

Short report

Predictive validity of acute stress disorder
in children and adolescentsTim Dalgleish, Richard Meiser-Stedman, Nancy Kassam-Adams, Anke Ehlers, Flaura Winston,
Patrick Smith, Bridget Bryant, Richard A. Mayou and William Yule**Summary**

Adult research suggests that the dissociation criterion of acute stress disorder has limited validity in predicting post-traumatic stress disorder (PTSD). We addressed this issue in child and adolescent survivors ($n=367$) of road accidents. Dissociation accounted for no significant unique variance in later PTSD, over and above other acute stress disorder criteria. Furthermore, thresholds of either three or more

re-experiencing symptoms, or six or more re-experiencing/hyperarousal symptoms, were as effective at predicting PTSD as the full acute stress disorder diagnosis.

Declaration of interest

None.

In the aftermath of trauma, an important challenge involves identifying individuals who will later develop post-traumatic stress disorder (PTSD).¹ The diagnosis of acute stress disorder, which differs from PTSD in its requirement of three or more dissociative symptoms (e.g. derealisation), was introduced to meet this challenge.^{2,3} The rationale is that dissociation in the acute phase can identify those at risk of later PTSD.² However, research suggests that dissociation actually accounts for little unique variance in predicting PTSD in adults,⁴ thus questioning the validity of acute stress disorder. Given the significant concerns about the dissociation mandate in adults, it is important to fully assess whether dissociation has predictive utility in trauma-exposed youth. Our primary aim was therefore to examine the predictive utility of the acute stress disorder dissociation criterion in children and adolescents in a large sample, homogeneous for type of trauma. To this end, we combined data from the three published studies in children and adolescents.^{5–7} Our second aim was to examine whether individual symptom counts across the different acute stress disorder/PTSD symptom criteria assessed in the month post-trauma can perform as well as full acute stress disorder in predicting later PTSD in children and adolescents.

Method

Data from hospital-attending, trauma-exposed child and adolescent road traffic accident survivors ($n=367$, 117 female) aged 6–17 years (mean=11.88, s.d.=2.60) were pooled from three centres: Oxford ($n=86$, aged 6–17 years);⁶ London ($n=41$, aged 10–16);⁵ and Philadelphia ($n=240$, aged 8–17).⁷ Written, informed consent was obtained from caregivers and assent from children. Of the 367 individuals, 285 were followed up at 6 months ($n=82$, $n=29$ and $n=174$ respectively). Participant recruitment and flow details are presented elsewhere.^{5–7} Diagnoses were based on widely used instruments with robust psychometrics, as follows. Acute stress disorder was assessed at 2–4 weeks (baseline) using either structured clinical interview (London), the Child Acute Stress Questionnaire⁸ (Philadelphia), or a combination of questionnaire and interview (Oxford). At 6 months PTSD was assessed using the Anxiety Disorder Interview Schedule,⁹ the Clinician-Administered PTSD Scale for Children and Adolescents,¹⁰ or the Childhood PTS Reaction Index^{11,12} respectively.

Results

At baseline 9% ($n=33$; 16 females) of the pooled sample met criteria for acute stress disorder and 23% ($n=83$; 38 females) for

sub-acute stress disorder (acute stress disorder minus dissociation), with 7% ($n=25$; 12 females) meeting criteria for PTSD at 6 months. Point-biserial correlations revealed no significant associations between age and presence of these diagnoses ($P>0.4$). As initial analyses revealed no significant effects involving research centre (coded by dummy variables) ($P>0.2$) reported analyses utilised the pooled sample.

As expected, baseline presence of acute stress disorder correlated significantly with 6-month PTSD ($\phi(283)=0.18$, $P<0.01$). Stepwise logistic regression predicting 6-month PTSD, with sub-acute stress disorder on step 1 and the acute stress disorder dissociation criterion on step 2, revealed sub-acute stress disorder as a significant predictor of PTSD (Wald=22.39, $P<0.001$), whereas dissociation provided no significant increment in PTSD prediction (Wald=0.48, $P>0.48$).

