

NEW RESEARCH

Population Prevalence of the Posttraumatic Stress Disorder Subtype for Young Children in Nationwide Surveys of the British General Population and of Children in Care

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Objective: Posttraumatic stress disorder (PTSD) is a debilitating condition that when left untreated can have severe lifelong consequences for psychological, social, and occupational functioning. Initial conceptualizations of PTSD were centered on adult presentations. However, the instantiation of developmentally appropriate PTSD in young children (PTSD-YC) criteria, tailored to preschool (6 years old and younger) children, represents an important step toward identifying more young children experiencing distress. This study explored population-level prevalence of PTSD-YC indexed via an alternative algorithm for *DSM-IV* PTSD (AA-PTSD).

Method: Representative population data were used to test whether application of AA-PTSD criteria, relative to the *DSM-IV* PTSD algorithm, increased identification of 5- to 6-year-old children with clinical needs in both the general population ($n = 3,202$) and among looked after children (ie, children in care) ($n = 137$), in whom the risk of mental health issues is greater.

Results: Notably, no 5- to 6-year-old children in the general population sample were diagnosed with PTSD using adult-based *DSM-IV* criteria. In contrast, AA-PTSD prevalence was 0.4% overall, rising to 5.4% in trauma-exposed children. In looked after children, overall PTSD prevalence rose from 1.2% when applying adult-based *DSM-IV* criteria to 14% when using AA-PTSD criteria. Of trauma-exposed looked after children, 2.7% met criteria for *DSM-IV* PTSD compared with 57.0% when applying AA-PTSD criteria. In both samples, use of the alternative algorithm to index PTSD-YC criteria markedly increased identification of children experiencing functional impairment owing to symptoms.

Conclusion: Results demonstrate the utility of the PTSD-YC diagnosis beyond at-risk and treatment-seeking samples. Use of PTSD-YC criteria substantially improves identification of 5- to 6-year-old children burdened by PTSD at the population level.

Key words: epidemiology, preschool, prevalence, PTSD, PTSD in young children

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The conceptualization of posttraumatic stress disorder (PTSD) historically has been driven by its clinical presentation in adults.¹ However, with the establishment by Scheeringa *et al.*² of a developmentally appropriate 'alternative algorithm' for *DSM-IV* PTSD (AA-PTSD), for the first time, we could identify and begin to understand the syndrome in children younger than 6 years of age.^{2,3} This early work led to the introduction in the *DSM-5*⁴ of a subdiagnosis of PTSD for children (PTSD-YC), 6 years old and younger, comprising a developmentally tailored symptom profile derived closely from the alternative algorithm (see Table S1, available online, for full diagnostic criteria).² Most notably, the PTSD-YC subdiagnosis requires the

presence of only 1, rather than 3, Criterion C avoidance symptoms.

Representative national surveys have estimated that as many as two thirds of children experience traumatic events by age 16.⁵ Despite this, population-based prevalence studies applying adult-based PTSD criteria suggested that only very small proportions of children meet the threshold for PTSD, with estimates of current diagnosis ranging from 0.6%⁶ to 4.4% in the United Kingdom⁷ and United States.⁸ A key rationale for the development of the alternative algorithm and for the introduction of the developmentally appropriate diagnostic criteria for PTSD-YC both in the *DSM-5* and in *DC:0-5*⁹ was to address concerns that PTSD in very young children was being

significantly underdiagnosed. These new criteria propose a different diagnostic algorithm that, while requiring fewer symptoms (see Table S1, available online, for full criteria), nevertheless preserves the requirement for functional impairment.

A recent literature review³ summarizing smaller-scale and non-population-representative prevalence studies in young children validated these concerns. The review indicated that use of developmentally appropriate PTSD-YC criteria in trauma-exposed samples did indeed increase PTSD prevalence estimates in preschool children (and in children up to 8 years of age¹⁰) and that the size of the increase ranged from 10% to 50% in studies that compared AA-PTSD or PTSD-YC diagnosis against *DSM-IV* or *DSM-5* (adult-based) criteria. However, the reviewed studies comprised help-seeking or at-risk populations, and there have been no prior examinations of diagnostic prevalence in large population-representative samples.

Accurate estimation of PTSD-YC population prevalence is vital for the appropriate commission and management of services for young trauma victims and for reducing the economic impact of untreated PTSD. Therefore, the objective of this study was to report the first population-based estimates of PTSD-YC, indexed using AA-PTSD, which requires only 1 avoidance symptom, in children 5–6 years old. The AA-PTSD and *DSM-5* criteria for PTSD-YC are conceptually comparable, as the *DSM-5* criteria were directly derived from the alternative algorithm prototype. We used British data from both a general population sample and a survey of children who had been removed from unsafe family homes and placed in foster care and who are more vulnerable and deemed at higher risk of mental health issues, particularly PTSD.^{11,12} In Britain, these children are called looked after children (LAC) (more commonly referred to as children in care). We report the correlates of AA-PTSD with regard to demographics and comorbid diagnoses to explore whether there are any individual-level characteristics that may be overrepresented or underrepresented when using the different diagnostic criteria.

Prior research has suggested that the AA-PTSD diagnosis may be appropriate beyond preschool age for children up to 8 years of age¹⁰; this slightly older age range has been applied in some treatment studies for PTSD-YC.^{13,14} The present study provides an opportunity to explore AA-PTSD prevalence in children up to age 8 in population samples for the first time to inform future nosological decisions about the boundaries of the diagnosis. We therefore also report data on PTSD-YC in these slightly older children. Finally, we present exploratory data on AA-PTSD and *DSM-IV* prevalence estimates across the entire age range of the samples (up to age 18) to provide the relevant context for these decisions.

