

Three Gamified Interventions for Traumatized Youths in Residential Care

A Validation Study Comparing the Empatica E4 Wristband with the VU-AMS

Angela Schuurmans
PhD Candidate

Youths in residential care

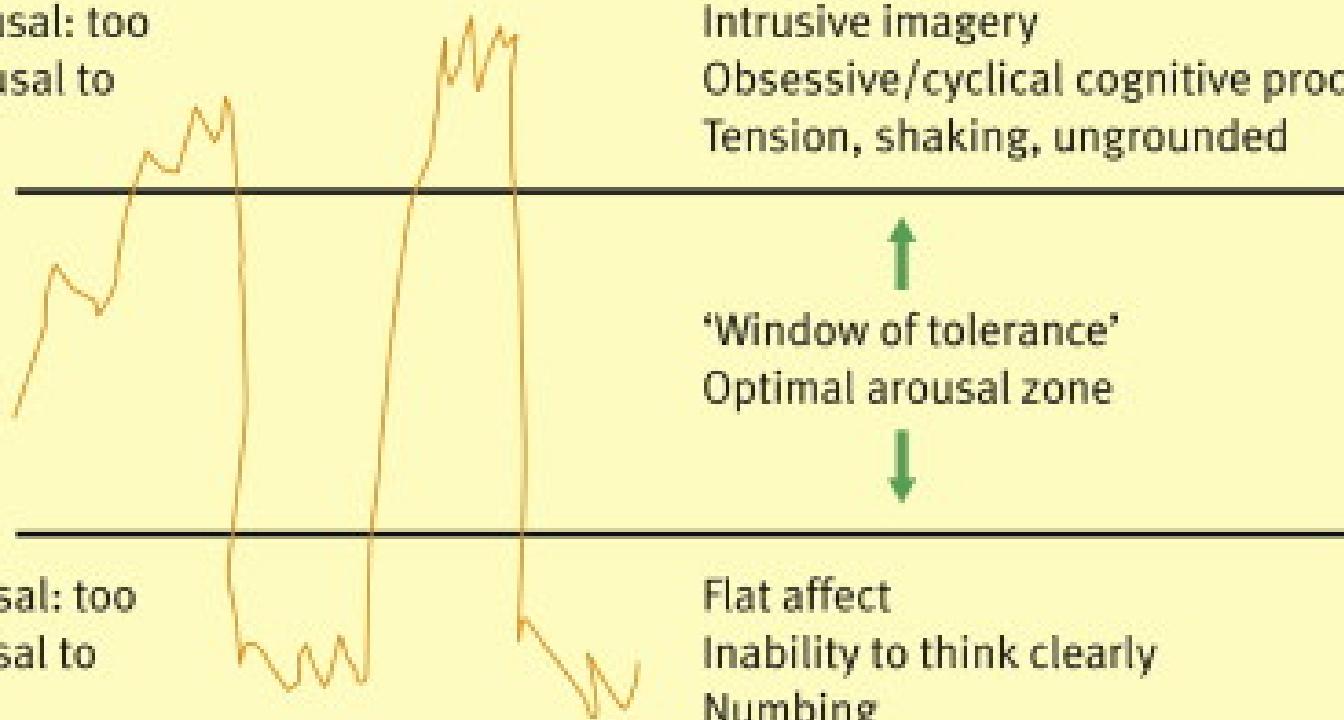


Up to 90% has been exposed to traumatic events as domestic violence, neglect, and/or emotional, physical, sexual abuse.



The ‘window of tolerance’: maintaining optimal arousal for trauma-focused therapy

Hyperarousal: too much arousal to integrate



Emotional reactivity

Hypervigilance

Intrusive imagery

Obsessive/cyclical cognitive processing

Tension, shaking, ungrounded

'Window of tolerance'
Optimal arousal zone

Flat affect
Inability to think clearly
Numbing
Collapse

(Adapted from Ogden and Minton 2000)¹⁰



Pilot study

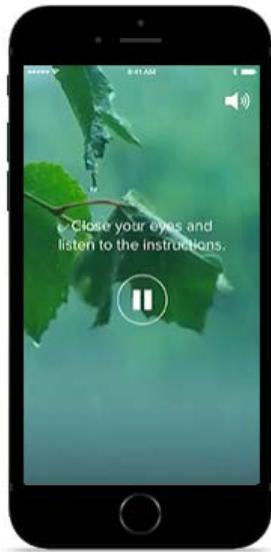
Pilot study ($N = 15$) testing three gamified relaxation interventions, with the goal to select one for a full-scale randomized controlled trial.

Participants have 15-minute gameplay sessions, twice a week, for six weeks.

We monitor participants' autonomic nervous system (ANS) parameters during the gameplay sessions.

