


# Views of young people with psychosis on using virtual reality assisted therapy. A qualitative study

Guri Holgersen<sup>1,2</sup>  | Tine Nordgreen<sup>2,3</sup> | Wenche ten Velden Hegelstad<sup>4,5</sup> | Irene Bircow Elgen<sup>1,2,6</sup>

<sup>1</sup>Department of Child and Adolescent Psychiatry, Haukeland University Hospital, Bergen, Norway

<sup>2</sup>Division of Psychiatry, Haukeland University Hospital, Bergen, Norway

<sup>3</sup>Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway

<sup>4</sup>TIPS Centre for Clinical Research in Psychosis, Stavanger University Hospital, Stavanger, Norway

<sup>5</sup>Faculty of Social Science, Institute for Social Studies, University of Stavanger, Stavanger, Norway

<sup>6</sup>Department of Clinical Medicine, University of Bergen, Bergen, Norway

## Correspondence

Guri Holgersen, Department of Child and Adolescent Psychiatry, Haukeland University Hospital, Post Office Box 1400, Bergen N-5021, Norway.

Email: [guri-elise.holgersen@helse-bergen.no](mailto:guri-elise.holgersen@helse-bergen.no)

## Abstract

**Aim:** Service disengagement is a challenge in young individuals struggling with psychosis. Combining cognitive behavioural therapy for psychosis (CBTp) with virtual reality (VR) has proven acceptable and potentially effective for symptoms and social functioning in adults with psychosis. However, studies focusing on young adolescents are lacking. The aim of the present study was to investigate the acceptability of VR-assisted CBTp among adolescents with psychosis.

**Methods:** A qualitative study investigating the acceptability of VR during exposure-based social training among adolescents with early onset psychosis. Thematic analysis was used to identify, analyse, interpret and report patterns from the qualitative interviews.

**Results:** A total of 27 adolescents with psychosis were invited to participate, 11 declined and 16 were enrolled (59%), and all completed the study. The participants were from 13 until 18 years old, mean age 16 years. None of them had previous experience with use of VR in therapy, but 10 out of 16 participants had prior experience with VR from playing video games. Regarding acceptability, 14 out of 16 had positive expectations towards using VR in CBTp, and they would prefer using VR during exposure-based social training to real-life training only.

**Conclusions:** VR-assisted CBTp can be an acceptable intervention for adolescents with psychosis, given their comfort with technology and the opportunity to confront their fears in less threatening virtual social settings with fewer social risks. The present study yields support to continue developing VR-assisted therapy for adolescents, and focusing on VR-interventions for early onset psychosis.

## KEYWORDS

adolescent, cognitive behavioural therapy, psychosis, service disengagement, virtual reality

Clinical trial registration: The trial was registered on [ClinicalTrials.gov](https://clinicaltrials.gov) (NCT04586868).

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## 1 | INTRODUCTION

For a substantial proportion of individuals diagnosed with psychosis, social and vocational disability diminishes quality of life and limits the extent of recovery (Grant & Beck, 2009; Harvey & Strassnig, 2012; Hegelstad et al., 2012). An early onset of psychosis confers an especially high risk of negative social consequences (Kumra & Charles Schulz, 2008; Schimmelmann et al., 2013). It can limit the opportunities for practice needed for reaching developmental and social milestones (Armando et al., 2015). Further, difficulties in maintaining a daily routine, initiating and sustaining activities and social contacts (Doyle et al., 2014), and interruptions in education and peer relationships complicate recovery after or during early onset psychosis (Armando et al., 2015).

