



Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Virtual reality job interview training and 6-month employment outcomes for individuals with schizophrenia seeking employment

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ARTICLE INFO

Article history:

Received 5 March 2015

Received in revised form 12 May 2015

Accepted 12 May 2015

Available online xxxx

Keywords:

Schizophrenia

Virtual reality training

Job interview skills

Vocational outcomes

ABSTRACT

Background: Individuals with schizophrenia have low employment rates and the job interview presents a critical barrier for them to obtain employment. Virtual reality training has demonstrated efficacy at improving interview skills and employment outcomes among multiple clinical populations. However, the effects of this training on individuals with schizophrenia are unknown. This study evaluated the efficacy of virtual reality job interview training (VR-JIT) at improving job interview skills and employment outcomes among individuals with schizophrenia in a small randomized controlled trial ($n = 21$ VR-JIT trainees, $n = 11$ waitlist controls).

Methods: Trainees completed up to 10 h of virtual interviews using VR-JIT, while controls received services as usual. Primary outcome measures included two pre-test and two post-test video-recorded role-play interviews scored by blinded raters with expertise in human resources and self-reported interviewing self-confidence. Six-month follow-up data on employment outcomes were collected.

Results: Trainees reported that the intervention was easy-to-use, helpful, and prepared them for future interviews. Trainees demonstrated increased role-play scores between pre-test and post-test while controls did not ($p = 0.001$). After accounting for neurocognition and months since prior employment, trainees had greater odds of receiving a job offer by 6 month follow-up compared to controls (OR: 8.73, $p = 0.04$) and more training was associated with fewer weeks until receiving a job offer ($r = -0.63$, $p < 0.001$).

Conclusions: Results suggest that VR-JIT is acceptable to trainees and may be efficacious for improving job interview skills in individuals with schizophrenia. Moreover, trainees had greater odds of receiving a job offer by 6-month follow-up. Future studies could evaluate the effectiveness of VR-JIT within community-based services.

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1. Introduction

Less than 20% of individuals with schizophrenia attain employment (Rosenheck et al., 2006; Salkever et al., 2007), while this rate climbs to 30–40% for individuals in Individual Placement and Support (IPS) services (Drake and Bond, 2011). Successfully navigating the job interview is critical to attaining employment and is the most proximal step to attaining employment for IPS clients (Corbiere et al., 2011). Moreover, social cognitive and neurocognitive deficits that characterize schizophrenia have been associated with poorer vocational outcomes (Eack

et al., 2011; Vargas et al., 2014; Martinez-Dominguez et al., 2015), and likely increase the difficulty of interviewing. Although individuals with schizophrenia self-identify having poor interview skills and want services to enhance these skills (Solinski et al., 1992; Marwaha and Johnson, 2006), there is a paucity of evidence-based interventions targeting interview skills (Bell and Weinstein, 2011).

Recently, two randomized controlled trials (RCTs) evaluated virtual reality job interview training (VR-JIT), which demonstrated acceptability and efficacy at improving interview skills and self-confidence for individuals primarily diagnosed with mood disorders and veterans with post-traumatic stress disorder (PTSD) (Smith et al., 2014b, 2015a). Moreover, VR-JIT trainees sustained their self-confidence and were more likely to receive job offers than controls when evaluated six months later. Additionally, completing more VR-JIT trials was associated with greater odds of receiving a job offer and spending fewer weeks searching for employment (Smith et al., 2015b).

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Thus, we hypothesized that 1) individuals with schizophrenia randomized to training would find VR-JIT acceptable and enhance their interviewing skills and interviewing self-confidence compared to waitlist controls; 2) trainees with schizophrenia would sustain their enhanced self-confidence and have greater odds of receiving a job offer compared to controls at 6-month follow-up; and 3) a greater number of completed VR-JIT trials, improved VR-JIT performance across trials, and self-confidence at the conclusion of training would be correlated with receiving a job offer and with fewer weeks until a job was offered. We generated these directional hypotheses based on our prior research (Smith et al., 2015b).

2. Methods

2.1. Participants

Participants included 32 individuals with schizophrenia or schizoaffective disorder recruited through Northwestern University's Schizophrenia Research Group. Bachelor's or Ph.D.-level research staff determined diagnoses (and antipsychotic treatment) using the Structured Clinical Interview for the DSM-IV-TR (SCID-IV) (First et al., 2002). Inclusion criteria included: 18–55 years old, minimum of a 6th grade reading level using the Wide Range Achievement Test-IV (WRAT-IV) (Wilkinson and Robertson, 2006), willingness to be video-recorded, unemployed or underemployed, and actively seeking employment. Exclusion criteria included: having a medical illness that significantly comprised cognition (e.g., traumatic brain injury), uncorrected vision or hearing problem, or current substance abuse. Northwestern University's Institutional Review Board approved the study protocol and all participants provided informed consent.

