TECHNICAL COMMENTARY

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POST-TRAUMATIC STRESS DISORDER LIBRARY

Social cognition

Introduction

Social cognition describes the ability to understand the actions and intentions of other people; the cognitive processes underlying social interactions that are used to guide behaviour. Social cognition is crucial for effective communication and relates to social competence and may predict work functioning.

Aspects of social cognition may be altered in people with a mental illness, including theory of mind, social perception, emotion processing, emotion regulation, and empathy. Theory of mind refers to the ability to infer the mental states of other people. Social perception is an awareness of social cues and norms that dictate social interactions. Emotion processing is the ability to perceive emotional cues, such as the emotional content of facial expressions or vocal inflections (prosody). Emotion regulation is the conscious or unconscious effort to affect the likelihood, intensity, or duration of an emotion. Empathy involves showing concern for others, understanding their perspective, experiencing distress when exposed to others' negative events, and having the ability to place oneself into fictional situations and empathically relate to the characters ('fantasy').

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 2010 that report results separately for people with PTSD. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. When multiple copies of reviews were found, only the most recent version was included. We prioritised reviews with pooled data for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews with less than 50% of items checked have been excluded from the library. 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 (RCTs) may be downgraded to moderate or 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)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found three systematic reviews that met our inclusion criteria[3-5].

- Moderate quality evidence found the emotional and affective aspects of theory of mind (but not cognitive aspects) were disturbed in people with PTSD. Most people with PTSD also exhibit altered perception of emotions, including difficulty processing threatening expressions and a reduction in the perception of positive emotions such as happiness. There were disturbances in affective empathy, from emotional

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resonance to compassionate feelings. Finally, social behaviour is disturbed in individuals with PTSD, which damages interactions within the family circle. Anger, impulsivity, and physical and verbal aggression underpin these difficulties.

- Moderate quality evidence finds a medium to large association between increased emotion regulation and increased PTSD symptoms. Small to medium-sized associations were also found with experiential avoidance, expressive suppression, rumination, thought suppression, and worry. There were no associations with reappraisal and acceptance.

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Social cognition

Couette M, Mouchabac S, Bourla A, Nuss P, Ferreri F

Social cognition in post-traumatic stress disorder: A systematic review

The British journal of clinical psychology 2020; 59: 117-38

View review abstract online

Comparison	**Social cognition in people with PTSD.**
Summary of evidence	**Moderate quality evidence (mixed samples, unable to assess consistency or precision, direct) found the emotional and affective aspects of theory of mind (but not cognitive) were disturbed in people with PTSD. Most people also exhibit altered perception of emotions, including difficulty processing threatening expressions (anger, fear, sadness) and a reduction (in terms of both intensity and processing speed) in the perception of positive emotions such as happiness. There were disturbances in affective empathy, from emotional resonance to more complex empathy such as compassionate feelings. Finally, social behaviour is disturbed in individuals with PTSD, which damages interactions within the family circle (partner, children). Anger, impulsivity, and physical and verbal aggression underpin these difficulties.**

Social cognition

Theory of mind

4 studies (N = 75) found cognitive theory of mind was preserved in participants with PTSD in 3/4 studies, whereas the emotional and affective aspects of theory of mind were disturbed in all participants.

Social perception

17 studies (N = 378) found nearly 75% of patients exhibited an altered perception of emotions. These alterations entailed difficulty processing threatening expressions (anger, fear, sadness) and a reduction (in terms of both intensity and processing speed) in the perception of positive emotions such as happiness.

Affective empathy

7 studies (N = 133) found disturbances in affective empathy, from emotional resonance to more complex empathy such as compassionate feelings.

Social behaviour deficits

6 studies (N = 355) found social behaviour is disturbed in individuals with PTSD. This deficit particularly damages interactions within the family circle (partner, children). Anger, impulsivity, and physical and verbal aggression underpin these difficulties.

Consistency in results‡	Unable to assess; no measure of consistency is reported.
Precision in results§	Unable to assess; no measure of precision is reported.
Directness of results‖	Direct

Seligowski AV, Lee DJ, Bardeen JR, Orcutt HK

Emotion regulation and posttraumatic stress symptoms: a meta-analysis

Cognitive Behaviour Therapy 2015; 44: 87-102

View review abstract online

Comparison	**Associations between emotion regulation and PTSD symptoms.**
Summary of evidence	**Moderate quality evidence (unclear sample size, inconsistent, precise, direct) finds a medium-sized association between increased emotion regulation and increased PTSD symptoms. Small to medium-sized associations were also found with experiential avoidance, expressive suppression, rumination, thought suppression, and worry. There were no associations with reappraisal and acceptance.**
Emotion regulation	
A large association between increased PTSD symptoms and increased emotion regulation; 13 studies, N not reported, r = 0.53, 95%CI 0.46 to 0.59, p < 0.001, Q = 68.91, p < 0.001 Small to medium-sized associations were also found with experiential avoidance, expressive suppression, rumination, thought suppression, and worry. There were no associations with reappraisal and acceptance.	
Consistency in results	Inconsistent
Precision in results	Precise
Directness of results	Direct

Villalta L, Smith P, Hickin N, Stringaris A

Emotion regulation difficulties in traumatized youth: a meta-analysis and conceptual review

Social cognition

European Child and Adolescent Psychiatry 2018; 27: 527-44 View review abstract online	
Comparison	**Associations between emotion regulation and PTSD symptoms in youth.**
Summary of evidence	**Moderate to high quality evidence (large sample size, inconsistent, precise, direct) finds a medium to large association between increased emotion regulation and increased PTSD symptoms. There were no moderating effects of measure, age, gender, type of trauma or source of recruitment.**
Emotion regulation	
A medium to large association between increased PTSD symptoms and increased emotion regulation; 21 studies, N = 5,818, r = 0.37, 95%CI 0.24 to 0.50, $p < 0.05$, I^2 = 95% There were no moderating effects of measure, age, gender, type of trauma or source of recruitment.	
Consistency in results	Inconsistent
Precision in results	Precise
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, Q = measure of heterogeneity, p = statistical probability of obtaining that result, r = correlation coefficient

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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 that 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[6].

† 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 that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that 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) that 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[6].

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 effect is considered if RR > 2 or < 0.5 and a large effect if RR > 5 or < 0.2[7]. 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

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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.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that 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[6];

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

§ 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[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 that 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.

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