



DIGITAL PSYCHOLOGICAL THERAPIES: INSIGHTS FROM RECENT WORK AND FUTURE CHALLENGES

Prof. Dr. Mar Rus-Calafell

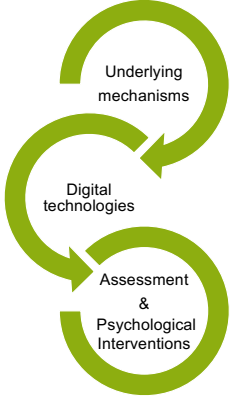
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ZENTRUM FÜR
KINDER UND JUGEND
PSYCHOTHERAPIE


FORSCHUNGS UND
BEHANDLUNGSZENTRUM FÜR
PSYCHISCHE GESUNDHEIT


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Background



Underlying mechanisms

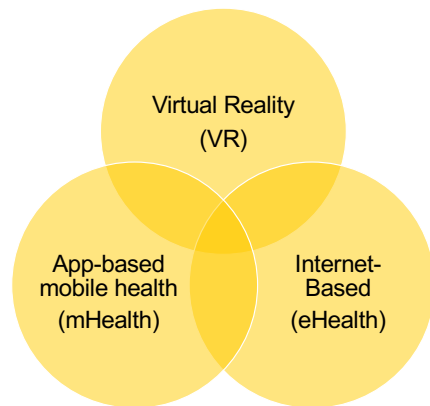
Digital technologies

Assessment & Psychological Interventions



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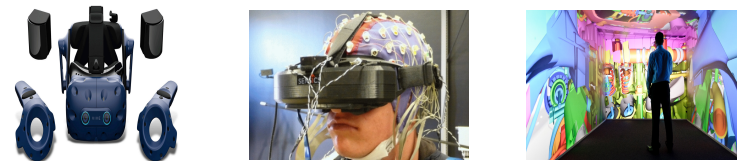
Main digital tools to deliver psychological therapy for Psychosis



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What's VR?

Virtual Reality (VR) can be defined as technology that integrates **real-time computer graphics, sounds and other sensory input** to create a **computer-generated world** with which the user can interact (Gregg & Tarrier, 2007).



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What's mHealth?

Mobile software applications (“apps”), sometimes combined with wearable devices (a wrist band, watch or clothes connected to the phone gathering physiological information for extended periods).

Sometimes also called mobile medical applications (MMA)

(e.g. Empatica E4)




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What are Internet-delivered Interventions?

Psychological treatments that are mainly delivered **via the Internet** with at least some **therapeutic tasks delegated to the computer**.

They appeared at the end of the 90', being the first computerized interventions by Marks et al (1998) and programs like Eliza (Epstein & Klinkenberg, 2001) historical hallmarks.

 Information seeking and online support groups

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Main digital tools to deliver psychological therapy for Psychosis

- They differ greatly in terms of their content, complexity and functionality (ranging from simple prompts sent via SMS to technologically very sophisticated interventions that include virtual agents responding in real-time to the person).
- Importantly, digital interventions can either be used to **supplement traditional face-to-face treatment** (e.g. use of an mHealth app to practice certain intervention components to augment traditional cognitive behaviour therapy) **OR to offer stand-alone interventions.**

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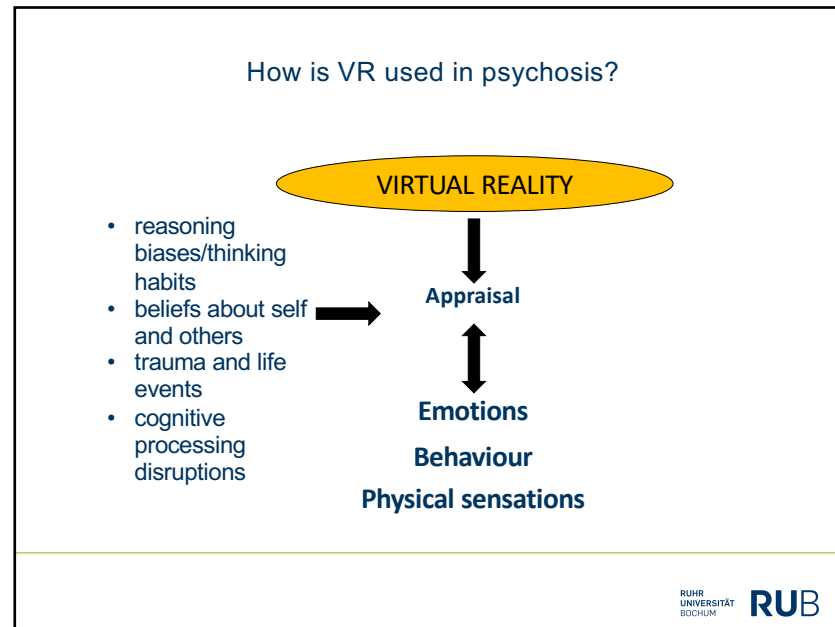
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Main digital tools to deliver psychological therapy for Psychosis