Table 1 shows the ability of different baseline acute stress disorder/PTSD symptom counts to predict PTSD at follow-up. In adult violent crime victims, six or more baseline symptoms of hyperarousal and/or re-experiencing predicted later PTSD as effectively as did full acute stress disorder, in terms of the trade-off between specificity and sensitivity.¹ It is clear from Table 1 that this threshold, and even a threshold of three or more re-experiencing symptoms, was if anything, somewhat better than the full acute stress disorder diagnosis in its balance of sensitivity and specificity for the present sample. Furthermore, adding full acute stress disorder (on step 2) to either of these symptom counts on step 1 in logistic regressions, to predict later PTSD, provided no significant independent predictive benefits for acute stress disorder (Wald<0.71, $P>0.4$) over and above the predictive effects of either symptom threshold alone (Wald>14.34, $P<0.001$).

Discussion

The acute stress disorder dissociation criterion appears to have no unique role in the prediction of later PTSD in a large sample of young trauma survivors, homogeneous for trauma type. The significant association between acute stress disorder and later PTSD may therefore simply reflect persistence or chronicity in the symptom clusters that acute stress disorder and PTSD have in common. Indeed, sub-acute stress disorder (acute stress disorder minus dissociation) was almost three times more sensitive than full acute stress disorder in predicting PTSD (Table 1). Thus, these data cast doubt on the predictive validity of the acute stress disorder diagnosis in younger people.

Table 1 Ability to predict PTSD at 6 months by varying acute stress disorder/PTSD symptom counts at 2–4 weeks

Criterion and number of symptoms required for diagnosis	Correctly classified, %	Sensitivity ^a	Specificity ^b	Positive predictive power ^c	Negative predictive power ^d
Acute stress disorder dissociation					
At least one symptom	41	0.85	0.37	0.12	0.96
At least two symptoms	68	0.50	0.70	0.14	0.93
At least three symptoms ^e	80	0.35	0.84	0.18	0.93
At least four symptoms	86	0.19	0.93	0.22	0.92
At least five symptoms	89	0.04	0.98	0.17	0.91
Acute stress disorder/PTSD					
Re-experiencing					
At least one symptom ^e	51	0.85	0.48	0.14	0.97
At least two symptoms	73	0.73	0.73	0.22	0.96
At least three symptoms	85	0.42	0.89	0.28	0.94
At least four symptoms	91	0.15	0.98	0.50	0.92
Avoidance					
At least one symptom ^e	48	0.81	0.44	0.13	0.96
At least two symptoms	72	0.54	0.74	0.17	0.94
Hyperarousal					
At least one symptom ^e	44	1.00	0.38	0.14	1.00
At least two symptoms	61	0.77	0.59	0.16	0.96
At least three symptoms	75	0.73	0.75	0.23	0.96
At least four symptoms	82	0.38	0.86	0.22	0.93
At least five symptoms	86	0.19	0.92	0.20	0.92
At least six symptoms	90	0.15	0.98	0.44	0.92
At least 6 re-experiencing or hyperarousal symptoms ^f	82	0.48	0.85	0.24	0.94
Sub-acute stress disorder	79	0.68	0.80	0.25	0.96
Acute stress disorder full diagnosis	87	0.24	0.93	0.26	0.93

PTSD, post-traumatic stress disorder.
a. Probability that someone with PTSD at 6 months would have earlier endorsed at least those particular symptoms of acute stress disorder/PTSD.
b. Probability that someone without later PTSD would not have endorsed at least those particular symptoms.
c. Probability that someone with those symptoms would later have PTSD.
d. Probability that someone without those symptoms would not go on to have PTSD.
e. Indicates the required number of symptoms for a DSM-IV diagnosis of acute stress disorder.
f. Algorithm used in the Trauma Screening Questionnaire.¹

Presence of three or more re-experiencing symptoms at baseline was as effective at predicting later PTSD as the full acute stress disorder diagnosis, and possibly better. Indeed, the full diagnosis provided no significant increment in PTSD prediction over and above this simple threshold. Similar results were found for a count of six or more hyperarousal/re-experiencing symptoms. However, sensitivities for both of these thresholds were less than 50%, suggesting that they are not an effective screen.

