Technology-mediated interventions to improve psychological and social skills: promises and pitfalls

Lina Gega, Paul Strickland, Owen Barry, Peter Langdon & Leen Vereenooghe
Background

Two types of technology:

- Virtual Environments with Video Capture
- Picture-based Computerised Training Paradigm

These technologies have been evaluated in the context of:

- Social anxiety in young people with psychosis (Gega et al, 2013; in press)
- Social skills training for adolescents with autism (Barry, 2015)
- Cognitive and emotional skills training for people with intellectual disabilities (Vereenooghe, 2015; in press; in prep)
Virtual Environments (VE) System

- The system uses video-capture to project the person’s life-size image on a TV screen which plays a recorded scene.

Each scene has been:
- specially filmed with actors who follow a therapist-written script.
- digitally edited to include relevant surroundings, noises and scenery.

- The person watches themselves being “present” and interacting in real time on screen.
- The scene with the person “present” can also be recorded.
Video capture

- Subject
- Camera
- Laptop
- Video display
Out-of-body experience?

“Self-observation” (watching self from behind and over the shoulder): an image of oneself is projected to a position about 1.5 meters in front of where actual self sits.

This is different than:
- **first-person perspective** of 3D virtual reality systems (watching the environment through goggles)
- **vicarious experience** of computer games (identifying with a small avatar on the screen)
- **watching self in a mirror** (image is a reversed reflection of self and person sees what happens behind them)
- **watching self on video** (not real time, no sense of “presence”, scene does not happen now)
Equipment

A “physical installation”:
- portable 2.2m X 1.5m x 1.5m pop-up blackout booth
- camera unit with ambient lighting
- TV screen and sitting stool

Outside the booth, the person who controls the VE has:
- laptop linked to the camera unit and the TV screen
- small digital recording unit
- small portable monitor
Software

Hundreds of scenarios that allow the user to experience and interact in a variety of social situations, such as:

- shops, bars and cafes
- job interviewing
- speed-dating
- medical consultations, one-to-one interviews
- public transport (buying a bus ticket, sitting in a bus, standing at a bus stop)
- crowded streets, supermarket queues
- parties & social gatherings
Ordering at a cafe
VEs for social anxiety in young people with psychosis

Two proof of concept studies: a single-group pre-post test and a case series (Gega et al, 2013; in press)
# Methods

<table>
<thead>
<tr>
<th>Aim</th>
<th>To understand which elements of the VE system could have therapeutic value or could be hindering.</th>
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<tbody>
<tr>
<td>Participants</td>
<td>32 young people recovering from psychosis who had severe social anxiety and residual paranoia.</td>
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<tr>
<td>Intervention</td>
<td>Cognitive Behaviour Therapy (CBT) – 12 sessions</td>
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<tr>
<td>Procedure</td>
<td>At assessment: Using 3 standard non-interactive VEs in a single session</td>
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<td>Within therapy: Single-session interaction with various VEs relevant to each participant</td>
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<td>Measures</td>
<td>• Subjective units of anxiety and paranoia before and after using the VEs</td>
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<td>• Narrative accounts of user experiences of and learning from the VEs</td>
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User experiences

Two-thirds showed or reported strong responses of either anxiety or paranoia to at least some of the VEs:

“*I started to breathe heavily like when I get anxious in real life*”

“*There were young people laughing, were they laughing about me?*”

“*I felt anxious and paranoid in the scene and thought ‘who is behind me? What are my escape routes?’*”

One-third either gave no feedback or were indifferent or sceptical:

“*It was weird*”

“*Not very interesting*”

“*Did not feel real… was more like watching TV*”.

“*The drinks party felt like watching a YouTube video. I was expecting something to happen, like something to jump like in a horror movie*…”.
Factors influencing user responses to VEs

- Avoidance and safety behaviours
- Anxiety or paranoia in the VE
- Perceived presence and realism
- Extraneous factors
- Relevance and meaning
## Key learning points

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<tr>
<th>Even if something feels threatening, it does not mean that it is actually threatening</th>
<th>Example: “it felt like someone was watching me “funny” but then I thought it can’t be because it’s not real…”</th>
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<tbody>
<tr>
<td>Having rehearsed something in the virtual world, makes it easier to do it in the real world</td>
<td>Example: Travelling on a bus and making small talk with a young woman… then using public transport and staying in a waiting room full of people in real life.</td>
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<td>Things are better than expected and get easier with time and practice</td>
<td>Example: “I thought I might stutter or not know what to say… but it got easier by the 4th clip and I didn’t look as bad as I thought on the screen.”</td>
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<tr>
<td>Safety behaviours make anxiety about social situations worse</td>
<td>Example: “Surprisingly I felt less anxious when he was looking up and making eye contact rather than when I was looking at the floor… I wouldn’t have dared test this in real life.”</td>
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Social skills training for adolescents with autism

Feasibility study: randomised controlled trial (RCT) with crossover

(Barry, 2015)
Methods

<table>
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<tr>
<th>Aim</th>
<th>To test whether VE-facilitated social skills training improves “real-life” social skills in a single context (ordering from a café counter) and in general</th>
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<tbody>
<tr>
<td>Participants</td>
<td>18 young people age 11-16; able to use at least 3 information carrying words; IQ&gt;70</td>
</tr>
<tr>
<td>Intervention</td>
<td>Social Skills Training (SST): 3 x 50 min weekly sessions</td>
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</table>
| Procedure | • Groups 1 & 2: assessed at baseline (Time 1)  
• Group 1: received SST post-T1, assessed post-training (T2) and a month later (T3)  
• Group 2: did not receive SST post-T1, assessed at T2, received SST post-T2, assessed again at T3 |
| Measures | • Researcher-rated observation of the teenager ordering at a café counter.  
• Parent and teacher-rated general social skills for the teenager. |
Findings

- Observed social skills in real life improve more for those teenagers with autism who receive VE-facilitated SST compared to those who do not receive any SST.

