



Research paper

Prediction of vocational participation and global role functioning in help-seeking young adults, from neurocognitive, demographic and clinical variables



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ABSTRACT

Background: The purpose of this study was to investigate neurocognitive, demographic and clinical correlates of vocational participation among a sample of young help-seeking adults.

Methods: Young people (18–25 years) accessing an early intervention youth health service participated. The Global Functioning: Role scale and level of vocational participation, participant characteristics (age, gender, socioeconomic background and family history of serious mental illness), distress, psychotic-like experiences, substance use, and mental health diagnoses were recorded. The Cambridge Neuropsychological Testing Automated Battery was used to assess sustained attention, visual memory and executive function.

Results: Of the 107 participants, 33 (31%) were not working or studying and 52 (49%) had a diagnosis of affective disorder. Impairments in neurocognitive tests were evidenced in attention shift, sustained attention target sensitivity, impulsivity and spatial working memory errors. Univariate analyses indicated that information processing and target impulsivity were associated with both vocational participation and global functioning, and that spatial working memory strategy was also associated with vocational participation. After controlling for significant demographic and clinical predictors, strategy formation remained a significant correlate of vocational participation (coefficient (95%CI) = -0.08 (-0.17 , -0.01)), but no neurocognitive measures remained significant in the multivariate prediction of global functioning.

Limitations: Neurocognitive outcomes were assessed at a single time point, factors such as fluctuations in motivation could impact on test results.

Conclusions: Interventions targeting work and education participation should consider the capacity of vulnerable young people to develop appropriate plans for role success and provide support accordingly. The study also emphasised the importance of high school completion and avoidance of cannabis use, especially in males.

1. Introduction

Young people explore educational and employment opportunities as they transition from secondary schooling and move into higher education, training or employment (Arnett, 2000). This time can offer great opportunities for personal growth and freedoms (Schulenberg et al., 2004). However, instability in employment can have a detrimental effect on income, occupational status and career satisfaction later in life, and instead of successfully exploring opportunities, vulnerable young

people may be left floundering in the labour market (Krahn et al., 2015). In the United Kingdom, a third of 16–19 year olds have had at least one experience of not working or studying (National Statistics of the United Kingdom, 2010). Ongoing unemployment in young people can reduce quality of life, increase ill health and social exclusion and is associated with severe levels of disadvantage through financial strain and poverty (Baum and Mitchell, 2008; McKee-Ryan et al., 2005; Morris and Wilson, 2014). Young people experiencing distress and emerging mental illnesses are particularly vulnerable to employment

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instability with rates of unemployment or NEET (Not in Education, Employment or Training) between 19% and 29% (O'Dea et al., 2014; Rickwood et al., 2014), compared with 13% of 20–24 year olds in the general youth population (Australian Institute of Health and Welfare, 2015).

Young adults presenting to early intervention services are predominantly experiencing affective and anxiety symptoms (37–53%), high or very high levels of distress (69%) and substantial levels of disability, with 55% of 21–25 year old males and 62% of similarly aged females reporting at least one day away from their occupational role due to mental ill health (Hamilton et al., 2011; Rickwood et al., 2014). People with severe mental illnesses such as psychosis, which emerge in adolescence and early adulthood, have been reported to have particularly high rates of unemployment, exceeding 40% (Killackey et al., 2006).

Individual, regional and economic factors all impact on youth unemployment rates and disengagement from occupational role (Baum and Mitchell, 2008). Individually, young people are at higher risk of disengagement if they are male, have a history of criminality, use cannabis or other illicit substances and experience higher rates of depressive symptoms (O'Dea et al., 2014; Ringel et al., 2007). Other mental health risk factors such as psychotic-like experiences and distress have also been associated with greater disability, including unemployment (Hannan et al., 1997; Scott et al., 2006; Yung et al., 2006).

Employment outcomes have also been associated with neurocognitive functioning. For example, a meta-analysis in 2003 identified a significant association between employment status and eight neurocognitive domains, including executive function and working memory (Kalechstein et al., 2003). Unfortunately, the majority of the studies reviewed in the analysis did not control for important factors such as age or level of education, and the patient population was both diverse in age and diagnosis (Kalechstein et al., 2003). In young people, neurocognitive deficits in sustained attention and executive function including spatial working memory have been observed in depressive disorders (Castaneda et al., 2008; Han et al., 2012; Maalouf et al., 2011), substance abuse issues (Solowij et al., 2012; Tapert and Brown, 1999) and those at risk of psychosis (Myles-Worsley et al., 2007). There is a paucity of evidence investigating the impact of these neurocognitive deficits on employment and educational engagement, and to our knowledge there are no studies assessing neurocognitive impairments in mild or subthreshold disorders in a youth help-seeking population.

