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**Comparing Time Use in Individuals at Different Stages of Psychosis and a Non-Clinical  
Comparison Group**

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## Abstract

Social functioning difficulties are a common and disabling feature of psychosis and have also been identified in the prodromal phase. However, debate exists about how such difficulties should be defined and measured. Time spent in structured activity has previously been linked to increased psychological wellbeing in non-clinical samples and may provide a useful way of assessing social functioning in clinical settings.

The current study compared weekly hours in structured activity, assessed with the Time Use Survey, in three clinical groups at different stages of psychosis: individuals with at-risk mental states ( $N = 199$ ), individuals with first-episode psychosis ( $N = 878$ ), and individuals with delayed social recovery following the remission of psychotic symptoms ( $N = 77$ ). Time use in the three clinical groups was also compared with norms from an age-matched non-clinical group ( $N = 5686$ ) recruited for the Office for National Statistics UK 2000 Time Use Survey. Cut-off scores for defining social disability and recovery were examined.

All three clinical groups spent significantly fewer hours per week in structured activity than individuals in the non-clinical group. Reduced activity levels were observed before the onset of psychosis in individuals with at-risk mental states. Additional reductions in activity were observed in the first-episode psychosis and delayed recovery groups compared to the at-risk mental state group. Assessing time spent in structured activity provides a useful way to assess social disability and recovery across the spectrum of psychosis.

Keywords: psychosis, time use, social functioning, recovery, at-risk mental state

## **1. Introduction**

### **1.1 Social Functioning and Psychosis**

Social functioning difficulties (i.e. difficulties engaging in meaningful activities and relationships) are a common and disabling feature of psychosis (Couture et al., 2006). A reduction in functioning has been identified prior to the onset of positive psychotic symptoms (Jang et al., 2011), with individuals at-risk of developing psychosis showing comparable impairments in social functioning to individuals following transition (Addington et al., 2008). As such, social disability may play a key role in the emergence of severe mental health problems and in defining individuals at high risk (Fowler et al., 2010). Social disability is also prevalent in the recovery phase, after the remission of psychotic symptoms (Menezes et al., 2006). This is hypothesised to result from the impact of psychosis on social networks and self-esteem (Gureje et al., 2004). Social disability has significant consequences for long-term outcomes and is an important area for research.

### **1.2 Measuring Social Functioning**

Despite the importance of social and functional outcomes, acknowledged by both service users and providers, debate exists about how these concepts are measured and defined (Silverstein and Bellack, 2008). The need for more sensitive, meaningful and appropriate functional outcome measures has been highlighted (Shepherd et al., 2008).

Existing measures of functioning often have a strong emphasis on engagement in paid work (Killackey et al., 2008). Whilst work represents a key marker of social recovery, it is not the only marker of improvement. Engagement in other domains of activity (e.g. education, voluntary work, leisure activities) reflect realistic and meaningful goals for many service users and have wider clinical and economic benefits. This is reflected in service user models of recovery, which emphasise “living a satisfying, hopeful, and contributing life” and “having friends with whom activities are shared with on a regular basis” (Lieberman et al.,

2002). However, these activities are not always explicitly assessed by existing tools. In addition, many measures have been designed and validated for use with individuals with chronic schizophrenia and assess the impact of symptoms on tasks of daily living. As such, they lack face validity for use with individuals at an earlier stage of illness.

Ideally, tools assessing social functioning would be appropriate for use with individuals at different stages of psychosis, enabling trajectories of functioning to be examined over the course of illness development and recovery. In addition, tools allowing functioning to be compared with non-clinical populations would be particularly useful in providing a point of reference to define reductions or improvements in functioning.

### **1.3 Using Time Use to Assess Social Functioning**

The Time Use Survey (TUS) was developed by the Office for National Statistics (ONS) for the UK 2000 Time Use Survey, a study investigating how the general population of the UK spend their time (Short, 2006). The TUS provides a direct measure of time spent in structured activity (i.e. work, education, housework and childcare, and sport and leisure activities). The TUS has been applied and validated in a normative community population enabling the time use of clinical samples to be compared with societal norms.

