Abstract

Safety-seeking behaviours (SSBs) may be employed after exposure to a traumatic event to prevent a feared outcome. Cognitive models of post-traumatic stress disorder propose that SSBs contribute to the maintenance of this disorder by preventing disconfirmation of maladaptive beliefs and maintaining a sense of current threat. Recent research has found that SSBs impact on children's posttraumatic stress symptoms (PTSS) and their recovery. This paper sought to develop and validate a novel 22 -item Child Safety Behaviour Scale (CSBS) in a school-based sample of 391 secondary school pupils (12-15 years) who completed a battery of questionnaires and 68 young people (8-17 years) recently exposed to a trauma. Ninety-three percent of the sample (N=426) completed the new questionnaire. This sample was split (n=213) and principal components analysis was utilized alongside parallel analysis, which revealed that 13-items loaded well onto a two-factor structure. This structure was superior to a one-factor model and overall was a moderately good model of fit across indices investigated using confirmatory factory analysis with the other half of the sample. The CSBS showed excellent internal consistency (r=.90), good test-retest reliability (r=.64) and good discriminant validity and specificity. In a multiple linear regression, SSBs, negative appraisals and number of trauma types each accounted for unique variance in a model of posttraumatic stress symptoms. This provides initial support for the use of the CSBS in trauma-exposed youth as a clinically valuable tool for further research, clinical assessment and targeted intervention.

There has been over 30 years of research looking at the psychological impacts of exposure to traumatic events in young people, with the most common reaction studied being post-traumatic stress disorder (PTSD) (Trickey, Siddaway, Meiser-Stedman, Serpell & Field, 2012). PTSD has been found to be high in post-trauma populations: a recent meta-analysis of 72 peer reviewed articles with 3,563 youths found incidence rates of 15.9% (Alisic, Zalta, van Wesel, Larsen, Hafstad, Hassanpour & Smid, 2014). Community samples also yield high prevalence rates; a national population-based survey in Switzerland found 4.3% of 6787 adolescents met criteria for PTSD (Landolt, Schnyder, Maier, Schoenbucher, and Mohler-Kuo 2013).

There is a wealth of supporting literature for aetiological cognitive models of PTSD (Brewin & Holmes, 2003) and successful treatments have been devised (Ehlers, Clark, Hackmann, McManus & Fennell, 2005; Cohen, Deblinger, Mannarino, Steer, 2004; Foa, Hembree & Rothbaum, 2011). Ehlers and Clark's (2000) model has received considerable attention with substantive evidence (see Brewin & Holmes, 2003 for a comprehensive research summary). This model theorizes that people with PTSD perceive a *current* sense of threat post-trauma, due to characteristics of their trauma memories and excessively negative appraisals of the trauma and its aftermath. A range of cognitive strategies and behaviours (e.g. rumination, suppression and safety behaviours) employed by an individual attempting to reduce a sense of current threat, paradoxically *maintain* their problems.

Ehlers and Clark's model led to the development of cognitive therapy for PTSD (CT-PTSD), which targets trauma memories, trauma-related appraisals and maladaptive coping strategies (Ehlers et al., 2013). CT-PTSD has been found efficacious in ameliorating symptoms of PTSD in both adults (e.g., Ehlers et al., 2005) and young people (Meiser-Stedman et al., 2017; Smith, Yule, Perrin, Tranah, Dalgleish & Clark, 2007).

Safety behaviours, or more specifically, 'safety-seeking behaviours' highlighted by Ehlers and Clark (2000) as an important maintaining factor in PTSD, are defined as discrete or hidden strategies employed in order to prevent a dreaded outcome (Salkovskis, 1999; Ree & Harvey, 2004). Safety-seeking behaviours maintain symptomatology by thwarting cognitive modification of anxiety-provoking beliefs, as individuals attribute any avoidance of catastrophe as resulting from their behaviours. Moreover, in some situations safety-seeking behaviours may actually increase the likelihood of feared outcomes happening (Salkovskis, 1999). Safety-seeking behaviours are therefore an important clinical concept within cognitive models and have been theorized to be involved in preventing disconfirmation of damaging negative appraisals in a range of clinical presentations; anxiety disorders including panic disorder with agoraphobia (Salkovskis, Clark, Hackmann, Wells & Gelder, 1999), specific phobias (Ehring, Ehlers & Glucksman, 2008), depression (Moulds, Kandris, Williams & Lang, 2008) and psychosis (Morrison, 2001). Therapeutic intervention involving dropping safety-seeking behaviours has generally been shown to be more effective in reducing clinical anxiety as opposed to intervention without this goal (e.g. OCD; Salkovkis et al., 1999).

