**Future-directed thinking in first episode psychosis**

**Abstract**

*Objectives.* This study employed the Future Thinking Task (MacLeod et al., 2005) to investigate whether future-directed thinking in first episode psychosis is significantly different from that of matched controls, and to identify its correlates in this patient group.

*Design.* Cross-sectional, mixed model, case-control design.

*Method.* Participants were 30 patients with first episode psychosis and 27 matched controls. The Future Thinking Task was used to assess future-directed thinking in both groups. Anxiety and depression were also measured as well as self-report measures of hopelessness, suicidal ideation and a measure of negative symptoms.

*Results.* Individuals with psychosis were impaired in future-directed thinking in both positive and negative domains, particularly with respect to the coming year. Increased self-reported hopelessness was associated with reduced positive future thinking and increased negative future thinking. Increased positive future thinking was also associated with reduced severity of negative symptoms, whilst negative future thinking was associated with suicide ideation.

*Conclusions.* Individuals with first episode psychosis show a reduction in positive future thinking in line with that seen in other clinical groups, but this is accompanied by an unexpected reduction in negative future thinking. The findings suggest a general disengagement with the future in this group that may affect recovery and functioning.

**Practitioner points**

* Individuals with first episode psychosis may benefit from interventions to help them engage with their future, in particular in the mid-range, up to 1 year.
* The Future Thinking Task may be a helpful addition to the assessment of suicide risk in those with first episode psychosis.
* Decreased positive future thinking was associated with increased severity of negative symptoms, indicating a potential new treatment angle for this resistant aspect of psychosis.
* The cross-sectional design of this study does not allow for conclusions about the causal relationship between psychosis and future-directed thinking.
* This study investigated future-directed thinking in individuals with a range of psychotic illnesses employing a trans-diagnostic approach, therefore conclusions cannot be drawn about the nature of future-directed thinking in individual psychotic disorders.

**Introduction**

Psychosis encompasses a constellation of symptoms that have far-reaching social, psychological, physical and functional consequences for sufferers. The impact of psychosis is exacerbated by the typical age of onset, which tends to be in late adolescence or the early twenties, a time when the individual is beginning to establish themselves and gain independence.

One of the most significant clinical concerns in the management of psychosis is the risk of suicide. Annual rates of death by suicide in individuals with schizophrenia have been estimated at 0.4-0.8% (Alphs et al., 2004), whilst rates in the general population of the UK are approximately 0.02% per year (Office for National Statistics, 2012): the Standardized Mortality Ratio for death by suicide in schizophrenia has been reported to be 12.9 (Challis, Nielssen, Harris, & Large, 2013). Alongside the post-discharge period, the period of highest risk is in the early stages of psychosis soon after diagnosis (e.g., Pompili et al., 2011), emphasising the importance of understanding this critical period in developing timely and effective early interventions for first episode psychosis.

Hopelessness about the future is a significant risk factor for suicidal behaviour in psychosis (e.g., Hawton, Sutton, Haw, Sinclair, & Deeks, 2005) as it is in almost all individuals who attempt or complete suicide, regardless of psychiatric diagnosis (if present). Moreover, a stronger relationship is found between measures of hopelessness and suicide behaviour than between measures of depression and suicide behaviour in both the general population (Beck, Kovacs, & Weissman, 1975) and in individuals with psychosis (Drake & Cotton, 1986).

The Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974) is the most commonly used measure of hopelessness, but is a global self-report scale that may tap into many different aspects of how people think about the future, reducing its specificity as an indicator of suicide risk. Attempts have been made to deconstruct the concept of hopelessness into components (and therefore increase its specificity as a risk indicator) via the application of factor analysis to data collected using the BHS. However, studies are rarely consistent in the number or content of factors defined (Aish, Wasserman, & Renberg, 2001; Beck et al., 1974; Dyce, 1996; Nissim et al., 2010), suggesting that this approach is problematic. An alternative approach is to characterise how suicidal people think about the future by examining the number and content of their future thoughts in comparison to the general population. Future-directed thinking has been investigated using the Future Thinking Task (FTT; MacLeod, Rose, & Williams, 1993), a modified verbal fluency task in which participants are asked to generate events in the short-, medium- and long-term future that they are looking forward to (giving a measure of positive future thinking, PFT) and not looking forward to (giving a measure of negative future thinking, NFT). Studies have consistently shown that hopelessness correlates negatively with PFT but has no association with NFT (e.g., MacLeod, Pankhania, Lee, & Mitchell, 1997), and that those at risk of suicide have reduced PFT in the absence of increased NFT (e.g., MacLeod et al., 1998). These studies provide evidence that difficulty in imagining good things in the future is functionally distinct from the tendency to imagine bad things in the future, and may be the element of future-directed thinking that most strongly indicates suicide risk.

Few studies have investigated the ability of individuals with psychosis to think about the future, and no published studies to date have employed the FTT in a psychosis sample. However, a series of studies of individuals with schizophrenia may be relevant to the concept of future-directed thinking in this sample. D’Argembeau, Raffard, & Van der Linden (2008) asked participants to generate detail about future events that might reasonably happen to them in response to cues about everyday situations or feelings. Patients were impaired in generating specific events in comparison with controls, and in a subsequent study employing a similar protocol (Raffard, D'Argembeau, Bayard, Boulenger, & Van der Linden, 2010), produced fewer details about their scenes than controls. In a closely related study (Raffard, Esposito, Boulenger, & Van der Linden, 2013), the same group distinguished between responses to positive and negative events. Patients generated fewer details than controls about future events of both valences, but showed reduced specificity regarding positive events in particular. Finally, in the study most closely related to the FTT (de Oliveira, Cuervo-Lombard, Salame, & Danion, 2009) participants were asked to describe three plans they had for each of four time periods: the next week, month, 1 year and 5-10 years. For each plan they were asked to imagine a connected specific future event. Patients showed impairment in their ability to generate future plans, and future events connected with their plans were rated as less specific.

The studies described above suggest that future-directed thinking in psychosis is impaired in both the number and detail of events that can be generated. Furthermore, this effect may be particularly marked for positive events. However, these studies focused mainly on specificity of future thoughts and only the Raffard et al. (2013) study drew a distinction between the generation of positive and negative scenarios. In addition, reported illness duration was long (between 9 and 14 years), therefore it is difficult to isolate the effects of psychosis from the effects of having a long-term condition.

The work of Corcoran and colleagues is also relevant to this discussion. In their 2006 study (Corcoran et al., 2006) participants with either depression or paranoid delusions were asked to rate the likelihood of pre-determined positive, neutral and threatening events. They observed that the presence of depression predicted reduced positive expectancies, and persecutory delusions were shown to predict both reduced positive expectancies and increased likelihood ratings of threatening events. These results were replicated in their 2010 study (Bennett & Corcoran, 2010) of participants without a psychiatric diagnosis.

These results are consistent with the findings of MacLeod and colleagues (1997) in that they suggest that individuals with first episode psychosis, who commonly experience paranoid delusions, would have reduced positive expectancies compared with the general population. However, in contrast to the work of Raffard and colleagues (2013) they also indicate that more threatening events would be predicted by those with first episode psychosis. Given this ambiguity, and the fact that the work of Corcoran and colleagues did not directly compare the future expectancies of those with paranoid delusions to those without, there is scope to investigate this subject further.

The current study sought to clarify, using the FTT, whether a group of patients with first episode psychosis would show: 1. The characteristic pattern of reduced PFT alongside intact NFT found in those with high depression and hopelessness, as predicted by the work of MacLeod and colleagues; 2. Generally impaired thinking about the future, both positive and negative, as suggested by the work of Raffard, de Oliviera and colleagues; or 3. Reduced PFT and increased NFT predicted by the work of Corcoran and colleagues. This study extended the existing work on future-directed thinking in psychosis by examining patients’ own idiographic anticipation for the future, and widening the category of negative events from threatening events to include all events not looked forward to.

