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The Preliminary Development and Validation of a Trauma-Related Safety-Seeking-Seeking Behavior Measure for Youth: The Child Safety Behavior Scale (CSBS)

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Safety-seeking behaviors (SSBs) may be employed after exposure to a traumatic event in an effort to prevent a feared outcome. Cognitive models of posttraumatic stress disorder propose SSBs contribute to maintaining this disorder by preventing disconfirmation of maladaptive beliefs and preserving a sense of current threat. Recent research has found that SSBs impact children's posttraumatic stress symptoms (PTSS) and recovery. In this paper, we sought to develop and validate a novel 22-item Child Safety Behavior Scale (CSBS) in a school-based sample of 391 pupils (age 12–15 years) who completed a battery of questionnaires as well as 68 youths (age 8–17 years) who were recently exposed to a trauma. Of the sample, 93.1% ($N = 426$) completed the new questionnaire. The sample was split ($n = 213$), and we utilized principal components analysis 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 demonstrated a moderately good model of fit across indices, based upon a 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 PTSS. This study provides initial support for the use of the CSBS in trauma-exposed youth as a valuable tool for further research, clinical assessment, and targeted intervention.

There is over 30 years worth of research examining the psychological impacts of exposure to traumatic events in young people, with the most commonly studied reaction being posttraumatic stress disorder (PTSD; Trickey, Siddaway, Meiser-Stedman, Serpell & Field, 2012). Researchers have found PTSD to be high in posttrauma populations; for example, a recent meta-analysis of 72 peer reviewed articles with a total of 3,563 youths found incidence rates of 15.9% (Alisic et al., 2014). Community samples also yield high prevalence rates, such as those reported in a national population-based survey conducted in Switzerland, in which 4.3% of 6,787 adolescents met criteria for PTSD (Landolt, Schnyder, Maier, Schoenbucher, & Mohler-Kuo 2013).

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There is a wealth of supporting literature for etiological cognitive models of PTSD (Brewin & Holmes, 2003), and successful treatments have been devised (Cohen, Deblinger, Mannarino, Steer, 2004; Ehlers, Clark, Hackmann, McManus & Fennell, 2005; 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 individuals with PTSD perceive a current sense of threat posttrauma due to characteristics of their trauma memories and excessively negative appraisals of the trauma and its aftermath. A range of cognitive strategies and behaviors (e.g., rumination, suppression, and safety behaviors) employed by an individual attempting to reduce a sense of current threat paradoxically maintains 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). Researchers have found CT-PTSD to be

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 behaviors, or more specifically, "safety-seeking behaviors" 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 behaviors maintain symptomatology by thwarting cognitive modification of anxiety-provoking beliefs as individuals attribute any avoidance of catastrophe as resulting from their behaviors. Moreover, in some situations, safety-seeking behaviors may actually increase the likelihood feared outcomes will happen (Salkovskis, 1999). Safety-seeking behaviors 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, such as 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 that involves dropping safety-seeking behaviors has generally been shown to be more effective in reducing clinical anxiety as compared to intervention without this goal (e.g., as in treatment for obsessive–compulsive disorder [OCD]; Salkovkis et al., 1999).

In order to screen for safety-seeking behaviors in young people, Meiser-Stedman and colleagues (2017) previously developed the novel 22-item Child Safety Behavior Scale (CSBS; modified from the adult Safety Behavior Scale; Ehring et al., 2008) for a randomized controlled trial (RCT) with a sample of 8–17-year-olds with PTSD. Mediation analysis revealed that safety-seeking behaviors (and trauma-related appraisals) partially mediated the association between treatment allocation (receiving child-appropriate CT–PTSD vs. being in a waitlist control group) and posttreatment group differences in child posttraumatic stress scale scores. This underscores the importance of safety-seeking behaviors 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 that used a nonvalidated safety-seeking behaviors measure; therefore, conclusions regarding this mechanism remain tentative and require further examination.

Within research and clinical settings, the development of a concise, psychometrically valid pediatric self-report tool that screens for the use of safety-seeking behaviors would be valuable. Within research, a validated measure of safety-seeking behaviors could be employed to further examine theoretical models of PTSD. This could elucidate differences in the use of safety-seeking behaviors 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, in the current study, we sought 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 posttraumatic stress symptoms (PTSS), the specificity of the association between safety-seeking behaviors and PTSS was also investigated. To further examine the role of safety-seeking behaviors in PTSD, we investigated the predictive power of safety-seeking behaviors alongside other identified risk factors in youth populations, including age, gender, number of types of trauma exposure, and negative appraisals (Landolt et al., 2013; Meiser-Stedman et al., 2017; Trickey et al., 2012).

