

Symposium 1 :

Ability, virtual reality and associated technologies

Design and Evaluation of a Virtual Environment for the Treatment of Anger

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Overview

1. Anger and Treatment
2. Design
3. Experiment
4. Conclusions and final remarks

1.

Anger and Treatment

- Anger disorder is not recognised by Diagnostic and Statistical Manual of mental disorders (DSM-IV-TR)
- Anger is observed in various other disorders
- Treatment for maladaptive anger are: cognitive behavioural therapy, exposure, psychodynamic, psycho-educational, relaxation-based, skill-based, stress inoculation, and multicomponent



Phases in Stress Inoculation Training (SIT)

1. Conceptual educational phase
2. Skill acquisition and skill consolidation phase
3. Application and follow-through phase

Patient rehearse their skills in vivo or vitro



Problems with vivo

- difficult to control
- difficult to organise

Potential solution exposure in virtual reality, as has been done for fear of flying, fear of heights, or social phobia



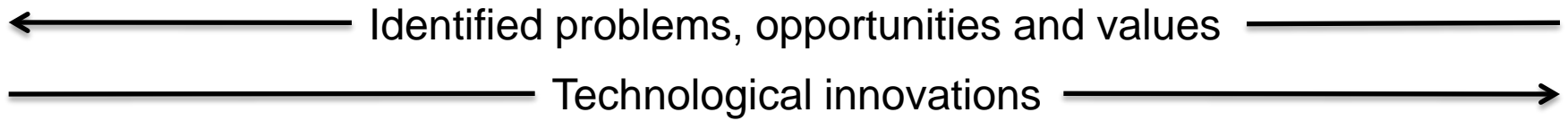
Collaboration with De Fjord, a
Dutch mental health clinic for
adolescents

Both in and outdoor patients



2.

Design



Technology element	Technology Intervention	Clinical effect	Field use
Focus on effect of technology components that affect the interactions with a user	Focus on establishing usable technological health intervention	Focus on efficacy of treatment with technology intervention	Focus on daily practice on technology intervention
Methods include, for example, lab studies, often with non-patients	Methods include both design activities and, for example, usability studies, often with non-patients, but also with therapists	Methods include case studies and randomized controlled trials with patients	Methods include field observations, or surveys among patients and/or therapists
Strong involvement of technology-oriented researchers	Often multidisciplinary team	Strong involvement of mental health researchers	Involvement of clinicians

Mental Health Computing Research Model (Brinkman, 2011)

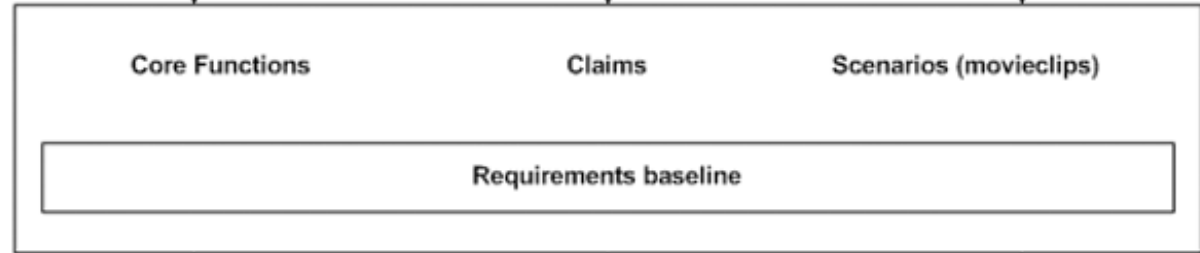
Situated Cognitive Engineering

(Neerincx and Lindenberg, 2008)

