Introduction

Decision making requires an individual to use their knowledge and experience of a context in order to choose a course of action. A person’s ability to autonomously make decisions is referred to as their decisional capacity. Effective decision making aims to increase the likelihood of a favourable outcome in the relevant context, selecting responses that avoid unfavourable or harmful outcomes. People with schizophrenia may show altered decision-making processes and impairments in their capacity to provide informed consent to medical or psychiatric treatment. People with impaired decisional capacity may not be able to understand information relating to the decision, appreciate the significance of the information and apply the information to decision-making, reason and compare potential consequences of the decision in a logical process, and/or communicate this decision.

A person’s ability to make decisions may vary depending on the time or nature of the decision they are making. Decision making and decisional capacity may be associated with other areas of cognitive functioning, with a certain level of mental functioning required to make the most appropriate decisions in the situation.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2000 that report results separately for people with a diagnosis of schizophrenia, schizoaffective disorder, schizophreniform disorder or first episode schizophrenia. Reviews were identified by searching the databases MEDLINE, EMBASE, CINAHL, Current Contents, PsycINFO and the Cochrane library. Hand searching reference lists of identified reviews was also conducted. When multiple copies of reviews were found, only the most recent version was included. Reviews with pooled data are given priority for inclusion when available.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist which describes a preferred way to present a meta-analysis. Reviews were assigned a low, medium or high possibility of reporting bias depending on how many items were checked. For instance, a low possibility of bias would be assigned to reviews checking over 66% of items, a medium possibility between 33 and 66% and a high possibility would be given to reviews checking less than 33%. Reviews rated as having less than 50% of items checked have been excluded from the library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCT) may be downgraded to moderate, low or very low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large or if there is a
dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms). The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of the Schizophrenia Research Institute.

Results

We found three systematic reviews that met our inclusion criteria.\textsuperscript{1-3}

See PRISMA checklists for assessment of reporting transparency.

Conclusions

• Moderate to low quality evidence suggests people with schizophrenia were more likely to make decisions with disadvantageous consequences compared with controls. This pattern was greater in those receiving atypical antipsychotics, and in people with catatonic, psychotic and deficit subtypes of schizophrenia.

• Low quality evidence is unclear as to the comparative ability to give informed consent in people with schizophrenia compared with people with depression.
Alves GS, Rozenthal M

Neuropsychological assessment of decision-making prefrontal circuits in schizophrenia: a systematic review of the literature

Revista de Psiquiatria do Rio Grande do Sul 2006; 28(3): 330-341

View review abstract online

Comparison

Performance on a decision making task in people with schizophrenia spectrum disorder compared with controls

Summary of evidence

Moderate to low quality evidence (direct, unable to assess consistency or precision) suggests people with schizophrenia were more likely to make decisions with disadvantageous consequences compared with controls. This pattern was greater in those receiving atypical antipsychotics, and in people with catatonic, psychotic and deficit subtypes of schizophrenia

Decision making

Measured by Iowa Gambling Task (IGT), Novel Decision Making Task (NDMT) or the Two-Choice Prediction Task

9 studies (N = 532) used decision making tasks to measure insensitivity to the possible consequences of the task-specific decisions

6 of 9 studies reported that people with schizophrenia were more likely to make decisions with unfavourable consequences, compared to controls,

Of the 6 studies, 4 used the IGT (N = 264), one used NDMT (N = 50) and one used the two-choice prediction task (N = 36). Worse decision making performance was associated with negative symptom severity, second-generation antipsychotic usage, and catatonic, psychotic and deficit subtypes of schizophrenia.

