Introduction

Functional outcomes refer to aspects of general life and day-to-day function that may be impacted as a consequence of schizophrenia-related impairments.

For example, symptom severity has been significantly associated with community function, including social function, work performance, and social skills [1]. Likewise, reduced neurocognitive function in schizophrenia [2] has also been identified as a strong predictor of community functioning [3]. Social cognition is another aspect of cognitive function that is impaired in schizophrenia [4, 5], and refers to the mental operations underlying social interactions, such as the ability to perceive intentions of others [6]. Impaired social cognition may also impact on functional outcome in schizophrenia, in terms of maintaining efficient social interactions and independent living skills. Interventions to improve symptom severity or cognitive impairments may have additional benefit for general functional outcomes.

The development of coping skills to manage general life stresses as well as manifestations of the illness (such as psychotic symptoms) may help to improve functional outcomes and illness management. Types of coping strategies include problem-focused, emotion-focused, avoidance, support-focused, task-focused and cognitive-focused strategies [7].

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. As part of a wider search for all topics included in the library, reviews on functional outcomes in schizophrenia 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. The decision to include or exclude reviews was conducted in duplicate by two independent reviewers with any disagreements settled by discussion. All quality assessments and data extraction have been completed in duplicate by two reviewers who were not masked to review authors.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (formerly the QUOROM statement) which describes a preferred way to present a meta-analysis [8]. 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 a high possibility of reporting bias 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
Course & Outcomes – Functional Outcomes

that gained from randomized 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)[9]. 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

See table below for a detailed summary of the available evidence pertaining to functional outcomes in schizophrenia. We found ten systematic reviews that met our inclusion criteria [1, 2, 4, 6, 7, 10-14]. Two non-systematic reviews were excluded [3, 5].

See PRISMA checklist for review quality assessments.

Conclusions

• High quality evidence suggests a relationship between neurocognitive performance and functional outcomes. Community functioning was associated with performance on ToM tasks, emotion and information processing, working memory, attention and reasoning bias. Social behaviour was associated with emotion processing, verbal learning, reasoning bias. Problem solving was associated with attention, working memory, verbal learning and reasoning bias. Social skills were associated with attention, visual learning, reasoning bias, verbal learning and insight.

• Moderate to low quality evidence further supports a relationship between social cognition and functional outcomes, suggesting that the ability to have insight and social perception influenced community function, work, and social behaviour, as well as social problem solving. Emotional perceptive ability also influenced community function and social behaviour, and social skills. An attribution bias influenced community function and social behaviour; while social skills were influenced by theory of mind. Premorbid social function had some bearing on theory of mind ability.

• Moderate to low quality evidence suggests that lower levels of work capacity are associated with poor cognitive functioning, including executive functioning, attention/vigilance, memory, language, psychomotor ability, visuospatial processing, IQ and emotional perception. The evidence also suggests that lower levels of work capacity is associated with increased negative symptoms, but not global, positive or disorganised symptoms.

• Moderate quality evidence suggests that negative symptoms (but not positive symptoms) are significantly associated with both global neurocognitive function and with community function and skills assessment, and may actually mediate the relationship between these outcomes. Moderate to low quality evidence suggests varied severity of social disability in low and middle income countries, with better outcomes in India and Indonesia and poorer outcomes in China, Brazil and African countries.
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• Low to moderate quality evidence suggests that in cross-sectional assessment, people with schizophrenia aged over 50 years old show impairment on cognitive measures including executive function, visuo-spatial ability, verbal fluency and memory. Over time, limited cognitive decline was reported in community-dwelling or hospitalised patients in the short term; however hospitalised patients showed significant cognitive decline in the long term.

• Low to moderate quality evidence suggested that people with schizophrenia can identify at least one strategy they use to cope with general life stressors or the symptoms of psychosis. The most commonly reported strategies include avoidance and problem-focused strategies, which also had the greatest association with quality of life. People with schizophrenia often reported limited belief in the effectiveness of these coping strategies, however the use of coping strategies was associated with better long term symptom outcomes.
### Course & Outcomes – Functional Outcomes

**Allott, K., Liu, P., Proffitt, T., Killackey, E.**

**Cognition at illness onset as a predictor of later functional outcome in early psychosis: Systematic review and methodological critique**

**Schizophrenia Research 2011, 125: 221 to 235**

*View review abstract online*

<table>
<thead>
<tr>
<th>Comparison</th>
<th>General and social cognitive predictors of later functional outcome in people with first episode psychosis or first episode schizophrenia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of evidence</td>
<td>Low quality evidence (unclear samples, direct, unable to assess consistency or precision) is unable to determine the relationship between cognitive domains and functional outcome in people with first-episode psychosis.</td>
</tr>
</tbody>
</table>

**Functional outcome**

*Measured by a self-report or interviewer-rated scale of community functioning or a measure of 'real world' community functioning (e.g., job tenure)*

22 studies (*N* = unclear) reported at least one cognitive domain predicted functional outcome. Cognitive domains were ranked in terms of how frequently they were found to predict functional outcome.

Taking the following methodological factors into consideration (potential confounding factors, study follow-up periods, study power and attrition rates), it was found that reasoning and problem solving ability was most frequently predictive of functional outcome. Three other cognitive domains that were consistently associated with functional outcome were global/general cognition, verbal/language skills and verbal learning and memory.