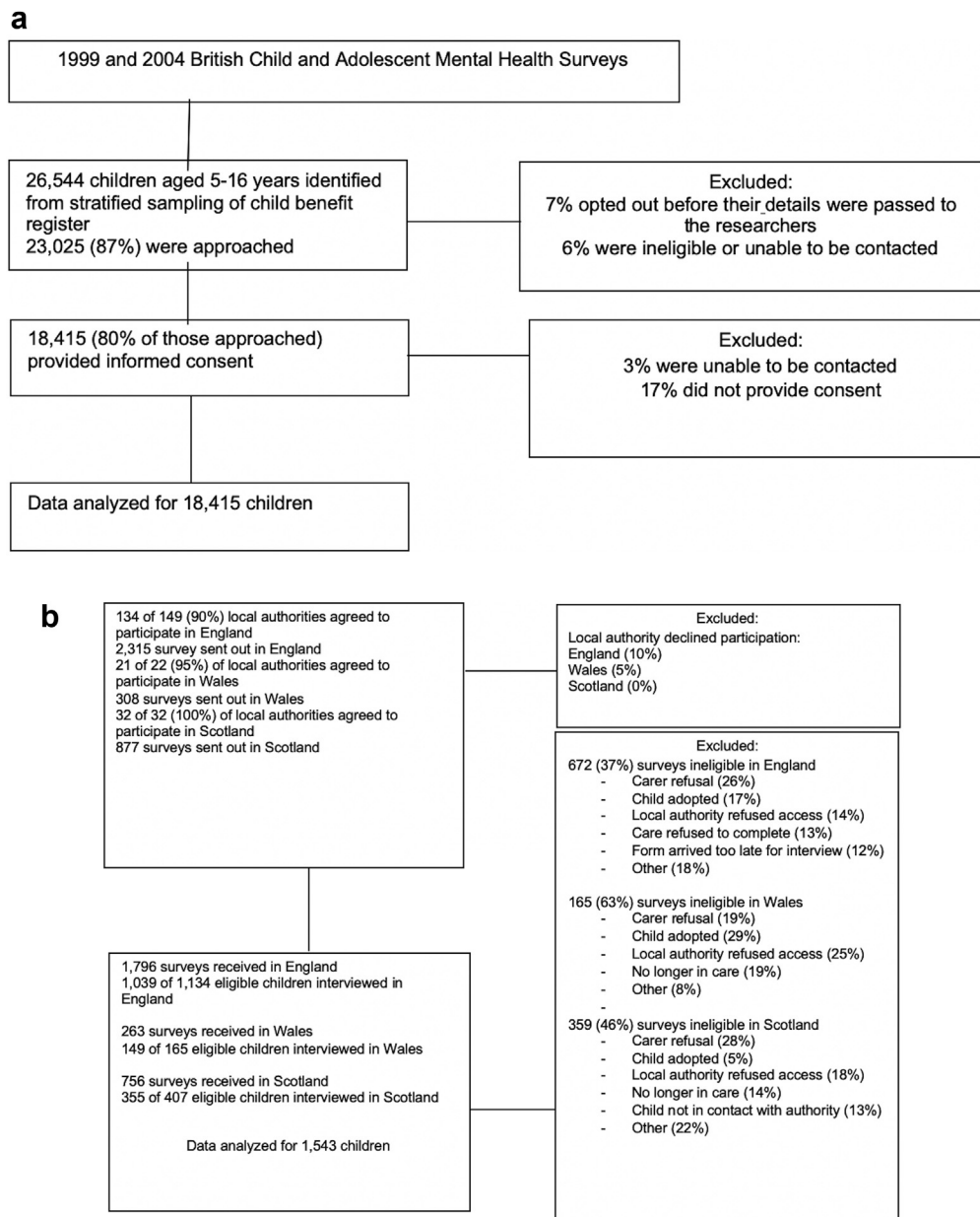
METHOD

General population data comprised 2 surveys: “Mental Health of Children and Adolescents in Great Britain” (1999)¹⁵ and “Mental Health of Children and Young People in Great Britain, 2004”¹⁶ (combined N = 18,415; age range, 5–16 years). The at-risk population data comprised a survey of LAC who had been removed from unsafe family homes and placed in state (ie, foster) care: “Mental Health of Young People Looked After by Local Authorities in Great Britain, 2001–2003”¹⁷ (N = 1,543). Sampling for both general population children and LAC are presented in Figure 1. All survey data are available from the UK Data Service (<https://ukdataservice.ac.uk/>). These datasets were chosen because they provided the youngest age range in British national surveys that measured PTSD. It is important to note that the youngest age was 5 years, and we were unable to obtain population-level data for children younger than 5 years of age, to whom the PTSD-YC diagnosis is also applicable.

General Population Samples

Mental Health of Children and Adolescents in Great Britain, 1999. The UK Child Benefit register was used as a sampling frame to select children 5–15 years of age throughout England, Scotland, and Wales. The records had postal codes for 90% of the population with no evidence of difference between records with or without a postal code. There were 2 levels of stratification: first by regional health authority and second by sociodemographic groupings. There were 475 postal sectors randomly selected with a probability proportional to the number of children in each country. Within these postal sectors, 30 children were randomly selected by the Child Benefit register, with letters sent out on behalf of the Office of National Statistics. Weights were introduced owing to oversampling in Scotland and Wales, for response variation by region and nonresponse bias by age and gender. See Meltzer *et al.*¹⁸ for further details. The obtained sample size of 5- to 6-year-old children was 3,202.