To summarize, in the current study, we study sought to examine (a) the psychometric properties of the CSBS to create a valid and clinically useful measure and (b) whether safety-seeking behaviors 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 behaviors compared to those without PTSD and that safety-seeking behaviors 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 East Anglia (see Figure 1 for sampling details and inclusion criteria). For S1, the authors liaised with school staff to ascertain which youths would not meet the study criteria. A total of 391 children and adolescents aged 12.6–15.9 years ($M = 13.7$, $SD = 0.5$) took part (see Table 1 for sample overview). From both schools 391 out of 555 (70.5%) pupils took part, with four students not participating due to guardian opt-out.

Sample 2 (S2) included youths from a previous study (Meiser-Stedman et al., 2017) who had been recently exposed to trauma, a subset of whom met criteria for PTSD (i.e., inclusion in the study required that their main presenting problem must have been PTSD). Full details of the recruitment and procedure for S2 are presented in Meiser-Stedman et al., 2017. Sample 2 consisted of 68 young people between 8.21 and 17.97 years of age, all of whom had been exposed to a single traumatic event but not all of whom had PTSD. Participants were assessed for PTSD using a structured interview conducted by a clinical psychologist; *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association [APA], 1994) or *International Classification of Diseases* (Version 10; *ICD-10;* World Health Organization [WHO], 1992) diagnostic criteria as well as the Children's PTSD Inventory (Saigh, 2004) were used for assessment. There were 29 youths

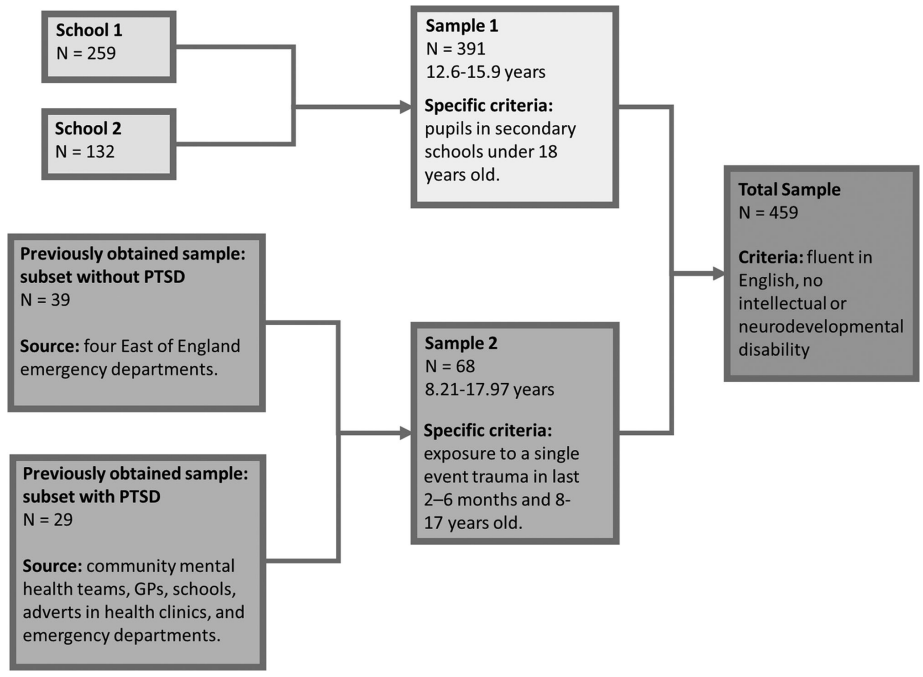

Figure 1. Sample recruitment flow chart. PTSD = posttraumatic stress disorder; GP = general practitioner.