Assessing how people spend their time is an important way of measuring participation in activities which may have important economic, societal, and personal benefits (Gershuny, 2011). It has been hypothesised that changes in patterns of time use over the last 20 years may be linked with changes in adolescent mental health (Hagell et al., 2012). Time spent in structured activity has been associated with increased mental wellbeing (Fletcher et al., 2003) and with a reduced risk of emotional and behavioural difficulties (Kantomaa et al., 2008). Moreover, individuals not in employment, education or training (NEET) have been found to have poorer long-term outcomes in relation to psychological wellbeing (Bynner and Parsons, 2002). It is argued that engagement in structured activity may protect against negative mental

health outcomes due to enhancement of social competence, autonomy, and relatedness (Ryan and Deci, 2000).

Given the links between wellbeing and time use, examining how young people spend their time is likely to be important in at-risk mental state research, and in assessing recovery from severe mental illness. Although time use may not capture the full range of concepts associated with recovery, it arguably provides an operationalised way to assess the behavioural aspects of functional recovery. Such information could also be utilised in cost-effectiveness studies to assess the economic impact of increased time use (Knapp et al., 2014). However, to date, time use research has focused exclusively on examining activity levels and wellbeing in non-clinical samples.

#### **1.4 Aims of the Current Study**

This study aimed to administer the TUS to individuals at different stages in the evolution of early psychosis and compare weekly hours spent in structured activity with norms for an age-matched non-clinical comparison group. Comparisons were used to determine cut-off scores on the TUS for defining social disability. The following research questions were posed:

1. Do individuals with and at-risk of psychosis spend less time in structured activity and thus have lower levels of social functioning than an age-matched non-clinical comparison group?
2. Does time use, and thus social functioning, differ between individuals at different stages of psychosis, i.e. between individuals with at-risk mental states and first-episode psychosis?

These questions examine the hypothesis that poor social functioning is an early feature of severe mental illness. A progressive decline in activity was predicted, with time use being more severely affected in more chronic samples.

## 2. Method

### 2.1 Participants

Four groups of participants were included in the study. Data from the non-clinical group were taken from the ONS UK 2000 Time Use Survey. Participants in the three clinical groups were recruited for other multicentre studies in which the TUS was included as an outcome measure. Demographic characteristics for all groups are shown in Table 1. There was a significant between-groups difference in age,  $F(3, 6836) = 154.03, p < .001$ , and a higher proportion of women in the non-clinical sample compared to the clinical samples,  $\chi^2(3) = 257.60, p < .001$ .

**2.1.1 At-risk mental state (ARMS).** Data for the ARMS sample ( $N = 199$ ) were taken from baseline assessments in the Early Detection and Intervention Evaluation (EDIE-II) study (Morrison et al., 2012), a multi-centre randomised controlled trial of CBT for help-seeking individuals with at-risk mental states, defined using the Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2002). None of the sample met DSM-IV criteria for psychotic disorders, but 67% had at least one other DSM-IV diagnosis at study entry. Recruitment for EDIE-II took place in centres across the UK.

**2.1.2 First-episode psychosis (FEP).** Data for the FEP sample ( $N = 878$ ) were taken from baseline assessments in the National EDEN study (Birchwood et al., 2013), a national evaluation of Early Intervention for Psychosis (EIP) services across the UK. Participants were recruited into the study upon acceptance into an EIP service and followed up over a 12 month period. All participants were presenting with their first psychotic episode and met DSM-IV criteria for broad spectrum non-affective psychosis.

**2.1.3 Delayed Recovery.** Data for the delayed recovery sample ( $N = 77$ ) were taken from baseline assessments in the Improving Social Recovery in Early Psychosis (ISREP) study (Fowler et al., 2009), a randomised controlled trial of social recovery-oriented CBT

(SRCBT) for individuals experiencing poor social recovery following remission of acute psychotic symptoms. All participants met DSM-IV criteria for a schizophrenia spectrum disorder. Mean duration of illness was 4.8 years ( $SD = 2.3$  years).

**2.1.4 Non-clinical comparison group.** Data from an age-matched sub-sample ( $N = 5686$ ) of individuals participating in the ONS UK 2000 Time Use Survey (Short, 2006) were used to obtain a non-clinical comparison group for the current study. The ONS 2000 Time Use Survey was a national study assessing how people in the UK spend their time. A total of 11,864 households were selected at random to participate in the study. All participants completed daily time use diaries and a questionnaire about their time use over the past month administered by an interviewer. Data for all individuals aged between 16 and 36 years were included in the current study.