Mental Health of Children and Young People in Great Britain, 2004. The sample design and organization were as described above, however the children selected were aged 5–16 years. There was no overlap in samples across the two surveys. The Child Benefit register had postal codes attached to records for 98% of the population. The 2 levels of stratification were first by Government Office Region and second by socioeconomic group. There were 426 postal sectors randomly selected,

FIGURE 1 Sampling Details

Note: (a) Sampling of participants in the 1999 and 2004 British Child and Adolescent Mental Health Surveys.^{16,18} (b) Sampling of participants in the *Mental Health of Young People Looked After by Local Authorities in Great Britain, 2001–2003*.¹⁷ Numbers were taken from references^{16–18}, published under Creative Commons license CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0>).

with 29 children from each postal sector invited to take part in the survey. Five postal sectors did not have 29 children within the age range sampled; therefore, all children within the age range from the postal sector were invited. Weights were calculated to adjust for delay in sampling, then for national balance of age, sex, and region structure. See Green *et al.*¹⁶ for further details.

LAC Sample

Mental Health of Young People Looked After by Local Authorities in Great Britain, 2001–2003. Within Great Britain, local authorities make annual reports to the governmental Department of Health that provide anonymized details of 1 in 3 of all LAC. These data were used to select a sample of 2,500 children (approximately 1 in 18 of all LAC aged 5–17) from each local authority who were

looked after on March 31, 2001. The number of participants was proportional to the number of LAC in each authority. As children may actually be living in another part of the country from the local authority responsible for their care (eg, a child looked after by an authority in England may be living with relatives or fostered in Wales), allocations were made on the basis of where the survey assessment would take place. The sample was selected to ensure equal proportions of children in each age band between 5 and 17 years. See Office for National Statistics¹⁷ for further details. The obtained sample size of 5- to 6-year-old children was 137.

Diagnostic Measure

All surveys indexed mental health difficulties using the Development and Well-Being Assessment (DAWBA).¹⁹ The DAWBA is a multi-informant measure of structured questions relating directly to *DSM* diagnostic criteria, delivered by trained interviewers to caregivers and teachers (when caregivers consented). The DAWBA combines highly structured questions that relate directly to diagnostic criteria in the *DSM* and the International Classification of Diseases with qualitative information about the nature of any problems. A team of experienced child and adolescent psychiatrists independently reviewed all data from all informants to assign diagnoses according to the *DSM-IV*. In situations where the information was inconsistent between multiple informants, clinicians reviewed interview transcripts and the interviewer's comments to decide whose account to prioritize. The raters applied clinical judgment as would be the case in a clinical assessment rather than a rule-based system of accepting "x" informant over "y." The κ statistic for chance-corrected agreement between 2 clinical raters who independently rated 500 children in the 1999 survey was 0.86 for any disorder (SE 0.04), 0.57 for internalizing disorders (SE 0.11), and 0.98 for externalizing disorders (SE 0.02). Disagreements were discussed until consensus was reached between the clinicians.

As *DSM-5* criteria for PTSD-YC were unpublished at the time of the included surveys, we applied the alternative algorithm,² which was derived to index the necessary PTSD-YC symptoms from *DSM-IV*-based interview items. AA-PTSD and *DSM-5* criteria for PTSD-YC are conceptually comparable, as the *DSM-5* criteria were directly derived from the alternative algorithm prototype (see Table S1, available online, for detailed mapping across the criteria).³ The only symptom indexed by the *DSM-5* criteria that cannot be detected by AA-PTSD criteria is increased frequency of negative emotional states, although a restricted range of (particularly positive)

affect is assessed, as are all other aspects of criterion C. PTSD-YC diagnosis does not significantly differ between use of AA-PTSD or *DSM-5* criteria,² validating use of the AA-PTSD criteria to index PTSD-YC. For AA-PTSD diagnoses, the first author (C.H.) wrote an automated scoring syntax that used the survey's clinician-reported rating of the presence or absence of each PTSD symptom (see Table S1, available online, for necessary symptoms) to determine if each child met the AA-PTSD criteria.

Analytic Approach

Data were weighted by demographics to ensure representativeness of the population. All prevalence estimates were calculated by a statistician using the weighted sample, adjusting for stratification and clustering in postal sectors, assuming a binomial distribution ($\alpha = .05$; 95% CIs). As the only difference between the *DSM-IV* PTSD and AA-PTSD criteria is the application of 1 criterion C (avoidance) symptom instead of 3, differences in prevalence rates reflect increased endorsement of criterion C under AA-PTSD criteria.

RESULTS

General Population Sample

Table 1 presents sample characteristics (by diagnostic status) for children 5–6 years old ($n = 3,202$). Prevalence of trauma exposure was 7.0% (95% CI: 5.8, 8.3). Remarkably, no children were diagnosed with PTSD using adult-based *DSM-IV* criteria. In contrast, AA-PTSD prevalence was 0.4% (95% CI: 0.2, 0.8) overall, rising to 5.4% (95% CI: 2.5, 11.1) in trauma-exposed children. Critically, of all children who endorsed functional impairment as a result of PTSD symptoms, 41% met criteria for a full diagnosis using AA-PTSD compared with none using the *DSM-IV*, validating the concerns that adult-derived *DSM* criteria miss very significant numbers of young children with clinical needs.

To elucidate why the different algorithms led to differential rates of identification of PTSD, we examined the number of 5- to 6-year-old children in the general population sample who endorsed at least 1 symptom (AA-PTSD) of criterion C relative to those who endorsed 3 symptoms (*DSM-IV*). Of these 5- to 6-year-old children, 0.94% endorsed at least 1 symptom, of whom only 0.22% endorsed at least 3 symptoms.