In order to screen for safety-seeking behaviours in young people, Meiser-Stedman, Smith et al. (2017) previously developed a novel 22-item Child Safety Behaviour Scale (CSBS; modified from the adult Safety Behaviour scale, Ehring et al., 2008) for a randomised controlled trial (RCT) with 8-17-year olds with PTSD. Mediation analysis revealed that safety-seeking behaviours (and trauma-related appraisals) partially mediated the relationship between treatment allocation (receiving child-appropriate CT-PTSD or being in a wait list control group) and post-treatment group differences in child post-traumatic stress scale scores. This underscores the importance of safety-seeking behaviours in predicting responsiveness to treatment and further highlights their potential underlying role in the maintenance of PTSD symptomatology in young people as well as adults. However, this was

a small RCT using a non-validated safety-seeking behaviours measure, therefore conclusions regarding this mechanism remain tentative and require further examination.

Within research and clinical settings, the development of a concise, psychometrically valid, paediatric self-report tool that screens for the use of safety-seeking behaviours would be valuable. Within research, a validated measure of safety-seeking behaviours could be employed to further examine theoretical models of PTSD. This could elucidate differences in the use of safety-seeking behaviours between age groups, gender and exposure to differing types of trauma. Such knowledge could also be used clinically to inform the development and targeting of idiosyncratic preventative methods and interventions. Thus, the current study seeks to validate the utility of the recently formed CSBS, exploring its psychometric properties, streamlining the content and exploring the factor structure to establish what strategies young people employ to feel safe following trauma.

As depression and anxiety often accompany PTSS, the specificity of the relationship between safety-seeking behaviours with PTSS was also investigated. To further examine the role of safety-seeking behaviours in PTSD, the predictive power of safety-seeking behaviours was investigated alongside other identified risk factors identified in young person populations including: age, gender, number of types of trauma exposure and negative appraisals (Trickey et al., 2012; Landolt et al., 2013; Meiser-Stedman, Smith et al., 2017).

To summarise. the current study sought to: 1) examine the psychometric properties of the CSBS to create a valid and clinically useful measure 2) examine whether safety-seeking behaviours predict the severity of PTSD, over and above the effect of other predictors. In line with Ehlers and Clark's model we hypothesized that children and adolescents with PTSD would display more usage of safety-seeking behaviours compared to those without PTSD, and that safety-seeking behaviours would be a significant predictor of PTSS (alongside aforementioned predictors).

Method

Participants

Participants were recruited from two sources. Sample 1 (S1) comprised participants recruited through two rural secondary schools in [*edited for blinding*]. See Figure 1 for sampling details and inclusion criteria. For S1, the authors liaised with school staff to ascertain young people who would not meet the criterion. A total of 391 children and adolescents took part, aged 12.6-15.9 years (see Table 1 for sample overview). From both schools 391/555 (70.5%) pupils took part with four guardian opt-outs.

For the subset of S2 with PTSD, their main presenting problem must have been PTSD. Full details of the recruitment and procedure for sample 2 (S2) are presented in [*edited out for blind review*]. In summary, S2 consisted of 68 young people aged between 8.21-17.97 years all of whom had been exposed to a single trauma event but not all had PTSD. PTSD was ascertained by structured interview with a clinical psychologist using DSM-IV (American Psychiatric Association [APA], 1994) or ICD-10 (World Health Organization [WHO], 1992) diagnostic criteria and The Children's PTSD Inventory (Saigh, 2004). The remaining 39 participants had been exposed to a single traumatic event but did not meet diagnostic criteria for PTSD. All participants in S2 completed the Child Safety Behaviour Scale (CSBS) as part of a battery of questionnaires either online or with a researcher in person or over the phone (with support from parents as necessary for younger participants).

Procedure

For S1, secondary schools and colleges within the [*edited out for blind review*] region were contacted and those expressing interest were sent further information. Two Secondary schools could take part within the recruitment timeframe. The study used an opt-out consent procedure based on previous successful study design (e.g. Meiser-Stedman et al., 2012). A guardian information sheet including study details and informing of the opt-out procedure

were sent out to pupil's guardians and if no opt-out was received, consent was presumed so long as pupils also assented. The school also reminded pupils and guardians two weeks before the study and were confident in their usual communication systems. Information sheets, assent forms and the questionnaire packs were provided to pupils either during their morning form-time (school 1) or during the beginning of a lesson (school 2). Questionnaires took approximately 10 minutes to complete and required pupils to fill out the information with the most frightening thing they have experienced in mind. All participants in S1 received an aftercare sheet detailing how they could obtain mental health support including self-help and information web links, helplines and a point of contact within their school (S2 were already under support services). A 'wellbeing screen' was completed to detect subsyndromal mental health issues indicated by the measures (as determined by the measure's validated cut offs) these pupils were highlighted to the school contact and followed up by usual school safeguarding procedures. Four classes were then randomly chosen from the school 1 and 40 pupils were invited to fill out the Child and Adolescent Trauma Screen and CSBS after five months in order to obtain test-retest reliability.

