Raycasting
  - Headset control vs Controller control
- Dynamic Child/UI Positioning
  - Continuous Animation
- Motion Detection

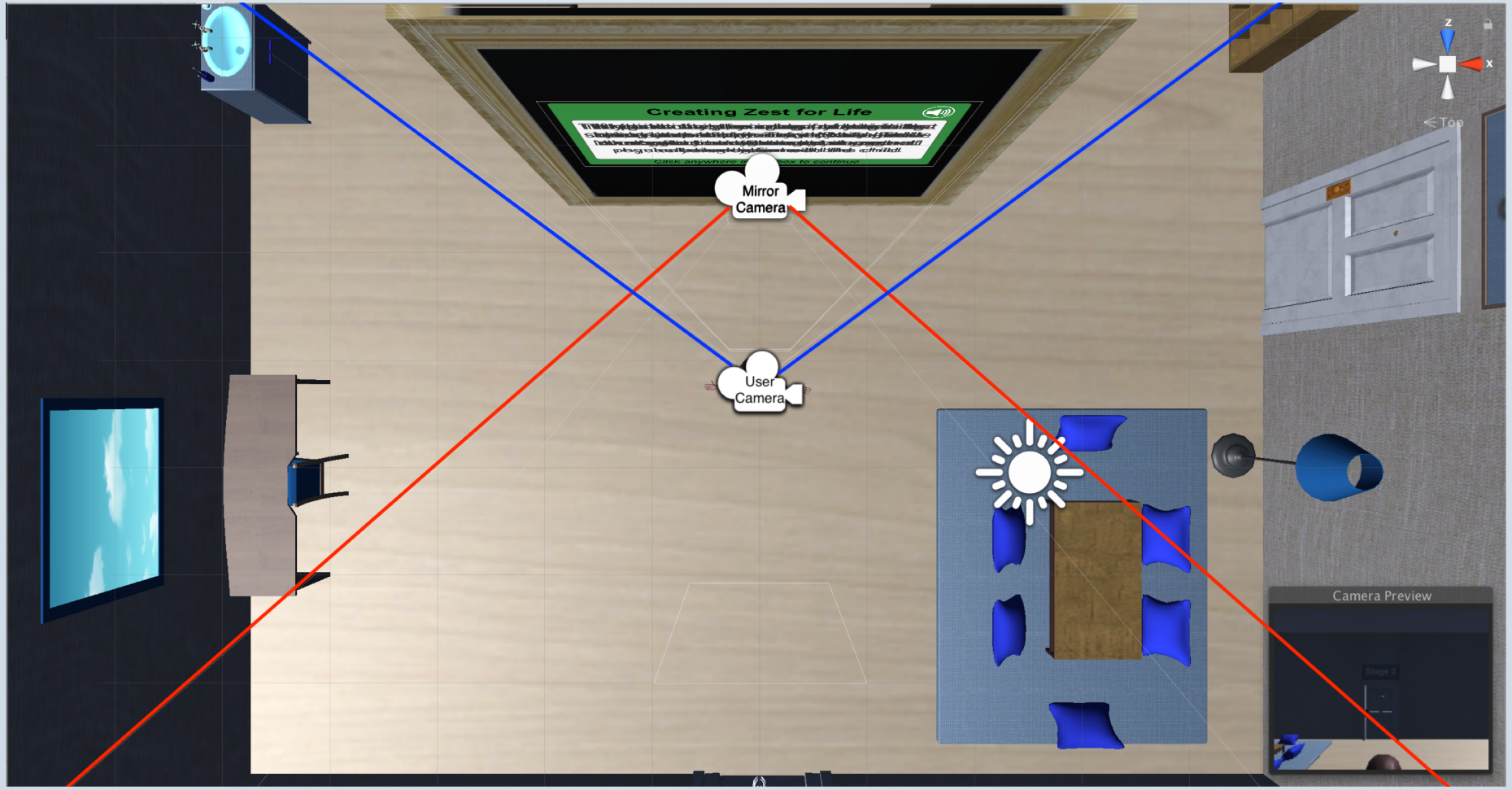
CUDDLING

- Dynamic Child Positioning
- Collision Detection
- Haptic Feedback





MIRRORING – EMBODIMENT ILLUSION



MIRRORING – COLLIDER PLACEMENT

EVALUATION

HOW DID USERS RESPOND TO THE PLATFORM? DOES IT WORK?

THERAPEUTIC EFFECTIVENESS

- Without clinical trials, statements comparing the clinical efficacy of Self-Attachment Therapy with and without VR cannot be made
- Evaluated with respect to how well this platform satisfied the conditions necessary for facilitating a successful VR intervention
  - Ability to create sense of **presence and embodiment**
  - Ability to overcome **barriers to accessing** SAT
- Before and After VR Questionnaire

PHYSICAL INTERACTIONS IN VR

	CUDDLING	MIRRORING
AUTHENTICITY	Should have longer embrace time	Should have more mirrored actions
EASE OF EXECUTION	70% on first attempt 100% within 3 attempts	80% within 3 attempts 100% within 5 attempts
SUMMARY	Adequate, easy to perform and repeat. Decisive.	Expected more. Reasonable ease of execution.