Looked After Children

For LAC aged 5–6 years old ($n = 137$), 1.2% (95% CI: 0.3, 5.3) met adult-based *DSM-IV* PTSD criteria. This rose

TABLE 1 Sample Characteristics and Prevalence Estimates of Posttraumatic Stress Disorder (PTSD) for Children Aged 5–6 Years

	General Population			LAC		
	Non-PTSD	PTSD DSM-IV	AA-PTSD	Non-PTSD	PTSD DSM-IV	AA-PTSD
Demographics						
Gender						
Female	49.2	None diagnosed using DSM-IV	36.4	42.3	100.0	25.0
Male	50.8		63.6	57.7	0	75.0
Ethnicity						
White	87.8 ^a		70.0 ^a	89.7	100.0	100.0
BAME	12.2 ^a		30.0 ^a	10.3	0	0
Marital status						
Married/cohabiting	78.3 ^a		30.0 ^a	—	—	—
Lone parent	21.7 ^a		70.0 ^a			
Income, £/wk						
0–199	22.3 ^a		66.7 ^a	—	—	—
≥200	77.7 ^a		33.3 ^a			
Housing tenure						
Owned	67.2 ^a		10.0 ^a	—	—	—
Rented	32.8 ^a		90.0 ^a			
Comorbidity						
Separation anxiety	1.3 ^a		100.0 ^a	3.8	50.0	8.3
Specific phobia	0.9		0	2.6	0	16.7
Social phobia	0.2		0	1.3	0	0
Panic disorder	0		0	0	0	0
OCD	0		0	1.3	0	0
Generalized anxiety	0.1		10.0	0 ^b	50.0 ^b	0
Anxiety NOS	0.4		10.0	1.3	0	8.3
MDD	0.2		0	1.3 ^b	50.0 ^b	0
Depression NOS	0		0	0	0	0
ADHD	1.7		0	16.7	0	25.0
Conduct/oppositional	3.1 ^a		30.0 ^a	30.8	100.0	50.0

Note: Reported demographic values are the percentage of the survey sample in each demographic category. Reported comorbidity values are population-based prevalence of disorder in children ≤6 years old in each survey. All comorbid diagnoses were made using DSM-IV criteria. PTSD DSM-IV includes cases also diagnosed with AA-PTSD. Shared superscript letters (^{a,b}) indicate significant group differences, $\chi^2 > 1$, $p < .5$. AA-PTSD = alternative algorithm for DSM-IV PTSD; ADHD = attention-deficit/hyperactivity disorder; BAME = Black, Asian, or other minority ethnicity; LAC = looked after children; MDD = major depressive disorder; NOS = disorder not otherwise specified; OCD = obsessive-compulsive disorder.

markedly to 14% (95% CI: 8.0, 22.0) when applying AA-PTSD criteria. All children identified by adult-based DSM-IV criteria were also identified by AA-PTSD criteria. Trauma exposure affected 48% (95% CI: 39.0, 56.0) of 5- to 6-year-old LAC. Of these trauma-exposed LAC, 2.7% (95% CI: 0.6, 11.0) met criteria for DSM-IV PTSD, but prevalence dramatically increased to 57.0% (95% CI: 34.0, 75.0) when applying AA-PTSD criteria. Of all 5- to 6-year-old LAC who endorsed functional impairment due to PTSD symptoms, PTSD was diagnosed in 63.2% using AA-PTSD criteria compared with only 10.5% using the DSM-IV criteria.

For the LAC sample, to elucidate why the different algorithms led to differential rates of identification of

PTSD, we examined the number of 5- to 6-year-olds who endorsed at least 1 symptom (AA-PTSD) of criterion C relative to those who endorsed 3 symptoms (DSM-IV). Of these 5- to 6-year-old children, 13.14% endorsed at least 1 symptom, of whom only 5.11% endorsed at least 3 symptoms.

Key Differences Between Cases Identified With AA-PTSD and DSM-IV Criteria

In the general population sample, no children were diagnosed using the DSM-IV criteria, preventing comparison of the 2 diagnostic algorithms. For LAC, there was no significant difference in demographics or comorbidity rates between LAC diagnosed using DSM-IV criteria versus AA-

PTSD criteria ($p > .11$). All LAC identified by adult-based *DSM-IV* criteria were necessarily also identified by AA-PTSD criteria, and so the *DSM-IV* prevalence estimates equate to estimates of children who satisfy criteria for both diagnostic algorithms.

Key Differences Between No-PTSD and PTSD Cases

Demographics. There were no gender differences between AA-PTSD and no-PTSD cases in either the general population or the LAC sample. In the general population sample, relative to the no-PTSD cases, there was a greater number of AA-PTSD cases with single parents, low-income families, and residency in rental housing (Table 1). Regarding ethnicity, children classified by the survey as Black, Asian, or other minority ethnicity were overrepresented in the general population AA-PTSD group. However, in the LAC sample, ethnicity did not differ significantly between AA-PTSD and no PTSD diagnosis.

Comorbidity. Different patterns of results were also observed between the AA-PTSD and no-PTSD cases for comorbid diagnoses. In the general population sample, AA-PTSD was associated with higher rates of separation anxiety and conduct/oppositional disorder relative to no-PTSD cases, while there was no significant increase in comorbidity in LAC with AA-PTSD relative to LAC with no PTSD diagnosis. It is worth noting that prevalence of other diagnoses was slightly higher in LAC than in the general population, with this difference being most pronounced for ADHD and conduct/oppositional disorder (Table 1).