Measures

A questionnaire battery containing the following measures was administered to S1:

Child and Adolescent Trauma Screen (CATS). To measure traumatic event exposure and PTSS the CATS, based on DSM-5 (APA, 2013) PTSD criteria, was employed (Sachser et al., 2017). Exposure to traumatic events is established on a 15-item checklist (CATSP1) including for example exposure to personal injury/abuse, observed violence, natural disaster and war followed by 20 items measuring PTSS rated on a scale of "*Never*" to "*Almost always*", and five questions pertaining to psychosocial functioning. The CATS has demonstrated good internal consistency in multiple samples (α=.88-.94) and good discriminant validity (Sachser et al., 2017). For the present sample, the presence of likely

PTSD was determined using the DSM-5 (APA, 2013) criteria; at least 1/5 re-experiencing symptoms, 1/2 avoidance symptoms, 2/7 symptoms of negative alterations in cognitions and mood and 2/6 hyperarousal symptoms, plus impairment in at least one area of functioning.

Child Safety Behaviour Scale (CSBS; see supplementary materials). An initial pool of 22-items was developed by clinicians with years of experience within trauma and research based on the adult scale (Ehring et al., 2008). Items included both behaviours (e.g., checking that windows are locked) and internal strategies (e.g., hiding one's feelings) that young people may use to prevent expected catastrophes such as being attacked or going crazy. Items were rated either "never", "sometimes", "often" or "always". The full 22-item scale was administered in S2. Participants from S2 completed the CSBS pre-treatment (if they had PTSD). For S1 the relevant ethics committee expressed concern over administering the item: 'I carry an object (e.g., special toy, sharp object) to make myself feel safer', given potential legal issues that might arise around whether such objects might be dangerous within schools. This item was therefore removed before administration to S1 and this item was therefore removed from all analysis. All data concerning the CSBS across both samples were used to ascertain the psychometric properties of the CSBS.

Children's Post-Traumatic Cognitions Inventory Short Form (CPTCI-S). Negative trauma-related appraisals were measured using the CPTCI-S (Mckinnon et al., 2016). The CPTCI-S consists of 10-items adapted from the original CPTCI (Meiser-Stedman et al., 2009) and items are rated on a 4-point scale from "*Don't agree at all*" to "*Agree a lot*". The CPTCI-S has demonstrated excellent internal consistency (α=.92), good construct validity and "moderate-to-high" test-retest reliability (*r*= .78; McKinnon et al., 2016).

Revised Child Anxiety and Depression Scale (RCADS-25). The short version of this scale was used to measure depression and anxiety (Ebesutani et al., 2012). The RCADS-25 has 25 items, 15 of which relate to the anxiety subscale and 10 to the depression subscale.

Items are scored on a 4-point scale ranging from "*Never*" to "*Always*". The RCADS-25 is a reliable measure demonstrating a clear-cut factor structure, satisfactory internal consistency (α=.65 and .83) and validity (Muris, Meesters & Schouten, 2002). The cut-offs for depression and anxiety for males and females are 15, 17 and 21, 25, respectively.

Design and ethical approval

For sample 1 (the current sample), a cross-sectional design was used, approved by the UK National Research Ethics Service, [*edited for blinding*]. For sample 2 (a previously obtained sample), a prospective longitudinal design and RCT design were used and involved with young people who had experienced a recent traumatic event ('*edited for blinding'* trial). This was approved by [*edit for blinding*].

Data analysis

The Statistical Package for Social Sciences (SPSS) was utilised for all analyses other than Confirmatory Factor Analysis (CFA) which was conducted in R 3.3.2 with the Lavaan package. Power calculations were obtained from G*Power (Erdfelder, Faul & Buchner, 1996) and most were conducted *a priori* to ensure well-powered analyses. Shapiro-Wilk tests showed that in both groups all CSBS items were positively skewed (p<.001) therefore natural log transformations were conducted on all data. The model parameters and fit indices were estimated using WLSMV (weighted least squares mean and variance adjusted) using a covariance matrix with a Satorra-Bentler scaled test statistic for non-normally distributed data (Rosseel, 2012).

To establish item redundancy on the CSBS and determine factor structure, exploratory factor analysis was performed on half of the sample using principal components analysis (PCA) with oblimin rotation (as recommended by Field, 2009). The established items and factor structure was further tested in the other half of the sample using CFA. Cronbach's alpha was utilised to calculate the internal consistency of the CSBS. Test-retest reliability was

also assessed using a sub-sample from S1. The discriminant validity of the CSBS was examined in both samples, as were potential age and gender differences in CSBS scores via Mann-Whitney U tests. To examine the validity of the CSBS and the specificity of the relationship between PTSS and other outcome measures, Pearson's bivariate and partial correlations were conducted. Predictors of PTSS were explored using multiple linear regression modelling. Pupils with more than 20% missing data on a measure were excluded from any analysis of that measure (details of *n* included in each individual analysis are detailed below).

