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Prevalence of anxiety following adult traumatic brain injury: a meta-analysis
comparing measures, samples and post-injury intervals

Electronic Supplementary Material

Table A: Search Strategy

PSYCINFO

traumatic brain injur*.SH OR traumatic brain injur*.TI OR traumatic brain injur*.AB OR TBI.SH OR TBI.TI OR TBI.AB OR head injur*.SH OR head injur*.TI OR head injur*.AB OR brain injur*.SH OR brain injur*.TI OR brain injur*.AB OR head trauma.SH OR head trauma.TI OR head trauma.AB OR cranio?cerebral trauma.SH OR cranio?cerebral trauma.TI OR cranio?cerebral trauma.AB

AND

anxiety disorder.SH OR anxiety disorder.TI OR anxiety disorder.AB OR psychiatric diagnos*.SH OR psychiatric diagnos*.TI OR psychiatric diagnos*.AB OR psychological sequelae.SH OR psychological sequelae.TI OR psychological sequelae.AB OR affective disorder.SH OR affective disorder.TI OR affective disorder.AB OR anxiety.SH OR anxiety.TI OR anxiety.AB OR generalised anxiety disorder.SH OR generalised anxiety disorder.TI OR generalised anxiety disorder.AB OR social anxiety disorder.SH OR social anxiety disorder.TI OR social anxiety disorder.AB OR acute stress disorder.SH OR acute stress disorder.TI OR acute stress disorder.AB OR post traumatic stress disorder.SH OR post traumatic stress disorder.TI OR post traumatic stress disorder.AB OR post-traumatic stress disorder.SH OR post-traumatic stress disorder.TI OR post-traumatic stress disorder.AB OR posttraumatic stress disorder.SH OR posttraumatic stress disorder.TI OR posttraumatic stress disorder.AB OR social phobia.SH OR social phobia.TI OR social phobia.AB

PUBMED

Brain concussion[mh] OR Brain hemorrhage, traumatic[mh] OR Brain injury, chronic[mh] OR Diffuse axonal injury[mh] OR Coma, post head injury[mh] OR Head injuries, closed[mh] OR Intracranial hemorrhage, traumatic[mh] OR Skull fractures[mh] OR traumatic brain injur* [tiab] OR TBI [tiab] OR head injur* [tiab] OR brain injur* [tiab] OR brain damage [tiab] OR head trauma [tiab] OR craniocerebral trauma [tiab] OR cranio-cerebral trauma [tiab] OR cranio cerebral trauma [tiab]

AND

Anxiety disorders[mh] OR Stress disorders, traumatic[mh] OR Anxiety disorder [tiab] OR Psychiatric diagnos* [tiab] OR Psychological sequelae [tiab] Affective disorder [tiab] OR Anxiety [tiab] OR generalized anxiety disorder [tiab] OR generalised anxiety disorder [tiab] OR social anxiety disorder [tiab] acute stress disorder [tiab] post-traumatic stress disorder [tiab] posttraumatic stress disorder [tiab] OR post traumatic stress disorder [tiab] OR social phobia [tiab]

NOT

War [tiab] OR combat [tiab] OR military [tiab]

SCOPUS

{(traumatic brain injur*} OR TBI OR {head injur*} OR {brain injur*} OR {brain damage} OR {head trauma} OR {craniocerebral trauma} OR {cranio-cerebral trauma} OR {cranio cerebral trauma}) AND (anxiety OR {anxiety disorder} OR {psychiatric diagnos*} OR {psychological sequelae} OR {affective disorder} OR {generalised anxiety disorder} OR {generalized anxiety disorder} OR {social anxiety disorder} OR {acute stress disorder} OR {post-traumatic stress disorder} OR {post traumatic stress disorder} OR {posttraumatic stress disorder}) OR PTSD AND NOT (combat OR war OR military OR veteran OR animal OR rat OR mice)

ISI Web of Science

Topic= (traumatic brain injur* OR TBI OR head injur* OR brain injur* OR brain damage OR head trauma OR craniocerebral trauma OR cranio-cerebral trauma OR cranio cerebral trauma)

AND

Topic= (anxiety OR anxiety disorder OR psychiatric diagnos* OR psychological sequelae OR affective disorder OR generalised anxiety disorder OR generalized anxiety disorder OR social anxiety disorder OR acute stress disorder OR post-traumatic stress disorder OR posttraumatic stress disorder OR post traumatic stress disorder OR PTSD)