Muse

Pluryn

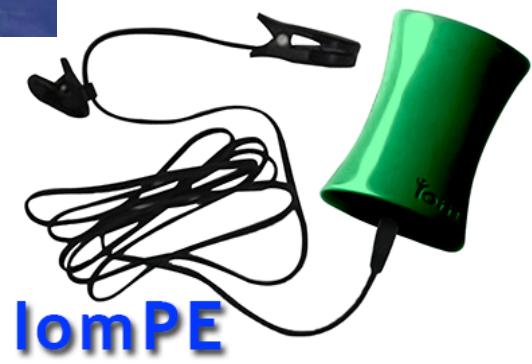


Daydream

Pluryn



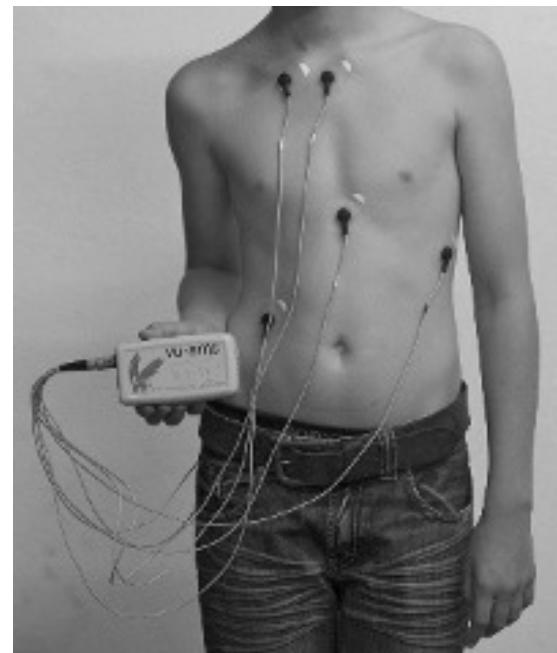
The Journey to the Eagle Mountain: The Seeker



Devices

Empatica E4 wristband (on both wrists)

VU-AMS



Empatica E4 wristband

- Skin temperature
- Electrodermal activity
- Tri-Axial accelerometry
- Blood pulse volume
 - Heart rate
 - Heart rate variability (HRV)

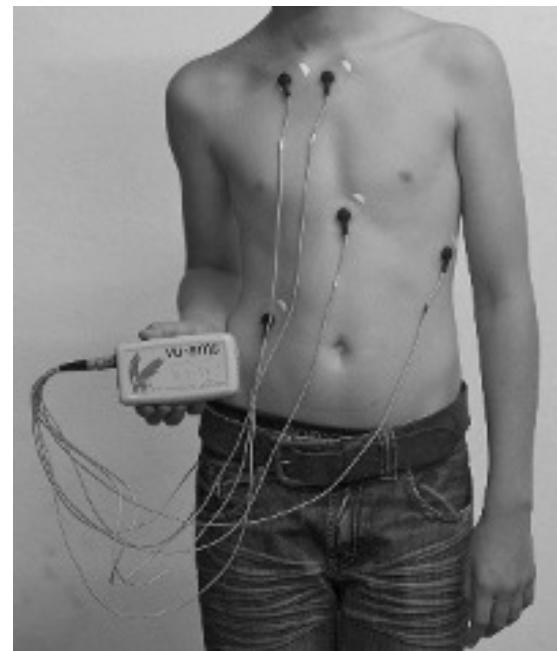


Empatica E4 wristband

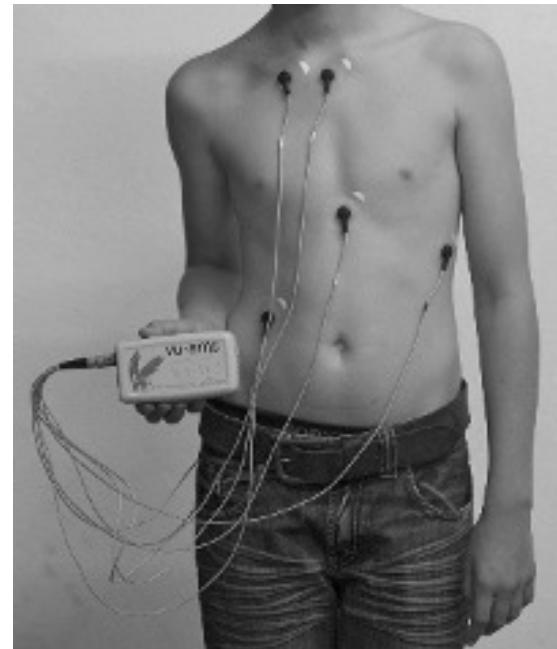
- Skin temperature
- Electrodermal activity
- Tri-Axial accelerometry
- Blood pulse volume
 - Heart rate
 - Heart rate variability (HRV)



- Heart rate
- Heart rate variability (HRV)
- Respiratory Sinus Arrhythmia (RSA)
- Pre-Ejection Period (PEP)
- Left Ventricular Ejection Time (LVET)
- Respiration rate
- Stroke volume and cardiac output
- Skin conductance level
- Tri-Axial accelerometry (body movement)



- **Heart rate**
- **Heart rate variability (HRV)**
- Respiratory Sinus Arrhythmia (RSA)
- Pre-Ejection Period (PEP)
- Left Ventricular Ejection Time (LVET)
- Respiration rate
- Stroke volume and cardiac output
- Skin conductance level
- Tri-Axial accelerometry (body movement)



Measurements

Baseline, all twelve sessions, and posttreatment:

- Resting ANS parameters while watching a four-minute under-sea movie

Twelve gameplay sessions:

- ANS parameters during interaction with the game/researcher, and short meditation sessions (\pm 15 minutes each session)

Expected results – pilot study

At this moment, nine participants have completed the pilot study and six participants are currently taking part.

We expect to have the first validation results before the summer.



Thank you!

Drs. Angela Schuurmans

aschuurmans01@pluryn.nl

Dr. Karin Nijhof

Pluryn

Dr. Roy Otten

Pluryn

Prof. Arne Popma

De Bascule, VU Amsterdam

Prof. Ron Scholte

Radboud University Nijmegen