AA-PTSD in Children Aged up to 8 Years

Although the PTSD-YC diagnosis was developed for children 6 years old and younger, as noted above, our previous work suggested that the PTSD-YC diagnosis may be valid for children up to age 8 years and even beyond.¹⁰ We therefore decided a priori to extend the age range for our analyses up to 8 years (see below). However, interestingly, in both survey samples, the AA-PTSD criteria identified far greater numbers of children across the entire younger age range than the *DSM-IV* criteria (Figure 2), as has been suggested in prior studies with at-risk samples,^{3,10} and captured up to 9 times as many of the children with functional impairments (see Supplement 1, available online, for further details). Indeed, in the general population the *DSM-IV* criteria failed to identify any children with PTSD younger than age 10 years.

General Population Sample. In children up to 8 years old ($n = 6,461$) (Table 2), *DSM-IV* criteria again did not diagnose any cases. Prevalence rose to 0.4% (95% CI: 0.2,

0.6) using AA-PTSD criteria. Trauma exposure affected 7.9% (95% CI: 7.1, 8.9) of children, of whom 5.0% (95% CI: 2.5, 11.3) met the AA-PTSD criteria. Of children who endorsed functional impairment, PTSD was diagnosed in 44.4% using AA-PTSD criteria compared with none using *DSM-IV* criteria.

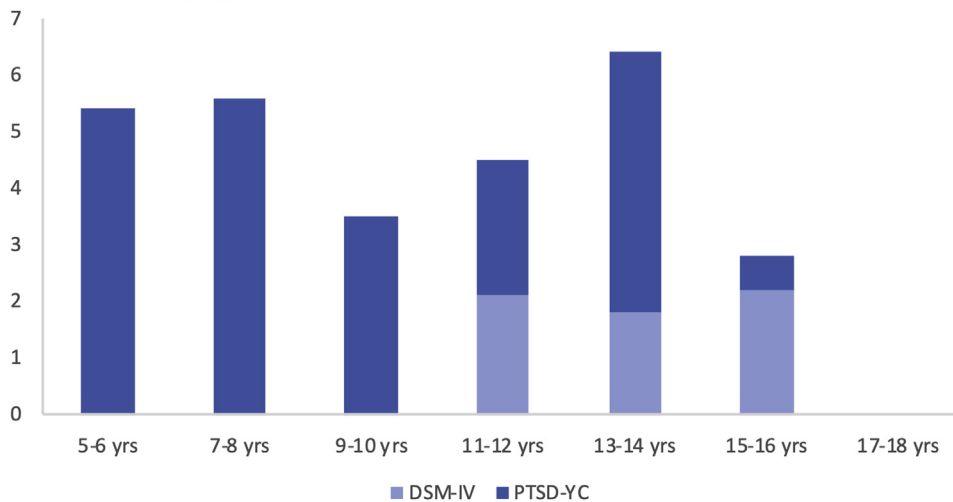
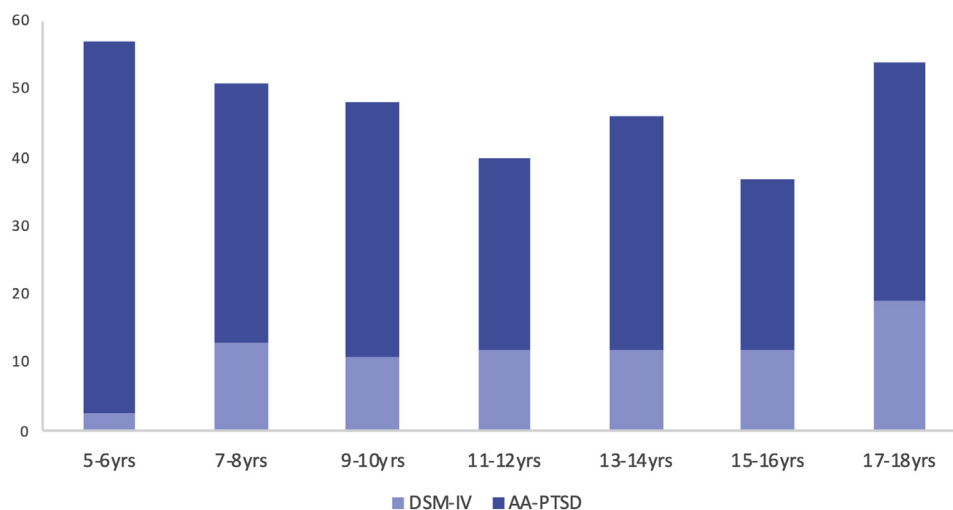
Looked After Children. Extending the age range up to 8 years, 1.4% (95% CI: 0.6, 3.6) of LAC met the *DSM-IV* criteria for PTSD, rising to 18% (95% CI: 13.0, 23.0) using AA-PTSD criteria. Of 5- to 8-year-old LAC, 53% (95% CI: 47.0, 58.0) had been exposed to trauma. Of these, 2.8% (95% CI: 1.1, 7.0) met the *DSM-IV* PTSD criteria, and 54% (95% CI: 42.0, 66.0) met AA-PTSD criteria—a 20-fold increase from estimates yielded using the adult-based *DSM-IV* PTSD criteria. Of all 5- to 8-year-old children who endorsed functional impairment, PTSD was diagnosed in 63.2% using AA-PTSD criteria compared with 3.5% using the *DSM-IV* criteria.