As a second aim, the study also examined the link between future-directed thinking and three other variables: self-reported hopelessness, suicide ideation and negative symptoms. The rationale for examining self-reported hopelessness and suicide ideation has already been outlined. Negative symptoms of psychosis are associated with significant functional impairment (Breier, Schreiber, Dyer, & Pickar, 1991), reduced functional outcome up to 10 years later (C. White et al., 2009), and are often resistant to treatment (Buchanan, 2007). Ferguson, Conway, Endersby, and MacLeod (2009) found that in a group of detained patients with chronic psychotic illnesses negative symptoms and PFT improved concurrently following a goals and plans training programme, but there is a need to investigate these links in the early course of psychotic illness.

This was the first use of the FTT in individuals with psychosis, therefore predictions about the direction of expected effects were tentative. However, based on the findings of previous work it was hypothesised that individuals with first episode psychosis would show a reduced ability to think about positive events in the future compared with a matched control group. Previous findings for negative expectancies are contradictory, therefore no hypothesis could be made with regard to NFT in the patient group. Within the patient group it was predicted that reduced PFT would be correlated with hopelessness, suicide ideation and negative symptoms but that there would be no correlations between these variables and NFT.

**Method**

**Participants**

Fifty-seven participants were recruited from two groups: 30 individuals within 12 months of their first episode of psychosis, and 27 matched controls with no history of psychosis. Psychosis was defined by the presence of positive symptoms such as delusions, hallucinations, thought disorder as indicated by disorganized speech, and grossly disorganized or catatonic behaviour, as outlined in DSM-IV-TR (American Psychiatric Association, 2000). Symptoms were not required to be present at the time of testing, but a decision had been made by the treating team (including a psychiatric assessment) that clinically significant symptoms of psychosis had been present in the previous 12 months. Individuals were excluded whose psychosis had a confirmed organic cause or first onset more than 12 months before testing. In the control group, individuals were recruited who had no personal history of psychotic disorder. All participants were required to have adequate understanding of English to comprehend the study information and communicate their responses. Exclusion criteria were the presence of a learning disability, and intoxication with drugs or alcohol at the time of testing.

Patient participants were recruited from five specialist Early Intervention services in the London and Cambridgeshire regions. The final patient sample consisted of 21 males and 9 females, with a mean age of 26 years (range = 19-35 years, SD = 4.7). Mean time since referral to the team was 6.1 months (SD = 3.26), with a range from 2 to 12 months. All patients were living in the community. Control participants were recruited from the London region via poster, leaflet and online classified advertising, and were matched to the patient group on age and gender. The final control sample consisted of 20 males and 7 females, with a mean age of 27 years (range = 19-33 years, SD = 4.1).

**Materials**

*Assessment of affective and negative symptoms.* Participants were asked to complete the General Anxiety Disorder questionnaire (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006), a seven-item questionnaire in which participants are asked to rate the frequency of their experience of common anxiety symptoms over the past week. The maximum score is 21. Participants were interviewed to assess levels of depression using the Calgary Depression Scale for Schizophrenia (CDSS; Addington, Addington, & Maticka-Tyndale, 1993), a nine-item scale with a maximum score of 27, administered via a semi-structured interview. The Beck Hopelessness Scale (BHS; Beck et al., 1974) was used to assess levels of self-reported hopelessness. This is a 20 item (true or false) self-report scale measuring expectancies about one’s future, with a maximum score of 20. In the patient group, the Beck Scale for Suicide Ideation (SSI; Beck, Kovacs, & Weissman, 1979) was used to assess suicide risk*.* This is a 21-item self-report clinical research instrument with a maximum score of 42.Patient participants were also interviewed to determine the presence and severity of negative symptoms of psychosis using the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1981). The SANS is administered via a semi-structured interview, and covers a period of one month. Ratings are made on 25 items based on participant responses and clinician observations. The maximum score is 125.