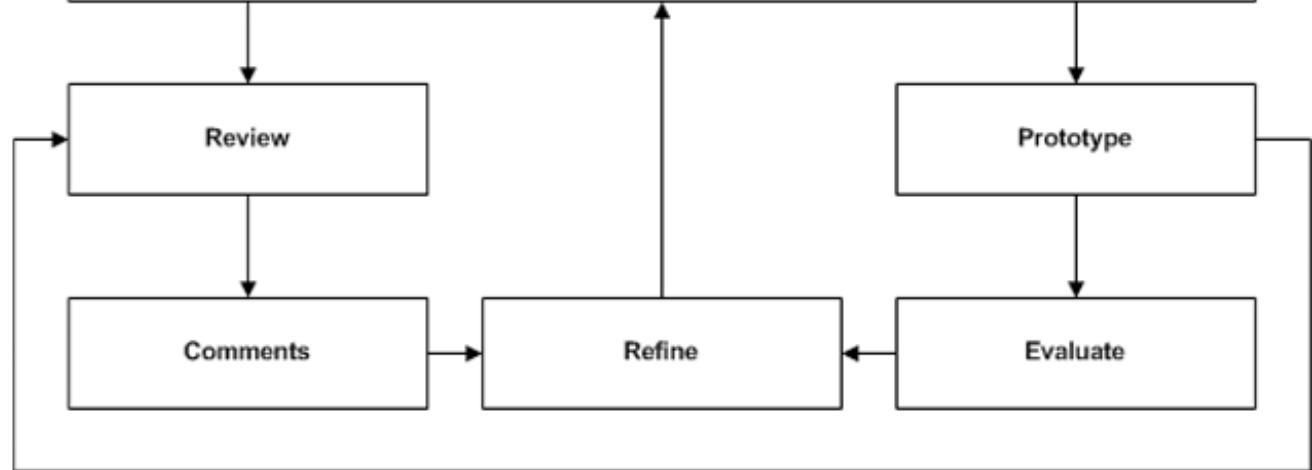
Phase 1:
WDS Analysis



Phase 2:
Requirements baseline



Phase 3:
Refining and validating

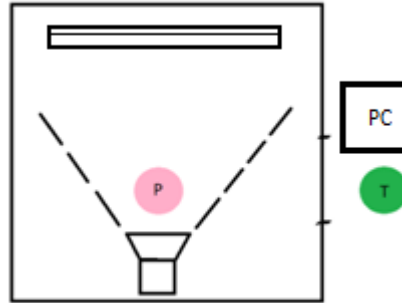


The Vision

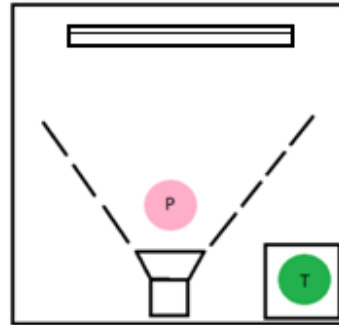


Use Scenarios Analysis

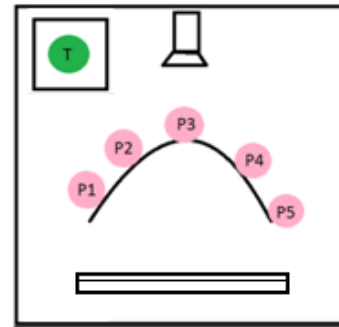
(A) Self training, afterwards reflection



(B) Therapist controlled session



(C) Group sessions



Core functions

→ Therapist controlled avatar response

Multiple social scenes

Arousal enhancing environmental stressors

Recording behaviour and emotional state

Support for reflection

- Pre-scripted Dialogues
- Avatar takes initiative
- Therapist selects next sentence the avatar will speak
- Avatar response
 1. Sub-assertive (passive) reaction
 2. Assertive reation
 3. Agressive reation

<asserive reaction> “Good afternoon sir, could I have a look into your bag please?”

<agressive reaction> “Hey you! Give me your bag”

Core functions

Therapist controlled avatar response

→ Multiple social scenes

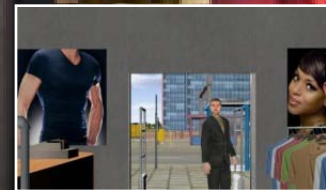
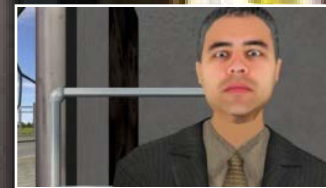
Arousal enhancing environmental stressors

Recording behaviour and emotional state

Support for reflection

Scenes in Clothes Shop

1. Neutral scene
2. Changing a bought item
3. Argument with other customers about the last item
4. Suspect of stealing



Core functions

Therapist controlled avatar response

Multiple social scenes

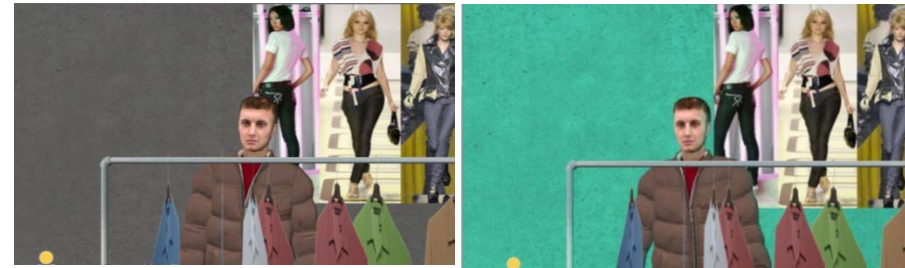
→ **Arousal enhancing environmental stressors**