Cognitive behavioural therapy for psychosis (CBTp) is the recommended psychological treatment in psychosis (Haddock et al., 2018; O'Keefe et al., 2017; Rasskazova & Friedberg, 2016). This psychotherapeutic intervention has shown to improve symptoms and social functioning (Fowler et al., 2018; Granholm et al., 2016) and covering problems of treatment-resistant symptoms and poor medication adherence (Rasskazova & Friedberg, 2016). There are however, several challenges related to this approach (Garrett et al., 2019; Pot-Kolder et al., 2018; Rasskazova & Friedberg, 2016). A main aim with CBTp is to expose the service user to a stressful social environment that could trigger fear and, for example, paranoid ideations, the purpose of which is to test the accuracy of the clients' beliefs or to test new, more adaptive beliefs (Freeman et al., 2019). However, many are reluctant or unable to undergo exposure-based social training because of too severe paranoid fears or negative symptoms (Freeman et al., 2019; Pot-Kolder et al., 2018). Second, since practice often takes place between therapy sessions (homework), clients' reports of how it went might be inaccurate since cognitive bias is one of the hallmarks of paranoia-like thinking (Dudley et al., 2016; Pot-Kolder et al., 2018). Third, forms of psychological resistance are common reactions to confronting and challenging CBTp interventions, as exposure-based social training, and could limit or postpone successful treatment outcomes (Garrett et al., 2019). Further, the approach has been difficult to implement in a traditional therapeutic setting, due to the stimuli required. The social environment and reactions of others cannot be controlled by a therapist, relevant events might not occur, or unwanted events can suddenly occur (Pot-Kolder et al., 2018). In addition to these challenges come variable attendance and in many cases, low activity levels of clients (Boeing et al., 2007). Approximately 30% of young people who experience psychosis disengage from therapy (Doyle et al., 2014). These limitations might be solved by combining CBTp with virtual reality (VR) (Dilgul et al., 2020; Freeman et al., 2019; Pot-Kolder et al., 2018).

VR is a computer technology that creates an illusion of being physically present in an artificial world (Freeman et al., 2017). VR has the ability to represent social environments that trigger physiological and psychological responses equivalent to what a given context in the real world would create (Valmaggia et al., 2016). This makes VR environments ecologically valid for the treatment of various psychological

disorders (Dilgul et al., 2020; Rus-Calafell et al., 2018; Valmaggia et al., 2016). The technology allows social scenarios to be personalized, repeated and varied, and the therapist to observe discreetly and give feedback in real time. Barriers to practice may also be smaller with VR than in real life, as users know that their actions have no real-world consequences, and that the VR can be stopped at any time (Bisso et al., 2020; Nijman et al., 2020). Since VR in therapy is well accepted by patients, and has a lower drop-out rate, it might potentially improve access and adherence to psychological treatments (Boeldt et al., 2019; Dilgul et al., 2020). For adolescents who experience challenges and fears within the peer social context, VR provides an opportunity to confront these in less threatening settings, with fewer social risks (Parrish et al., 2016).

For adults diagnosed with psychosis, VR-interventions have been used successfully in social skills training, in reducing paranoid ideations and in improving social functioning (Bisso et al., 2020; Pot-Kolder et al., 2018; Rus-Calafell et al., 2018). Clients' attitudes towards using VR have been reported as positive, and the technology has been perceived as safe and acceptable (Rus-Calafell et al., 2018). The use of technology in the treatment of common mental health disorders has grown exponentially, and some reasons for this are availability and acceptability, especially for young people (Thompson et al., 2018). Despite this, there is still a lack of VR-treatments targeting adolescents (Parrish et al., 2016; Valmaggia et al., 2016) and currently none are focusing on the use of VR in early onset psychosis (Bisso et al., 2020; Rus-Calafell et al., 2018; Rus-Calafell & Schneider, 2020). To our knowledge, there are no previous studies investigating VR-assisted CBTp for adolescents. The effectiveness of any intervention depends on the willingness of individuals to engage with the intervention in a sustained manner (Birckhead et al., 2019; Doyle et al., 2014). The aim of the present study was to investigate the acceptability of VR-assisted CBTp among adolescents with psychosis.