*Verbal fluency control task.* Verbal fluency was assessed using the FAS test (Lezak, Howieson, & Loring, 2004). In this task participants are asked to generate as many words as possible beginning with a given letter – F, A or S – in three separate, one-minute trials. Proper nouns are not permitted, and multiple words involving the same stem word score only once. The outcome measure was the total number of words generated across all three trials.

*Assessment of future-directed thinking.* The future thinking task (FTT; MacLeod et al., 2005) is an adapted fluency task in which participants are asked to generate events that they anticipate will happen to them in the future in each of three different time periods: the next week, the next year, and the next 5-10 years. Two trials are administered for each time period, one in which participants are asked to generate positive events (events they are looking forward to), and one in which they are to generate negative events (events they are not looking forward to), therefore there are six trials in total. Each trial lasts for one minute and the participant is encouraged to keep trying to generate events throughout. Each response was written down by the researcher. Following each trial participants were presented with their responses one at a time and asked to rate the likelihood of each event (likelihood rating) and how they would feel if it occurred (affect rating), both on a seven-point Likert scale. The likelihood rating scale was anchored by 1 = *not at all likely* to 7 = *extremely likely*. The affect rating scale was anchored by -3 = *very unhappy* to +3 = *very happy*. Following MacLeod et al. (2005) a composite score was calculated for each trial in the FTT by multiplying the mean likelihood and affect ratings by the number of events generated. Thus, for a person who generated five things that they were looking forward to in the next week, gave a mean likelihood rating for those items of 6, and gave a mean affect rating for those items of +2.5, the composite PFT score for 1 week would be 75 (5 x 6 x 2.5). To facilitate the comparison of scores between positively- and negatively-valenced trials, affect and composite scores for the negatively-valenced trials were multiplied by -1.Outcome measures were: number of events generated (FTT-number), mean likelihood rating per trial (FTT-likelihood), mean affect rating per trial (FTT-affect), and composite score (FTT-composite).

**Procedure**

Data were collected between December 2013 and April 2014. Research sessions were conducted at their early intervention team’s base for patient participants, and at a university site for control participants. Demographic details were collected first, including age, gender, ethnicity, first language, education level and employment status. Education level was coded into one of nine categories depending on the highest qualification obtained by the participant. The categories ranged from 0 = *Entry level or no qualifications*, to 8 = *doctorate, NVQ level 5 or equivalent* (Office of Qualifications and Examinations Regulation, 2012). Time since referral to early intervention services was recorded for patients. Testing began with administration of the FAS test, to orient participants to the nature of fluency tasks, followed by the FTT. The order of presentation of positive and negative conditions was counterbalanced across participants. Participants were then interviewed about symptoms of depression (both groups) and negative symptoms (patient group only) to facilitate scoring of the CDSS and SANS, then completed the GAD-7 and BHS. Patients additionally completed the SSI. The procedure lasted for 45-60 minutes in total, and all participants attended for the full duration of testing.

**Results**

**Demographic and clinical features**

The mean and standard deviations of demographic variables for each group and test statistics for group differences are shown in Table 1. The groups did not differ significantly in age, gender, ethnicity, or first language. Patients had significantly lower scores than controls on verbal fluency and education level. The group difference in employment approached significance, with fewer patients employed than controls. Patients scored higher than controls on the CDSS and GAD-7 as well as BHS. Means and standard deviations for these measures are shown in Table 1 along with the scores for the SSI and SANS in the patient group.

Table 1 about here.

**Group differences in FTT scores**

The means and standard deviations of FTT scores for group, period and valence are shown in Table 2. Only effects involving group are reported due to the number of effects and because the questions of interest in the present study all relate to group

Table 2 about here.

*Composite*. A Group (patient, control) × Period (week, year, 5-10 years) × Valence (positive, negative) mixed-model ANOVA on FTT-composite revealed a significant main effect of group (*F*(1,55) = 7.43, *p* = .009), reflecting the fact that patients (*M* = 44.74, *SD*= 20.24) had lower scores overall than controls (*M* = 61.60, *SD*= 25.92). There was also a significant Group × Period interaction (*F*(2,110) = 3.39, *p* = .037). There was no Group x Valence interaction (F(1,55) = 2.55, p = .116) nor was there a Group x Valence x Period interaction (*F*(2,110) = 2.05, *p* = .134).