Other cognitive domains were found to have comparatively poor predictive value with functional outcome, including motor skills, working memory, verbal fluency, visual learning and memory, and construction and visuospatial skills.

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<tr>
<th>Consistency in results‡</th>
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<tbody>
<tr>
<td>Precision in results§</td>
<td>Unable to assess</td>
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<tr>
<td>Directness of results¶</td>
<td>Direct</td>
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**Christensen, T.**
The influence of neurocognitive dysfunctions on work capacity in schizophrenia patients: a systematic review of the literature


**Comparison**

| Employment outcomes, cognitive performance and symptom severity in people with schizophrenia |
| Note: work capacity is the ability to obtain and maintain competitive work, as well as work behaviours and skills |

**Summary of evidence**

| Moderate to low quality evidence (direct, unable to assess consistency or precision) suggests that lower levels of work capacity are associated with poor cognitive functioning, including executive functioning, attention/vigilance, memory, language, psychomotor ability, visuospatial processing, IQ and emotional perception. The evidence also suggests that lower levels of work capacity is associated with increased negative symptoms, but not global, positive or disorganised symptoms |

**Cognitive performance**

21 studies (N = 1411) assessed the relationship between work capacity and cognitive performance in people with schizophrenia

2 studies (N = 166) reported that poor general neurocognitive functioning was associated with worse work behaviour and employment status, whereas 2 studies (N = 140) found no association between neurocognitive functioning and employment or social functioning

7 studies (N = 366) reported that poor executive functioning was associated with worse task orientation, social skills, full time employment, occupational functioning, work behaviour improvement, wages earned, contact with employment specialist, cooperativeness, work quality and general impression

7 studies (N = 389) reported that poor attention/vigilance was associated with worse employment status, less full time employment or unemployment, poorer occupational functioning, work behaviour improvement, work performance and work adjustment

5 studies (N = 365) reported that poor verbal memory was associated with worse work habits,
occupational functioning, work performance, work behaviour, integrated employment status, less
hours worked and wages earned. No association between verbal memory and personal
presentation, social work skills and cooperativeness.

1 study (N = 77) reported that poor immediate and delayed memory was associated with worse
employment status. Poor working memory (1 study, N = 30) was associated with unemployment.

5 studies (N = 348) reported that poor verbal learning and language was associated with worse
work behaviour improvements, work performance, less hours worked, wages earned and contact
with employment specialist.

2 studies (N = 208) reported that poor psychomotor functioning/speed was associated with worse
work performance and behaviour

2 studies (N = 128) reported that poor visuospatial processing/ ability, visual recall and visual
scanning was associated with worse occupational activity and functioning

1 study (N = 53) reported that poor WAIS non-verbal IQ performance was associated with worse
vocational functioning

1 study (N = 94) reported that poor emotional perception was associated with worse work
functioning

### Symptom severity

14 studies (N = 884) assessed the relationship between work capacity and symptom severity in
people with schizophrenia

2 studies (N = 128) reported that increased global symptoms were associated with worse
occupational changes and vocational functioning. However, 5 studies (N = 290) reported no
association between global symptoms and social skills at work, employment status, occupational
functioning or work behaviour improvement

6 studies (N = 354) reported that increased negative symptoms were associated with impaired work
behaviour, vocational functioning, less hours worked, wages earned, social functioning and a long
employment history. 1 study (N = 112) reported that negative symptoms was not associated with
work behaviour
3 studies (N = 270) reported that positive symptoms were not associated with employment history or work behaviour. 1 study (N = 30) reported that increased psychotic symptoms were associated with less hours of on-job support and contact with employment specialist.

1 study (N = 112) reported that disorganised symptoms were not associated with work behaviour.

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<th>Consistency</th>
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<td>Directness</td>
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Cohen A., Patel V., Thara R., Gureje O.

Questioning an axiom: better prognosis for schizophrenia in the developing world?


View review abstract online

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Measuring disability and social function in schizophrenia patients in low and middle income countries (as defined by the World Bank)</th>
</tr>
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<tbody>
<tr>
<td>Summary of evidence</td>
<td>Moderate to low quality evidence (direct, large sample size, unable to assess consistency, precision) suggests severity of social disability varies worldwide, with better outcomes in India and Indonesia and poorer outcomes in China, Brazil and African countries.</td>
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</table>

Disability and social outcomes in low and middle income countries

Follow up status of functional assessments is quoted as a percentage of people with a diagnosis of schizophrenia.

18 studies worldwide, N = 2636

Chennai, India: Prospective study: 1 year follow up, 73% had moderate to severe global disability.
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(compared to 98% at baseline); 34% had no impairment in social function; 51% had no impairment in occupational function.

Rural Karnataka, India: Prospective study: 1.5 year follow up, overall group showed significant reduction from baseline disability ($p < 0.001$)

São Paulo, Brazil: Prospective study: 2 year follow up, 54% showed social withdrawal (compared to 74% at baseline); 37% showed impaired self-care (compared to 55% at baseline); 52% show impaired interest and information (compared to 68% at baseline)

Sichuan, China: Prospective study: 2 year follow up, social function was mildly impaired in 20.9%; moderately impaired in 10.9% and seriously impaired in 68.2%

Multisite, India: Prospective study: 2 year follow up, social function was not impaired in 33.7%; moderately impaired in 53.6% and seriously impaired in 12.7%

Ilesa, Nigeria: Prospective study: 2 year follow up, social relationships were satisfactory in 43.6%; moderate problems in 23.4% and serious problems in 22.3%. 10.6% had no social relationships.