USABILITY TESTING

- **Onboarding**
  - Onboarding increased the speed and confidence with which users successfully performed interactions
- **Speech Recognition**
  - Confidence Level calibration
  - Wide range of satisfaction levels, temperamental
  - Sensitive to accent, volume and speed
- **Text to Speech**
  - Consistent, but not useful

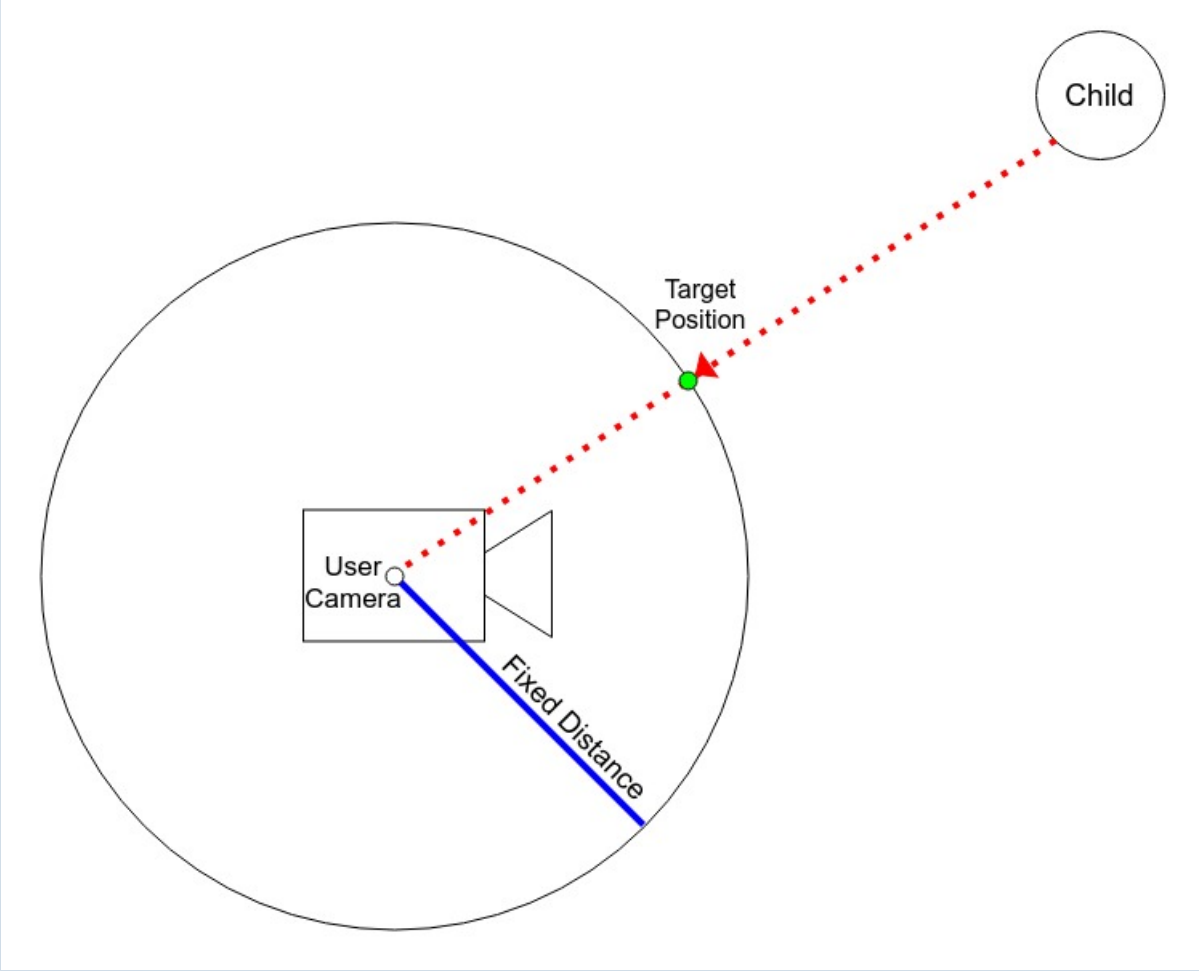
INNER CHILD EMOTIONAL MODEL

- Child model has limited set of emotions: happy, sad, scared, idle.
- Cannot display gradual improvements in emotional state.
- Has static reactions to user actions. Does not dynamically adjust emotional state in response to user input.
- Addressing this limitation is an important future extension.

SUMMARY

- This work supports the **validity** of administering SAT in VR and this VR platform serves as a **proof of concept**.
- The use of VR for SAT aims to make **it more accessible** by providing a virtual inner child for users to interact with.
- The **self-administration** of SAT aims to contribute to the movement towards better access to mental health services.
- The mapping of SAT protocols to VR, in particular with physical interactions, is possible to an **adequate level of authenticity**.

DYNAMIC CHILD POSITIONING



BEFORE AND AFTER VR QUESTIONNAIRE

1 Visualise your childhood self, imagine they are standing in front of you.

2 Give the child a hug.

3 Imagine the child is distressed. Give the child some words of encouragement.

Before VR

1 From these activities, would you consider administering SAT?

2 Did you experience difficulties imagining and interacting with your childhood self?

3 Could you see yourself performing these activities as part of your daily routine?

After VR

1 After using the VR platform, would you consider administering SAT?

2 If yes, would you prefer to perform the therapy with or without VR?

3 Could you see yourself performing these activities in VR as part of your daily routine?

4 Has the VR platform changed how you will imagine the experience if asked to perform SAT without VR?

5 Did the likeness of the child affect your ability to project your childhood self onto the VR child model?