Key Differences Between Children Identified With AA-PTSD and *DSM-IV* Criteria. No children in the general population sample were diagnosed using *DSM-IV* criteria, preventing comparison of the 2 sets of diagnostic criteria. Although there was no significant difference in demographics between LAC diagnosed using the *DSM-IV* criteria versus AA-PTSD criteria ($p > .32$), rates of comorbid separation anxiety disorder were lower for LAC diagnosed using AA-PTSD criteria ($p = .043$).

Key Differences Between No-PTSD and PTSD Cases. For children up to 8 years of age (Table 2), there were no significant differences in gender or ethnicity between AA-PTSD cases and no-PTSD cases for either the general population sample or LAC. As observed in the general population sample 6 years old and younger, AA-PTSD cases remained more prevalent in single-parent and low-income families and families residing in rental housing. Psychiatric comorbidity rates in the general population sample were higher for AA-PTSD cases relative to no-PTSD cases. Most notably, AA-PTSD cases were associated with higher rates of separation anxiety and conduct/oppositional disorder, as also seen in children 6 years old and younger. This pattern was also evident in LAC 8 years old and younger.

DISCUSSION

Our findings reveal that prevalence estimates of PTSD in representative British general population and LAC (fostered) samples of children 5–6 years old generated using a developmentally appropriate alternative algorithm for

FIGURE 2 Percent Prevalence of Diagnosis of Posttraumatic Stress Disorder (PTSD)**a General population****b LAC**

Note: Charts show the percent prevalence of PTSD in trauma-exposed young people according to DSM-IV and an alternative algorithm for DSM-IV PTSD (AA-PTSD), per age band, in (a) the general population and (b) looked after children. See Supplement 1, available online, for further details. LAC = looked after children.

DSM-IV PTSD (AA-PTSD) to index PTSD-YC criteria are markedly higher than estimates using the adult-derived DSM-IV criteria. Critically, this leads to increased identification of up to 4 times as many 5- to 6-year-old children who demonstrate functional impairment, with associated clinical needs, due to their PTSD symptoms, relative to the adult-derived DSM-IV criteria. Our observed AA-PTSD prevalence levels in these very young children were comparable in magnitude to prior population-based surveys with older school-age children in the United Kingdom⁷ and United States.⁸

Notably, in the general population, the DSM-IV criteria did not identify any children 5–6 years old as experiencing

PTSD, which prevented us from exploring demographic differences in children diagnosed with criteria specific to adults vs criteria specific to young children. There were, however, key demographic differences in the general population sample between children with an AA-PTSD diagnosis and children with no PTSD diagnosis. Children 5–6 years old with an AA-PTSD diagnosis were more likely to be from single-parent, low-income families residing in rental housing. This replicates a recent population prevalence survey in British young people, which reported that disadvantaged socioeconomic conditions were a risk factor for PTSD.⁷ Children in the general population 5–6 years old with an AA-PTSD diagnosis were also more likely to be of

TABLE 2 Sample Characteristics and Prevalence Rate of Posttraumatic Stress Disorder (PTSD) for Children Aged 8 Years and Younger

	General Population			LAC		
	Non-PTSD	PTSD <i>DSM-IV</i>	AA-PTSD	Non-PTSD	PTSD <i>DSM-IV</i>	AA-PTSD
Demographics						
Gender						
Female	50.2	None diagnosed using <i>DSM-IV</i>	35.7	47.3	60.0	30.6
Male	49.8		64.3	52.7	40.0	69.4
Ethnicity						
White	88.4		88.5	90.4	80.0	88.9
BAME	11.6		11.5	9.6	20.0	11.1
Marital status						
Married/cohabiting	77.7 ^a		30.8 ^a	—	—	—
Lone parent	22.3 ^a		69.2 ^a			
Income, £/wk						
0–199	21.7 ^a		61.9 ^a	—	—	—
≥200	78.3 ^a		38.1 ^a			
Housing tenure, %						
Owned	67.7 ^a		11.5 ^a	—	—	—
Rented	32.3 ^a		88.5 ^a			
Comorbidity						
Separation anxiety	1.1 ^a		25.0 ^a	2.4 ^{b, c}	60.0 ^{c, d}	13.9 ^{b, d}
Specific phobia	0.9 ^a		7.1 ^a	2.4	0	8.3
Social phobia	0.2		0	1.8	0	0
Panic disorder	0		0	0	0	0
OCD	0.1		0	0.6	0	0
Generalized anxiety	0.2 ^a		10.7 ^a	0.6	0	0
Anxiety NOS	0.4 ^a		7.1 ^a	0	0	0
MDD	0.2		0	1.8	20.0	2.8
Depression NOS	0		0	0	0	0
ADHD	2.1		7.1	13.8	20.0	22.2
Conduct/oppositional	4.0 ^a		35.7 ^a	32.3 ^{b, c}	80.0 ^c	58.3 ^b

Note: Reported demographic values are the percentage of the survey sample in each demographic category. Reported comorbidity values are population-based prevalence of disorder in children ≤8 years old in each survey. All comorbid diagnoses were made using *DSM-IV* criteria. PTSD *DSM-IV* includes cases also diagnosed with AA-PTSD. Shared superscript letters (^{a,b,c,d}) indicate significant group differences, $\chi^2 > 1$, $p < .5$. AA-PTSD = alternative algorithm for *DSM-IV* PTSD; ADHD = attention-deficit/hyperactivity disorder; BAME = Black, Asian, or other minority ethnicity; LAC = looked after children; MDD = major depressive disorder; NOS = disorder not otherwise specified; OCD = obsessive-compulsive disorder.

minority ethnicity (indexed as Black, Asian, or other minority ethnicity), although the categorical manner in which the survey data were collected prohibited us from examining individual minority ethnicities. Though we observed only a small number of cases, this contrasts with data from older children and youths, in which minority ethnicity did not appear to increase risk of PTSD.⁷ Direct examination of risk factors for PTSD-YC in children 6 years old and younger, including whether particular trauma types (eg, interpersonal trauma) increase risk, will be an important next step for research.