NOT

Topic = (combat OR war OR military OR veteran OR animal OR rat OR mice)

Refined by: Publication Years AND Document Type=(ARTICLE)

Table B: Anxiety measures eligible for analysis and corresponding list of references

General anxiety measures

Self-report scale name	Abbrev.	Author(s) / Year	Time frame
Beck Anxiety Inventory	BAI	(Beck, Epstein, Brown, & Steer, 1988)	previous week
Hospital Anxiety and Depression Scale	HADS	(Zigmond & Snaith, 1983)	previous week
Leeds Scale for the Self-assessment of Anxiety & Depression	Leeds	(Snaith, Bridge, & Hamilton, 1976)	previous 1-2 days
State Trait Anxiety Inventory	STAI	(Spielberger, Gorsuch, & Luchene, 1970)	at this moment
Clinical interview name	Abbrev.	Author(s) / Year	'Current' time frame
Diagnostic Interview Schedule	DIS	(Robins, Helzer, Croughan, & Ratcliff, 1981)	previous week, previous month, previous 6 months, previous year
Mini International Neuropsychiatric Interview	MINI	(Sheehan et al., 1998)	previous 2 weeks
Present State Examination	PSE	(Wing, Cooper, & Sartorius, 1974)	previous month
Schedule for Affective Disorders and Schizophrenia - Lifetime	SADS-L	(Endicott & Spitzer, 1978)	previous week
Schedules for Clinical Assessment in Neuropsychiatry	SCAN	(Wing et al., 1990)	previous month
Structured Clinical Interview for DSM disorders	SCID	(First, Spitzer, Gibbon, & Williams, 1997)	previous month

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: psychometric properties. *Journal of Consulting and Clinical Psychology*, 56(6), 893-897.

Endicott, J., & Spitzer, R. L. (1978). A diagnostic interview: the schedule for affective disorders and schizophrenia. *Arch Gen Psychiatry*, 35(7), 837-844.

- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. (1997). Structured clinical interview for DSM-IV axis I disorders, clinician version (SCID-CV). *Washington, DC: American Psychiatric Association.*
- Robins, L. N., Helzer, J. E., Croughan, J., & Ratcliff, K. S. (1981). National Institute of Mental Health Diagnostic Interview Schedule. Its history, characteristics, and validity. *Arch Gen Psychiatry, 38*(4), 381-389.
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., . . . Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (MINI): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry, 59*, 22-33
- Snaith, R., Bridge, G., & Hamilton, M. (1976). The Leeds scales for the self-assessment of anxiety and depression. *The British Journal of Psychiatry, 128*(2), 156-165.
- Spielberger, C. D., Gorsuch, R. L., & Luchene, R. E. (1970). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Wing, J. K., Babor, T., Brugha, T., Burke, J., Cooper, J. E., Giel, R., . . . Sartorius, N. (1990). SCAN: Schedules for clinical assessment in neuropsychiatry. *Archives of General Psychiatry, 47*(6), 589-593.
- Wing, J. K., Cooper, J. E., & Sartorius, N. (1974). The description and classification of psychiatric symptoms: An instruction manual for the PSE and CATEGO system. *London: Cambridge University.*
- Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica, 67*(6), 361-370. doi: 10.1111/j.1600-0447.1983.tb09716.x