Post hoc *t*-tests revealed that the source of the Group x Period interaction was variation in the size of group differences across time periods: Figure 1 shows the data visually. Patients were statistically similar to controls in their scores for 1 week trials (*t*(55) = 1.41, *p* = .164), but significantly lower than controls in their scores for 1 year trials (*t*(55) = 3.70, *p* < .001) and 5-10 year trials (*t(*55) = 2.15, *p* = .036). Because the groups differed on verbal fluency and educational level, correlations were carried out between these variables and FTT scores. Educational level did not correlate with PFT or NFT, either within groups separately or across the whole sample (all *p*’s > .30) but verbal fluency correlated with PFT in the within-group correlations and with PFT and NFT across the whole sample (*p* < .001 and *p* = .025, respectively). Therefore, groups were compared again with FAS as a covariate. The difference in scores for 1 year remained significant (*p* = .014) but became non-significant (*p* = .327) for 5-10 years, and for 1 week the effect remained non-significant (*p* = .995). Miller and Chapman (2001) caution against the use of covariance to control for variables on which groups differ as this may eliminate genuine group differences. However, since the result for 1 year was maintained after covariance it can reasonably be expected to represent a real effect.

Figure 1 about here.

*Individual components*. To investigate whether the predicted effect was found when only the number of items generated was analysed, the sameGroup × Period × Valence ANOVA was conducted on FTT-number. There was a significant main effect of group (*F*(1,55) = 17.67, *p* < .001), reflecting the fact that patients (*M* = 4.22, *SD* = 1.45) generated fewer items overall than controls (*M* = 5.96, *SD* = 1.67). There were no significant effects for the Group x Valence (*F*(1,55) = 1.20, *p* = .278), Group x Period (*F* < 1) or Group x Valence x Period (F < 1) interactions. The main effect of group for FTT-number remained significant after covarying FAS (*p* = .005). Analysing FTT-likelihood and FTT-affect separately produced no significant main effects or interactions involving group (all *F*’s < 2.1, all *p*’s > .13).

**Correlations between variables**

Bivariate correlations were carried out in the patient group between FTT-composite scores for each valence and CDSS, GAD-7, BHS, SANS and SSI. The results are shown in Table 3. Higher PFT was significantly associated with lower levels of self-reported hopelessness and decreased severity of negative symptoms. Higher NFT was significantly related to higher BHS and SSI scores. Neither PFT nor NFT correlated significantly with measures of anxiety and depression.

**Discussion**

This study compared the future-directed thinking of individuals with first episode psychosis with that of matched controls. As predicted patients exhibited reduced PFT, but against prediction also showed a reduction in NFT. A general reduction in future-directed thinking was observed for events in the medium- (next year) and long-term (next 5-10 years), and the reduction shown for the next year was maintained after controlling for verbal fluency. The simple measure of number of events generated followed a similar pattern, with the patient group generating fewer events overall (but without pronounced effects for particular time periods), an effect which also survived covarying for verbal fluency. There were no differences between the groups in anticipated likelihood and anticipated affect. As predicted, reduced PFT correlated with high levels of self-reported hopelessness and negative symptoms, but unexpectedly did not correlate with suicide ideation. NFT was not expected to show significant correlation with these variables but correlated with both hopelessness and suicide ideation.