- They focused on **5 domains** (Rauschenberg et al. 2020):
 1. enabling **remote communication and social interactions** among service users, carers and mental health professionals.
 2. allowing easy **access to evidence-based information**
 3. supporting **real-time and real-world self-monitoring and management** of symptoms
 4. delivery of **person-tailored feedback** (e.g. the use of fine-grained real-time data on behaviours, mental states and minor stressors that are actively used by clinicians during therapy sessions)
 5. delivery of **psychological interventions in individuals' daily lives** or in immersive virtual environments.

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VR in Psychosis

Psychological Medicine, Page 1 of 30. © Cambridge University Press 2017
doi:10.1017/S0033291717001945

REVIEW ARTICLE

Virtual reality in the assessment and treatment of psychosis: a systematic review of its utility, acceptability and effectiveness

M. Rus-Calafell^{1,2}, P. Garety^{1,2}, E. Sason¹, T. J. K. Craig^{1,2} and L. R. Valmaggia^{1,2*}

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PROSPERO register: CDR 4201507776.

- 50 studies were included in the review.
- Immersive and/or highly interactive environments.
- **IT IS SAFE and DO NOT EXACERBATE SYMPTOMS.**

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Virtual Reality in Psychosis

Valmaggia, Rus-Calafell, Garety 2015
VR developer: Virtualware

Main fields of research:

- Safety and acceptability
- Neurocognitive evaluation
- Functional capacity and performance evaluation
- Assessment of paranoid ideation and auditory I

Interventions:

- ✓ Cognitive rehabilitation
- ✓ Social skills training
- ✓ Virtual reality-assisted therapies




Rus-Calafell et al. (2014)



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AVATAR therapy for resistant auditory verbal hallucinations (AVHs)



- It creates a digital representation of the voice-entity, to enable a real-time but safe dialogue to promote therapeutic change (Leff et al., 2013).
- First VR exposure-based (+ relational) approach to AVHs in psychosis (Rus-Calafell et al., 2015, 2020).



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Important aspects related to technology

- Delivery challenges: switching between speaking as therapist and avatar in real-time.
- Ethical considerations for therapists who voice abuse (through the voice-transformed avatar) and re-enact critical and abusive relationships (Ward et al., 2020).



Tangible “self” or “other” representation

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AVATAR RCT main outcome paper

AVATAR therapy for auditory verbal hallucinations in people with psychosis: a single-blind, randomised controlled trial



Tom KJ Craig, Mar Rus-Calafell, Thomas Ward, Julian P Leff, Mark Huckvale, Elizabeth Howarth, Richard Emsley, Philippa A Garety



Summary

Background A quarter of people with psychotic conditions experience persistent auditory verbal hallucinations, despite treatment. AVATAR therapy (invented by Julian Leff in 2008) is a new approach in which people who hear voices have a dialogue with a digital representation (avatar) of their presumed persecutor, voiced by the therapist so that the avatar responds by becoming less hostile and concedes power over the course of therapy. We aimed to investigate the effect of AVATAR therapy on auditory verbal hallucinations, compared with a supportive counselling control condition.