Table C: Overview of study review and selection

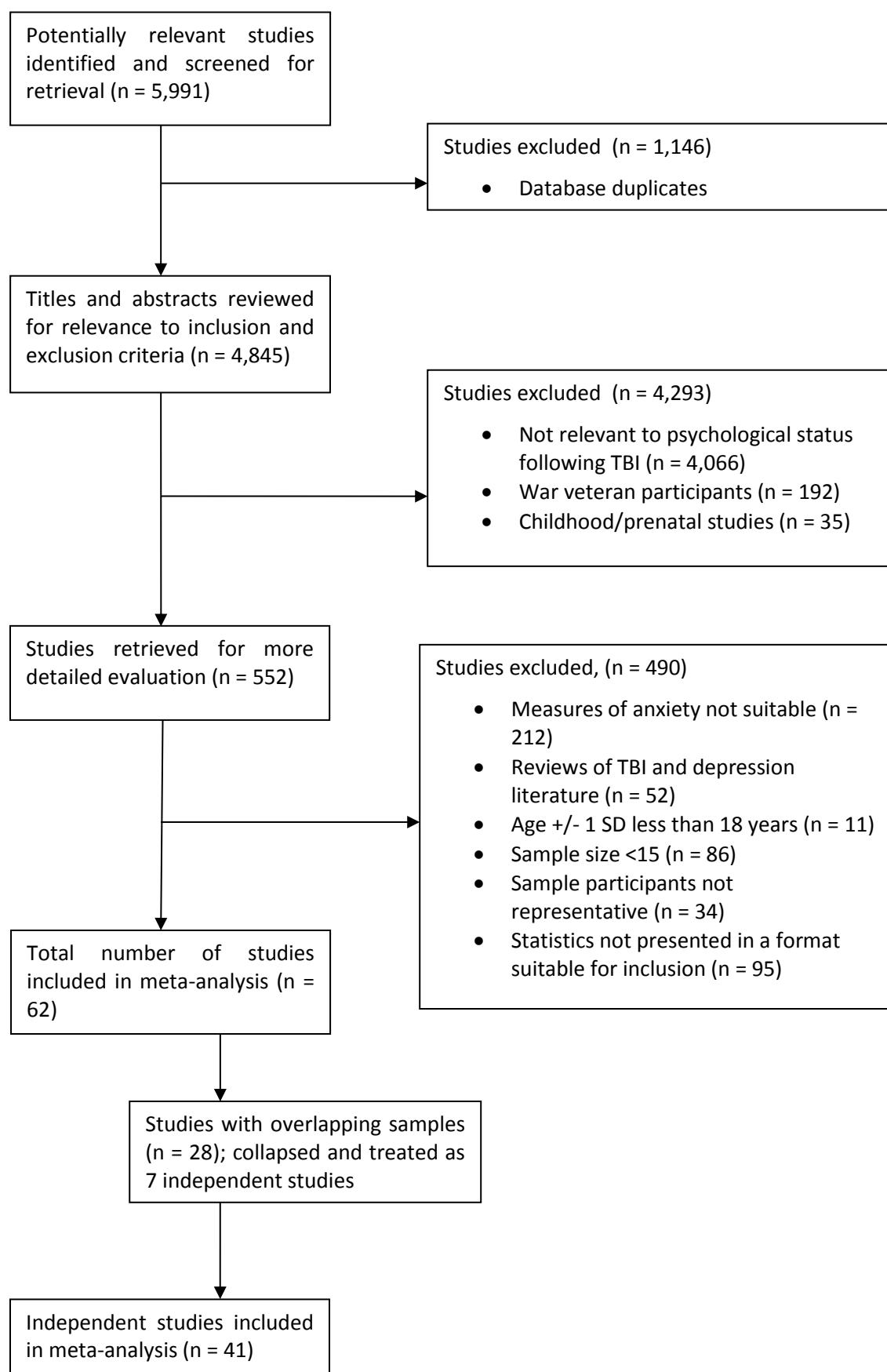


Table D: Papers using overlapping samples - combined and treated as non-independent studies in the current meta-analysis

Study 'name' in meta-analysis	Papers with overlapping samples
Bryant 2010	(Bryant et al., 2010) (Meares et al., 2011)
Hawthorne 2011	(Hawthorne, Gruen, & Kaye, 2009) (Hawthorne, Kaye, Gruen, Houseman, & Bauer, 2011)
Koponen 2002	(Koponen et al., 2002) (Koponen et al., 2005)
Ponsford Group A	(Ponsford, Olver, Ponsford, & Nelms, 2003) (Ponsford, 2003) (Ponsford & Schönberger, 2010)
Ponsford Group B	(Draper, Ponsford, & Schonberger, 2007) (Draper & Ponsford, 2009) (Senathi-Raja, Ponsford, & Schonberger, 2010)
Ponsford Group C	(Ponsford & Ziino, 2003) (Ziino & Ponsford, 2006) (Parcell, Ponsford, Rajaratnam, & Redman, 2006) (Whelan-Goodinson, Ponsford, & Schönberger, 2008) (Whelan-Goodinson, Ponsford, & Schönberger, 2009) (Whelan-Goodinson, Ponsford, Johnston, & Grant, 2009) (Whelan-Goodinson, Ponsford, Schonberger, & Johnston, 2010) (Shekleton et al., 2010) (Ponsford, Parcell, Sinclair, Roper, & Rajaratnam, 2013) (Ponsford, Schönberger & Rajaratnam, 2014)
Ponsford Group D	(Gould, Ponsford, & Spitz, 2014) (Gould, Ponsford, Johnston, & Schonberger, 2011) (Alway, McKay, Ponsford, & Schnberger, 2012) (Dahm, Wong, & Ponsford, 2013) (Spitz, Schonberger, & Ponsford, 2013) (Gregório, Gould, Spitz, van Heugten, & Ponsford, 2014)