The observed global impairment in future-directed thinking is consistent with three previous studies that have found reductions in the quality and specificity of future events generated by participants diagnosed with schizophrenia, compared to controls (D'Argembeau et al., 2008; de Oliveira et al., 2009; Raffard et al., 2010). However, the current results are different from those of Corcoran and colleagues (Bennett & Corcoran, 2010; Corcoran et al., 2006), who showed a relationship between increased negative expectancies and the presence of paranoid delusions. In the present study we measured the accessibility of negative expectancies as measured by the ease with which negative future events could be brought to mind, whereas in the studies by Corcoran and colleagues participants were presented with hypothetical threatening future events and asked to rate their likelihood. This latter method may give insight into how an expectation of threatening events, once fixated upon, may lead to paranoia, but not how easily these thoughts occur in the first instance, which is more likely to be detected by the FTT. Moreover, our study aimed to capture information about the broader experience of psychosis, both active and remitted, and its relationship to hopelessness. Therefore our patient sample may not have included people with significant current paranoia, which was the factor found to be related to increased expectancies of threat events (Bennett & Corcoran, 2010; Corcoran et al., 2006).

One explanation for generally reduced future-directed thinking in patients with early psychosis is that the potential experience of positive symptoms such as auditory hallucinations during the task may have distracted some patients. A measure of positive symptoms was not included in our protocol, in order to minimise the burden of the research on patients given that our research questions did not necessitate this. However, this is something that future work might consider in order to explore their relationship with future-directed thinking.

The work of Birchwood and others on beliefs about illness offers an alternative explanation for reduced future-directed thinking in psychosis. Studies using the Personal Beliefs about Illness Questionnaire (Birchwood, Jackson, Brunet, Holden, & Barton, 2012) show that individuals with psychosis experience an expectation that they will occupy lower status roles in the future (Iqbal, Birchwood, Chadwick, & Trower, 2000). Such beliefs about what it means to have psychosis could result in individuals feeling that their illness may limit their future. The work of White and colleagues (2007) is consistent with this hypothesis, showing an association between negative beliefs about illness and hopelessness in schizophrenia. Alternatively, individuals may deliberately avoid negative thoughts about what their illness might entail, for example relapse or loss of employment, resulting in the unwanted side effect of reducing PFT as well as NFT.

The deficit in future-directed thinking persisted after controlling for verbal fluency, though a number of other cognitive factors may underlie the results. A number of elements are required to think about future episodic events, including the ability to construct mental representations of scenes and events not directly connected to the external world, and the ability to think about the self in time (Rendell et al., 2012). The former has been shown to be impaired in schizophrenia (Raffard et al., 2010), and both sense of self (Moe & Docherty, 2014) and perception of time (Sass & Pienkos, 2013) have also been shown to be disrupted. Semantic (Irish, Addis, Hodges & Piguet, 2012) and autobiographical (Schacter, Addis, & Buckner, 2007) memory have also been associated with difficulties in imagining future events, via the proposed constructive episodic simulation hypothesis of future-directed thinking (Schacter & Addis, 2007). It has been shown that people with psychosis have impaired and over-general autobiographical memory in the absence of mood disturbance (e.g., de Oliveira et al., 2009), and this is indeed associated with impairments in the generation of future events (D'Argembeau et al., 2008). Functional magnetic resonance imaging studies also show strong evidence of overlap between memory and future thinking, although there is also evidence of distinctiveness (Gilmore, Nelson, & McDermott, 2014). Therefore there is evidence that difficulties with episodic memory, semantic memory, or both may partly underlie the difficulties with future-directed thinking observed in the current study.

The group difference in future-directed thinking was clearest for the period of the next year, which may be a consequence of the timing of psychosis onset in late adolescence and the early twenties. The onset of psychosis is highly disruptive for suffers: patients may feel that the next 12 months is an uncertain time in their recovery and may wish to avoid planning for this period. By contrast, patients may feel they can reasonably expect recovery and a return to typical activities within 5-10 years, whilst the period of the next week may be concerned with more trivial matters, less affected by longer-term illness outcome. Replication of these *post hoc* analyses would lend support to these explanations.