Recording behaviour and emotional state

Support for reflection

Directed at copying resources

1. Volume and type of background music
 - Rock
 - Hip-hop
 - Heavy-metal
 - Classical music
2. Lighting in shop
 - Normal very bright
 - Flashing



Core functions

Therapist controlled avatar response

Multiple social scenes

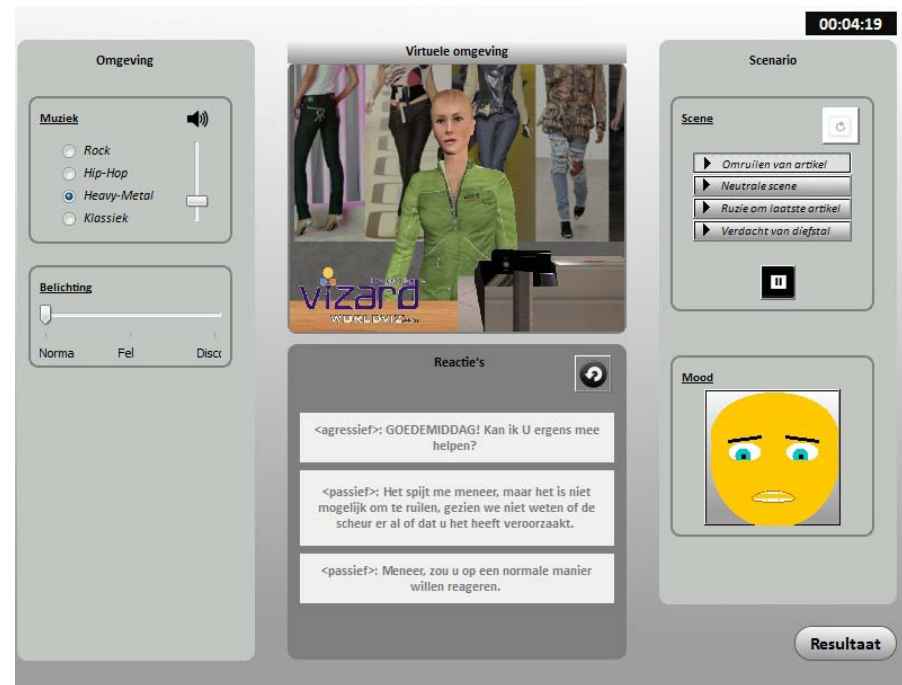
Arousal enhancing environmental stressors

→ Recording behaviour and emotional state

Support for reflection

Record behaviour avatar (indirect recording patient by mirroring strategy)

Affectbutton -> Pleasure, Arousal, Dominance state patient



Core functions

Therapist controlled avatar response

Multiple social scenes

Arousal enhancing environmental stressors

Recording behaviour and emotional state

➔ Support for reflection

Resultaat Behandeling

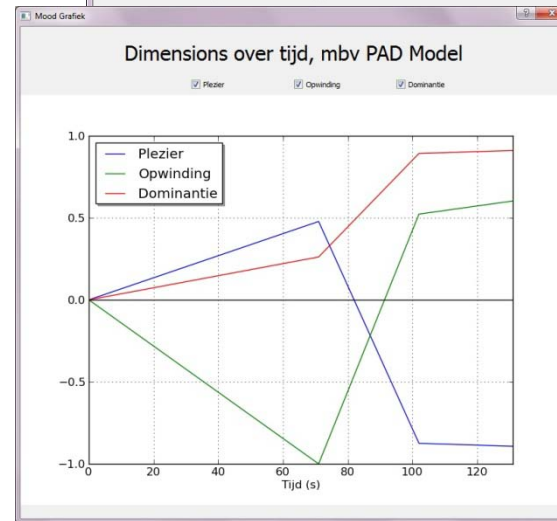
Patient: Test Therapeut: T.H.Erapist
 Stoornis: Geen Datum: 2011-01-09
 GBD: 09-01-2011 Duur: 00:13:20