Study limitations are that diagnoses were derived differently across the three centres on samples with different age ranges and the focus on a single-incident civilian trauma.

Tim Dalgleish, PhD, Medical Research Council Cognition and Brain Sciences Unit, Cambridge, UK; **Richard Meiser-Stedman**, PhD, Institute of Psychiatry, University of London, UK; **Nancy Kassam-Adams**, PhD, The Children's Hospital of Philadelphia, USA; **Anke Ehlers**, PhD, Institute of Psychiatry, University of London, UK; **Flaura Winston**, MD, PhD, The Children's Hospital of Philadelphia, USA; **Patrick Smith**, PhD, Institute of Psychiatry, University of London, UK; **Bridget Bryant**, PhD, **Richard A. Mayou**, FRCPsych, Department of Psychiatry, University of Oxford, UK; **William Yule**, PhD, Institute of Psychiatry, University of London, UK.

Correspondence: Tim Dalgleish, Medical Research Council Cognition and Brain Sciences Unit, 15 Chaucer Road, Cambridge CB2 2EF, UK. Email: tim.dalgleish@mrc-cbu.cam.ac.uk

First received 15 May 2007, final revision 8 Jan 2008, accepted 21 Jan 2008

References

- Brewin CR, Rose S, Andrews B, Green J, Tata P, McEvedy C, Turner S, Foa EB. Brief screening instrument for post-traumatic stress disorder. *Br J Psychiatry* 2002; **181**: 158–62.
- Harvey AG, Bryant RA. Acute stress disorder: a synthesis and critique. *Psychol Bull* 2002; **128**: 886–902.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders* (4th edn) (DSM-IV). APA, 1994.
- Harvey AG, Bryant RA. The relationship between acute stress disorder and posttraumatic stress disorder: a prospective evaluation of motor vehicle accident survivors. *J Consult Clin Psychol* 1998; **66**: 507–12.
- Meiser-Stedman R, Yule W, Smith P, Glucksman E, Dalgleish T. Acute stress disorder and posttraumatic stress disorder in children and adolescents involved in assaults or motor vehicle accidents. *Am J Psychiatry* 2005; **162**: 1381–3.
- Bryant B, Mayou R, Wiggs L, Ehlers A, Stores G. Psychological consequences of road traffic accidents for children and their mothers. *Psychol Med* 2004; **34**: 335–46.
- Kassam-Adams N, Winston FK. Predicting child PTSD: the relationship between acute stress disorder and PTSD in injured children. *J Am Acad Child Adolesc Psychiatry* 2004; **43**: 403–11.
- Winston FK, Kassam-Adams N, Vivarelli-O'Neill C, Ford J, Newman E, Baxt C, Stafford P, Cnaan A. Acute stress disorder symptoms in children and their parents after pediatric traffic injury. *Pediatrics* 2002; **109**: e90.
- Silverman WK, Albano AM. *Anxiety Disorder Interview Schedule for DSM-IV: Child and Parent Interview Schedule*. Psychological Corporation, 1996.
- Nader KO, Kriegler JA, Blake DD, Pynoos RS, Newman E, Weathers FW. *Clinician-Administered PTSD Scale for Children and Adolescents*. National Center for PTSD, 1996.
- Nader KO. Psychometric review of the Childhood PTS Reaction Index (CPTS-R). In *Measurement of Stress, Trauma, and Adaptation* (ed BH Stamm): 83–6. Sidran Press, 2004.
- Pynoos RS, Frederick C, Nader K, Arroyo W, Steinberg A, Eth S, Nunez F, Fairbanks L. Life threat and posttraumatic stress in school-age children. *Arch Gen Psychiatry* 1987; **44**: 1057–63.