*Insert Table 1 here*

## **2.2 Procedure**

A shortened version of the questionnaire used in the ONS Time Use Survey (Short, 2006) was administered to all participants by a trained interviewer, taking approximately 20 minutes to complete (inter-rater reliability ICC = .99). Selected categories of activity from the ONS survey were included: work, education, voluntary work, housework and childcare, leisure, sports, and hobbies. Lists of activities are provided for each category (e.g. leisure activities include going to the cinema, pub, eating out, etc). Participants were asked how many times they had engaged in each activity over the past month and for how long on each occasion. A weekly average in minutes was then calculated for each activity category. A composite score of hours per week spent in Structured Activity (paid/voluntary work, education, childcare and chores, and structured social activities) was also calculated.

## 2.3 Data Analyses

Weekly hours in structured activity and individual activity categories were compared using one-way between-groups ANOVAs. Bonferroni corrections were applied for multiple comparisons. ANCOVAs were conducted to compare time use between groups controlling for age and gender. Cut-off scores between the clinical and non-clinical samples were examined using Receiver Operating Characteristic (ROC) curves and by establishing a cut-off for clinically significant change (Jacobson et al., 1984).

## 3. Results

### 3.1 Descriptive Statistics

Descriptive statistics for the TUS for each group are shown in Tables 2 and 3.

### 3.2 Between Group Differences

**3.3.1 Structured Activity.** There was a significant main effect of group on hours per week spent in structured time activity,  $F(3, 6836) = 655.75, p < .001$ . Post-hoc comparisons indicated that all three clinical groups had significantly lower levels of time use than the non-clinical group (see Table 2). Social disability was evident in the ARMS group who showed low time use compared to controls, although less severe social disability than the FEP and delayed recovery groups. These differences remained when controlling for gender and age differences,  $F(3, 6834) = 517.93, p < .001$ . There was no significant difference in time use between the FEP and delayed recovery samples.

**3.3.2 Activity categories.** Significant main effects were found for all activity categories apart from sport and are shown in Table 3. The non-clinical sample spent more time in work, housework and childcare, and structured leisure activities than all psychosis groups, including the ARMS group.

*Insert Tables 2 and 3 here*

### 3.4 Defining Cut-off Scores on the TUS

A ROC curve (Figure 1) was plotted to examine the ability of the TUS to discriminate between clinical and non-clinical samples. The area under the curve was .86 (95% CI = .85 to .88) suggesting good accuracy. The optimal cut-off point was 45 hours per week (sensitivity = .81, specificity = .79). Individuals scoring below this cut-off can be considered to be scoring in the clinical range.

*Insert Figure 1 here*

The majority of the FEP group (over 80%) scored below the clinical cut-off of 45 hours per week on the TUS. A lower cut-off may be useful in determining those with more severe levels of social disability, increasing the specificity of the TUS. Clinically significant change between the ARMS and FEP groups was calculated. This produced a cut-off score of 30 hours per week (sensitivity = .68, specificity = .91), consistent with a median split of the ARMS group.

A further cut-off of 15 hours per week (sensitivity = .50, specificity = .97) was chosen to define individuals with severe levels of social disability, and is consistent with a median split of the FEP and delayed social recovery group. This cut-off score is almost two standard deviations from the non-clinical mean ( $z = 1.87$ ), suggesting a severely disabled group.

These cut-offs illustrate of the level of social disability in the ARMS and psychosis groups (see Table 4). Fifty per cent of ARMs cases were already disabled (engaging in less than 30 hours of structured activity per week) compared to less than 10% of the non-clinical sample. Table 5 compares the time use of young people Not in Education, Employment or Training (NEET) in the non-clinical, ARMS, and psychosis groups.

*Insert Tables 4 and 5 here*

## 4. Discussion

### 4.1 Summary of Results

Individuals with first-episode psychosis and at-risk mental states spend significantly fewer hours per week in structured activity than individuals in an age-matched non-clinical comparison group. Very low levels of activity corresponding to severe social disability can be clearly observed in at-risk samples as well as in samples of individuals with first-episode psychosis and those with delayed social recovery following the remission of psychotic symptoms.