## 2 | MATERIAL AND METHODS

### 2.1 | Design

An intervention development qualitative study investigating the acceptability of VR during exposure-based social training among adolescents with early onset psychosis. We created a semi-structured interview with questions that would ensure that we obtained the information necessary to address our aims of the study. A panel with expertise was assembled to assess the effectiveness of the interview questions. Thematic analysis was used to identify, analyse, interpret, and report patterns from qualitative interviews (Braun & Clarke, 2006).

### 2.2 | Participants

Participants were recruited from a specialized outpatient early intervention unit at Haukeland University Hospital in Bergen, Norway.

1. Inclusion criteria: Age 13–18, diagnosed with a psychotic disorder (World Health Organization, 1992), receiving treatment at the outpatient clinic for  $\geq 4$  months yielding enough time to have prepared a mental health crisis plan in order to ensure safety during and after the interview, and being able to provide informed consent.
2. Exclusion criteria: In transition between child and adolescent and adult mental health services, and  $IQ \leq 75$ .

## 2.3 | Procedures

The semi-structured interview consisted of a combination of closed and open-ended questions, and took approximately 15–20 min to complete. First, a short presentation of VR was given. Second, the participants were asked whether they had prior knowledge and/or experiences with VR, what their experiences were, what types of VR-applications they had tried, and number of times used. Third, we introduced a case vignette describing a 15-year-old girl with psychosis. She experienced low self-efficacy in social situations and was given the opportunity to practice talking to peers in VR. Participants were asked about the advantages and disadvantages of practicing this in VR. Finally, to ascertain preferences for CBT treatment, participants chose one out of several type of CBTp-intervention for exposure-based social training based on personal preference. A short description of each option was given, and the alternatives presented in a nonrandomized way. Options were as follows: (1) An assignment between sessions (homework), (2) together with their therapist or (3) in VR. If the answer was “in VR”, they were asked to elaborate why, and if they would not prefer VR, they were asked why not. The interviews were audio recorded and transcribed.

Demographic and clinical characteristics data were collected from patient records: Gender, age, diagnoses, level of function, time in treatment, school attendance and time with friends.

## 2.4 | Analysis

The qualitative data were analysed using thematic analysis (Alhojailan, 2012; Braun & Clarke, 2006). We followed the six-phase method for the analysis to describe how patterns of meanings were combined into broader conceptualizations = themes (Braun & Clarke, 2006). All transcripts were analysed by the lead author. Two therapists from the specialized outpatient unit were asked which codes they would give randomly picked answers. This was an effort to minimize bias in the interpretation of the data. In addition, one of the co-authors with extensive research experience reviewed the coding process. All members of the research team rigorously reviewed the research process. This peer verification process is a recognized method of ensuring reliability of the data and subsequent findings (Gibson & Brown, 2009). The demographic and clinical characteristics data were summarized and analysed using SPSS Statistics (IBM Corp, 2019).

## 3 | RESULTS

### 3.1 | Participants

During the time of recruitment, 32 participants received treatment at the unit. Of these, one had not received psychological treatment for  $\geq 4$  months, and four were in transition between child and adolescent and adult mental health services. Thus, 27 individuals were invited to participate in the study; 11 declined and 16 were enrolled (59%). All participants completed the study. The mean age was 16 years ( $SD = 1.52$ ). The level of functioning and time in treatment varied, but all participants were attending school and had friends that they spent time with on a regular basis. Demographic and clinical characteristics of the sample are presented in Table 1.

### 3.2 | Thematic analysis

The first-level codes were grouped into different, broader themes based on our aim of the study. Since none of the participants had any previous experience with VR in therapy, we divided the thematic map into the superordinate themes: Experience from VR-gaming and Expectations for VR-therapy, as measure for acceptability. We then analysed the participants' preferred choice of therapeutic intervention. Finally, we searched for patterns of meaning across our thematic map.

#### 3.2.1 | Experience with virtual reality

None of the participants had experienced VR in therapy. A total of 10 out of 16 had tried VR in gaming, all labelling the experience as positive. When asked to elaborate, seven explained “immersive” and two “real”, why their experience was positive (Table 2). Two participants reported minor “side effects” from their previous experience with VR.