Once enrolled, participants were randomized using a random number generator into training ($n = 17$) or treatment-as-usual waitlist control ($n = 8$) groups at an estimated ratio of 2 to 1 to optimize VR-JIT evaluation. Four trainees and three controls with schizophrenia completed prior RCTs of VR-JIT (Smith et al., 2014b, 2015a) and their data were included in all current analyses to optimize statistical power with final sample sizes of $n = 21$ trainees and $n = 11$ controls. Participants were re-contacted after 6 months and asked to complete a follow-up survey. Of the original 32 participants, 30 (94%) completed the follow-up survey and 2 (6%) were lost to contact.

2.2. Intervention

Virtual Reality Job Interview Training (VR-JIT) is a computer-based intervention developed by SIMmersion LLC (<http://www.simmersion.com>) to improve interviewing skills for adults with a range of disabilities. See Supplemental Material and Smith et al. (2014b) for details on VR-JIT design, use, and delivery (e.g., fidelity training).

2.3. Study procedures

Pre-test measures included demographic, clinical, and vocational interviews; clinical, neurocognitive, and social cognitive assessments; and self-reported self-confidence and two standardized video-recorded role-plays. Participants were randomized following pre-test assessments. Trainees completed up to 10 h of VR-JIT (approximately 20 trials) over the course of 5 visits (across 5–10 business days). Controls received services-as-usual for 5–10 business days. Both groups returned after ten business days to complete post-test measures of self-confidence and two standardized video-recorded role-plays, while trainees also completed the Treatment Experience Questionnaire (TEQ). After the post-test visit, all controls were invited from the waitlist to use VR-JIT. Two controls used VR-JIT and crossed-over to the training group (Fig. 1).

Research staff contacted participants to complete a follow-up survey over the phone or via email approximately 6 months after completing the efficacy trial. Two controls were unreachable by phone, mail, and

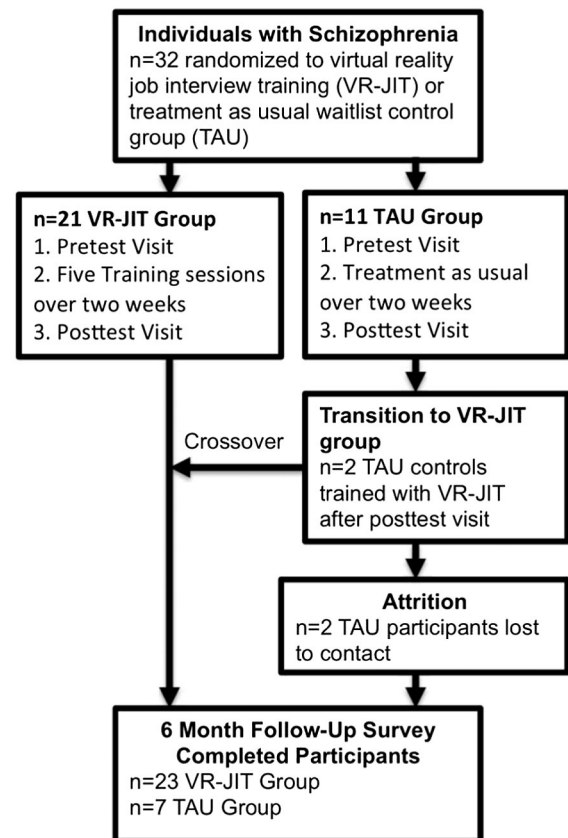


Fig. 1. Consort diagram of study participation.

email, and were lost to contact. Overall, 23 VR-JIT and 7 controls completed follow-up (Fig. 1).

2.4. Study measures

2.4.1. Participant characteristics

We assessed demographic characteristics and vocational history via self-report. Symptoms were assessed using global ratings from the Scale for the Assessment of Positive Symptoms and the Scale for the assessment of Negative Symptoms (Andreasen, 1983a, 1983b). For the 7 participants who completed prior studies (Smith et al., 2014b, 2015a), we used ratings and notes from the Mini-International Neuropsychiatric Interview (Sheehan et al., 1998) to inform symptom ratings and SCID diagnosis.

2.4.2. Cognition

We assessed global cognitive ability with the total score from the Repeatable Battery for the Assessment of Neuropsychological Status (Randolph et al., 1998). We assessed basic social cognition using the Bell-Lysaker Emotion Recognition Task (Bell et al., 1997), and advanced social cognition using an emotional perspective-taking task (Smith et al., 2014c). Accuracy ratings for each task were generated using the number of correct responses.

2.4.3. VR-JIT acceptability

We recorded trainee attendance across five sessions and the number of minutes (600 min possible) that they engaged in virtual interviews. Trainees completed the TEQ to evaluate whether they felt that VR-JIT was easy to use, enjoyable, helpful, instilled confidence, and prepared them for interviews (Bell and Weinstein, 2011). The TEQ used a 7-point Likert scale with higher scores reflecting more positive views ($\alpha = 0.86$).

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