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## Cognitive remediation and occupational outcome in schizophrenia spectrum disorders: A 2 year follow-up study

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### ABSTRACT

Neurocognitive impairment is prominent in schizophrenia and a significant predictor of poor occupational outcomes. Vocational rehabilitation (VR) is frequently implemented to counteract high unemployment rates. Individuals with schizophrenia however face numerous challenges such as neurocognitive impairments and psychotic symptoms. Hence, augmenting VR to address illness-related factors may optimize occupational outcomes. The aim of this study was to examine the effects of Cognitive Remediation (CR) combined with VR (CR + VR) compared to techniques from Cognitive Behavioral Therapy (CBT) combined with VR (CBT + VR) on neurocognition and occupational functioning over a 2 year period. A total of 131 participants underwent assessment with the MATRICS Consensus Cognitive Battery (MCCB) at baseline, post treatment (after 10 months) and follow-up (2 years after randomization). Occupational status and number of hours worked were recorded at all assessment points. Both groups improved on several neurocognitive domains. All improvements were however in favor of the CR group. There was a significant increase in number of participants working and hours worked in both groups throughout the project period, with no between-group differences. Number of hours worked at follow-up was predicted by change in Working Memory and the Composite Score in the CR group. CR-augmented VR improved several domains, particularly Verbal Learning and Working Memory, which were central in the CR program. The combination of VR and CR or CBT thus enabled a significant proportion of participants to attain and maintain work.

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### 1. Introduction

Neurocognitive deficits are prominent in schizophrenia (August et al., 2012; Green et al., 2004; Reichenberg et al., 2009) and significantly related to functional outcome (Bowie and Harvey, 2005; Green, 2006; Keefe, 2014; McGurk and Mueser, 2006; Shamsi et al., 2011; Strassnig et al., 2015). Neurocognitive impairment contributes substantially to low occupational attainment and poor occupational outcomes (Christensen and Stergaard, 2007; Kukla et al., 2012; Lystad et al., 2015; Strassnig et al., 2015; Vargas et al., 2014) and is an important predictor of poor engagement in vocational rehabilitation (VR) (O'Connor et al., 2011).

In addition to financial benefits, employment is associated with improved self-esteem, quality of life and lowered relapse rates in schizophrenia (Bond et al., 2001; Bryson et al., 2002; Bush et al., 2009; Lieberman et al., 2008; McGurk and Mueser, 2004). Although work is a commonly sought goal, considerable research has shown that employment rates are consistently low, estimates ranging from 10% to 25% (Bond, 2004; Evensen et al., 2015; Marwaha and Johnson, 2004; Tandberg et al., 2011).

As vocational rehabilitation gains momentum in clinical guidelines, the implementation of programs including Supported Employment (SE)/Individual Placement and Support (IPS) has increased accordingly to help individuals with schizophrenia reach their work goals. However, despite superior competitive employment outcomes in SE/IPS studies (Bond et al., 2012; Marshall et al., 2014), this group still faces numerous occupational challenges such as unwanted job discontinuations and work performance difficulties. These may be caused by illness-related barriers, including neurocognitive functioning (Allott et al., 2013;

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Bond et al., 2012; Marshall et al., 2014). Hence, augmenting vocational programs in order to address illness-related barriers and optimize occupational outcomes are of interest (Khare et al., 2016).

The strong relationship between neurocognition and occupational outcome underlines the importance of targeting neurocognitive dysfunctions through psychosocial interventions such as cognitive remediation (CR) as a means to improve occupational functioning. Recent meta-analyses show small to moderate effects of CR on neurocognition and beneficial effects on symptoms and psychosocial functioning, including social skills and employment when integrated with psychiatric rehabilitation (McGurk et al., 2007; Wykes et al., 2011). The combination of VR with CR appears to maximize benefits of CR, allowing participants to apply enhanced neurocognitive skills in real-world settings (McGurk et al., 2007).

Individuals with schizophrenia also face challenges such as psychotic symptoms, comorbid disorders, stigma, low expectations and social impairments that interfere with occupational functioning (Buckley et al., 2009; Milev et al., 2005; Morrison, 2009). Combined, these factors may translate into beliefs of own incompetence and fear of occupational failure, in turn elevating stress levels, lowering problem-solving capabilities and possibly resulting in actual limited occupational function. Negative expectations toward self-efficacy and self-defeating beliefs are strong predictors of occupational outcomes (Davis et al., 2004; Lysaker et al., 2009), thus addressing these beliefs as they appear in a work setting suggests adapting general CBT principles to 'vocational CBT. There is strong support for CBT improving symptoms and social relations (Rector and Beck, 2001; Tarrier and Wykes, 2004). More recently, CBT programs designed to enhance occupational functioning have been developed (Kukla et al., 2014; Lecomte et al., 2014). Although evidence is still scant regarding CBT adjunct to VR, results are promising (Davis et al., 2008; Lecomte et al., 2014; Lysaker et al., 2009).

