

Method Document – AI-Deputy 1.0 (Reverse Cue Reactivity, RCR)

- strictly confidential -

Abstract

AI-Deputy operationalizes Reverse Cue Reactivity (RCR) — the deliberate training to reach low reactivity to negative cues and high reactivity to positive cues — within Level 1 in-vitro cue exposure, targeting working memory mechanisms. Drawing on conditioning, counterconditioning, polyvagal-informed safety, and bilateral approaches (dual attention), the method systematizes embodied, multi-sensory procedures (audio, haptic, and olfactory inputs) to stabilize arousal, update maladaptive associations, and anchor resilience in procedural memory.

1. Introduction

Trauma and stress-related disorders affect millions worldwide and pose a major health burden. Traditional exposure therapies are effective but limited by therapist availability and accessibility. AI-Deputy addresses this gap by embedding scientifically validated cue exposure principles into a scalable, digital therapeutic format.

2. Historical Development of Cue Exposure

- From Behaviorism to Exposure Therapy: Pavlov → Wolpe → Systematic desensitization.
- In Vivo vs. In Vitro: AI-Deputy works in vitro, focusing on imaginal and symbolic cues.
- Bilateral Approaches & Working Memory Taxation: Dual-attention tasks reduce vividness and emotional load. AI-Deputy automates this principle.
- Digital Expansion: Unlike VR or CBT apps, AI-Deputy emphasizes sensory, embodied counterconditioning.

3. Neurobiological Foundations

- Polyvagal Theory: Regulation through ventral vagal activation.
- Memory Reconsolidation: Updating maladaptive traces during labile windows.
- Working Memory Load: Reduces intensity of traumatic imagery when taxed.

4. Conditioning and Counterconditioning

Cue Exposure paradigm contains “Cue Exposure-Response Prevention”.

AI-Deputy leverages counter conditioning (response transformation instead of response prevention), pairing stress cues with calming or positive sensory experiences. The goal is not only to weaken fear/ craving responses but also to build durable, adaptive associations stored in procedural memory.

5. Reverse Cue Reactivity (RCR)

- Step 1: Stress Activation — symbolic or sensory trigger introduced.
- Step 2: Taxing the working memory — stress encoded in externalizable sensory form.
- Step 3: Counter-Experience — calm stimulus introduced during reconsolidation window.
- Step 4: Procedural Anchoring — calm response anchored for future recall.

Clinical significance: RCR not only reduces pathological fear but also restores positive affectivity, critical for resilience and recovery.

6. Application Framework

AI-Deputy operates as both a pre-psychological intervention and as a framework for more complex psychological interventions:

- Stabilizes arousal before deeper therapy.
- Scales to many users simultaneously (remote, app-based).
- Provides structured support for complex therapeutic settings.
- Bridges gaps for patients on waiting lists or in underserved regions.

7. Future Development

- Integration with haptic devices (e.g., Haptic Cover).
- Connection to scent emitters for safe in vivo olfactory cue exposure.
- AI-based adaptive feedback loops (HRV, EDA).
- Hybrid care models combining therapist supervision and automated sessions.