Project Exposé

Title

Embodied Interaction with a Spider in Virtual Reality: Associations with Affective Responses and Physiological Indicators

1. Background and Rationale

Immersive virtual reality (VR) has become a powerful tool for investigating embodiment and self-perception. Previous research has demonstrated that users can experience strong body ownership over non-human avatars, especially when visual and motor congruency are high. In this project, we explore how individuals embody a non-human agent (a spider) in a virtual environment and examine whether the degree of embodiment is associated with emotional responses, specifically fear or discomfort.

Understanding the affective effects of such non-human embodiment may contribute to the development of novel therapeutic or educational interventions. The study also explores the feasibility and usability of the virtual setup for future research or clinical applications.

2. Aim and Research Questions

This study aims to evaluate how strongly participants embody a non-human virtual avatar and how this is related to subjective affective states and physiological arousal.

Research questions include:

- To what extent do participants report a sense of body ownership and agency over a non-human body in VR?
- How is this sense of embodiment associated with subjective fear or discomfort?
- Can physiological markers (e.g., heart rate) serve as correlates of emotional intensity during embodiment?
- Is the developed VR system usable and tolerable for a diverse group of participants?

3. Method Participants (N ≈ ()) will engage in a short VR experience in which they control a non-human body through first-person perspective. The scene includes interactive elements and visual feedback designed to promote embodiment. A usability-optimized VR environment will be

implemented using Unity. Visual, motor, and proprioceptive cues will be synchronized to increase body ownership.

After each trial, participants will complete a short questionnaire (e.g., slider-based ratings) on embodiment and emotional responses. Additionally, a biomarker (to be defined: e.g., heart rate via wearable sensor) will be recorded during the experience to explore physiological correlates of fear or arousal.

4. Ethical Considerations Participants may experience mild fear or discomfort due to the nature of the avatar. The scenario will not involve aggressive or disturbing imagery. Participants will be informed about the content in advance and may stop participation at any time without penalty. A short debriefing will follow each session. All data will be pseudonymized and stored securely in accordance with GDPR and institutional guidelines.

5. Timeline and Output The development and piloting of the VR environment will occur in July 2025, with data collection planned for September 2025. The study is part of a master thesis project at Karolinska Institutet and will be supervised by Prof. Philip Lindner.

6. Benefits and Relevance This research may provide novel insights into emotional mechanisms during VR-based embodiment and contribute to future applications in digital mental health, exposure therapy, and human-computer interaction.