Butajira, Ethiopia: Prospective study: 1-4 year follow up, functional status was reportedly poorer than industrialised countries

Bali, Indonesia: Prospective study: 11 year follow up, 39% were self-supportive; 13% were semi self-supportive; 15% were socially adjusted to family or community; 32% were maladjusted.

Bali, Indonesia: Retrospective study: 5 year follow up, 34.8% were self-supportive; 19.6% were semi self-supportive; 30.4% were socially adjusted to family or community; 15.2% were maladjusted

Madras Longitudinal Study: Prospective study: 20 year follow up, 73.8% had little impairment in GAF social and occupational domains

Sofia, Bulgaria: Prospective study: 16 year follow up, 32.7% had minimal social disability on GAF-D; 36.4% had poor functioning on GAF-D. 32.7% had minimal disability on DAS; 36.4% had poor functioning on DAS.

China: Prospective study: 12 year follow up, 32.8% had good social functioning on GAF-D; 39.6% had serious impairment in social functioning on GAF-D.

Cali, Colombia: Prospective study: 26 year follow up, social disability on GAF-D was minimal in 45.8%; mild in 27.8%; moderate in 23.6%; severe in 2.8%. Social functioning on DAS was excellent in 52%; poor in 9% and severe in 0%.

Agra, India: Prospective study: 25 year follow up, GAF-D functioning was improved in 48.7% of men and 81.8% of women. DAS functioning was excellent in 60%; fairly good in 19% and not measured in 21%.

Chandigarh (rural), India: Prospective study: 15 year follow up, GAF-D social functioning was excellent in 71%; and serious impairment in 5%

Chandigarh (urban), India: Prospective study: 15 year follow up, GAF-D social functioning was excellent in 63%; and serious impairment in 14%

Ibadan, Nigeria: Prospective study: 2 year follow up. No results reported.

Ibadan, Nigeria: Retrospective study: 7-26 year follow up, women had poorer social outcomes
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following a first episode than men

Abeokuta, Nigeria: Retrospective study: 13 year follow up, social function was unimpaired in 22%, mild in 19%, moderate in 23% and severe in 36%.

There was considerable variation in the reported rates among many countries worldwide, possibly due to differences in social and disability support

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<thead>
<tr>
<th>Consistency‡</th>
<th>No measure of consistency reported, results appear inconsistent</th>
</tr>
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<tbody>
<tr>
<td>Precision§</td>
<td>No measure of precision reported</td>
</tr>
<tr>
<td>Directness‖</td>
<td>Direct</td>
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</tbody>
</table>

Couture, S.M., Penn, D.L., Roberts, D.L.

The Functional Significance of Social Cognition in Schizophrenia: A Review


View review abstract online

Comparison  Effect of deficits in various social cognition domains on functional outcome in schizophrenia spectrum disorders

Summary of evidence  Moderate to low quality evidence (direct, large sample size, unable to assess consistency, precision) suggests a relationship between cognition and functional outcomes, suggesting that the ability to have social perception influenced community function and social behaviour, as well as social problem solving. Emotional perceptive ability also influenced community function and social behaviour, and social skills. An attribution bias influenced community function and social behaviour; while social skills were influenced by theory of mind. Premorbid social function had some bearing on theory of mind ability.

Social perception (SP) and functional outcome
Social perception is a person’s ability to perceive social cues from behaviour in a social context, and incorporates knowledge of social rules and conventions

Three of four studies (N = 207) reported a significant medium to large relationship between SP and social behaviour in treatment settings, with increases in SP correlating positively with improved social behaviour.

Three studies (N = 116) reported a significant small to medium relationship between SP and community functioning, and one study (N = 162) showed a small effect, that SP could predict inpatient or outpatient status, with increased SP predicting outpatient status.

Three studies of inpatients (N = 158) reported a significant medium to large effect associating increased SP with increased social problem solving skills.

Two studies (N = 172) reported a significant medium association between increased SP and increased social skills, while two studies reported no association (N = 75).

### Emotional perception (EP) and functional outcome

Emotional perception is the ability to infer emotional information from facial expressions and vocal inflections.

Four of six studies (N = 126) reported a significant medium to large relationship between EP and social behaviour in treatment settings.

Three of four studies (N = 131) showed a significant small relationship between EP and social skills.

Three studies (N = 260) found a consistent significant medium relationship between improved EP and community function, including work function and independent living scales.

### Theory of Mind (ToM) and functional outcome

Theory of Mind is the cognitive ability to attribute mental states such as thoughts, beliefs and intentions to other people.

One study (N = 23) found limited evidence for a small significant association between ToM and social behaviour.

One study (N = 49) found ToM had a significant medium size association with overall social skill in outpatients.

One study (N = 44) found evidence for a medium significant association between increased ToM and community function.

One study (N = 42) found a large significant relationship between ToM and premorbid social functioning.