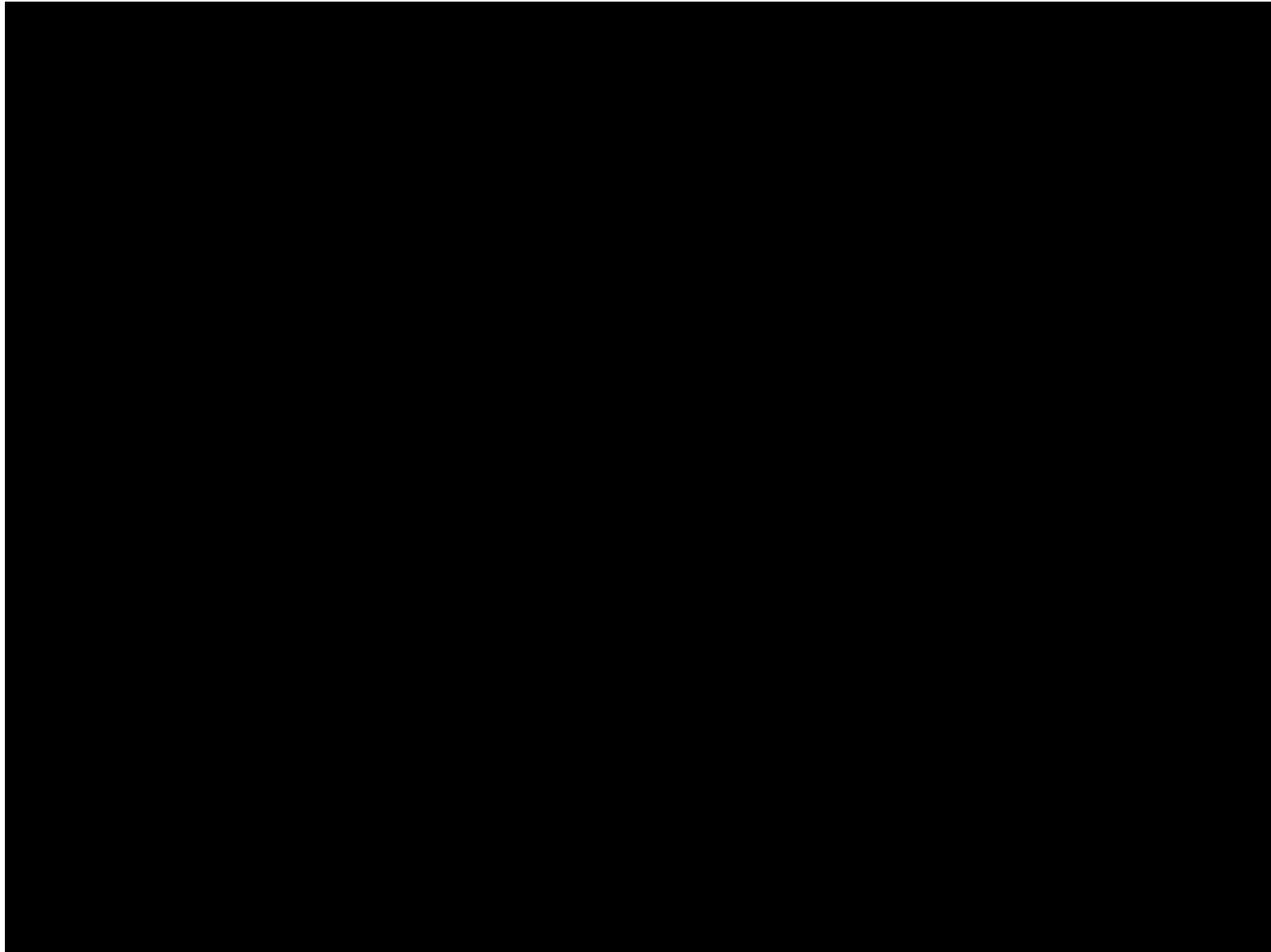
Laat dialoog zien inclusief aanpassingen aan de environment

Dialoog

Patient	Omgeving	Avatar
14 SCENE SWITCH	* Ruzie om laatste artikel!	SCENE SWITCH
15 De patient reageert happy		
16	Muziek verandert in Klassiek	
17	Licht verandert in Disco	
18	Licht verandert in Fel	
19	Licht verandert in Normaal	
20		Hey! Die blouse die je net heb gekocht dat is de laatste en ik heb hem nu al vanavond, kan je me misschien helpen?
21 De patient reageert angry		
22		Ja toch, maar balen man... Godverdomme. Ik ga ff kijken bij de balie of ik kan bestellen. Loop je naar de kassa, vanwege het artikel.
23		Jaja, vast wel. Doe nou maar rustig man... Als het zo belangrijk voor je is, Beetje jammer...
24 De patient reageert frustrated		

Buttons: Ga naar startscherm, Verwijder therapie, Graph, Cancel





3.

Experiment

Research Questions

Patient side :

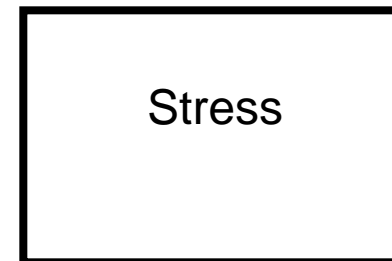
Can the stressors in the virtual environment evoke stress?