The aim of this study was to examine the effects of a CR augmented VR program, the Job Management Program (JUMP), on neurocognition and occupational functioning in participants with schizophrenia spectrum disorders. The comparison group received CBT augmented VR. Specifically, we evaluated the effects of CR on neurocognitive and occupational outcomes over a two year period

## 2. Material and method

### 2.1. JUMP

JUMP is a multisite hybrid VR program for adults with psychotic disorders in Norway. JUMP is a collaborative effort between health and welfare services with the overall goal of enhancing occupational outcomes for persons with psychosis. Participants were offered a 10 month extensive program consisting of competitive or sheltered work, close collaboration between psychiatric and vocational services, employers and employment specialists in addition to either CR or CBT. CR and CBT were carried out by employment specialists based in sheltered workshops. Throughout the project, employment specialists received weekly supervision by an experienced mental health professional. In SE/IPS programs, competitive employment is the main goal. Competitive employment was defined as part- or full-time work in a position that is open to anyone and wages were paid by the employer.

Sheltered employment refers to work in a sheltered workshop. Tasks may be similar to those in competitive positions; the pay is however different, as sheltered work is funded by the Norwegian Labor and Welfare Services through so-called work assessment allowance or disability pensions. It is important to note that sheltered work did not represent pre-vocational training in which participants underwent preparation (preparing for job interview, how to write a successful CV etc.), but rather work with actual demands in a sheltered environment.

SE/VR services in the Nordic countries routinely offer sheltered work in a train and place tradition (Hagen et al., 2011). Vocational training is

thus offered in sheltered workshops if competitive work is not possible. Work placement is work in a competitive setting financed by the Norwegian Labor and Welfare Administration through work assessment allowance or disability benefits. Work demands are however equal to those in competitive employment. JUMP was carried out within this tradition; consequently, all types of employment were considered a success.

JUMP consists of the following components:

### 2.2. Interventions

#### 2.2.1. Cognitive remediation

Employment specialists received information about neurocognitive impairment in psychotic disorders. Furthermore, they were taught basic principles of CR, use of computer software, strategies to enhance motivation and performance, and transfer of knowledge and skills acquired through training to the work setting. The JUMP CR program is similar to the Thinking Skills for Work program (McGurk et al., 2005; McGurk et al., 2015). Training lasted 40 h. The program included the following elements: Feedback from neurocognitive assessment, setting up personal goals for the training, psychoeducation about cognitive impairment, and two hours weekly of computer-based training with focus on transfer between training and work. The computer programs targeted attention/vigilance, working memory, visual and verbal memory, executive functioning and processing speed. The tasks originated from four different programs: COGPACK (Marker Software), Vision Builder (Haraldseth Software), Brain Fitness and InSight (Posit Science). The computerized training program contained elements based on a combination of feed-forward bottom up and top-down processes. Participants carried out repetitive drill-and-practice tasks to enhance and automatize neurocognitive processing (bottom-up) and when tasks allowed, strategy use was implemented (top-down).

#### 2.2.2. Cognitive behavioral therapy techniques

Employment specialists received training in basic methods of CBT, focusing on maladaptive patterns of thinking contributing to, or arising from work related difficulties. Training lasted 40 h. The CBT intervention was based on principles of simple behavioral activation concepts such as activity schedule and gradual task assignments as well as addressing of maladaptive schema underlying beliefs with regard to the occupational setting (Co-workers, supervisors etc.). CBT was carried out by employment specialists in individual sessions with participants twice a week. That is, employment specialists in the CBT intervention worked with participants in the attempt to alter cognitive biases related to work by addressing content of thought and style of thinking in terms of recognizing, changing and coping with underlying thinking patterns possibly limiting occupational success. Social relationships were addressed through focus on work environment and close cooperation with the immediate supervisor; for example how the workplace is organized, working conditions, rehearsal of social situations arising in the workplace etc. The CBT intervention in the JUMP study did not focus on psychotic symptoms but concentrated on work related negative thoughts and beliefs. Frequently used techniques were cognitive restructuring, motivational interviewing, graded exposure and homework.

The group receiving CBT augmented VR serves as a comparison group in the current paper.

#### 2.2.3. Vocational rehabilitation

Employment specialists focused rapid job placement in positions matched to participants preferences with ongoing job support. Competitive employment was the goal, but vocational training was offered in sheltered workshops if this was not possible.

Participants were assessed at baseline, post treatment approximately 10 months after baseline and 2 years after randomization (follow-up). CBT and CR were discontinued at post treatment.

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