### Attributional Style (AS) and functional outcome
Attributional style refers to a person’s tendencies toward explaining the cause of events (blaming people versus situations)

One study (N = 40) reported a significant, medium effect that stable attributions were related to better community function.

One study (N = 29) found that hostile attributional bias had a significant small relationship with aggressive inpatient behaviour.

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Fett A.K., Viechtbauer W., Dominguez M., Penn D., van Os J. and Krabbendam L.

The relationship between neurocognition and social cognition with functional outcomes in schizophrenia: A meta-analysis

Neuroscience and Biobehavioural Reviews, 2011. 35: 573-588

View review abstract online

Comparison

Association between functional outcomes (community function, social behaviour, social problem solving, social skills) and performance on various cognitive domains in patients with schizophrenia.

Summary of evidence

High quality evidence (direct, mostly consistent, mostly precise) showed that increased community functioning was positively influenced by better performance in ToM, emotion processing, information processing verbal learning and working memory, but had a weak relationship with attention and reasoning bias. Improved social behaviour may be associated with better emotion processing and verbal learning, but had a weak association with reasoning bias. Greater problem solving ability showed positive associations with better attention, working memory, verbal learning and reasoning bias. Better social skills were associated with improved performance in tasks measuring attention, visual learning, and reasoning bias, but only a weak association with verbal learning.

Community functioning (work performance, social interaction)
<table>
<thead>
<tr>
<th>Category</th>
<th>Studies, N</th>
<th>Description</th>
<th>Estimated Average Correlation</th>
<th>95% CI</th>
<th>p Value</th>
<th>Q</th>
<th>I²</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory of Mind</strong></td>
<td>3, 114</td>
<td>Significant large positive association between increased performance on ToM task and greater community functioning</td>
<td>0.48</td>
<td>0.32 to 0.61</td>
<td>&lt;0.001</td>
<td>0.81</td>
<td>1%</td>
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<td><strong>Emotional perception</strong></td>
<td>5, 378</td>
<td>Significant medium positive association between increased performance on emotional perception and processing tasks and greater community functioning</td>
<td>0.31</td>
<td>0.21 to 0.40</td>
<td>&lt;0.001</td>
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<tr>
<td><strong>Attention</strong></td>
<td>9, 481</td>
<td>Significant weak positive association between increased performance on attention tasks and greater community functioning</td>
<td>0.16</td>
<td>0.04 to 0.27</td>
<td>0.01</td>
<td>13.15</td>
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<td><strong>Information Processing</strong></td>
<td>8, 465</td>
<td>Significant medium positive association between increased performance on a processing speed task and greater community functioning</td>
<td>0.25</td>
<td>0.13 to 0.37</td>
<td>&lt;0.001</td>
<td>12.36</td>
<td>42.94%</td>
<td>non-significant</td>
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<tr>
<td><strong>Working memory (WM)</strong></td>
<td>7, 495</td>
<td>Significant weak to medium positive association between increased performance on WM task and greater community functioning</td>
<td>0.22</td>
<td>0.05 to 0.38</td>
<td>0.01</td>
<td>18.89</td>
<td>69.30%</td>
<td>significant</td>
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*Significant correlations are highlighted in bold.*
## Course & Outcomes – Functional Outcomes

<table>
<thead>
<tr>
<th>Function</th>
<th>Studies</th>
<th>N</th>
<th>Association</th>
<th>Correlation Estimate</th>
<th>95% CI</th>
<th>p</th>
<th>Q</th>
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<tr>
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<td>1125</td>
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<td>71.65</td>
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<td>Q = 69.54, I² = 71.65%</td>
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<td><strong>Visual learning</strong></td>
<td>6</td>
<td>230</td>
<td>Significant weak positive association between</td>
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<td>0.07</td>
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<td><strong>Reasoning bias</strong></td>
<td>16</td>
<td>901</td>
<td>Significant weak positive association between</td>
<td></td>
<td>0.19, 95% CI</td>
<td>0.12</td>
<td>0.26</td>
<td>9.95</td>
<td>non-significant (p value not reported)</td>
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<td>increased performance on a reasoning and problem</td>
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<td>solving tasks and greater community functioning</td>
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<td>Estimated average correlation = 0.19, 95% CI 0.12 to</td>
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<td>0.26, p &lt; 0.001</td>
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<td>Q = 16.19, I² = 9.95%</td>
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<td><strong>Social behaviour</strong></td>
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<tr>
<td><strong>Emotional perception</strong></td>
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<td>265</td>
<td>Significant medium positive association between</td>
<td></td>
<td>0.22, 95% CI</td>
<td>0.10</td>
<td>0.34</td>
<td>0</td>
<td>non-significant (p value not reported)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>increased performance on emotional perception</td>
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<td></td>
<td></td>
<td></td>
<td>and processing tasks and improved social behaviour</td>
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<td></td>
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<td></td>
<td>Estimated average correlation = 0.22, 95% CI 0.10 to</td>
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<td>0.34, p &lt; 0.001</td>
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<td></td>
<td></td>
<td></td>
<td>Q = 3.08, I² = 0%</td>
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</tr>
<tr>
<td><strong>Attention</strong></td>
<td>4</td>
<td>234</td>
<td>No association between performance on attention</td>
<td></td>
<td>0.19, 95% CI</td>
<td>-0.11</td>
<td>0.45</td>
<td>74.16</td>
<td>significant (p value not reported)</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>tasks and social behaviour</td>
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<td></td>
<td>Estimated average correlation = 0.19, 95% CI -0.11 to</td>
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<td></td>
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<td></td>
<td>0.45, p = 0.21</td>
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<td></td>
<td></td>
<td></td>
<td>Q = 14.95, I² = 74.16%</td>
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</tr>
</tbody>
</table>
### Verbal learning