in the sample who met criteria for PTSD; the remaining 39 participants had been exposed to a single traumatic event but did not meet diagnostic criteria for PTSD. All S2 participants completed the CSBS as part of a battery of questionnaires completed 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 East Anglian region were contacted, and those expressing interest were sent further information; there were two secondary schools able take part within the recruitment timeframe. The study used an opt-out consent procedure based on previous successful study design (e.g., Meiser-Stedman, Dalgleish, Yule, & Smith, 2012). A guardian information sheet that included study details and informed guardians of the opt-out procedure was sent out to participants' guardians; if no opt-out was received, consent was presumed as long as the pupil also assented to participation. Personnel from the school also reminded pupils and guardians 2 weeks before the study was to take place, and school staff was confident in their usual communication systems. Information sheets, assent forms, and the questionnaire packs were

Table 1
Summary of Sample Characteristics

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

Note. S1 = Sample 1 (sample of school pupils in current sample); S2 = Sample 2 (previously obtained sample of trauma exposed youth).

provided to pupils either during their morning form-time (School 1) or during the beginning of a lesson (School 2). Questionnaires took approximately 10 min to complete and required pupils to fill out the information using the most frightening thing they had experienced as a reference. All S1 participants received an aftercare sheet detailing how they could obtain mental health support, including self-help, information web links, helplines, and a point of contact within their school (S2 participants were already partaking in support services). All participants consented to a "well-being screen" to detect subsyndromal mental health issues indicated by the measures, as determined by the measure's validated cutoffs; these pupils were brought to their school's attention and followed up by usual school safeguarding procedures. Four classes were then randomly chosen from School 1, and 40 pupils were invited to fill out the Child and Adolescent Trauma Screen and CSBS after 5 months in order to obtain test–retest reliability.

For S1 (the current sample), a cross-sectional design was used and approved by the U.K. National Research Ethics Service, Derby Research Ethics Committee. For S2 (a previously obtained sample), a prospective longitudinal design and randomized controlled trial design were used and involved young people who had experienced a recent traumatic event (ASPECTS trial). This was approved by Cambridgeshire Research Ethics Committee.

Measures

Exposure to traumatic events. To measure traumatic event exposure and PTSS, we employed the Child and Adolescent Trauma Screen (CATS; Sachser et al., 2017), which is based on PTSD diagnostic criteria given in the *DSM-5* (APA, 2013). Exposure to traumatic events is established on a 15-item checklist (CATSP1), which asks individuals to endorse whether they have experienced exposure to different types of traumatic events, such as personal injury/abuse, observed violence, or natural disaster and war. This is 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 (Cronbach's αs = .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 one reexperiencing symptoms, one avoidance symptom, two symptoms of negative alterations in cognitions and mood, and two hyperarousal symptoms, plus impairment in at least one area of functioning.

Safety-seeking behaviors. For the CSBS (see Supplementary Materials), an initial pool of 22 items was developed by clinicians with years of experience within trauma and research and was based on the adult version of the scale (Ehring et al., 2008). Items included both behaviors (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 to participants in S2, who also completed the CSBS pretreatment if they had been diagnosed with PTSD. For S1 participants, 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 therefore removed from all analysis. All data concerning the CSBS across both samples were used to ascertain the psychometric properties of the CSBS.

Negative cognitions. Negative trauma-related appraisals were measured using the Children's Posttraumatic Cognitions Inventory Short Form (CPTCI-S; Mckinnon et al., 2016). The CPTCI-S consists of 10 items adapted from the original CPTCI (Meiser-Stedman, Dalgleish, Glucksman, Yule, & Smith, 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 (Cronbach's $\alpha = .92$), good construct validity, and moderate-to-high test–retest reliability ($r = .78$; McKinnon et al., 2016).

Anxiety and depression. The short version of the Revised Child Anxiety and Depression Scale (RCADS-25; Ebesutani et al., 2012) was used to measure depression and anxiety. 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 that has demonstrated a clear-cut factor structure, satisfactory internal consistency (Cronbach's $\alpha = .65$ and .83, respectively), and validity (Muris, Meesters & Schouten, 2002). The cutoff scores for depression and anxiety are 15 and 17 for male and 21 and 25 for female individuals, respectively.

Data Analysis

We used SPSS (Version 22.0) for all analyses other than confirmatory factor analysis (CFA), which we conducted using R (Version 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 weighted least squares mean and variance (WLSMV), adjusted using a covariance matrix with a Satorra-Bentler scaled test statistic for nonnormally distributed data (Rosseel, 2012).