#### 3.2.2 | Virtual reality in therapy

A total of 14 out of 16 participants accepted VR in therapy, with descriptions as “not real” and “increased self-confidence” as potential advantages. Five participants voiced potential disadvantages including that VR might not be a good match for everyone and had doubts about the transfer value of the intervention. The two participants who did not have any input regarding potential advantages also had no input regarding disadvantages.

A total of 14 out of 16 participants would prefer VR-assisted CBTp when doing exposure-based social training, instead of as an assignment between sessions or together with their therapist. A total of 11 participants explained that it is “not real” as the reason why they would prefer VR: “Because it's not real. I will not become that scared when I talk. I can also practice what to say” [ID16]. “Because it's not real, but at the same time you can learn real conversations.

**TABLE 1** Demographic and clinical characteristics.

|                                | N = 16 |    |
|--------------------------------|--------|----|
|                                | N      | %  |
| Gender                         |        |    |
| Female                         | 12     | 75 |
| Male                           | 4      | 25 |
| Age (years)                    |        |    |
| 13–14                          | 2      | 13 |
| 15–16                          | 8      | 50 |
| 17–18                          | 6      | 38 |
| Diagnoses                      |        |    |
| F20.9 <sup>a</sup>             | 1      | 6  |
| F29 <sup>b</sup>               | 13     | 81 |
| F31.2 <sup>c</sup>             | 1      | 6  |
| F32.3 <sup>d</sup>             | 1      | 6  |
| Level of function <sup>e</sup> |        |    |
| C-GAS 41–50                    | 6      | 38 |
| C-GAS 51–60                    | 6      | 38 |
| C-GAS 61–70                    | 4      | 25 |
| Time in treatment (months)     |        |    |
| <12                            | 9      | 56 |
| 12–24                          | 2      | 13 |
| >24                            | 5      | 31 |
| School attendance              |        |    |
| Reduced time                   | 8      | 50 |
| Full-time                      | 8      | 50 |
| Time with friends              |        |    |
| Daily                          | 3      | 19 |
| Weekly                         | 12     | 75 |
| Monthly                        | 1      | 6  |

<sup>a</sup>F20.9 Schizophrenia, unspecified.

<sup>b</sup>F29 Unspecified nonorganic psychosis.

<sup>c</sup>F31.2 Bipolar affective disorder, current episode manic with psychotic symptoms.

<sup>d</sup>F32.3 Severe depressive episode with psychotic symptoms.

<sup>e</sup>Level of functioning, school attendance and time with friends registered at time of collection.

And you can figure out what to say" [ID3]. Two would choose VR because it is "fun". The two participants who did not choose VR as their preferred intervention had no prior experience with the technology. One would prefer doing exposure-based social training together with the therapist and the other as an assignment between sessions (homework).

## 4 | DISCUSSION

This is the first study to investigate the acceptability of VR-assisted CBTp among adolescents with psychosis. More than half of the participants had prior experience with VR from playing video games, but

**TABLE 2** Themes, codes and illustrating quotes

| Themes & codes                 | Illustrating quotes  |
|--------------------------------|--|
| <b>Experiences VR-gaming</b>   |  |
| Positive experiences           |  |
| Immersive                      | "You can be inside and experience it for yourself. Instead of watching". [ID1]<br>"You disappear into another world". [ID6]  |
| Real                           | "Realistic. Real, present," [ID9]<br>"It was so real". [ID8]   |
| Negative experiences           |  |
| Side effects                   | "I became dizzy. It only happened once". [ID1]<br>"Once I became very nauseous". [ID3]   |
| <b>Expectations VR-therapy</b> |  |
| Advantages                     |  |
| Increased self-confidence      | "Gain better experience in those situations". [ID2]<br>"Learn to be more social". [ID16]   |
| Not real                       | "It seems real, and can be real conversations, but it is not real people". [ID3]<br>"It is not real, so you cannot make a fool of yourself". [ID8]   |
| Disadvantages                  |  |
| Poor match                     | "Maybe VR is not the best method for her". [15]  |
| Transition                     | "If you only practice in VR, you become more closed when you talk to people in real life". [ID1]   |
| <b>Choice of intervention</b>  |  |
| VR                             |  |
| Not real                       | "Because it's not real, but at the same time you can learn real conversations. And you can figure out what to say". [ID3]<br>"Because it's not real. I will not become that scared when I talk. I can also practice what to say". [ID16] |
| Fun                            | "It's fun. I love VR". [ID1]   |
| With therapist                 |  |
| Poor match                     | "Because I wanted to try in vivo with a therapist first". [ID14]   |
| Homework                       |  |
| No knowledge                   | "I have not heard of VR before, have not seen it, and so I do not know what it is like". [ID13]  |