Results

Descriptive psychometric statistics for all measures from S1, excluding the CSBS which is discussed below, are displayed in Table 2. Varying numbers of pupils from S1 filled in each measure with the RCADS-25 being filled out the least, possibly due to order of presentation.

Exploratory factor analysis

In total 426 pupils completed the CSBS across samples. All participants were individually (from schools one and two and from the [*edited out for blind review*] trial) randomly assigned to two groups in SPSS to ensure each sample contributed 50% of cases to each group. Therefore, both groups consisted of 213 children (32 participants from the [*edited out for blind review*] previous RCT and 181 participants from the schools).

Preliminary analysis of group one (n=213) found the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .940 which is in the "superb range" (Hutcheson & Sofroniou, 1999). Bartlett's test of sphericity (χ^2 (210) = 2775.82, p<.001) demonstrated that correlations between items were adequate for PCA. PCA was run on the 21-item CSBS within group one. Examination of the scree plot showed an inflexion at three factors

suggesting a three-factor solution that accounted for 61.98% of variance. Using the Monte Carlo Parallel Analysis program (MCPA: Watkins, 2000), 100 random data sets were produced each with 21 variables and 213 participants for each PCA. Only factors with observed eigenvalues higher than the random eigenvalues are retained (Hayton, Allen & Scarpello, 2004): this criterion resulted in 3 factors. One of these had less than three loading items which has been shown to be weak/unstable (Costello & Osborne, 2005) resulting in an overall two-factor solution. Items loading at least .32 on one factor and .1 greater than its loading on the other factor were retained (Tabachnik & Fidell, 2007) resulting in the removal of a further seven items. Two factors were selected with the 13 remaining items and were rotated using direct oblimin rotation (Table 3 displays factor loadings). Assessment of the semantic content of the items that congregated on each factor led to the labelling of factor one "strategic hypervigilance" and factor two, "affective suppression". The correlation between these factors was r=.58, p<.001.

Confirmatory Factor Analysis

Factor loadings from the CFA showed similarly high factor loadings on the corresponding factors found in the PCA (Tabachnik & Fidell, 2007). This two-factor solution was tested via CFA in group 2 (n=213) using the same items for the factors found in the PCA (which were inputted as correlated factors) with several recommended indices (Jackson, Gillaspy, & Purc-Stephenson, 2009; Hu & Bentler, 1995). Cut-off criteria for fit indices for the CSBS conformed to widely used recommendations (Jackson et al., 2009; Hu & Bentler, 1995): χ^2 /degrees of freedom (df) ratio < 3 (Matsunaga, 2010), Comparative Fit Index (CFI) of at least .900, Root-Mean-Square Error of Approximation (RMSEA) of <.080 (Hooper, Coughlan & Mullen, 2008) and Tucker Lewis-Index (TLI) of at least 0.95 (Hu & Bentler, 1999). The χ^2 value was significant (χ^2 (89) = 128.87, p<.001) indicating the proposed model is discrepant from the data's true structure (Matsunaga, 2010). However, this test is notoriously difficult to

obtain a non-significant χ^2 when using self-report data (Bentler, 1990; Byrne, 1994), is very sensitive to sample size (Bandalos, 1993) and violations of the multivariate normality assumption (Curran, West & Finch, 1996; Hu, Bentler & Kano, 1992), even when the model may be adequate (McIntosh, 2007). Therefore, the fit of the model is better determined through other descriptive fit indices such as the CFI (Van Prooijen & Van Der Kloot, 2001; McDonald & Marsh, 1990). The CFI=0.98, TLI= 0.98 and RMSEA= 0.046 (CI 90% 0.027-0.063) indices all indicated the model was a good fit. The correlation between the two factors was r=.70, p<.001. The two-factor model was compared to a one factor model to compare whether the apparent subscales explain the underlying factor structure of the CSBS. The one factor model was a poor fit of the data; χ^2 (90) = 336.16, p<.001, CFI= 0.78, RMSEA= 0.155 (CI 90% 0.139-0.172), TLI= 0.69. Therefore, the two-factor model was a superior fit compared to a one-factor model.

Internal consistency

The internal consistency of the 13 item CSBS was explored for the total scale with S1 and S2 combined (N=431; 28 participants were excluded by SPSS due to missing values). *A priori* power calculations indicated this sample size reliability was adequately powered (α = 0.05; 1-β = 0.8). Cronbach's alpha was .90 for the full scale, indicating excellent overall internal consistency (George & Mallery, 2003). The subscales, strategic hypervigilance (CSBS-SH) and affective suppression (CSBS-AS), had alpha levels of .89 (n=437) and .85 (n=438), respectively, demonstrating good internal consistency (George & Mallery, 2003).