To establish item redundancy on the CSBS and determine factor structure, we performed exploratory factor analysis on half of the sample, using principal components analysis (PCA) with oblimin rotation (as recommended by Field, 2009). The

established items and factor structure were further tested in the other half of the sample using CFA. Cronbach's alpha was utilized to calculate the internal consistency of the CSBS. Test–retest reliability was also assessed using a subsample from S1. We examined the discriminant validity of the CSBS in both samples as well as 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 association between PTSS and other outcome measures, Pearson's bivariate and partial correlations were conducted. Predictors of PTSS were explored using multiple linear regression modeling. Pupils with more than 20% missing data on a measure were excluded from any analysis of that measure (details of the number of individuals included in each analysis are detailed in the Results section).

Results

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

Exploratory Factor Analysis

In total, 426 pupils completed the CSBS across samples. All participants were individually (from S1 and S2) 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 (181 from S1 and 32 from S2).

Preliminary analysis of Group 1 ($n = 213$) found the Kaiser–Meyer–Olkin measure of sampling adequacy was .940, which is in the "superb range" (Hutcheson & Sofroniou, 1999). Bartlett's test of sphericity, $\chi^2(210, N = 213) = 2{,}775.82$, $p < .001$, demonstrated that correlations between items were adequate for PCA. We ran PCA on the 21-item CSBS within Group 1. 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 (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 three factors. One of these factors had fewer than three loading items, which has been shown to make a factor weak or unstable (Costello & Osborne, 2009), 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 seven more 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 1 as Strategic Hypervigilance and Factor 2 as 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 input as correlated factors, with several recommended indices (Hu & Bentler, 1995; Jackson, Gillaspy, & Purc-Stephenson, 2009). Cutoff criteria for fit indices for the CSBS conformed to widely used recommendations (Hu & Bentler, 1995; Jackson et al., 2009): χ^2/degrees of freedom (*df*) ratio < 3 (Matsunaga, 2010); comparative fit index (CFI) of at least 0.900; root mean square error of approximation (RMSEA) of < 0.080 (Hooper, Coughlan & Mullen, 2008); and Tucker–Lewis Index (TLI) of at least 0.95 (Hu & Bentler, 1999). The chi-square value was significant, $\chi^2(89, N = 213) = 128.87$, $p < .001$, indicating the proposed model is discrepant from the data's true structure (Matsunaga, 2010). However, it is notoriously difficult to obtain a nonsignificant chi-square value with this test when using self-report data (Bentler, 1990; Byrne, 1994), and the test 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).

Table 2
Descriptive Statistics for Each Measure Used to Assess Sample 1

Measure	*n*	*M*	*SD*	Possible Range	Observed Range	Cronbach's 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. Sample 1 was 391 secondary school students. CATS = Child and Adolescent Trauma Screen; RCADS-25 = Revised Child Anxiety and Depression Scale; CPTCI-S = Children's Posttraumatic Cognitions Inventory Short-Form.

Table 3
Factor Loadings for the 13-Item Child Safety Behavior Scale (CSBS) on a Two-Factor Structure in Both Exploratory Confirmatory Analyses

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

Note. CFA = confirmatory factor analysis; PCA = principal components analysis.
[a]Group 1 was randomly assigned 50% of pupils and 50% of youths from previously obtained ASPECTS trial participants. [b]Group 2 was the other 50% of pupils and ASPECTS participants. [c]Factor on which the item has the highest loading.

Therefore, the fit of the model is better determined through other descriptive fit indices, such as the CFI (McDonald & Marsh, 1990; Van Prooijen & Van Der Kloot, 2001). As CFI = .98, TLI = .98, and RMSEA = 0.046, 90% CI [0.027, 0.063], indices all indicated the model was a good fit. The correlation between the two factors was $r = .70$, $p < .001$. We compared the two-factor model 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, $\chi^2(90, N = 213) = 336.16$, $p < .001$, CFI = .78, RMSEA = 0.155, 90% CI [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 that reliability for this sample size was adequately powered, Cronbach's $\alpha = 0.05$, $1\text{-}\beta = .8$. The Cronbach's alpha value for the full scale was .90, indicating excellent overall internal consistency (George & Mallery, 2003). The subscales, Strategic Hypervigilance (CSBS–SH) and Affective Suppression (CSBS–AS), had Cronbach's alpha values levels of .89 ($n = 437$) and .85 ($n = 438$), respectively, demonstrating good internal consistency (George & Mallery, 2003).