Consistent with previous findings (e.g., MacLeod et al., 2005), as PFT decreased self-reported hopelessness increased. However, increased self-reported hopelessness has rarely been found to be associated with NFT (one exception being MacLeod et al. 2005, though the correlation was small and seen in the context of a very large sample). In the present study there was a moderate correlation between NFT and hopelessness, which may reflect a characteristic unique to individuals with psychosis. One point of note is that although the groups differed in levels of self-reported hopelessness, the BHS scores of the patient group were well within the 4-8 ‘mild’ range (Beck & Steer, 1978). The fact that the patient group were clearly impaired in their ability to think about specific future personal events at the same time as showing only mild self-reported hopelessness illustrates the value of having measures of future-directed thinking other than global self-report.

As predicted, a reduction in PFT was associated with increased severity of negative symptoms, and negative symptoms did not correlate significantly with NFT. Both results are consistent with the findings of Ferguson et al. (2009), and indicate a possible focus for further work to develop clinical interventions for negative symptoms by improving PFT. The observed association of increased NFT with suicidal ideation, however, was contrary to our expectations and inconsistent with previous findings (MacLeod et al., 1993; O'Connor, Fraser, Whyte, Machale, & Masterton, 2008). One possible explanation is that studies in the literature have predominantly focused on individuals who have made a suicide attempt very recently, whereas in the current study only 28% of the patients reported a history of suicide attempts, and these were not in the very recent past. The detection of associations between suicide risk and future-directed thinking was therefore reliant on the assumed increased risk of suicide in this population, rather than the presence of active risk as evidenced by a recent attempt. Future studies may wish to address this by using a sample of psychosis patients with 100% history of suicide attempts, preferably in the recent past.

A strength of this study is in the application of a well-established measure of future-directed thinking in individuals with psychosis, in comparison with a group of matched controls. The cultural diversity of the participants increased the generalizability of the study, whilst the use of a first episode psychosis sample reduced the potential effects of illness chronicity in what some have argued may be a degenerative disorder (Rund, 2009). Identification of these effects in the early stages of the illness provides a target for early intervention and therefore a way to reduce the long-term impact of psychosis. Due to the comprehensive assessment process and recovery-focussed approach associated with early intervention services, patients’ final diagnoses were not known at the time of testing, allowing for the trans-diagnostic investigation of future-directed thinking in all psychoses. However, capacity for future-directed thinking may vary with specific diagnosis, weakening the effects sought. Future studies may wish to gather information about final diagnosis in order to investigate future-directed thinking in different psychotic disorders.

This study has shown that individuals with psychosis have a significant deficit in future-directed thinking, both positive and negative, primarily in the number of events generated. This is particularly pronounced for the medium- and long-term future, and is associated with suicide risk and severity of negative symptoms. A particular need for interventions to improve mid-range planning was indicated as well as a potential addition to the assessment of suicide risk in early psychosis using the FTT. Impaired PFT was also identified as a target worthy of further study in the treatment of negative symptoms of psychosis. Reduced NFT may contribute to inability to foresee difficulties or negative consequences in the future, which in turn could impact on functional outcome (Eack & Keshavan, 2008). Thus it is possible that individuals with psychosis may benefit from interventions to improve both PFT and NFT, perhaps through efforts to improve engagement with the future as a whole.

**Table 1. Demographic and clinical summary of participants in each group.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | | Patients | Controls | Test statistic | *p* |
| Age, mean (SD) | | 26.6 (4.7) | 27.3 (4.1) | *t*(55) = 0.66 | .515 |
| Age range | | 19-35 | 19-33 | - | - |
| Gender, n (%) male | | 21 (70) | 20 (74) | \* | .776 |
| Educational level, median (range) | | 3 (1-8) | 6 (0-6) | *z* = -3.20 | .001 |
| Employment, n (%) employed | | 9 (30) | 15 (56) | χ2 = 3.80 | .051 |
| Ethnic group, n (%) | |  |  | \* | .412 |
| White | | 19 (63) | 19 (70) | - | - |
| Mixed / Multiple ethnic groups | | 2 (7) | 0 (0) | - | - |
| Asian / Asian British | | 5 (17) | 2 (7) | - | - |
| Black / African / Caribbean / Black British | | 4 (13) | 6 (22) | - | - |
| First language, n (%) English | | 22 (73) | 17 (63) | \* | .569 |
| Verbal fluency total score (FAS) , mean (SD) | | 25.4 (9.6) | 34.2 (11.9) | *t*(55) = 3.08 | .003 |
| CDSS, mean (SD) | 5.03 (4.02) | 1.80 (1.95) | *t*(43) = 3.93 | <.001 |
| GAD-7 | 8.70 (7.26) | 4.78 (3.90) | *t*(45) = 2.58 | .010 |
| BHS | 6.87 (5.95) | 3.22 (2.87) | *t*(43) = 2.46 | .017 |
| SSI | 2.83 (5.34) | - | - | - |
| SANS | (8.62) | - | - | - |