Test-retest reliability

Twenty-six pupils (out of 40) filled out the CSBS and 26 completed the CATS a second time from a subset of S1. The CSBS (total score) was significantly correlated between time points (r=.41, p=.03, *two-tailed,* 1-β=.75). Two clear outliers were identified from this group with CSBS scores dramatically changing between time points. These were removed

from the analysis, resulting in a stronger correlation of r=.64, p<.0.01, *two-tailed, n*=26, 1-β=.95. The CATS also had good test-retest reliability (n=28; r=.70, p<.001, *two-tailed*, 1-β=.99).

Discriminant validity

The ability of the CSBS to discriminate between children diagnosed with PTSD from S2, pupils without PTSD from S1 and those meeting threshold criteria for PTSD from S1 was examined using Mann-Whitney U tests. Cohen's *d* was used to measure effect size (conventional interpretation is that effect sizes of 0.2, 0.5 and 0.8 correspond to small, medium and large effect sizes, respectively; Cohen, 1992). Significantly higher scores on the CSBS (n=35, *Mdn*=23.0, IQR=10.0) were found in pupils in S1 meeting threshold for PTSD than for non-PTSD pupils (n=270, *Mdn*=12.0, IQR=10.0: U=1735.50, p<.001, Cohen's d= 1.28; 1-β = 0.91). Significantly higher scores on the CSBS were also found in the S2 between clinically diagnosed young people with PTSD (n=29, *Mdn*=22.0, IQR=17.0: U=67.000, p<.001) in comparison to trauma-exposed non-PTSD youth (n=39, *Mdn*= 6.0, IQR=11.0 Cohen's d=2.13; 1-β = 0.91).

Age and gender comparisons

A Mann-Whitney U test was employed to determine any gender differences in CSBS scores from combining S1 and S2. Females had significantly higher scores on the CSBS (n=224, *Mdn*= 10.0; IQR=10.0) than males (n=209, *Mdn*=11.0; IQR=14.0: U=16123.50, p<.001; Cohen's d=0.47). In order to examine the effects of age on the CSBS a Spearman's correlation was conducted between age and the CSBS which found a non-significant correlation (r =.04, p=.9). This analysis was also well powered (1-β = 0.91).

It was not possible to look at significant differences relating to ethnicity as there were not enough participant groupings.

Specificity

The CSBS and its subscales significantly positively correlated with the CATS (PTSD severity scale) and the RCADS-25 and its subscales (see Table 4). CATS scores significantly correlated with RCADS-25 depression (n=211, r=.71, p<.001) and anxiety (n=211, r=.73, p<.001*)* subscales. This is expected given the common comorbidity between depression and anxiety with PTSD in young people (Kar & Bastia, 2006). To ensure that the relationship between the CSBS and CATS was not an artifact of the relationship between anxiety or depression and the CATS, partial correlations were conducted. The CSBS remained significantly correlated with the CATS when controlling for depression, anxiety and total RCADS-25 scores (for all three analyses, r=.54, p<.001; n=202). All sample comparisons were well powered (minimum of 1-β = 0.8).

Predictors of PTSS

Bivariate correlations of S1 revealed significant zero-order relationships between total CATS score and number of trauma types (CATSP1; n=344, r=.45, p<.001), trauma-related appraisals (CPTCI-S; n=320, r=.82, p<.001), safety-seeking behaviours (CSBS; n=324, r=.54, p<.001) and gender (n=339, r =.29, p<.001), but not age (n=317, r=.03, p=.543). In order to determine the unique predictive power of non-outcome variables, the number of traumas, trauma-related appraisals (CPTCI-S), safety-seeking behaviours (CSBS) and gender were entered into a multiple linear regression with CATS score (i.e. PTSS) as the dependent variable. Gender (β =.05, p=0.11) did not account for unique variance in the model, however number of traumas (β =.17, p<.0001), CPTCI-S (β =.66, p<.0001), and the CSBS (β =.16, p<.0001) were all significant unique predictors. The overall model was significant, accounting for 72% of variance in CATS scores ($F_{4,299}$ = 188.01, p<.0001).

Discussion

The current study sought to develop a measure of safety-seeking behaviours suitable for children and adolescents, and to examine its relationship with PTSS. The psychometric properties of the CSBS were explored in this study across two samples; one with school pupils and one with a trauma-exposed sample (comprising youths with and without PTSD).