These findings replicate previous research and support the hypothesis that social disability occurs prior to the onset of psychosis (Addington et al., 2008). Early social disability may play a key role in the development and onset of psychotic symptoms (French and Morrison, 2004). Withdrawing from social and leisure activities reduces opportunities to obtain disconfirmatory evidence for emerging delusions, and may confirm paranoid ideas (Garety et al., 2001). As psychotic symptoms develop, further withdrawal occurs and a vicious cycle ensues. Assessing activity levels may therefore be important in identifying individuals who may be at risk of making transition to psychosis (Cannon et al., 2008; Yung et al., 2006). Moreover, assisting individuals to maintain their engagement in structured activity and social relationships may help in preventing the onset of severe mental illness.

The findings also support the hypothesis that social disability occurs after the onset of psychosis (Menezes et al., 2006), with individuals in the FEP and delayed recovery groups spending significantly less time in structured activity than the ARMS and non-clinical groups. As a result of psychosis, individuals often leave work or education and lose contact with social networks (Jackson and Edwards, 1992). This can have a negative impact on self-esteem, resulting in further withdrawal. A focus on social recovery in the early stages of psychosis may be important in preventing long-term social disability.

Young people meeting ARMS and NEET criteria had extremely low levels of structured time use, similar to the most severely socially disabled FEP and delayed recovery groups. This may indicate a group at high risk of long term social disability associated with severe mental illness. Studies screening for low time use in ARMS populations may be warranted to detect and intervene with this group who may be developing severe social disability before they become unwell.

#### **4.2 Clinical Implications**

This study has shown that the TUS is an acceptable tool for use in individuals with and at-risk of psychosis. Whilst the time use construct cannot assess all aspects of the wider recovery concept, it arguably provides a meaningful approach to assessing behavioural aspects of social recovery. Participation in activity is central to the definition of recovery provided by service users (Windell et al., 2012), and this theme also featured in qualitative feedback about the TUS from service users and clinicians involved in the current study. The ability to objectively compare time use between clinical and non-clinical samples is helpful in defining thresholds for social disability and for measuring change in functioning over time. Research suggests that premorbid social disability is predictive of poor long-term outcomes (Fowler et al., 2010). Identifying individuals at-risk of long-term social disability using cut-off scores on the TUS may be helpful in the targeting of interventions.

#### **4.3 Weaknesses of the Current Study and Future Research**

As the current study was cross-sectional, the findings only show differences between groups at one point in time and do not provide insight into the nature of these differences or the reasons for them. Although differences appeared unrelated to age or gender, more complex interactions are likely to be present, including the impact of developmental stage and cultural factors on an individual's social role. It is difficult to ascertain whether reduced activity levels are an artefact of mental health difficulties or reduced opportunities for

individuals with mental health difficulties to engage in structured activities. Moreover, the current study cannot establish whether reduced activity levels are a cause or a consequence of mental health difficulties. It is possible that differences between groups may also have been due to issues other than psychosis, as there were high levels of comorbidity within all samples.

Although the findings could be indicative of progressive decline in functioning over the course of psychosis, longitudinal research will be important in providing further evidence, and in identifying predictors of poor outcome. Relationships between mental health and functioning are complex and there are likely to be a range of moderating and mediating factors, such as cognitive deficits (Bora and Murray, 2014), identity and self-efficacy (Davidson and Strauss, 1992). As demonstrated by the large standard deviations in Table 2, there was significant heterogeneity in time use within the clinical samples. Understanding why some individuals experience social disability whilst others do not will be useful in developing and targeting interventions to aid social recovery.

Replication studies using the TUS will be important in consolidating findings. Although the TUS is a well validated measure in epidemiological time use research, further investigation in clinical settings is warranted to increase confidence in the findings and to test the utility of the proposed cut-off scores. Two of the three clinical groups in this study were recruited using convenience sampling and generalisation of the findings must be applied with caution. In addition, the effect of any memory difficulties in the clinical sample on recall of time use over the past month was not examined.

#### **4.4 Conclusion**

Social disability is a key feature across the spectrum of psychosis. The TUS provides a unique method by which to compare the functioning of clinical samples with non-clinical norms. Individuals at different stages of psychosis spent significantly fewer hours per week in

structured activity than an age-matched non-clinical comparison group. This finding supports literature suggesting that social disability occurs early and can remain over the course of psychotic illness. Longitudinal research is warranted in order to understand how social disability influences the onset and remission of psychosis, and to develop interventions focused on reducing social disability in individuals at-risk of and suffering with psychosis.