none of them had previous experience with use of VR in therapy. Almost all had positive expectation regarding using VR in therapy, and they would prefer VR-assisted CBTp when doing exposure-based social training.

### 4.1 | Experience with virtual reality

Participants that had tried VR in gaming reported the experience as exclusively positive. The technology's ability to create an immersive experience was the main reason for their positive experiences. The results are consistent with findings from User Experience

(UX) research; VR in gaming is a satisfying immersive experience (Shelstad et al., 2017). The immersive experience is also one of the reasons why VR triggers responses, reactions and emotions equivalent to what a given context in the real world would create, and why it is used in therapy (Boeldt et al., 2019; Valmaggia et al., 2016). The fact that some individuals might not be able to immerse themselves in the virtual world is a potential disadvantage with VR-assisted therapy (Rizzo et al., 2002). The participants' immersive experience with VR from gaming implies that they might also immerse themselves in virtual social environments and get responses similar to a social situation in the real world.

The use of technology in the treatment of severe mental disorders is underdeveloped (Ose et al., 2019). A reason might be concerns that people with psychosis will not use technology, or even that the technology may exacerbate symptoms, such as paranoia (Andrew Thompson et al., 2020). However, there is no consistent evidence to suggest either of these concerns (Bucci et al., 2018; Rus-Calafell & Schneider, 2020; A. Thompson et al., 2018). The fact that more than half of the participants had prior experience with VR from playing video games and that none of them reported their experience as negative, are in line with these findings. Results from this study imply that VR in treatment could be acceptable to adolescents with psychosis given their comfort with the technology. This is consistent with studies indicating that youth are avid computer technology users, early adopters of new technology (Bailey & Bailenson, 2017; Lauricella et al., 2014) and that VR treatment may be more acceptable for youth given their comfort with technology (Parrish et al., 2016).

## 4.2 | Virtual reality in therapy

That almost all of the participants would choose VR as their preferred choice of CBT-intervention, supports the potential of VR-assisted CBT for individuals suffering from psychosis (Freeman et al., 2019; Pot-Kolder et al., 2018). Only one of the participants would prefer doing exposure-based social training as an assignment between sessions, which is the alternative offered in CBTp (Pot-Kolder et al., 2018). This may indicate a certain mismatch between what adolescents want and what current services offer. The use of VR in therapy might be an opportunity to spur service engagement among the younger service users, who arguably have different needs compared to the more grown-up population (Armando et al., 2015).

The participants' main reason for choosing VR was that it is "not real". This could suggest that they consider VR as an opportunity to confront their fears in a less threatening setting with fewer social risks. Illustrated quotes verifies this argument, for example, "Because it's not real, but at the same time you can learn real conversations. And figure out what to say" [ID3]. These perceptions might make barriers to exposure-based social training smaller, since they know that their actions have no real-world consequences. The participants' also had assumptions that "not real" is consistent with recused emotional arousal, for example, "Because it's not real. I will not become that scared when I talk" [ID16]. VR may diminish the service users'