3 IGT studies (N = 182), reported no difference in decision making between people with schizophrenia and controls

Consistency in results

Unable to assess

Precision in results

Unable to assess

Directness of results

Direct

### Mental capacity in psychiatric patients: systematic review

**British Journal of Psychiatry 2007; 191: 291-297**

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<table>
<thead>
<tr>
<th>Comparison</th>
<th>Mental capacity to consent to treatment in people with schizophrenia compared with people with depression</th>
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<tbody>
<tr>
<td>Summary of evidence</td>
<td>Low quality evidence (direct, unable to assess consistency or precision, small sample) is unclear as to the comparative ability to give informed consent in people with schizophrenia compared with people with depression</td>
</tr>
</tbody>
</table>

**Mental capacity**

Measured by MacArthur Competency Assessment Tool for Treatment

3 studies (N > 109) reported that, compared to people with depression (where 20-24% of participants rated as having impaired capacity), people with schizophrenia were more likely to have impaired capacity to consent to treatment (52-53% rated as impaired).

One study reported specific difficulty in decision making, appreciation and reasoning, and indicated that severity of psychopathology may contribute to a lack of capacity for consent

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**Palmer BW, Savla GN**

**The association of specific neuropsychological deficits with capacity to consent to research or treatment**


View review abstract online

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Relationship between neuropsychological performance and capacity to consent to treatment and research in people with schizophrenia spectrum disorders, in terms of their understanding of the information; appreciation of the context;</th>
</tr>
</thead>
</table>
Summary of evidence

Moderate to low quality evidence (direct, unable to assess precision or consistency, mostly small samples) suggests that impaired understanding and appreciation were more consistently associated with more severe psychopathology, particularly negative symptoms.

For cognitive performance, the evidence suggests that impaired understanding, appreciation and reasoning were associated with poorer neuropsychological scores (medium to large effect) and executive function (small to medium effect). Impaired understanding and appreciation were associated with poorer language performance (large to medium effect), attention/working memory (medium to large effect), visuospatial ability (medium to large effect), episodic memory (medium to large effect).

Poorer understanding (small to medium effect) and reasoning (medium effect) were associated with impaired processing speed. Reasoning had fewer associations overall, but may be associated with poor visuospatial ability (large effect), attention/working memory (medium effect), and episodic memory (medium to large effect).

Neuropsychological performance

Decisional capacity measured by MacArthur Competency Assessment Tool for Treatment

Five studies (N = 1680) examined the association between an individual’s capacity to consent, and their neuropsychological performance. Capacity to consent was assessed in terms of understanding, appreciation and reasoning, in the context of consent to either treatment or research.

**Understanding** was significantly associated with symptom severity, language, attention and working memory, processing speed, visuospatial ability, executive function, and episodic learning.

3 of 5 studies reported a very small but significant negative association between understanding and severity of *general psychopathology*, N = 1542, \( r = -0.06 \) to \(-0.48, p < 0.05\)

3 of 4 studies reported a small, significant negative association between understanding and *negative symptom severity*, N = 1542, \( r = -0.14 \) to \(-0.50, p < 0.05\)

1 of 5 studies reported a medium-size significant negative association between understanding and *positive symptom severity*, N = 30, \( r = -0.38, p < 0.05\)

5 studies reported significant medium to large associations with *general neuropsychological scores*, including RBANS (2 studies, N = 55, \( r = 0.55 \) to \(0.82, p < 0.05\)); DRS (1 study, N = 108, \( r = 0.49, p < 0.01\)) and NBC (2 studies, N = 1517, \( r = 0.23 \) to \(0.44, p < 0.05\))

4 of 5 studies reported significant medium to large associations with *language and semantic knowledge*, including 1 study (N = 70) reporting \( p < 0.05\) for WAIS, PIAT, Token, \( r = 0.39\) to \(0.52\);
### Signs and Symptoms – Decision Making

**Appreciation** was significantly associated with symptom severity, attention and working memory, visuospatial ability, executive function, episodic learning

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
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<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>&lt;0.01</td>
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</tr>
<tr>
<td>2</td>
<td>70</td>
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<td>0.60</td>
</tr>
<tr>
<td>3</td>
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<td>0.15</td>
</tr>
<tr>
<td>4</td>
<td>1472</td>
<td>&lt;0.05</td>
<td>-0.06</td>
</tr>
<tr>
<td>5</td>
<td>1447</td>
<td>&lt;0.05</td>
<td>0.54</td>
</tr>
</tbody>
</table>