LAC with PTSD diagnosed by both adult-specific *DSM-IV* criteria and child-specific AA-PTSD criteria

were comparable to children with no PTSD diagnosis in terms of ethnicity and gender, and rates of comorbid diagnoses in children with an AA-PTSD diagnosis did not significantly differ from those in children with no PTSD diagnosis. The only observed difference between diagnosis using *DSM-IV* criteria and AA-PTSD criteria was a higher rate of comorbid separation anxiety disorder in 5- to 8-year-old children diagnosed using *DSM-IV* criteria. Overall, in contrast to the observation in the general population sample, increased risk of PTSD was not seen in LAC from minority ethnicity backgrounds. We were unable to explore the relationships between diagnosis and household income and housing status owing to a lack of

data, although these data would likely have been inaccurate because of the frequent placement changes and placement in residential homes experienced by many LAC.¹¹ Although our sample of LAC was relatively small for a prevalence study, it is important to note that LAC represent a small subgroup of the child and adolescent population, and our sample surveyed 1 in 18 of LAC in the population. Nevertheless, further evaluations of prevalence should ideally aim to recruit a larger sample size. Although LAC status itself would appear to increase risk of AA-PTSD diagnosis in younger children, understanding of the predictors of PTSD in older LAC is advancing (eg, 10- to 18-year-olds²⁰), and further exploration of specific risk factors for PTSD-YC in this younger population is needed.

Interestingly, our findings suggest not only that PTSD-YC criteria may increase identification of functionally impaired children 5–6 years old, but also that the diagnosis may have clinical utility in children up to 8 years old and potentially beyond, in line with previous studies (eg, Meiser-Stedman *et al.*¹⁰). This was particularly pronounced in LAC, but even in the general population the *DSM-IV* algorithm failed to identify PTSD in any children younger than 10 years of age. Trials of psychological intervention for PTSD-YC have previously included children up to 8 years of age,^{14,21} and our findings suggest that this practice is warranted. In preparing future editions of diagnostic criteria, reevaluation of the upper age limit for the PTSD-YC subtype may be advisable, and the present data should inform these decisions.

A limitation of this study is that our samples did not include children younger than 5 years of age. We have therefore been unable to establish population PTSD-YC prevalence in 3- to 4-year-old children. To our knowledge, population-wide representative data that would allow accurate assessment of PTSD-YC in such a young sample are not available. Similarly, we were necessarily reliant on caregiver and teacher report (as is standard in assessments for this age range), as self-report measures of PTSD-YC in young children have not been established.²¹ This likely contributes to the lack of population data in children younger than 5 years old. Finally, analysis of existing data necessitated use of the alternative algorithm to index PTSD-YC criteria, as interviews indexing *DSM-5* criteria had not yet been developed at the time of survey completion. Use of 3 separate survey samples minimizes the impact of cohort effects, although it is important to consider that because these surveys are now relatively old, the use of more methodologically sophisticated data collection techniques in

line with advances in technology may mean that the same surveys now would return slightly different results. Addressing each of these issues would facilitate future population-level assessment of PTSD-YC in children younger than 5 years of age.

In sum, findings indicate clearly that use of PTSD-YC criteria markedly improves the identification of 5- to 6-year-old children experiencing diagnosable clinical distress following a traumatic event, especially in vulnerable populations. Increasing use of such criteria will thereby have important implications for ensuring that all distressed children are identified. In particular, 5- to 6-year-old children in care should be routinely assessed for PTSD-YC and provided with appropriate evidence-based support. Evidence-based treatments for PTSD-YC are available (eg, trauma-focused cognitive behavioral therapy^{19,20,22}), and our results emphasize the importance of making these treatments readily available to 5- to 6-year-old children. Planning and regulation of mental health services now needs to be updated to reflect the true population prevalence of PTSD in younger children.

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SUPPLEMENT 1: RESULTS ACROSS THE ENTIRE AGE RANGE

Given that the PTSD-YC criteria appeared to have utility in children up to 8 years of age, we also explored prevalence of PTSD-YC vs *DSM-IV* in the entire age range.

General Population

Across the whole general population sample ($n = 18,415$; age range, 5–16 years), the prevalence of trauma exposure was 11.0% (95% CI: 10.0, 11.0). Overall, <0.1% of children experienced PTSD according to the *DSM-IV* criteria (95% CI: 0.05, 0.2), while 0.5% (95% CI: 0.4, 0.7) met PTSD-YC criteria. When considering only children who were exposed to trauma (Figure 2), 0.9% (95% CI: 0.5, 1.7) met adult *DSM-IV* criteria for PTSD. Even for this wider age range (up to 16 years), this prevalence estimate increased 5-fold to 4.7% (95% CI: 3.5, 6.2) using PTSD-YC criteria, and Figure 2 shows that PTSD-YC criteria may have clinical utility up to at least age 14 years. Of children

endorsing functional impairment as a result of PTSD symptoms, PTSD was diagnosed in 33.3% using PTSD-YC criteria compared with 7.6% using *DSM-IV* criteria.