Note. CDSS = Calgary Depression Scale for Schizophrenia; GAD-7 = Generalised Anxiety Disorder Questionnaire; BHS = Beck Hopelessness Scale; SSI = Beck Scale for Suicide Ideation; SANS = Scale for the Assessment of Negative Symptoms.

\* = Fisher’s Exact Test.

**Table 2. Means (and standard deviations) of FTT scores by group, period and valence.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Positive condition | | Negative condition | |
| Time period | Patients | Controls | Patients | Controls |
| FTT-composite |  |  |  |  |
| 1 week | 67.24 (40.82) | 84.46 (49.18) | 23.41 (17.10) | 25.76 (16.29) |
| 1 year | 60.29 (35.31) | 99.05 (58.82) | 22.74 (17.29) | 32.94 (18.74) |
| 5-10 years | 69.14 (39.26) | 86.45 (44.39) | 25.62 (19.95) | 36.74 (22.80) |
| All trials | 65.56 (33.62) | 90.75 (46.64) | 23.92 (14.60) | 31.46 (14.30) |
| FTT-number |  |  |  |  |
| 1 week | 5.23 (2.36) | 7.07 (3.10) | 3.33 (1.54) | 4.81 (1.62) |
| 1 year | 4.97 (2.13) | 7.37 (3.24) | 3.07 (1.51) | 4.67 (1.64) |
| 5-10 years | 4.97 (1.94) | 6.70 (2.40) | 3.77 (2.06) | 5.11 (1.67) |
| All trials | 5.06 (1.84) | 7.05 (2.48) | 3.39 (1.39) | 4.86 (1.24) |
| FTT-likelihood | |  |  |  |
| All trials | 5.56 (0.91) | 5.46 (0.59) | 4.53 (1.52) | 4.49 (1.22) |
| FTT-affect |  |  |  |  |
| All trials | 2.24 (0.56) | 2.25 (0.42) | 1.62 (0.75) | 1.60 (0.59) |

Note. FTT = Future Thinking Task.

**Table 3. Bivariate correlations between clinical symptoms and FTT variables.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | CDSS | GAD-7 | BHS | SANS | SSI | PFT composite | NFT composite |
| CDSS | - | .84\*\*\* | .67\*\*\* | .33 | .37\* | -.25 | .28 |
| GAD-7 |  | - | .58\*\* | .38\* | .28 | -.31 | .27 |
| BHS |  |  | - | .43\* | .33 | -.39\* | .38\* |
| SANS | |  |  | - | .19 | -.55\*\* | -.12 |
| SSI | |  |  |  | - | -.11 | .40\* |
| PFT-composite | |  |  |  |  | - | .30 |

Note: CDSS = Calgary Depression Scale for Schizophrenia; GAD-7 = Generalised Anxiety Disorder Questionnaire; BHS = Beck Hopelessness Scale; SSI = Beck Scale for Suicide Ideation; SANS = Scale for the Assessment of Negative Symptoms.

*\*p* < .05. \*\**p* < .01. \*\*\**p* < .001

**Figure 1.**



**Captions**

**Figure 1:**

Mean FTT-composite score for each group, plotted against time period.  
Error bars represent standard error of the mean.

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