Lancet Psychiatry 2017
Published Online
November 23, 2017
[http://dx.doi.org/10.1016/S2215-0366\(17\)30427-3](http://dx.doi.org/10.1016/S2215-0366(17)30427-3)

Methods We did this single-blind, randomised controlled trial at a single clinical location (South London and Maudsley NHS Trust). Participants were aged 18 to 65 years, had a clinical diagnosis of a schizophrenia spectrum (ICD10 F20–29) or affective disorder (F30–39 with psychotic symptoms), and had enduring auditory verbal hallucinations during the previous 12 months, despite continued treatment. Participants were randomly assigned (1:1) to receive AVATAR therapy or supportive counselling with randomised permuted blocks (block size randomly varying between two and six). Assessments were done at baseline, 12 weeks, and 24 weeks, by research assessors who were masked to therapy

This online publication has been corrected. The corrected version first appeared at [thelancet.com/psychiatry](http://www.thelancet.com/psychiatry) on November 29, 2017.
See Online/Comment
[http://dx.doi.org/10.1016/S2215-0366\(17\)30427-3](http://dx.doi.org/10.1016/S2215-0366(17)30427-3)
Department of Health Service


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Article

The Role of Sense of Voice Presence and Anxiety Reduction in AVATAR Therapy

Mar Rus-Calafell^{1,2,*}, Thomas Ward^{3,4}, Xiao Chi Zhang¹, Clementine J. Edwards^{3,4} , Philippa Garety^{3,4,†} and Tom Craig^{2,4,†}


Rus-Calafell, et al., 2020. The role of sense of voice presence and anxiety reduction in AVATAR therapy. *Journal of Clinical Medicine*, 9 (9), 2748



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BACKGROUND

- AT involves direct exposure to the anxiety-provoking fear stimuli (i.e., the representation of the voice and specific distressing content).
- The *embodiment of the voice* is enhanced by the use of direct verbatim speech, and enactment of the ascribed character and background of the voice.



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Sense of Presence

- Embodied cognition: cognitive processes are deeply rooted in the body's interactions with the world (Wilson, 2002);
- Refers to the individual's **psychological sensation of "being there"** in the environment with the ability to do there (Slater, 2004)
- People report feeling some level of presence in almost all computerised mediated environments (Nowac & Biocca, 2003).
- This phenomenon has been linked to **knowledge transfer** (i.e., skills or knowledge gained in virtual environment can be successfully transferred to the real world) (Slater, Usoh, & Steed, 1994).
- High sense of presence is related to high experienced anxiety during the exposure (Riva et al., 2012).

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Sense of Voice Presence

- In AT:
 - Tailored mediated environment and delivers a realistic simulation of the experience of hearing and relating to the agent behind the voice (virtual embodiment).

Sense of voice presence (SoVP): individual's perception of voice embodiment, real-time communication and enactment of relationship.

- Supports *in vivo* cognitive and emotional work, focusing on associated meanings and attributions to the hearing voice experience (e.g. paranoid beliefs) with potential for generalisation to the real world.

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METHODS

- **Aim:** impact of voice presence, reduction of anxiety and paranoid attributions on significant AVATAR therapy outcomes (Craig et al., 2018).
- **Sample:** Completers of AT and assessment at 12 weeks (N=39).
- **Design:**
 - Repeated measures (S1- SLastSession)
 - Multiple linear regressions (Therapy outcomes T12-weekFU—TBaseline)

METHODS

Therapy Outcomes Measures (according to significance in Craig et al., 2018, difference baseline and 12w)

- **Voices:** Psychotic Symptom Rating Scales—Auditory Hallucinations, (PSYRATS-AH, Haddock et al., 1995)
- **Beliefs about Voices:** Revised version of the Beliefs about Voices Questionnaire (Chadwick et al., 2000)

In-session Measures

- **Anxiety:** Anxiety visual analogical scale (VAS): level of anxiety they experienced in dialogue with the avatar from 1 (not at all) to 5 (very anxious).
- **SoVP:** Sense of Presence Questionnaire (Slater, 2004; adapted in consultation with Prof Slater)
- **Paranoid attributions:** State Social Paranoia Scale (SSPS, Freeman et al., 2012; adapted in consultation with Prof Freeman)