psychological resistance to exposure-based social training and help them face dysphoria, which will enhance the treatment outcomes (Garrett et al., 2019). These assumptions can be perceived as being in conflict with CBTp, where one wants the user to be exposed to social situations that trigger stress and in some cases anxiety (Freeman et al., 2019). We think that the participants' reasons for choosing VR because of it is "not real" social situation will enhance engagement and are not in conflict with CBTp principles' of exposure-based training. This because the immersive technology will trigger responses, reactions and emotions equivalent to what a given context in the real world would create (Boeldt et al., 2019). This is in line with studies assessing VR in treatment. The users know that a computer environment is not real but their minds and bodies behave as if it is real; hence, people will much more easily face difficult situations in VR than in real life and be able to try new therapeutic strategies (Freeman et al., 2017).

Our finding that the adolescents with psychosis find the use of VR to be an acceptable tool to confront their fears in a less threatening setting with fewer social risks is consistent with research addressing how VR can enhance treatment for youth with anxiety disorders. VR provides multiple opportunities for youth to be exposed to environments that mimic real-world setting, and an opportunity to practice in a safe environment (Parrish et al., 2016).

It could be argued that a weakness with our study is that we assessed the acceptability with a semi-structured interview instead of testing the clinical outcomes of VR-assisted treatment. The effectiveness of any intervention depends on the willingness of the service user to engage with the intervention in a sustained manner (Birckhead et al., 2019; Doyle et al., 2014). Thus, we conducted this study before starting to develop a novel VR-treatment. Exploring the acceptability of VR-treatment in adolescents diagnosed with psychosis at this early stage of the design, will probably enhance the service users engagement (Rus-Calafell & Schneider, 2020).

## 4.3 | Limitations

This study has some limitations that need to be addressed. Adolescents without friends or those not attending school were not represented in the sample. Considering the differences in level of function and time in treatment, the participants seemed as a representative sample for the adolescents assessed. Since the majority of the eligible adolescents at an outpatient unit for early onset psychosis participated, this study is considered an adequate degree of transferability (Malterud, 2001).

Another limitation that needs to be highlighted is the gender imbalance, as 75% of the participant were females. Even though the emergence of psychosis is brought to clinical attention earlier for men than for women (Mazza et al., 2021; Ochoa et al., 2012), this is not the case at our unit of recruitment. Only 7 out of the 27 individuals invited to participate in the study were male. Our design was not suitable for investigating this point, which will be a focus in the planned clinical trial ahead. This is relevant because young males, who often

struggle with higher levels of negative symptoms, could perhaps benefit from a social intervention such as this to prevent further alienation from important areas of social functioning.

The ethical committee had concerns regarding the safety of enrolling participant under 16 years of age, and to comply these we had to adjust the procedure. To ensure that the participants felt safe and consequently prevent increase in psychotic symptoms, their therapist was required to be present during the interview. Since several of those involved in this research are therapists at the unit of recruitment, lead author included, the risk of positive bias cannot be ruled out. Since the research, regarding early onset psychosis is limited (Rasskazova & Friedberg, 2016), the procedure was chosen on the basis that potential benefits outweighed the methodological problems. Young people's general enthusiasm for technology and the participants' uniform answers could be arguments against positive bias.

#### 4.4 | Clinical implications

Assessing adolescents' acceptance for implementing VR in CBTp will enhance the effectiveness of future VR-treatments and contribute to an efficacious implementation in the clinic. We anticipate that VR-assisted CBTp for adolescents could improve engagement, reduce the risk of service disengagement and be a novel intervention targeting functional and social recovery.

#### 4.5 | Conclusion

VR-assisted CBTp could be an acceptable intervention for adolescents with psychosis, given their comfort with technology and the opportunity to confront their fears in less threatening virtual social settings with fewer social risks. The present study yields support to continue developing VR-assisted therapy for adolescents, and focusing on VR-interventions for early onset psychosis.

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#### CONFLICT OF INTEREST

The authors declare no conflicts of interest.

#### DATA AVAILABILITY STATEMENT

Research data are not shared.

#### ORCID

Guri Holgersen  <https://orcid.org/0000-0001-5199-9211>

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