Test–Retest Reliability

A subset of S1 participants ($n = 40$) was asked to complete the CSBS and CATS a second time 5 months later. Of this group, 26 filled out the CSBS and 26 completed the CATS. The CSBS total score was significantly correlated between time points, $r = .41$, $p = .030$ (two-tailed), $1\text{-}\beta = .75$. We identified two clear outliers from this group whose CSBS scores changed dramatically between time. Data for these individuals were removed from the analysis, resulting in a stronger correlation ($n = 26$), $r = .64$, $p = .011$ (two-tailed), $n = 26$, $1\text{-}\beta = .95$. The CATS also had good test–retest reliability ($n = 28$), $r = .70$, $p < .001$ (two-tailed), $1\text{-}\beta = .99$.

Discriminant Validity

We examined the ability of the CSBS to discriminate between children diagnosed with PTSD from S2, pupils without PTSD from S1, and those who met threshold criteria for PTSD from S1 using Mann-Whitney U tests. Cohen's d was used to measure effect size (conventional interpretation is that effect sizes of $d = 0.2$, 0.5, and 0.8 correspond to small, medium, and large effect sizes, respectively; Cohen, 1992). Significantly higher scores on the CSBS ($n = 35$, median = 23.0, interquartile range [IQR] = 10.0) were found in pupils in S1 who met the threshold for PTSD than for pupils who did not ($n = 270$, median = 12.0, IQR = 10.0), U = 1735.50, $p < .001$, $d = 1.28$; $1\text{-}\beta = .91$. Significantly higher scores on the CSBS were also found in S2 between young people who had been clinically diagnosed with

Table 4
Pearson's Correlations (r) of the Child Safety Behaviors Scale (CSBS) and Its Subscales With Anxiety, Depression, Posttraumatic Stress Disorder, and Negative Appraisals

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

Note. CSBS = Child Safety Behavior Scale; CSBS–SH = Child Safety Behavior Scale–Strategic Hypervigilance subscale; CSBS–AS = Child Safety Behavior Scale–Affective Suppression subscale; RCADS–25 = Revised Child Anxiety and Depression Scale; PTSS = posttraumatic stress symptoms; CATS = Child and Adolescent Trauma Screen; CPTCI–S = Children's Posttraumatic Cognitions Inventory–Short-Form.
*$p < .05$. **$p < .01$.

PTSD ($n = 29$, median = 22.0, IQR = 17.0), U = 67.000, $p < .001$, in comparison to trauma-exposed youth without PTSD ($n = 39$, median = 6.0, IQR = 11.0), $d = 2.13$; 1-β = 0.91.

Demographic Comparisons

A Mann-Whitney U test was employed to determine any gender differences in CSBS scores from the total sample (combining S1 and S2). Female participants ($n = 224$) had significantly higher scores on the CSBS (median = 10.0; IQR = 10.0) than male participants ($n = 209$, median = 11.0, IQR = 14.0), U = 16,123.50, $p < .001$, $d = 0.47$. In order to examine the effects of age on the CSBS, we conducted a Spearman's correlation between age and the CSBS and found a nonsignificant correlation, $r = .04$, $p = .943$. 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 were significantly positively correlated with the CATS as well as the RCADS-25 and its subscales (see Table 4). Scores on the CATS were significantly correlated with the Depression ($n = 211$), $r = .71$, $p < .001$, and Anxiety ($n = 211$), $r = .73$, $p < .001$, subscales of the RCADS-25. This is expected given that depression and anxiety are commonly comorbid with PTSD in young people (Kar & Bastia, 2006). To ensure that the association between the CSBS and CATS was not an artifact of the association between anxiety or depression and the CATS, we conducted partial correlations. The CSBS remained significantly correlated with the CATS when controlling for depression, anxiety, and total RCADS-25 scores (for all three analyses [$n = 202$], $r = .54$, $p < .001$). All sample comparisons were well powered (minimum of 1-β = 0.8).