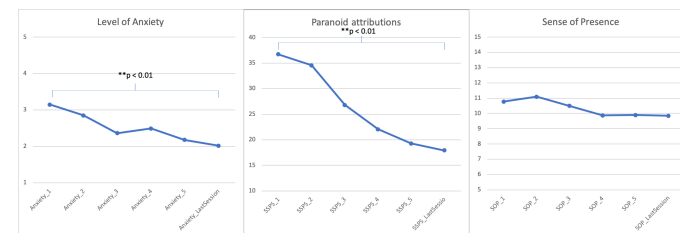
METHODS

HYPOTHESES

- (1) the level of sense of voice presence would remain consistently high across the sessions;
- (2) there would be a significant reduction of anxiety and paranoid attributions across therapy sessions;
- (3) better therapy outcomes at 12-week follow-up (as reported in Craig et al., 2018: PSYRATS-total, frequency, distress and BAVQ-R omnipotence) would be associated with;
 - (i) sense of voice presence,
 - (ii) anxiety reduction,
 - (iii) decreased paranoid attributions to the avatar,
 - (iv) the interaction between anxiety reduction and sense of voice presence.

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RESULTS



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RESULTS

Table 2. Levels of anxiety, sense of presence and paranoid attributions by session and differences between session 1 and last.

	Session_1	Session_2	Session_3	Session_4	Session_5	Session_Last	t _{S1-SLast}	p	Cohen's d
	Mean (SD)								
Anxiety	3.15 (1.18)	2.85 (1.33)	2.36 (1.09)	2.49 (1.25)	2.18 (1.14)	2.03 (1.16)	4.29	p < 0.001	0.7
Anxiety S1-S3							3.33	p < 0.001	0.6
Anxiety S4-SLast							0.97	0.33	0.2
Sense of Presence	10.78 (2.61)	11.10 (2.48)	10.49 (2.76)	9.87 (3.05)	9.90 (3.28)	9.85 (3.21)	1.70	0.10	0.2
Paranoid Thoughts	36.72 (9.32)	34.54 (10.38)	26.82 (12.85)	22.06 (14.54)	19.26 (12.23)	17.95 (12.64)	9.15	p < 0.001	1.4

Note: S1: Session 1; S3: Session 3; SLast: Last session.

RESULTS

Table 4. Results of linear regression analysis by significant therapy outcome.

	t	Beta	p	R ²	F	df	p
Improvement in PSYRATS-AH (Total)							
Overall model				0.24	2.62	4	0.04*
Reduction of Anxiety	-52	-0.07	0.61			1	
Sense of Presence	0.93	0.14	0.35			1	
Reduction of Paranoid Attributions	0.25	0.03	0.80			1	
Reduction of Anxiety*Sense of Voice Presence	2.39	0.46	0.02*			1	
Improvement in PSYRATS-AH (Frequency)							
Overall model				0.28	3.02	4	0.03*
Reduction of Anxiety	-66	-0.08	0.51			1	
Sense of Presence	0.56	0.07	0.64			1	
Reduction of Paranoid Attributions	1.48	0.16	0.14			1	
Reduction of Anxiety*Sense of Voice Presence	2.94	0.47	0.00*			1	
Improvement in PSYRATS-AH (Distress)							
Overall model				0.09	0.80	4	0.53
Reduction of Anxiety	-62	-0.41	0.53			1	
Sense of Presence	0.46	0.05	0.65			1	
Reduction of Paranoid Attributions	0.61	0.00	0.54			1	
Reduction of Anxiety*Sense of Voice Presence	1.67	0.37	0.10			1	
Improvement in omnipolesence BAVQ-R							
Overall model				0.04	0.36	4	0.83
Reduction of Anxiety	0.26	0.05	0.26			1	
Sense of Presence	0.39	0.08	0.69			1	
Reduction of Paranoid Attributions	-0.87	0.15	0.39			1	
Reduction of Anxiety*Sense of Voice Presence	0.51	0.13	0.61			1	

Note: PSYRATS-AH: Psychotic Symptom Rating Scales-Auditory Hallucinations; BAVQ-R: Beliefs about Voices Questionnaire-Revised.

DISCUSSION

- The present study is the first to explore the sense of voice presence in a psychological therapy for voices .
- Evidence for a consistent sense of voice presence during the therapy. 3 important processes:
 1. incorporation of a tangible "self" or "other" representation, helping to differentiate between the two agents of the relationship;
 2. improvement of the interactivity, realism and impact of the dialogue between the person and the agent behind the voice,
 3. reducing cognitive and behavioural avoidance, during exposure to the voice as fear stimuli.