Looked After Children

The prevalence of trauma exposure across the age range of LAC (age range, 5–18 years) was 61.0 % (95% CI: 59.0, 64.0)—substantially higher than in the general population sample, as expected. Overall, 2.3% (95% CI: 1.6, 3.1) of LAC experienced PTSD according to the adult *DSM-IV* criteria. Even in the full age range, this rose 10-fold to 20% (95% CI: 18.0, 23.0) when using the PTSD-YC criteria. When considering only trauma-exposed LAC (Figure 2), 3.2% (95% CI: 2.2, 4.5) met *DSM-IV* PTSD criteria, whereas 48% (95% CI: 43.0, 52.0) met PTSD-YC criteria, with the latter criteria showing utility across the full age range. Of children endorsing functional impairment as a result of PTSD symptoms, PTSD was diagnosed in 58% using PTSD-YC criteria compared with 6.4% using *DSM-IV* criteria.

TABLE S1 Diagnostic Criteria for Posttraumatic Stress Disorder (PTSD) for Children 6 Years and Younger (PTSD-YC) According to the *DSM-5* (APA, 2013⁴) and the Alternative Algorithm (Scheeringa *et al.*²), both relative to the adult-derived *DSM-IV* PTSD criteria (APA, 2013)⁴**DSM-IV PTSD**

A: The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury or a threat to the physical integrity of self or others; the person's response involved intense fear, helplessness, or horror. Note: In children, this may be expressed instead by disorganized or agitated behavior.

B: One or more of the following:

- (1) Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
- (2) Recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognizable content.
- (3) Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific reenactment may occur.
- (4) Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
- (5) Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.

C: Three or more of the following:

- (1) Efforts to avoid thoughts, feelings, or conversations associated with the trauma.
- (2) Efforts to avoid activities, places, or people that arouse recollections of the trauma.
- (3) Inability to recall an important aspect of the trauma.

DSM-5 PTSD-YC

A: Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways: (1) directly experiencing the traumatic events, (2) witnessing in person the event as it occurred to others, especially primary caregivers, (3) learning that the traumatic event occurred to a parent or caregiving person.

B: One or more of the following:

- (1) Recurrent, involuntary, and intrusive distressing memories of the traumatic event. Note: May not necessarily appear distressing and may be expressed as play reenactment.
- (2) Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event. Note: It may not be possible to ascertain that the frightening content is related to the traumatic event.
- (3) Dissociative reactions (eg, flashbacks) in which the child feels or acts as if the traumatic event were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.) Such trauma-specific reenactment may occur in play.
- (4) Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
- (5) Marked physiological reactions to reminders of the traumatic event.

C: One or more of the following:

- (1) Persistent avoidance of stimuli (1) Avoidance of or efforts to avoid activities, places, or physical reminders that arouse recollections of the traumatic event.
- (2) Avoidance of or efforts to avoid people, conversations, or interpersonal situations that arouse recollections of the traumatic event.

AA-PTSD

A: The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury or a threat to the physical integrity of self or others (extreme reaction at time of the event not required).

B: One or more of the following:

- (1) Recurrent and intrusive recollections of the event, including images, thoughts, or perceptions (not required to be distressing).
- (2) Recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognizable content.
- (3) Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific reenactment may occur.
- (4) Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
- (5) Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.

C: One or more of the following:

- (1) Efforts to avoid thoughts, feelings, or conversations associated with the trauma.
- (2) Efforts to avoid activities, places, or people that arouse recollections of the trauma.
- (3) Inability to recall an important aspect of the trauma.

(continued)

TABLE S1 Continued

DSM-IV PTSD

- (4) Markedly diminished interest or participation in significant activities.
- (5) Feeling of detachment or estrangement from others.
- (6) Restricted range of affect (eg, unable to have loving feelings).
- (7) Sense of a foreshortened future (eg, does not expect to have a career, marriage, children, or a normal life span).

D: Two or more of the following:

- (1) Difficulty falling or staying asleep
- (2) Irritability or outbursts of anger
- (3) Difficulty concentrating
- (4) Hypervigilance
- (5) Exaggerated startle response

E: Duration of the disturbance (symptoms in criteria B, C, and D) is > 1 month.

F: The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

DSM-5 PTSD-YC

- Negative alterations in cognitions
- (3) Substantially increased frequency of negative emotional states (eg, fear, guilt, sadness, shame, confusion).
 - (4) Markedly diminished interest or participation in significant activities, including constriction of play.
 - (5) Socially withdrawn behavior.
 - (6) Persistent reduction in expression of positive emotions.

D: Two or more of the following:

- (1) Irritable behavior or angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects (including extreme temper tantrums).
- (2) Hypervigilance
- (3) Exaggerated startle response
- (4) Problems with concentration
- (5) Sleep disturbance (eg, difficulty falling or staying asleep or restless sleep).

E: Duration of the disturbance (symptoms in criteria B, C, and D) is > 1 month.

F: The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

AA-PTSD

- (4) Markedly diminished interest or participation in significant activities.
- (5) Feeling of detachment or estrangement from others.
- (6) Restricted range of affect (eg, unable to have loving feelings).
- (7) Sense of a foreshortened future (eg, does not expect to have a career, marriage, children, or a normal life span).

D: Two or more of the following:

- (1) Difficulty falling or staying asleep
- (2) Irritability or outbursts of anger
- (3) Difficulty concentrating
- (4) Hypervigilance
- (5) Exaggerated startle response

E: Duration of the disturbance (symptoms in criteria B, C, and D) is > 1 month.

F: The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Note: Reprinted with permission from the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, (Copyright 2013⁴). American Psychiatric Association. *Alternative Algorithm* (Scheeringa et al., 2012²) reprinted with permission from Wiley and Sons. AA-PTSD = alternative algorithm for DSM-IV PTSD; PTSD = posttraumatic stress disorder; PTSD-YC = PTSD in young children.