4 of 5 studies reported significant medium to large associations with attention and working memory, including 1 study (N = 25) reporting p < 0.05 for RBANS, WAIS, r = 0.44-0.56; 1 study (N = 1447) reporting p < 0.01 for CPT, r = 0.15; 3 studies (N = 1625) reporting p < 0.05 for Working memory composite, r = 0.22 to 0.40

3 of 3 studies report a significant small to medium association with processing speed, N = 1625, r = 0.19 to 0.30, p < 0.05

2 of 4 studies reported significant medium to large associations with visuospatial ability, including 1 study (N = 25) reporting p < 0.05 for RBANS and Matrix reasoning, r = 0.44-0.71; and 1 study (N = 108) reporting p < 0.05 for perceptual organisation, r = 0.31.

3 of 3 studies report a significant small to medium association with executive function, including 3 studies reporting on executive composite scores, N = 1625, r = 0.15 to 0.41, p < 0.05; 1 study (N = 108) also reporting on DRS conceptualisation (r = 0.30) and initiation (r = 0.35), p < 0.05

4 of 5 studies reported significant medium to large associations with episodic learning/memory, including 1 study (N = 25) reporting p < 0.05 for RBANS-immediate (r = 0.63) and delayed (r = 0.41); 1 study (N = 70) reporting p < 0.05 for auditory (r = 0.50) and visual learning composites (r = 0.40); 1 study (N = 1447) reporting on Hopkins verbal learning test (r = 0.16, p < 0.01); and 1 study (N = 108) reporting p < 0.05 for DRS memory (r = 0.54) and learning composite score (r = 0.47).

**Notes:**
- **Signs and Symptoms** section provides a detailed overview of the factors related to schizophrenia, including symptom severity, attention, and working memory.
- A significant association between appreciation and symptom severity is highlighted, indicating a complex relationship between positive symptomatology and cognitive function.
- The study findings support the importance of visuospatial ability, executive function, and episodic learning in understanding schizophrenia.
- The significant associations with processing speed, executive function, and visuospatial ability suggest potential areas for targeted interventions.

**Conclusion:**
The research findings underscore the need for further investigation into the interplay between appreciation and various cognitive domains in schizophrenia, with potential implications for the development of effective treatment strategies.
Signs and Symptoms – Decision Making

0.01

2 of 4 studies reported significant medium to large associations with visuospatial ability, including 1 study (N = 25) reporting \( p < 0.05 \) for Matrix reasoning, \( r = 0.64 \); and 2 studies (N = 55) reporting \( p < 0.05 \) for RBANS, \( r = 0.24-0.54 \).

2 of 3 studies report a significant small to medium association with executive function, including executive composite scores, \( N = 1517 \), \( r = 0.16 \) to 0.35, \( p < 0.05 \).

4 of 5 studies reported significant medium to large associations with episodic learning/memory, including 1 study (N = 25) reporting \( p < 0.05 \) for RBANS-immediate (\( r = 0.57 \)) and delayed (\( r = 0.47 \)); 1 study (N = 70) reporting \( p < 0.05 \) for auditory learning composite (\( r = 0.29 \)); 1 study (N = 1447) reporting on Hopkins verbal learning test (\( r = 0.20, p < 0.01 \)); and 1 study (N = 108) reporting \( p < 0.05 \) for DRS memory (\( r = 0.27 \)) and learning composite score (\( r = 0.34 \)).

Reasoning was significantly associated with symptom severity, processing speed, visuospatial ability, executive function, episodic learning:

1 of 5 studies reported a significant large negative association between reasoning and general psychopathology, \( N = 30 \), \( r = -0.47 \), \( p < 0.05 \).

1 of 4 studies reported a small but significant negative association between reasoning and negative symptom severity, \( N = 1447 \) schizophrenia, \( r = -0.09 \), \( p < 0.001 \).