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Table 1

*Demographic Characteristics of Study Groups*

Sample	<i>N</i>	Gender (% male)	Age range	Mean Age (SD)
At-risk mental state (EDIE-II)	199	64.3	14-34	21.0 (4.4)
First episode psychosis (National EDEN)	878	69.1	14-37	22.9 (4.8)
Delayed recovery (ISREP)	77	71.4	18-52	29.0 (6.8)
Non-clinical (UK 2000 Time Use Survey)	5686	42.7	16-36	26.7 (6.2)

Table 2

*Descriptive Statistics for Structured Time Use Across Study Groups*

	<i>N</i>	Min-Max	Median	Mean (SD)
Non-clinical (UK 2000 Time Use Survey)	5686	0.00 – 140.00	61.83	63.49 (25.89)
At-risk mental state (EDIE-II)	199	1.31 – 139.19	29.91	35.61 (29.68)
First episode psychosis (National EDEN)	878	0.00 – 140.00	16.00	25.17 (26.22)
Delayed recovery (ISREP)	77	2.25 – 97.00	14.50	19.66 (17.54)

Table 3

*Between-group Comparison of Mean (SD) Hours per Week Spent in Activities on the Time Use Survey controlling for age and gender*

	Non-Clinical (UK 2000 Time Use Survey)	At-risk Mental State (EDIE-II)	First Episode Psychosis (National EDEN)	Delayed Recovery (ISREP)	<i>F</i>
Paid work	26.04 (21.72)	5.57 (10.33)	4.44 (12.01)	0.55 (2.56)	394.44*
Voluntary work	1.24 (5.12)	0.43 (1.66)	0.44 (3.14)	1.47 (3.66)	7.13*
Education	3.28 (11.42)	9.82 (19.47)	3.69 (9.09)	0.46 (1.43)	13.71*
Housework and childcare	19.82 (19.81)	13.05 (23.77)	8.38 (18.38)	9.96 (15.10)	20.04*
Leisure	11.12 (13.78)	5.02 (8.47)	5.03 (7.90)	4.83 (4.21)	72.60*
Sports	2.00 (6.04)	1.71 (3.44)	3.20 (8.29)	2.40 (4.37)	3.99
Hobbies	2.48 (6.87)	6.56 (12.98)	9.30 (17.89)	9.37 (9.92)	103.05*

Note. \* $p < .007$

Table 4

*Frequencies N (%) of samples scoring at different cut-off scores on the TUS*

	TUS Cut-off Scores			
	No Social Disability (≥45 hrs.)	At-risk of Social Disability (>30<45 hrs.)	Social Disability (>15≤30 hrs.)	Severe Social Disability (≤15 hrs.)
Non-clinical (UK 2000 TUS)	4435 (78.0)	720 (12.7)	353 (6.2)	178 (3.1)
At-risk mental state (EDIE-II)	57 (28.6)	42 (21.1)	43 (21.6)	57 (28.6)
First episode psychosis (National EDEN)	166 (18.9)	119 (13.5)	157 (17.9)	436 (49.7)
Delayed recovery (ISREP)	7 (9.1)	3 (3.9)	26 (33.8)	41 (53.2)

Table 5

*Hours per week in Structured Activity in individuals meeting NEET (not in education, employment or training) criteria compared with those who do not meet NEET criteria*

	In Education, Employment		Not in Education,	
	or Training		Employment or Training	
	<i>N (%)</i>	<i>Mean (SD)</i>	<i>N (%)</i>	<i>Mean (SD)</i>
Non-clinical	5079 (89.3)	67.41 (23.67)	607 (10.7)	30.73 (19.74)
(UK 2000 Time Use Survey)				
At-risk mental state	129 (64.8)	46.24 (29.85)	70 (35.2)	16.02 (16.57)
(EDIE-II)				
First episode psychosis	407 (46.4)	41.05 (28.08)	471 (53.6)	11.45 (13.95)
(National EDEN)				
Delayed recovery	33 (42.9)	28.82 (22.30)	44 (57.1)	12.79 (7.79)
(ISREP)				

*Figure 1*

ROC curve for sensitivity and specificity of the TUS