Exposure stressors (IV)

Passive
Aggressive
Aggressive & environmental stressors



(DV)



Therapist side :

How usable is the system for a therapist?

Methods

Participants

- 18 non-patients, 14 males, 4 females, 17-24 years
- Two patients of De Fjord clinic

Measures (patient side)

- Galvanic Skin Response (GSR)
- Simulation Sickness Questionnaire (SSQ)
- Igroup Presence Questionnaire (IPQ)
- Self-Assessment Manikin (SAM)
- Affectbutton
- Dialogue Experience Questionnaire (DEQ)

Procedures

1. SAM, SSQ
2. VR Exposure Neutral
3. VR Exposure
 - Passive dialogue
 - Aggressive dialogue
 - Aggressive dialogue + additional environmental stressors
 - SAM,IPQ,DEQ
4. SSQ

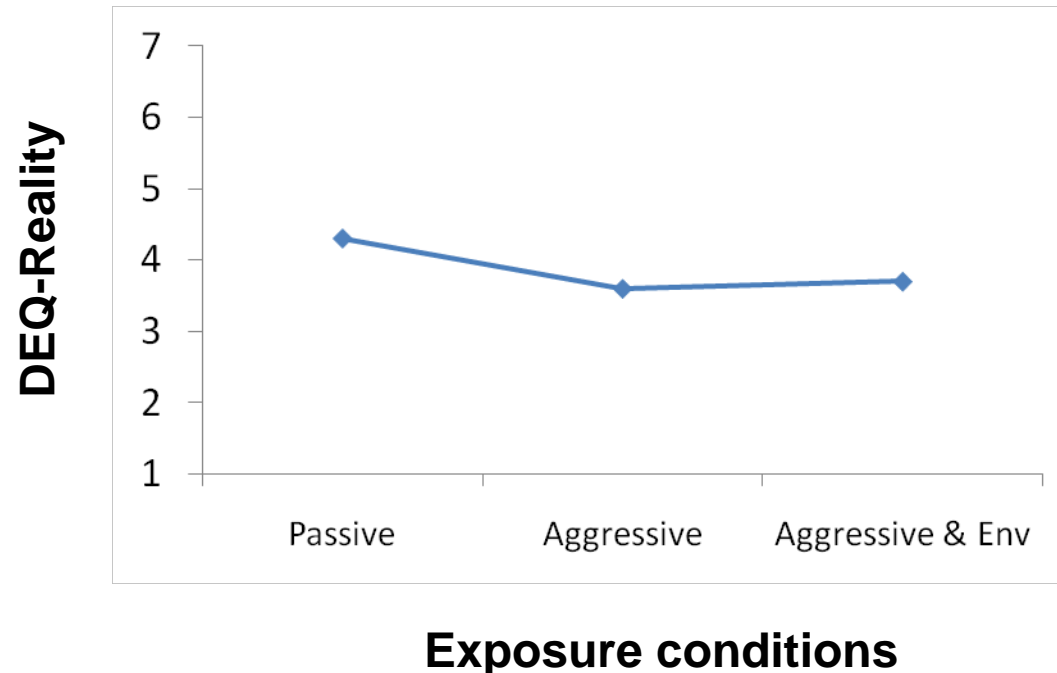
Measures (therapist side)