DISCUSSION

- **Key finding: interaction effect between sense of presence and anxiety reduction** associated with better post-therapy outcomes (PSYRATS total and frequency):
 - In line with the results reported mainly in the field of anxiety disorders (Riva, 2012, Ling et al., 2014)
 - Meaningful clinical changes after AVATAR therapy rely on **providing a realistic simulation of the voice experience capable of triggering and reducing the targeted emotions**, in particular fear and anxiety.
 - Learning to face this **potentially terrifying presence** and overcoming the initial fear reaction in a safe and supported way, can be a crucial step towards changing the relation to a voice (Ward et al., 2020).

Remaining Challenges

- Barriers on implementation
- Digital applications for young people

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Barriers in Implementation

- Cost of devices (?)
- The need for knowledge about software and programming,
- Training of MH professionals

“As more clinicians and clinical researchers integrate these methods into their work, more guidance and resources (e.g., freeware, how-to manuals) will likely be available” (Prof. Ebner-Priemer, Mannheim)

- The challenge of how best to view or analyze the data gathered (even for a single case).
- Related to evaluation framework policies...

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Barriers in Implementation

- Efforts to systematically evaluate currently available digital interventions based on established criteria:
 - National Health Service Apps Library in the UK;
<https://www.nhs.uk/apps-library/>
 - Platform for Digital health applications (DiGA) in Germany;
<https://diqa.bfarm.de/de>
 - App Evaluation Database by the Division of Digital Psychiatry, Beth Israel Deaconess Medical Center in the USA).
<https://www.digitalpsych.org/app-evaluation.html>

Digital applications for young people

Young people often fail to engage adequately with services preventing them from obtaining long-term benefits from treatment (Burns & Birrell, 2014)

Review Article

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Are we there yet?! – a literature review of recent digital technology advances for the treatment of early psychosis

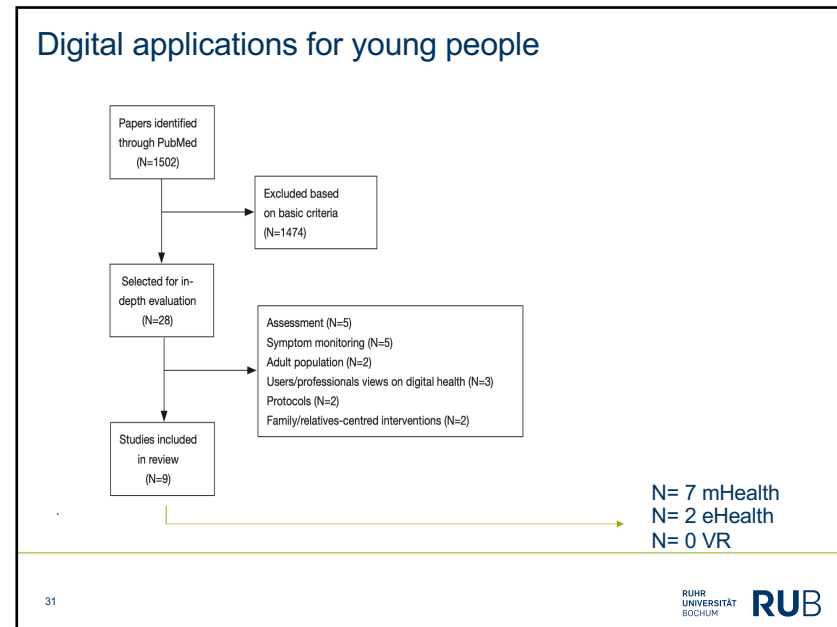
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Contributions: (I) Conception and design: All authors; (II) Administrative support: None; (III) Provision of study material or patients: None; (IV) Collection and assembly of data: All authors; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

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Take-home messages

- Main digital technologies used in Clinical Psychology are: **VR, mobile medical applications and internet-delivered interventions.**
- Scientific and clinical community agree that the objective is **NOT to replace the clinician**, but to improve access and adherence and improve therapy outcomes.
- Experience as a clinician in AVATAR Therapy (using VR-based technology to make voices “tangible”)
 - Powerful in vivo experience providing unique context for developing dialogue and maintaining focus in therapy
 - It allows clinicians to access experiences that are difficult to access using traditional techniques (making the invisible, tangible).
 - It affects therapy outcomes.
- Main remaining challenges: implementation, professional training and young people.

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THANK YOU!

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