- Gains are maintained at 1-month follow-up and are replicated with those who receive SST with a month’s delay.

- Social skills learned by *in-virtuo* training in a specific context generalise *in-vivo* to the same context, BUT….

- Gains in social skills do not necessarily generalise to contexts other than the one targeted by the *in-virtuo* training.
Picture-based Computerised Training

- Adaptation and computerisation of paper-based tasks that have previously been developed and evaluated using written scenarios and pictures on cards.

 Task 1: Match situations to congruent emotions and vice versa.

 Task 2: Identify emotions as consequences to a given a thought, and thoughts as mediators of a given emotion, both in the context of a situation.

 Task 3: Identify and differentiate thoughts, feelings and behaviours in a given story.
'AB, choose C' task

A1 'You walk into a room. There are some of your friends.'
A2 'Your friends start to laugh.'
B- 'You think your friends are laughing at you.'
C+ & C- 'How would that make you feel: happy or sad?'

'AC, choose B' task

A1 'You walk into a room. There are some of your friends.'
A2 'Your friends start to laugh.'
B+ & B- 'Would you feel happy if you think your friends are happy to see you? Or would you feel happy if you think your friends are laughing at you?'

C+ 'You feel happy.'
MAKING A CUP OF TEA

DO

FEEL

THINK
Picture-based computerised training in psychological skills for people with intellectual disabilities

Two RCTs and a small qualitative study
(Vereenooghe, 2015; in press; in prep)
## Methods

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<tr>
<th>Aim</th>
<th>To improve the ability of people with intellectual disabilities (IDs) to understand the nature of, and relationship between, emotions, thoughts &amp; behaviours as preparation for CBT.</th>
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<tr>
<td>Participants</td>
<td>N=65 (study 1); N=55 (study 2) 18+ yrs with IDs (IQ&lt;70)</td>
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</table>
| Intervention | Picture-based computerised training in:  
- Matching situations to emotions and vice-versa  
- Identifying the feeling, thought or behaviour in a story. |
| Procedure | Random allocation to a single session of either computerised training or computerised attention control. |
| Measures | Computerised tasks assessing:  
a) cognitive mediation skills (link thought to emotion)  
b) emotion/ thought/ behaviour-recognition skills |
Findings

When controlling for baseline scores and IQ and compared to a computerised attention-control task, participants who received computerised training were:

- better at selecting emotions for given situation-belief scenarios.
- no better at selecting beliefs for given situation-feeling scenarios.
- better at discriminating between behaviours, thoughts and feelings pooled together.
- improved at their ability to identify behaviours and feelings but not thoughts.
## User & Clinician Perspectives on Computerised Interventions for People with IDs

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<th>Users (n=3)</th>
<th>Clinicians (n=3)</th>
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| **Functions & Benefits** | • No need for verbal responses  
• Having an alternative to pen and paper.  
• Therapy as a game | • A tool for homework  
• Promoting independence  
• Safe, non-intimidating, predictable environment. |
| **Challenges & Barriers** | • Not a person: “you just want to talk to someone…”                          | • Gimmick-focused: “Is the client going to build rapport with that laptop or with you?” |
|              | • Aware of potential threats to privacy                                      | • Worried about users with ID not being aware of potential threats to privacy |
## Summary

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<th>Promises</th>
<th>Pitfalls</th>
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<td>Numerous and varied tasks and scenarios</td>
<td>Not necessarily relevant or meaningful to the individual</td>
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<td>Emotional engagement</td>
<td>Cognitive dissonance</td>
</tr>
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<td>Emotion recognition</td>
<td>No cognitive mediation</td>
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<tr>
<td>Non-threatening</td>
<td>Not a person</td>
</tr>
<tr>
<td>Controlled and safe practice</td>
<td>Does not account for unpredictability of real life</td>
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<tr>
<td>Opportunities for behaviour change and skills practice</td>
<td>Not necessarily generalisable / transferable to different contexts</td>
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Technologies as therapeutic and training tools for those on the autism spectrum

We shouldn’t assume that we have to do things differently...

Do people on the autism spectrum perform and respond differently to “generic” technology-mediated interventions than people without autism?

Do technology-mediated interventions have an added and specific value for people with autism compared to conventional discussion-based face-to-face interventions?

Do we need to adapt our existing technology-mediated interventions to suit people on the autism spectrum and meet their needs, and how?
References


Vereenooghe L, Gega L, Reynolds S, & Langon P (in prep) Service user and clinician perspectives on computerised CBT for people with intellectual disabilities.
THANK YOU!

For further information, feel free to contact:

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