References

- Alway, Y., McKay, A., Ponsford, J. L., & Schnberger, M. (2012). Expressed emotion and its relationship to anxiety and depression after traumatic brain injury. *Neuropsychological Rehabilitation, 22*(3), 374-390.
- Bryant, R. A., O'Donnell, M. L., Creamer, M., McFarlane, A. C., Clark, C. R., & Silove, D. (2010). The psychiatric sequelae of traumatic injury. *Am J Psychiatry, 167*(3), 312-320. doi: 10.1176/appi.ajp.2009.09050617
- Dahm, J., Wong, D., & Ponsford, J. L. (2013). Validity of the Depression Anxiety Stress Scales in assessing depression and anxiety following traumatic brain injury. *Journal of Affective Disorders.*
- Draper, K. R., & Ponsford, J. L. (2009). Long-term outcome following traumatic brain injury: A comparison of subjective reports by those injured and their relatives. *Neuropsychological Rehabilitation, 19*(5), 645-661. doi: <http://dx.doi.org/10.1080/17405620802613935>
- Draper, K. R., Ponsford, J. L., & Schonberger, M. (2007). Psychosocial and emotional outcomes 10 years following traumatic drain injury. *Journal of Head Trauma Rehabilitation, 22*(5), 278-287.
- Gould, K. R., Ponsford, J. L., Johnston, L., & Schonberger, M. (2011). The nature, frequency and course of psychiatric disorders in the first year after traumatic brain injury: A prospective study. *Psychological Medicine, 41*(10), 2099-2109.
- Gould, K. R., Ponsford, J. L., & Spitz, G. (2014). Association between cognitive impairments and anxiety disorders following traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology, 36*(1), 1-14.
- Gregório, G. W., Gould, K. R., Spitz, G., van Heugten, C. M., & Ponsford, J. L. (2014). Changes in self-reported pre- to postinjury coping styles in the first 3 years after traumatic brain injury and the effects on psychosocial and emotional functioning and quality of life. *Journal of Head Trauma Rehabilitation, 29*(3), E43 - E53.
- Hawthorne, G., Gruen, R. L., & Kaye, A. H. (2009). Traumatic brain injury and long-term quality of life: Findings from an Australian study. *Journal of Neurotrauma, 26*(10), 1623-1633.
- Hawthorne, G., Kaye, A. H., Gruen, R., Houseman, D., & Bauer, I. (2011). Traumatic brain injury and quality of life: Initial Australian validation of the QOLIBRI. *Journal of Clinical Neuroscience, 18*(2), 197-202.
- Koponen, S., Taiminen, T., Honkalampi, K., Joukamaa, M., Viinamäki, H., Kurki, T., . . . Tenovu, O. (2005). Alexithymia after traumatic brain injury: Its relation to magnetic resonance imaging findings and psychiatric disorders. *Psychosomatic Medicine, 67*(5), 807-812.
- Koponen, S., Taiminen, T., Portin, R., Himanen, L., Isoniemi, H., Heinonen, H., . . . Tenovu, I. (2002). Axis I and II psychiatric disorders after traumatic brain injury: A 30-year follow-up study. *American Journal of Psychiatry, 159*(8), 1315-1321. doi: 10.1176/appi.ajp.159.8.1315
- Meares, S., Shores, E., Taylor, A. J., Batchelor, J., Bryant, R. A., Baguley, I. J., . . . Marosszeky, J. E. (2011). The prospective course of postconcussion syndrome: The role of mild traumatic brain injury. *Neuropsychology, 25*(4), 454-465. doi: <http://dx.doi.org/10.1037/a0022580>
- Parcell, D. L., Ponsford, J. L., Rajaratnam, S. M., & Redman, J. R. (2006). Self-reported changes to nighttime sleep after traumatic brain injury. *Arch Phys Med Rehabil, 87*(2), 278-285.
- Ponsford, J. L., Schönberger, M. & Rajaratnam, S. M. (2014). A model of fatigue following traumatic brain injury. *Journal of Head Trauma Rehabilitation*, article in press.
- Ponsford, J. L. (2003). Sexual changes associated with traumatic brain injury. *Neuropsychological Rehabilitation, 13*(1-2), 275-289.
- Ponsford, J. L., Olver, J., Ponsford, M., & Nelms, R. (2003). Long-term adjustment of families following traumatic brain injury where comprehensive rehabilitation has been