4 studies, N = 253

Significant medium positive association between increased performance on verbal learning tasks and improved social behaviour

Estimated average correlation = 0.32, 95%CI 0.15 to 0.47, \( p < 0.001 \)

\[ Q = 4.84, I^2 = 39.22\%, \text{ non-significant (p value not reported)} \]

### Visual learning

4 studies, N = 122

Significant medium positive association between better performance on visual learning task and improved social behaviour

Estimated average correlation = 0.30, 95%CI 0.10 to 0.47, \( p = 0.002 \)

\[ Q = 3.47, I^2 = 11.76\%, \text{ non-significant (p value not reported)} \]

### Reasoning bias

5 studies, N = 257

Significant weak positive association between increased performance on a reasoning and problem solving tasks and improved social behaviour

Estimated average correlation = 0.23, 95%CI 0.11 to 0.35, \( p < 0.001 \)

\[ Q = 2.06, I^2 = 0\%, \text{ non-significant (p value not reported)} \]

### Social problem solving

#### Attention

3 studies, N = 100

Significant medium positive association between increased performance on attention tasks and greater social problem solving

Estimated average correlation = 0.25, 95%CI 0.07 to 0.47, \( p = 0.007 \)

\[ Q = 1.45, I^2 = 0\%, \text{ non-significant (p value not reported)} \]

#### Working memory

4 studies, N = 127

Significant medium positive association between increased performance on WM task and greater social problem solving

Estimated average correlation = 0.25, 95%CI 0.07 to 0.41, \( p = 0.007 \)

\[ Q = 0.29, I^2 = 0\%, \text{ non-significant (p value not reported)} \]
### Verbal learning

**4 studies, N = 117**

Significant medium positive association between increased performance on verbal learning tasks and greater social problem solving

Estimated average correlation $= 0.26$, 95%CI 0.07 to 0.43, $p = 0.003$

$Q = 0.44$, $I^2 = 0\%$, non-significant (p value not reported)

### Reasoning bias

**3 studies, N = 90**

Significant medium positive association between increased performance on a reasoning and problem solving tasks and greater social problem solving

Estimated average correlation $= 0.29$, 95%CI 0.08 to 0.47, $p = 0.008$

$Q = 0.73$, $I^2 = 0\%$, non-significant (p value not reported)

### Social skills

**Attention**

**3 studies, N = 119**

Significant medium to large positive association between increased performance on attention tasks and better social skills

Estimated average correlation $= 0.39$, 95%CI 0.22 to 0.53, $p < 0.001$

$Q = 0.22$, $I^2 = 0\%$, non-significant (p value not reported)

**Verbal learning**

**7 studies, N = 250**

Significant weak positive association between increased performance on verbal learning task and better social skills

Estimated average correlation $= 0.18$, 95%CI 0.06 to 0.31, $p = 0.005$

$Q = 8.54$, $I^2 = 0\%$, non-significant (p value not reported)

**Visual learning**

**4 studies, N = 149**

Significant medium positive association between increased performance on visual learning task and better social skills

Estimated average correlation $= 0.28$, 95%CI 0.07 to 0.46, $p = 0.008$

$Q = 5.22$, $I^2 = 30.81\%$, non-significant (p value not reported)
Course & Outcomes – Functional Outcomes

Reasoning bias
3 studies, N = 119
Significant medium association between improved performance on a reasoning and problem solving tasks and better social skills
Estimated average correlation = 0.34, 95%CI 0.17 to 0.50, p < 0.001
Q = 1.04, I² = 0%, non-significant (p value not reported)

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Consistent for all outcomes except community function – working memory and social behaviour – attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision</td>
<td>Precise for all outcomes except social behaviour – attention</td>
</tr>
<tr>
<td>Directness</td>
<td>Direct</td>
</tr>
</tbody>
</table>

Lincoln T.M. Lüllmann E. and Rief W.
Correlates and long-term consequences of poor insight in patients with schizophrenia. A systematic review

View review abstract online

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Association between insight and functional outcomes in people with schizophrenia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of evidence</td>
<td>Low to moderate quality evidence (direct, unable to assess consistency or precision) suggests that people with schizophrenia may show an association between increased insight and better work functioning</td>
</tr>
</tbody>
</table>

Insight and functional outcomes

2 studies (N = 127) reported that lower insight was associated with worse work performance including lower social skills, work quality, cooperativeness and personal presentation at work. Impaired insight was also associated with poorer overall functioning (1 study, N = 23), social functioning (1 study, N = 74) and social adjustment and symptom discomfort (1 study, N = 32)

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Unable to assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision</td>
<td>Unable to assess</td>
</tr>
</tbody>
</table>
Directness | Direct
---|---