Item reduction and Factor Structure

The PCA in group one (the first half of the sample) supported a reduced 13-item CSBS with a two-factor underlying structure. The items loaded onto two factors which were labelled strategic hyper-vigilance and affective suppression. The overall scale and subscales showed good internal consistency. The two-factor model showed a moderately good fit in the CFA although this may require replication given the Chi-square index did not support this although this index is notoriously affected by sample size and non-normally distributed data (Curran, et al., 1996; Kenny, Kaniskan, & McCoach, 2015). All other indices did support the two-factor structure found in the PCA and this model did prove a better fit than a one-factor model, suggesting the scale is not unidimensional. The factor loadings and the finding that the two factors and overall scale correlated significantly with PTSS provide moderate support for a two-factor model, however interpretations should be tentative as the chi-square could indicate a potentially weak factor structure. The CSBS was also found to have good discriminant validity in distinguishing between both PTSD and non-PTSD pupils (in line with our hypothesis) and also between trauma-exposed children without PTSD and children with clinically diagnosed PTSD.

Psychometric properties

The full 13-item scale validated in the current study may provide valuable clinical insight into this coping strategy, and inform psychological intervention for youth with PTSD. It would be useful however for further research to examine the factor-structure in another sample. However, the fact that the CSBS can detect a difference between clinically diagnosed

PTSD and trauma-exposed children without PTSD suggests safety-seeking behaviours are an important mechanism in PTSD in young people.

The CSBS also showed good test-retest reliability, suggesting safety-seeking behaviour usage may change over time. The intermission of 5 months instead of the recommended 3-month gap (Clark-Carter, 2009) and small sample may have resulted in a diminished correlation. The initial test-retest reliability results for the CSBS are promising, suggesting the scale shows some stability over time and may be useful in assessing individual differences in safety-seeking behaviour use.

Females across the samples used safety-seeking behaviours following trauma significantly more so than males. This gender difference also mirrors the significantly higher levels of PTSS in females than males which has been noted in other surveys (e.g. Landolt et al., 2013). Differences in the use of safety-seeking behaviours across genders highlight the need for idiosyncratic psychological assessment and intervention in the treatment of PTSD. Although age was not significantly correlated with the CSBS, the majority of the participants were of secondary school age so it remains to be established whether there might be age differences between younger children or older adolescents and their safety-seeking behaviour usage.

The CSBS was significantly correlated with anxiety and depression as anticipated given their common comorbidity with PTSS (Kar & Bastia, 2006). The CSBS showed good specificity in its association with PTSS, remaining significantly correlated when controlling for overall levels of anxiety and depression. This evidences the potential clinical use of the CSBS as an outcome measure and the particular importance of safety-seeking behaviours for assessing and treating PTSS. Interestingly, the Affect Suppression subscale showed a closer relationship with PTSD symptoms and PTSD-typical appraisals than the Strategic Hypervigilance subscale. This is in line with other research showing that appraisals about

internal threat are more closely related to PTSD than those about external threat (Foa et al., 1997; Ehring et al., 2008). This suggests that for clinical practice, internal processes such as affect suppression, which may be more difficult to spot than observable behaviours, are of particular importance in treating PTSD in young people. It is interesting to note that young people seem to be using emotional suppression more so than avoidance as a strategy to feel safe. The present questionnaire may be a useful tool in identifying such problematic strategies.

Predictors of PTSS

A further aim of the study was to establish whether, compared to other putative predictors, CSBS might account for unique variance in PTSS. Regression modelling found appraisals, safety behaviours (as indexed by the CSBS) and number of trauma types significantly accounted for a significant 71.9% proportion of variance in PTSS, in line with our hypothesis. The unique predictive power of safety-seeking behaviours highlights the potential importance of this mechanism and necessitates more of a focus of safety-seeking behaviours within the trauma literature and within clinical practise as a potential target for intervention (Meiser-Stedman, Smith et al., 2017). The findings of this regression model are in line with the cognitive model of PTSD (Ehlers & Clark, 2000) and research demonstrating the importance of cognitive mechanisms in PTSD (Ehlers et al., 2003). Additional research will be necessary to ascertain other predictors (e.g. psychological, demographic, specific trauma types) that account for further variance in PTSS.

Strengths and limitations

The current study has notable strengths including that the main study recruited a large UK school-based sample size which makes the findings regarding prevalence of trauma exposure, safety-seeking behaviours and PTSD more reliable and generalizable. The trauma prevalence was in line with a previous UK sample that found 84% of adolescents had

experienced negative life events (Joseph, Mynard & Mayall, 2000). The low opt-out rates in the current study amongst the schools also means the sample should be relatively unbiased in terms of high or low rates of trauma exposure and psychopathology.

This research also had limitations, including the relative homogeneity of each sample (e.g. in terms of age, ethnicity or trauma events). With larger and more heterogenous samples it would be useful to determine whether certain safety-seeking behaviours are associated with specific traumas (e.g. interpersonal trauma compared to natural disasters). The sample had mostly older children therefore the finding that age was not a significant predictor of PTSS requires further investigation in younger samples (e.g. 7-11-years).