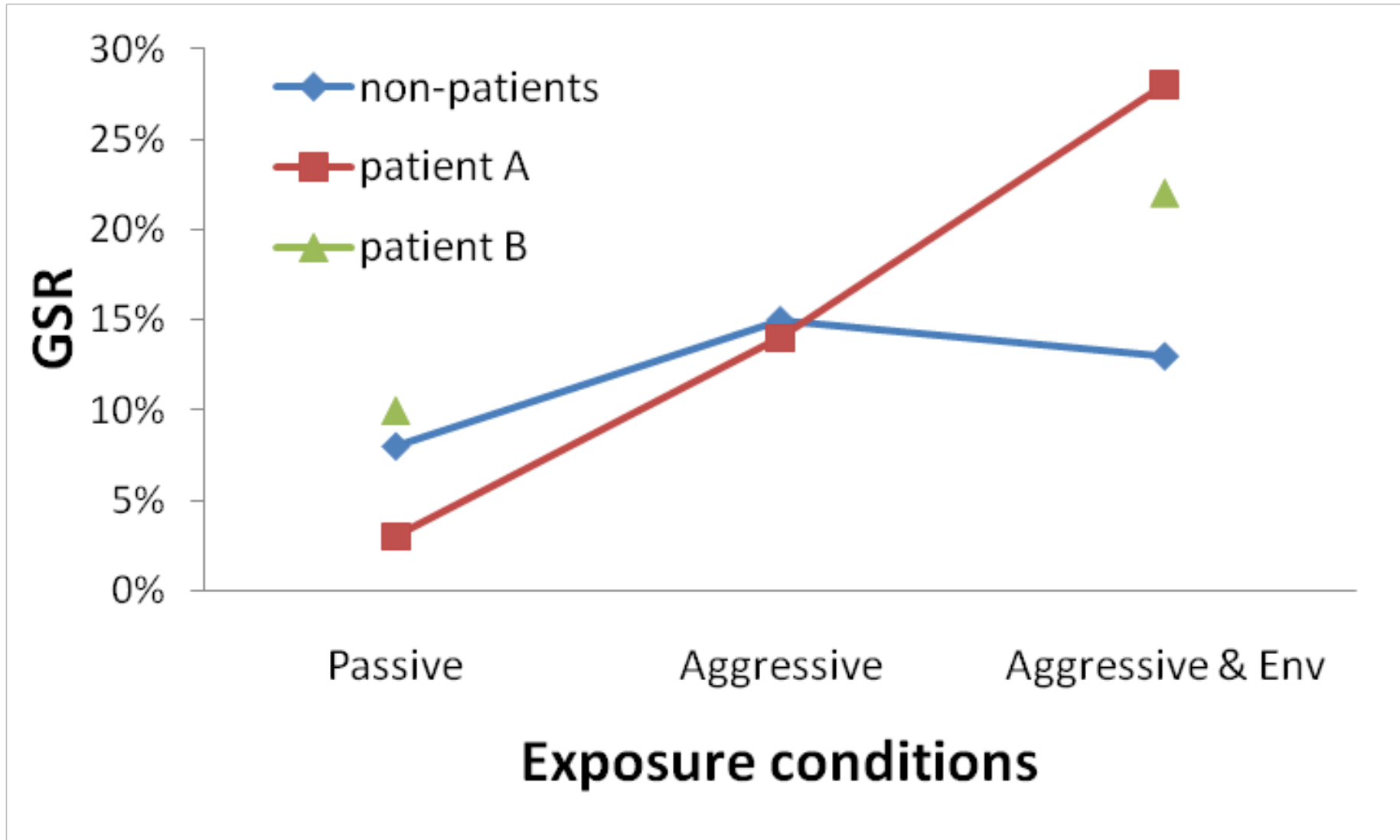
- Component-based usability questionnaire (CBUT)