**Strategies used by psychotic individuals to cope with life stress and symptoms of illness: a systematic review**


[View review abstract online](#)

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Outcomes of natural coping strategies employed by people with psychosis, for dealing with general life stressors and symptoms of psychosis. Most studies are single group design.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of evidence</td>
<td>Low to moderate quality evidence (direct, medium to large samples, unable to assess consistency or precision) suggests that people with schizophrenia can identify at least one strategy they use to cope with general life stressors or the symptoms of psychosis. The most commonly reported types include avoidance and problem-focused strategies, which also had the greatest association with quality of life. People with schizophrenia often reported limited belief in the effectiveness of these coping strategies, however the use of coping strategies was associated with better long term symptom outcomes.</td>
</tr>
</tbody>
</table>

### Coping with general life stressors

*21 studies examined characteristics of coping strategies for general life events.*

*Types of coping include problem-focused, emotion-focused, avoidance, support-focused, task-focused, and cognitive-focused strategies*

One study (N = 73) reported people with schizophrenia spectrum disorders are more likely to rate their ability to cope with stressors as less effective compared to controls. Four studies (N = 228) report that people with schizophrenia and other psychoses are more likely to use avoidance or maladaptive coping compared to healthy controls. Three of four studies (N = 559) suggested patients were more likely to use problem solving or emotion-focused coping strategies than controls. One study (N = 91) suggests problem-focused strategies are reported more frequently than avoidance strategies.

One study (N = 237) reported that 6 months following a hospital admission, emotional coping strategies were used less frequently but no change reported in avoidance strategies. A severe life event was associated with higher levels of problem-centred coping in people with schizophrenia.
who relapsed (N = 41) compared to relapsed patients who did not experience a life event. Another group (N = 42) reported a longer duration between a life event and a relapse if patients used support services as a coping strategy.

Three studies (N = 187) found that cognitive and executive function deficits were associated with higher levels of avoidant coping or lower levels of cognitive-focused strategies. Two further studies associated higher levels of avoidance with higher levels of hope and insight (N = 113) and one found higher levels of hope and insight were associated with having more active, adaptive coping strategies (N = 96). Insight was also positively correlated with distress (N = 65). Ease of adaptation to illness was significantly influenced by coping strategies (N = 101).

One study (N = 35) found that over a 16 month follow up, 38% of people schizophrenia reported changes in their method of coping, of which 19.6% shifted toward unfavourable methods. Unfavourable coping was associated with lower self-efficacy; favourable coping was associated with lower symptom levels.

One study (N = 161) found task-oriented and avoidance coping were the best predictors of quality of life for inpatients; emotion-oriented coping was negatively associated with quality of life. Coping was able to account for 7-25% of variance in quality of life ratings in two studies (N = 304). However, one study of outpatients (N = 58) found no associations between quality of life and coping.

### Coping with symptoms of psychosis

<table>
<thead>
<tr>
<th>Studies examined characteristics of coping strategies for psychotic symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>59 studies evaluated coping strategies for psychotic symptoms.</td>
</tr>
<tr>
<td>17 of 19 studies (N = 1426) report that people with schizophrenia can identify at least one strategy employed to cope with psychotic symptoms such as auditory hallucinations or negative symptoms.</td>
</tr>
<tr>
<td>Only two of six studies (N = 365) found a relationship between duration of illness and number of coping strategies. One study (N = 60) suggested 93% of respondents used at least one strategy to mitigate the impact of a stressful occurrence or relapse.</td>
</tr>
<tr>
<td>Two studies (N = 198) suggest patients found little effectiveness of the coping strategies employed. However, those patients who do cope well with illness reported the most confidence in multiple coping strategies (three studies, N = 125).</td>
</tr>
<tr>
<td>A longitudinal study (N = 95) of inpatients following a first psychotic episode reported that active behavioural coping strategies at baseline were associated with better symptom outcomes over 24 months. However, one study (N = 58) suggests that coping style did not moderate a relationship between symptom severity and quality of life.</td>
</tr>
<tr>
<td>Three studies (N = 158) found higher levels of negative symptoms was associated with less adaptive coping strategies and more use of emotion-oriented strategies; higher levels of positive symptoms associated with ignoring symptoms and cognitive-oriented strategies.</td>
</tr>
<tr>
<td>Three studies (N = 186) reported inconsistent results on the relationship between hospitalisation and the type of coping strategies employed. Coping responses which exacerbate symptom presentation were reportedly less effective than non-symptomatic coping strategies in four studies,</td>
</tr>
</tbody>
</table>
### Course & Outcomes – Functional Outcomes

| N = 179. One longitudinal study (N = 47) found that inpatients with psychosis were more likely to utilise coping strategies that exacerbate psychotic symptoms, and to report less control over their symptoms. |
| Consistency | Unable to assess consistency |
| Precision | Unable to assess precision |
| Directness | Direct |

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*Rajji T.K., Mulsant B.H.*

**Nature and course of cognitive function in late-life schizophrenia: a systematic review**


[View review abstract online](#)

| Comparison | Cross-sectional assessment of cognitive performance in people with schizophrenia aged over 50 years (late-life schizophrenia, LLS) |
| Summary of evidence | Low to moderate quality evidence (large samples, direct, unable to assess consistency or precision) suggests people with late-life schizophrenia are impaired on several measures of cognition, including executive function, visuospatial ability, verbal fluency and memory. |