1 of 5 studies reported a significant large negative association between reasoning and positive symptom severity, \( N = 30 \), \( r = -0.52 \), \( p < 0.05 \).

3 of 5 studies reported significant medium to large associations with general neuropsychological scores, including RBANS (1 study, \( N = 30 \), \( r = 0.76 \), \( p < 0.05 \)), DRS (1 study, \( N = 108 \), \( r = 0.44 \), \( p < 0.01 \)) and NBC (1 study, \( N = 1447 \) schizophrenia, \( r = 0.26 \), \( p < 0.01 \)).

1 of 5 studies reported significant large association between language and semantic knowledge, including 1 study (N = 108) reporting \( p < 0.05 \) for Verbal composite score, \( r = 0.45 \).

2 of 5 studies reported significant associations with attention and working memory, including 2 studies (N = 1555) reporting \( p < 0.05 \) for working memory composite, \( r = 0.26-0.54 \); 1 study (N = 1447) reporting \( p < 0.01 \) for CPT, \( r = 0.12 \); and 1 study (N = 108) reporting \( p < 0.05 \) for DRS-Attention, \( r = 0.33 \).

2 of 3 studies report a significant association with processing speed, \( N = 1555 \), \( r = 0.21-0.43 \), \( p < 0.05 \).

2 of 4 studies reported significant medium associations with visuospatial ability, including 1 study (N = 25) reporting \( p < 0.05 \) for Matrix reasoning, \( r = 0.45 \); and 1 study (N = 108) reporting \( p < 0.01 \) for perceptual organisation, \( r = 0.47 \).

2 of 3 studies report a significant association with executive function, including 2 studies reporting on executive composite scores, \( N = 1555 \), \( r = 0.19 \) to 0.39, \( p < 0.05 \), and 1 study (N = 108) reporting on DRS conceptualisation (\( r = 0.45 \), \( p < 0.01 \)).

3 of 5 studies reported significant associations with episodic learning/memory, including 1 study (N = 30) reporting \( p < 0.05 \) for RBANS-immediate (\( r = 0.30 \)); 1 study (N = 1447) reporting on Hopkins verbal learning test (\( r = 0.24, p < 0.01 \)); and 1 study (N = 108) reporting \( p < 0.05 \) for DRS memory (\( r < 0.05 \)).
Signs and Symptoms – Decision Making

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Explanation of acronyms

CPT = Continuous Performance Test, DRS = Mattis Dementia Rating Scale, GORT = Grey Oral Reading Test, IGT = Iowa Gambling Task, N = number of participants, MacCAT-CR = MacArthur Competency Assessment Tool for Clinical Research, MacCAT-T = MacArthur Competency Assessment Tool for Treatment, NDMT = Novel Decision Making Task, NBC = Neuropsychological Battery Composite, p = statistical probability of obtaining that result (p < 0.05 generally regarded as significant), PIAT = Peabody Individual Achievement Test, r = correlation coefficient, RBANS = Repeatable Battery of the Assessment of Neuropsychological Status, vs = versus, WAIS-III = Wechsler Adult Intelligence Scale- Third Edition, WRAT-III = Wide Range Achievement Test- Third Edition
Explanation of technical terms

- Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include: reporting bias – selective reporting of results; publication bias - trials which are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small.\(^7\)

† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives which are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives which are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) which allows results from different scales to be combined and compared. Each study’s mean difference is then given a weighting depending on the size of the sample and the variability in the data. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect.\(^7\)

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium to large effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2.\(^8\) lnOR stands for logarithmic OR where a lnOR of 0
shows no difference between groups. Hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (b) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

\[ I^2 = \left( \frac{Q - df}{Q} \right) \times 100\% \]

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) which is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. \( I^2 \) is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. \( I^2 \) can be calculated from \( Q \) (chi-square) for the test of heterogeneity with the following formula:⁷

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed.⁸

|| Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C which allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

This topic is yet to be reviewed by a content expert.
Signs and Symptoms – Decision Making

References