Predictors of PTSS

Bivariate correlations of S1 revealed significant zero-order associations 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 behaviors (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 nonoutcome variables, number of traumas, trauma-related appraisals (CPTCI-S), safety-seeking behaviors (CSBS), and gender were entered into a multiple linear regression with CATS score (i.e., PTSS) as the dependent variable. Gender, β = .05, $p = .11$, did not account for unique variance in the model; however, number of traumas, β = .17, $p < .001$; CPTCI-S, β = .66, $p < .001$; and the CSBS, β = .16, $p < .001$, were significant unique predictors. The overall model was significant, accounting for 72% of the variance in CATS scores, $F(4, 299) = 188.01$, $p < .001$

Discussion

In the current study, we sought to develop a measure to assess safety-seeking behaviors that would be suitable for children and adolescents and to examine its association with PTSS. We examined the psychometric properties of the CSBS across two samples: one with school pupils (S1) and one with trauma-exposed youths both with and without PTSD (S2). The PCA for Group 1 supported a reduced 13-item CSBS with a two-factor

underlying structure. The items loaded onto two factors, which were labeled Strategic Hypervigilance 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 that the chi-square index did not support this; however, this index is notoriously affected by sample size and nonnormally 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 value 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 with clinically diagnosed PTSD and those without.

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 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 behaviors are an important mechanism in PTSD in young people.

The CSBS also showed good test–retest reliability, suggesting safety-seeking behavior usage may change over time. The intermission of 5 months instead of the recommended 3-month gap (Clark-Carter, 2009) and small sample size 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 the use of safety-seeking behaviors.

Female participants across the samples used safety-seeking behaviors following trauma significantly more so than did male participants. This gender difference also mirrors the significantly higher levels of PTSS in female versus male individuals, which has been noted in other surveys (e.g., Landolt et al., 2013). Differences in the use of safety-seeking behaviors 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; thus, it remains to be established whether there might be age differences between younger children or older adolescents and their use of safety-seeking behaviors.

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 behaviors for assessing and treating PTSS. Interestingly, the Affect Suppression subscale showed a closer association with PTSD symptoms and PTSD-typical appraisals than the Strategic Hypervigilance subscale. This is in line with other research that has shown appraisals about internal threat to be more closely related to PTSD than those about external threat (e.g. 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 behaviors, are of particular importance in treating PTSD in young people. It is interesting to note that young people seem to use 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.

A further aim of the study was to establish whether, compared to other putative predictors, the CSBS might account for unique variance in PTSS. Through regression modeling, we found that appraisals, safety behaviors (as indexed by the CSBS), and number of trauma types significantly accounted for a 71.9% proportion of variance in PTSS, in line with our hypothesis. The unique predictive power of safety-seeking behaviors highlights the potential importance of this mechanism and necessitates more of a focus on safety-seeking behaviors within the trauma literature and within clinical practice as a potential target for intervention (Meiser-Stedman 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, Mayou, & Bryant, 2003). Additional research will be necessary to ascertain other predictors, such as psychological and demographic factors and specific trauma types, that account for further variance in PTSS.

The current study had notable strengths, including that the main study included a large, school-based sample of youths in the United Kingdom, which makes the findings regarding prevalence of trauma exposure, safety-seeking behaviors, and PTSD more reliable and generalizable. The trauma prevalence was in line with a previous sample of youths in the United Kingdom that found 84% of adolescents had experienced negative life events (Joseph, Mynard, & Mayall, 2000). The low opt-out rates in the current study also means the sample should have been relatively unbiased in terms of high or low rates of trauma exposure and psychopathology.

This study also had limitations, including the relative homogeneity of each sample in terms of age, ethnicity, and/or trauma events. With larger and more heterogenous samples, it would be useful to determine whether certain safety-seeking behaviors are associated with specific traumas (e.g., interpersonal trauma compared to natural disasters). The sample for this study included 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 of age). 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 that allowed pupils to feel more able to answer items truthfully and disclose sensitive information. Furthermore, the results of the second sample, which included individuals with 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.

Further research on the CSBS would be beneficial. Although this study supports a potential two-factor structure that could provide a deeper clinical understanding of safety-seeking behaviors, the structure validation requires further investigation. Given that negative trauma-related appraisals are strongly associated with the onset of acute PTSD and that safety-seeking behaviors 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-United Kingdom–based samples to further knowledge of safety-seeking behavior usage and whether it is a universally important sequela of PTSD. Larger samples of younger children (under 12 years of age) and older children (14 years of age or older) will be important in exploring whether safety-seeking behavior usage is as prevalent and relevant to these age groups.

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

In conclusion, in this paper, we presented the development of a 13-item measure of safety-seeking behaviors 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 behaviors and pinpoint areas for treatment, such as which safety-seeking behaviors need dropping, and adds to our knowledge of PTSS in this age group.

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