**Global cognitive score**

Seventeen studies reported the total score of a cognitive screening test (Mini-Mental Status Examination; Dementia Rating Scale) or a comprehensive battery (Repeatable Battery for the Assessment of Neuropsychological Status)

People with LLS were consistently found to be impaired relative to age-matched controls

10 studies (N = 1417) found lower MMSE scores in LLS; 7 studies (N = 1068) found lower DRS scores in LLS; 1 study (N = 157) found lower RBANS scores in LLS

No data reported

**Executive function**
Executive function was consistently found to be impaired in nine studies in LLS
Six studies (N = 766) reported LLS were impaired in composite measures of executive function; three further studies (N = 399) reported LLS impairments in individual tests of executive function, such as Wisconsin Card Sorting Test, letter fluency, Tower of London. This dysfunction was maintained regardless of early or late illness onset in nine LLS studies (N = 895).
One study (N = 75) additionally reported poorer executive performance in hospitalised patients compared to ambulatory patients, after controlling for illness severity and medication.

No data reported

### Visuospatial ability

Visuospatial ability was consistently found to be impaired in ten studies in LLS
One study (N = 181) reported LLS were impaired in composite measures of visuospatial ability; three studies (N = 445) reported LLS impairments in visuospatial tasks combined with information processing tasks, and six further studies (N = 951) reported impairments in individual tests of visuospatial ability.
These deficits were consistent across hospitalised patients, ambulatory subjects and mixed subject groups, but may be more prevalent in late onset schizophrenia. One study (N = 75) additionally reported no difference in visuospatial ability in hospitalised patients compared to ambulatory patients, after controlling for illness severity and medication.

No data reported

### Verbal fluency

Verbal fluency was consistently found to be impaired in thirteen studies in LLS (N = 1721).
These deficits were consistent across both hospitalised patients and ambulatory subjects, as well as in both early- and late-onset LLS.

No data reported

### Psychomotor function

Four studies assessed measures of psychomotor function. No deficits were reported on one study (N = 83) using digit-symbol test; however three more recent studies (N = 445) reported impairments in motor speed and information processing speed in LLS, with no difference reported between early and late onset LLS.

No data reported

### Memory
Memory impairment was reported in eleven studies in LLS (N = 1505), including verbal and visual memory measures, in both hospitalised and ambulatory patients. No difference was reported between early and late onset LLS.

No data reported

### Attention and Working memory

Six studies (N = 792) reported impairments in working memory and attention tasks in LLS (both hospitalised and ambulatory) compared to controls. However, three studies reported no difference in LLS compared to healthy controls (N = 225). The separation between working memory and executive function was not adequately delineated in most of these studies and so pure attentional deficits are unclear.

No data reported

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Unable to assess – no measure of consistency reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision</td>
<td>Unable to assess – no confidence intervals reported</td>
</tr>
<tr>
<td>Directness</td>
<td>Direct</td>
</tr>
<tr>
<td>Comparison</td>
<td>Longitudinal assessment of cognitive performance outcomes in people with schizophrenia aged over 50 years (late-life schizophrenia, LLS).</td>
</tr>
</tbody>
</table>

Summary of evidence

Low to moderate quality evidence (large samples, direct, unable to assess consistency or precision) suggests people with late-life schizophrenia who live in the community are less likely to show cognitive impairment in the short term. Those with LLS who are hospitalised show limited change in cognitive ability in the short term, however showed significant cognitive decline in the longer term (follow up greater than two years).

### Longitudinal outcomes

Seventeen longitudinal studies, with follow-up up to 10 years, investigated cognitive outcomes in LLS. Eleven of the seventeen studies were on hospitalised patients. Only five studies compared LLS to healthy controls.

**Community-dwelling subjects**

Four studies (N = 284, three from the same research centre) found no evidence for cognitive decline in groups of LLS (either early or late onset), over follow-up between one and three years. However, a fifth study (N = 19) found that while half of the subject group remained cognitively stable on Clinical Dementia Rating and Cognitive Decline Scales, half of the subject group showed declining performance over 5 years, and later progressed to dementia.
Hospitalised subjects

One of four studies (total N = 868) with a follow-up less than two years reported a drop in global cognitive function over time. Three studies (N = 644) examined specific cognitive domains and largely showed no change, however some reduction in visuospatial ability and verbal fluency was reported in one study by 15 months.

However, eight studies (N = 1761) with greater than two years follow-up all report ongoing cognitive decline. In one study (N = 70) rates of decline were correlated with patients age at baseline, where older patients showed greater decline over 6 years.

Consistency | Unable to assess – no measure of consistency reported
Precision | Unable to assess – no confidence intervals reported
Directness | Direct

Switaj P., Anczewska M., Chrostek A., Sabariego C., Cieza A., Bickenbach J., Chatterji S.

Disability and schizophrenia: a systematic review of experienced psychosocial difficulties.