It could be argued that the use of self-report measures to categorize pupils with and without PTSD may not be clinically valid, however this format also may have enabled an anonymity enabling pupils to feel more able to answer truthfully and disclose sensitive information. Furthermore, the results of the second sample, which included clinician-diagnosed PTSD, confirmed the findings.

It could also be argued that these cognitive constructs are simply a description of PTSD symptoms and that the CSBS portrays symptoms of hypervigilance and withdrawal. However, if this were the case we would expect there to be more overlap with anxiety and depression, which was not supported by specificity analyses.

Future research and implications

Further research on the CSBS would be beneficial. Although this study supports a potential two-factor structure which could provide a deeper clinical understanding of safety-seeking behaviours, the structure validation requires further investigation. Given that negative-trauma related appraisals are strongly associated with the *onset* of acute PTSD and safety-seeking behaviours are theorized to prevent the disconfirmation of damaging beliefs the CSBS could be a useful tool in delineating the development and onset of PTSD. It would

be useful to look at different translations of the CSBS and whether these can be validated in non-UK samples to further knowledge of safety-seeking behaviour usage and whether it is a universally important sequela of PTSD. Larger samples of younger children (<12 years) and older children (14+) will be important in exploring whether safety-seeking behaviour usage is as prevalent and relevant to these age groups.

The high levels of endorsement of safety-seeking behaviours overall, highlights that even within school-based samples, children and young people are using such strategies to prevent feared outcomes (i.e. future physical harm or they fear emotions could overwhelm them or cause another catastrophe). Targeting safety-seeking behaviours may therefore be important to include in school-based interventions for trauma-exposed pupils.

Conclusion

This paper presents a 13-item measure of safety-seeking behaviours for trauma-exposed youth, which is brief, reliable and psychometrically valid. The measure may be used in both research and clinical settings to inform the assessment of safety-seeking behaviours and pinpoint areas for treatment (i.e. which safety-seeking behaviours need dropping) and adds to our knowledge of PTSS in this age group.

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Table 1. Summary of sample characteristics.

Variable	S1 (*n*=391)	S2 (*n*= 68)
Sex, n (%)		
Female	197 (50.1)	41 (60.3)
Unknown, *n* (%)	8 (2.0)	-
Ethnicity, n (%)		
White British	331 (84.6)	59 (86.8)
Minority ethnicity	8 (2.1)	9 (13.2)
Unknown	52 (13.3)	-
Age (in years), mean (STD)	13.73 (0.59)	13.49 (2.85)
Unknown, *n* (%)	32 (8.2)	-
Trauma exposure, n (%)	323 (82.8)	68 (100.0)
Unknown, *n* (%)	1 (0.3)	-