Patient side

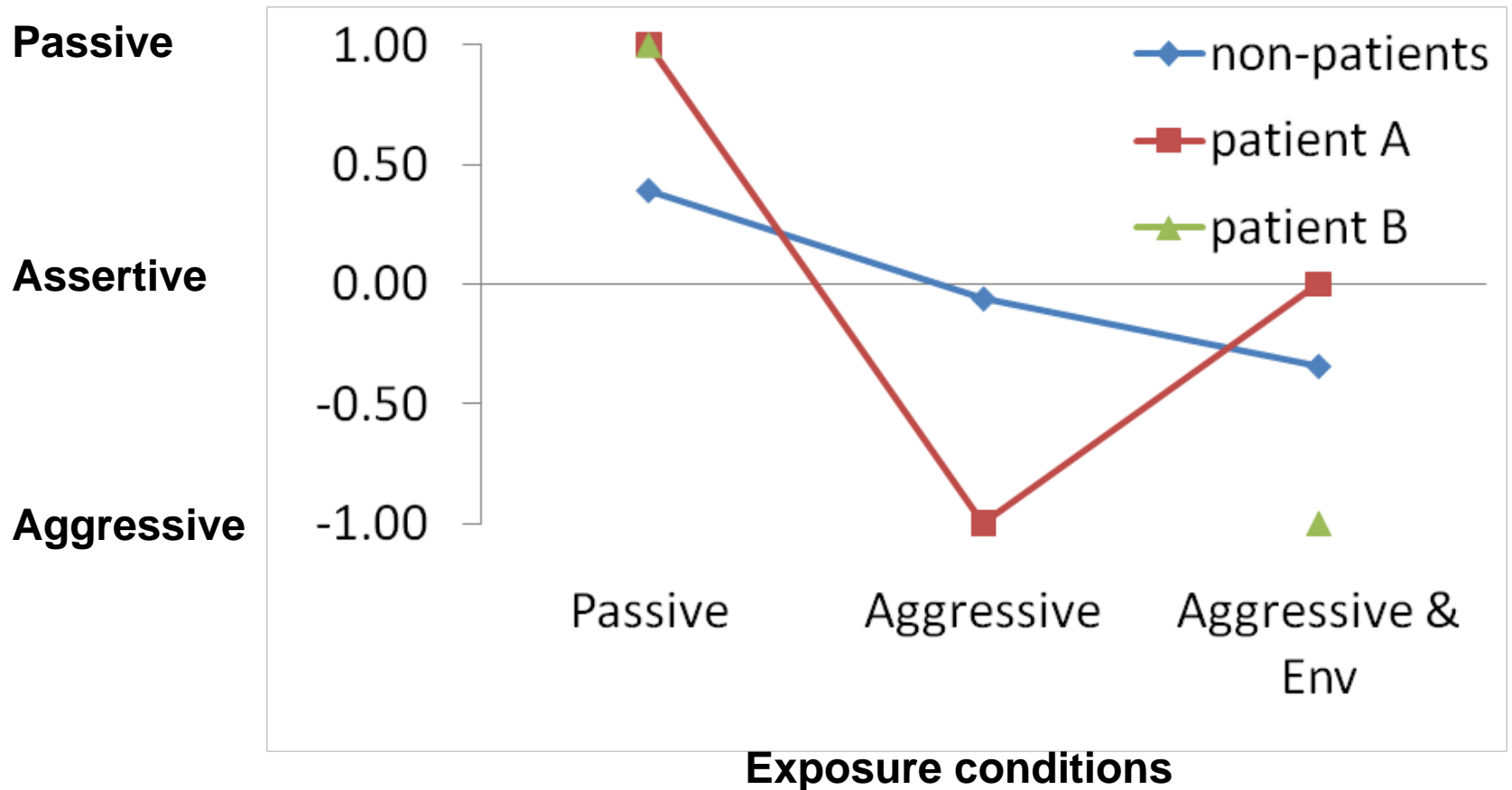
Some results

- (SSQ) Sign. less reported Simulation Sickness after experiment than before experiment (?)
- (IPQ) no sign. effect for exposure conditions was found on presence level
- (DEQ) no sign. overall effect for exposure conditions was found on dialogue experience
- (DEQ-Reality) sign. effect for exposure conditions on reality dimension of dialogue experience.