BMC Psychiatry, 2012. 12:193
View review abstract online

Comparison | Assessment of research focus into domains of psychosocial disability experienced by people with schizophrenia
Summary of evidence | Low quality evidence (unable to assess precision or consistency, unclear samples and comparisons) is uncertain as to the key research focus into domains of functional disability in schizophrenia

Psychosocial Disabilities

104 studies were identified that assessed a measure of psychosocial disability in schizophrenia.

The most extensively studied disabilities were global concepts including psychopathological symptoms (53% of studies); disability and function (37% of studies); quality of life (23% of studies); health status (12% of studies).

The most extensively studied domains of mental function were cognitive function (27% of studies); emotional function (27%); energy and drive (15%); psychomotor functions (11%); and pain (11%)
The most extensively studied domains of functional activity and participation were in relationships (31% of studies); employment (20%); health (12%); social activities (11%) and self-care (11%)

17 studies assessed factors associated with the onset of disability
Medication was reported in 14 studies to be associated with a range of disability (adverse effects of medication) including pain (11 studies); anxiety (8 studies); insomnia (8 studies); somnolence (7 studies); appetite (3 studies); fatigue (3 studies); and libido (3 studies)

95 papers assessed factors associated with the intensity of disability
These included treatment (reported in 56% of papers): symptoms (26%); socio-demographics (24%); global disability (13%); emotional function (12.5%); and cognitive function (12%)

<table>
<thead>
<tr>
<th>Consistency</th>
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<tbody>
<tr>
<td>Precision</td>
<td>Unable to assess</td>
</tr>
<tr>
<td>Directness</td>
<td>Unable to assess</td>
</tr>
</tbody>
</table>

Ventura J., Helleman G.S., Thames A.D., Koellner V., Nuechterlein K.H.,

Symptoms as mediators of the relationship between neurocognition and functional outcome in schizophrenia: a meta-analysis.

View review abstract online

Comparison
Relationship between functional outcomes (both neurocognitive function and community function) and symptom severity in schizophrenia (both inpatients and outpatients)

Summary of evidence
Moderate to low quality evidence (large sample, direct, inconsistent, unable to assess precision) suggests that negative symptoms (but not positive symptoms) are significantly associated with global neurocognitive function and with community function and skills assessment. Symptom severity may act as a mediator between neurocognition and functional impairment.

Positive Symptoms
# Course & Outcomes – Functional Outcomes

## Positive Symptoms

<table>
<thead>
<tr>
<th>Studies</th>
<th>N</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>1297</td>
<td>No significant relationship reported between positive symptom severity and composite neurocognitive function, ( r = -0.00, p = 0.97 )</td>
</tr>
<tr>
<td>Individual domains of cognitive function (including working memory, processing speed, verbal learning, problem solving, attention, visual learning) also failed to show any significant interaction with positive symptoms</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Studies</th>
<th>N</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>549</td>
<td>No significant relationship reported between positive symptom severity and community function, ( r = -0.03, p = 0.55 )</td>
</tr>
</tbody>
</table>

## Negative Symptoms

<table>
<thead>
<tr>
<th>Studies</th>
<th>N</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>4929</td>
<td>Medium effect size suggests a significant relationship between negative symptom severity and composite neurocognitive function, ( r = -0.24, p &lt; 0.01 )</td>
</tr>
<tr>
<td>Significant effect was consistent across all individual domains of cognitive function including working memory, processing speed, verbal learning, problem solving, attention, visual learning</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Studies</th>
<th>N</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>2341</td>
<td>Medium effect size suggests a significant relationship between negative symptom severity and community function, ( r = -0.42, p &lt; 0.01 ); and skills assessment (5 studies, N = 269), ( r = -0.28, p &lt; 0.01 )</td>
</tr>
</tbody>
</table>

### Subgroup analysis examined the potential for negative symptoms to mediate the effect of neurocognitive performance on functional outcomes

- The relationship between global neurocognition and community function appears to be at least partially mediated by negative symptom severity, \( p < 0.01 \)
- The relationship between global neurocognition and skills assessment also appears to be mediated by negative symptom severity, \( p < 0.01 \)
- These effects were consistent across all neurocognitive domains, including speed of processing, verbal learning, working memory, attention, problem solving, and visual learning.

## Consistency

Authors report all results are inconsistent

## Precision

No measure of precision reported

## Directness

Direct for symptom relationships, indirect subgroup analysis
Explanation of acronyms

CI = Confidence Interval,  
\( d \) = Cohen’s \( d \) and \( g \) = Hedges’ \( g \) = standardized mean differences (see below for interpretation of effect size)  
\( I^2 \) = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance),  
\( N \) = number of participants,  
\( p \) = statistical probability of obtaining that result (\( p < 0.05 \) generally regarded as significant),  
\( Q \) = \( Q \) statistic for the test of heterogeneity,  
\( Q_w \) = test for within group differences (heterogeneity in study results within a group of studies – measure of study consistency),  
\( Q_B \) = test for between group differences (heterogeneity between groups of studies for an outcome of interest),  
\( vs \) = versus
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[15].

† 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 randomized trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardized 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[15].

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[16]. lnOR stands for logarithmic OR where a lnOR of 0
hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (e.g., 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 unforeseen 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. Unstandardized (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. Standardized regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

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

§ 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[16].

‖ 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.

The content in this topic is yet to be reviewed by a content expert
REFERENCES