- provided. *Brain Injury*, 17(6), 453-468. doi:
<http://dx.doi.org/10.1080/0269905031000070143>
- Ponsford, J. L., Parcell, D. L., Sinclair, K. L., Roper, M., & Rajaratnam, S. M. (2013). Changes in sleep patterns following traumatic brain injury: A controlled study. *Neurorehabilitation and Neural Repair*, 27(7), 613-621. doi:
<http://dx.doi.org/10.1177/1545968313481283>
- Ponsford, J. L., & Schönberger, M. (2010). Family functioning and emotional state two and five years after traumatic brain injury. *Journal of the International Neuropsychological Society*, 16(2), 306-317.
- Ponsford, J. L., & Ziino, C. (2003). Fatigue and Attention Following Traumatic Brain Injury. *Zeitschrift fur Neuropsychologie*, 14(3), 155-163. doi: <http://dx.doi.org/10.1024/1016-264X.14.3.155>
- Senathi-Raja, D., Ponsford, J. L., & Schonberger, M. (2010). The association of age and time postinjury with long-term emotional outcome following traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, 25(5), 330-338. doi:
<http://dx.doi.org/10.1097/HTR.0b013e3181ccc893>.
- Shekleton, J., Parcell, D., Redman, J., Phipps-Nelson, J., Ponsford, J. L., & Rajaratnam, S. (2010). Sleep disturbance and melatonin levels following traumatic brain injury. *Neurology*, 74(21), 1732-1738. doi:
<http://dx.doi.org/10.1212/WNL.0b013e3181e0438b>
- Spitz, G., Schonberger, M., & Ponsford, J. L. (2013). The Relations Among Cognitive Impairment, Coping Style, and Emotional Adjustment Following Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation*, 28(2), 116-125. doi:
[10.1097/HTR.0b013e3182452f4f](http://dx.doi.org/10.1097/HTR.0b013e3182452f4f)
- Whelan-Goodinson, R., Ponsford, J. L., Johnston, L., & Grant, F. (2009). Psychiatric disorders following traumatic brain injury: Their nature and frequency. *The Journal of Head Trauma Rehabilitation*, 24(5), 324-332. doi:
<http://dx.doi.org/10.1097/HTR.0b013e3181a712aa>
- Whelan-Goodinson, R., Ponsford, J. L., & Schonberger, M. (2008). Association between psychiatric state and outcome following traumatic brain injury. *Journal of Rehabilitation Medicine*, 40(10), 850-857. doi: 10.2340/16501977-0271
- Whelan-Goodinson, R., Ponsford, J. L., & Schönberger, M. (2009). Validity of the Hospital Anxiety and Depression Scale to assess depression and anxiety following traumatic brain injury as compared with the Structured Clinical Interview for DSM-IV. *Journal of Affective Disorders*, 114(1-3), 94-102.
- Whelan-Goodinson, R., Ponsford, J. L., Schonberger, M., & Johnston, L. (2010). Predictors of psychiatric disorders following traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, 25(5), 320-329. doi: <http://dx.doi.org/10.1097/HTR.0b013e3181c8f8e7>
- Ziino, C., & Ponsford, J. L. (2006). Selective attention deficits and subjective fatigue following traumatic brain injury. *Neuropsychology*, 20(3), 383-390. doi:
<http://dx.doi.org/10.1037/0894-4105.20.3.383>