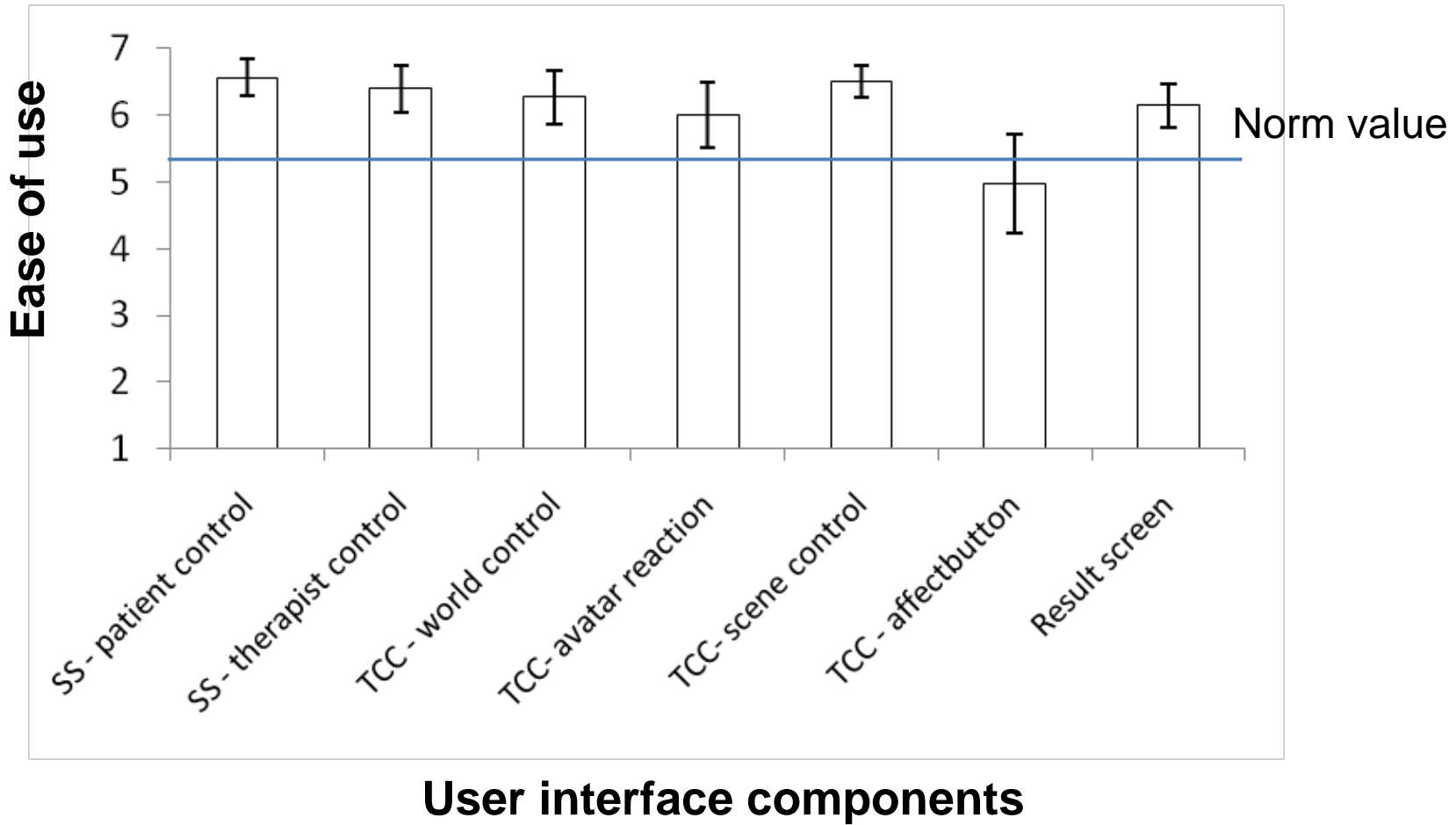




Avatar response



Therapist side

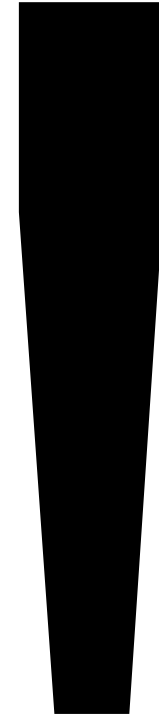


4.

Conclusions and Final Remarks

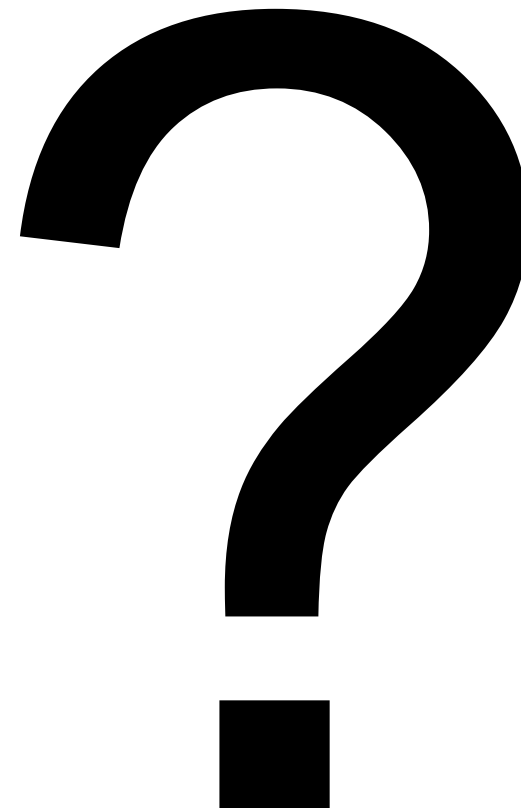
Conclusions

- The system allows individuals to engage in potential aggressive dialogues with increased their physiological arousal and evoked more aggressive replies.
- Results of the 2 patients also seem to point in this direction
- Various therapist user interface components seem easy to use



Future work

- How can this system be used effectively in anger treatment?
- More dialogues and also more physical setting
- Reduce therapist workload by using automated free speech interaction (ter Heijden and Brinkman, 2011)
- More (additional) environmental stressors, e.g. avatars with emotional expression such as facial expression and body posture



Thank you for your attention!!

Literature

Brinkman, W.-P. (2011). Cognitive Engineering in Mental Health Computing. *Journal of CyberTherapy and Rehabilitation*.

ter Heijden, N., and Brinkman, W.-P. (2011). Design and Evaluation of a VR Exposure Therapy System with Automatic Free Speech Interaction. *Journal of CyberTherapy and Rehabilitation*.

Neerincx, M. A., & Lindenberg, J. (2008). Situated cognitive engineering for complex tasks environments. In J. M. C. Schraagen, L. Militello, T. Ormerod & R. Lipshitz (Eds.), *Naturalistic decision making and macrocognition* (pp. 373-390). Aldershot, UK: Ashgate.