Accordingly, this study aimed to identify correlates of employment and education functioning from neurocognitive domains, before and after controlling for demographic and clinical factors, in a sample of young adults seeking psychological help.

2. Methods

2.1. Design, participants and setting

This cross-sectional, prospective investigation recruited participants

Table 1
CANTAB subtests.

Task name	Task demands	Task variables
Intra-extra dimensional set shifting (IED)	Rule acquisition and attentional set shifting	1. EDS errors
Rapid visual information processing task (RVP)	Sustained visual attention	1. Target sensitivity (RVPA')
		2. Response bias or impulsivity (RVPB')
Spatial working memory (SWM)	Working memory and strategy	1. Total errors
		2. Strategy score (lower is better)
Paired associates learning (PAL)	New learning and visual memory	1. First trial memory score
Information Sampling Task (IST)	Information processing and reflection impulsivity	1. Mean number of boxes opened per trial (No Cost and Cost)
		2. Discrimination errors (No Cost and Cost)

Target sensitivity RVPA' (range 0.00–1.00); low score indicates difficulty discriminating target and therefore a sustained attention deficit. Target response RVPB' (range –1.00 to +1.00); low score indicates disinhibited response to non-targets suggested greater impulsivity (Maalouf et al., 2011).

between May and November 2014. All young adults aged 18–25 years who sought help from two centres offering a youth health service (*headspace*) were invited to participate. Both centres were in South East Queensland, Australia. *headspace* provides early intervention services to 12–25 year olds experiencing mental health, general health, vocational and substance use issues (McGorry et al., 2007; Rickwood et al., 2015). This study recruited people over 18 years of age as this represents the age at which people often transition from the structured secondary school environment into either further education or employment. Due to the nature of participation, those unable to communicate in written or spoken English or with a diagnosed intellectual impairment were not eligible to participate. Approval was granted by the Queensland University of Technology Human Ethics committee (#1400000066).

2.2. Measures

2.2.1. Vocational functioning

Participants reported their total level of *vocational participation* as either: 1. Not working or studying. No volunteer work or home care responsibilities, 2. Working part time or studying part time or have part time home care responsibilities (caring for children or loved ones), 3. Full time working, studying and/or home care responsibilities. The quality of role performance in education, employment or as a home maker was assessed with the *Global Functioning: Role (GFR)* scale (Cornblatt et al., 2007), inter-rater reliability has been reported at ICC = 0.93 (Cornblatt et al., 2007) and construct validity demonstrated significant correlation with the Strauss-Carpenter Outcome Scale: Work/School Functioning $r = 0.57$; and the Premorbid Adjustment Scale $r = 0.68$ (Cornblatt et al., 2007). This is an interviewer-rated 10-point Likert scale, from 1, severe dysfunction, to 10, superior functioning (Piskulic et al., 2011). The GFR scale is based on the demands of the vocational role, the level of support provided to the individual and the person's overall performance as a result.

2.2.2. Neurocognitive function

Five neurocognitive subtests were administered from the computerised Cambridge Neuropsychological Testing Automated Battery (CANTAB) (Sahakian and Owen, 1992) measuring aspects of executive function, including decision making, visual and working memory, attention and cognitive flexibility. These tests were selected as they reportedly assess a range of neurocognitive skills and have been used previously in studies with adolescence and young adults (Conklin et al., 2007; De Luca et al., 2003; Gould et al., 2012; Harvanko et al., 2012; Khurana et al., 2012; Luciana et al., 2009; Waber et al., 2007). A fixed order of tasks was used to ensure tasks that were likely to be more demanding tasks were not presented consecutively to limit potential fatigue.

The CANTAB subtests used in this present study, their task demands and the variables of interest are displayed in Table 1. The *Intra-extra Dimensional Set Shifting (IED)* task presents participants with two patterns and through trial and error participants select the correct pattern

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