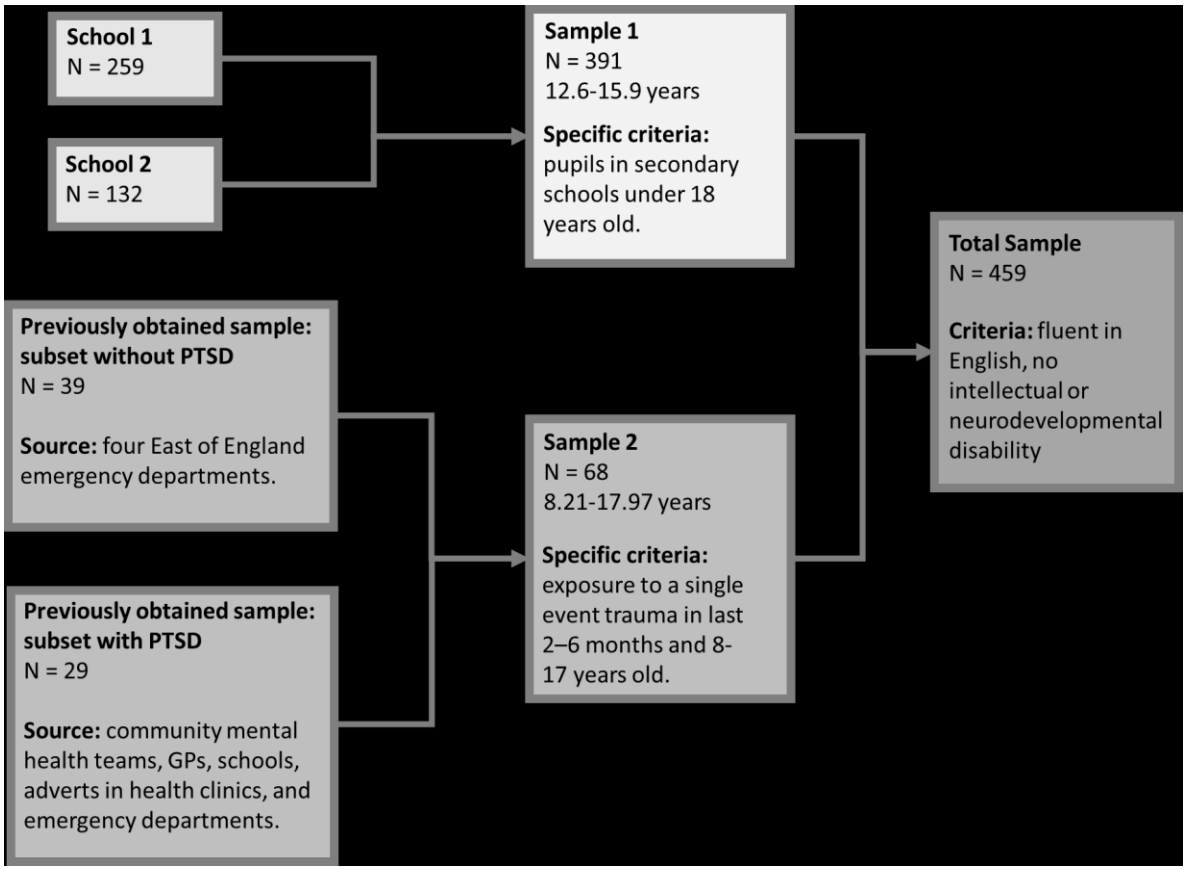

Figure 1. Sample recruitment flow chart

Table 2. S1 descriptive statistics including the mean observed score, standard deviation (SD), possible range and observed scores and Cronbach's alpha coefficient of each measure.

Measure	*n*	M	SD	Possible range	Observed range	α
CATS	344	12.78	12.46	0-80	0-53.00	.93
RCADS-25	253	14.64	14.02	0-75	0-68.00	.95
Anxiety		9.38	8.89	0-45	0-42.47	.92
Depression		5.69	6.27	0-30	0-29.63	.91
CPTCI-S	336	5.50	6.86	0-30	0-30.00	.94

Note: CATS= Child and Adolescent Trauma Screen, RCADS-25= Revised Child Anxiety and Depression Scale, CPTCI-S= Children's Post-Traumatic Cognitions Inventory Short-Form.

Table 3. Factor loadings for the 13-item CSBS on a two-factor structure in both exploratory confirmatory analyses.

Scale / Item	PCA (group 1)		CFA (group 2)
	1	2	
Factor 1: Strategic hypervigilance			
(2) I always check that my friends and family are safe	*0.739*	0.422	0.656
(3) I am always thinking about ways to make myself safer	*0.811*	0.491	0.728
(4) I am really careful to stay away from unsafe situations	*0.855*	0.302	0.810
(5) I am careful not to do dangerous things	*0.810*	0.239	0.794
(6) I often do things to try and make myself feel safer	*0.837*	0.580	0.827
(7) I always check that doors and windows are locked or I ask my parents to	*0.665*	0.460	0.565
(16) I do extra things to make sure the places I am are safe	*0.756*	0.602	0.663
Factor 2: Affective suppression			
(9) I do not like to try new things	0.268	*0.774*	0.462
(10) I try to stop my feelings about it	0.519	*0.838*	0.771
(12) I do not like changing the way I do things	0.484	*0.774*	0.602
(13) I try really hard to stop my thoughts about it	0.498	*0.825*	0.842
(14) I try not to let other people see how I am feeling	0.355	*0.795*	0.698
(17) I do not like making choices	0.367	*0.738*	0.576

Note. Italicised values indicate the factor on which the item has the highest loading.

Table 4. Pearson's correlations of the safety-seeking behaviours (CSBS) and its' subscales with anxiety and depression (RCADS-25), PTSD (CATS), negative appraisals (CPTCI-S).

Measure	CSBS-SH	CSBS-AS	CSBS Total
Safety behaviours (CSBS)			
"Affective suppression" (CSBS-AS)	.50**	-	-
Total	.89**	.85**	-
Depression & anxiety (RCADS-25)			
Depression	.24**	.64**	.48**
Anxiety	.40**	.66**	.59**
Total	.34**	.68**	.56**
PTSS (CATS)			
Total	.27**	.69**	.53**
Trauma-related appraisals (CPTCI-S)			
Total	.21**	.65**	.49**

*p=.05, **p=.01 *Note. CSBS= Child Safety Behaviour Scale, CSBS-SH= Child Safety Behaviour Scale- Strategic Hypervigilance, CSBS-AS= Child Safety Behaviour Scale- Affective Suppression, RCADS-25= Revised Child Anxiety and Depression Scale, CATS= Child and Adolescent Trauma Screen, CPTCI-S= Children's Post-Traumatic Cognitions Inventory Short-Form*