Trauma memories, mental health, and resilience: a prospective study of Afghan youth

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Background: Studies of war-affected youth have not yet examined how trauma memories relate to prospective changes in mental health and to subjective or social experiences. Methods: We interviewed a gender-balanced, randomly selected sample of Afghan child-caregiver dyads (n = 331, two waves, 1 year apart). We assessed lifetime trauma with a Traumatic Event Checklist, past-year events with a checklist of risk and protective events, and several child mental health outcomes including posttraumatic distress (Child Revised Impact of Events Scale, CRIES) and depression. We examined the consistency of trauma recall over time, identified mental health trajectories with latent transition modeling, and assessed the predictors of posttraumatic distress and depression trajectories with multinomial logistic regressions. Results: From baseline to follow-up, reports of lifetime trauma significantly changed (p ≤ 0.01). A third of the cohort reported no trauma exposure; only 10% identified the same event as their most distressing experience. We identified four CRIES trajectories: low or no distress (52%), rising distress (15%), declining distress (21%), and sustained high distress (12%). Youth with chronic posttraumatic distress were more likely to be girls (OR = 5.78, p ≤ 0.01), report more trauma exposure at baseline (OR = 1.55, p ≤ 0.05) and follow-up (OR = 5.96, p ≤ 0.01), and experience ongoing domestic violence (OR = 4.84, p ≤ 0.01). The risks of rising distress and sustained distress showed a steady increase for youth recalling up to four traumatic experiences. Depression and CRIES trajectories showed weak comorbidity. Conclusions: Memories of violent events are malleable, embedded in social experiences, and present heterogeneous associations with posttraumatic distress. Our study provides insights on resilience and vulnerability to multiple adverse childhood experiences, highlighting research and clinical implications for understanding trauma in conflict-affected youth. Keywords: Adverse childhood experiences, trauma, violence, PTSD, depression, Afghanistan, Pakistan.

Introduction

Little is known about the consistency of traumatic memory over time and the extent to which fixed or malleable memories of violent events predict resilience to stress or trauma. Specifically, is trauma recall associated with changes in posttraumatic stress disorder (PTSD) symptoms over time? To date, most studies examining the consistency of war-related traumatic events have focused on adults, addressing a debate focused on whether traumatic reports are indelible – akin to a flash photograph – or malleable – open to being forgotten or modified over time (Southwick, 1997). Much of this work indicates that trauma recall is often modified, and that PTSD symptoms have complex associations with measures of trauma exposure (Morgan & Southwick, 2014; Southwick, Litz, Charney, & Friedman, 2011).

The recall of personally experienced traumatic events can show dramatic and unexpected changes. In a prospective study of 59 veterans 1 month and 2 years after Operation Desert Storm, Southwick (1997) found that a majority (88%) modified their recall of trauma in response to a yes/no checklist: some violent events were forgotten, as veterans changed their responses from yes to no, while other events were recalled anew. Interestingly, PTSD symptoms correlated with recall inconsistency, specifically with the number of combat exposures that changed from no to yes. The study raised questions both regarding the accuracy of trauma memory and the relationship between trauma and PTSD. In another two-wave study, Dekel and Bonanno (2013) interviewed 39 civilians who survived the World Trade Center attacks, 7 and 18 months after 9/11. They found that while trauma recollection attenuated over time, survivors with chronic PTSD were unlikely to create a more benign memory of the attacks, in contrast to survivors with symptom trajectories of recovery or resilience: the former maintained similar narratives of perceived threat, even as they switched or changed reports of actual exposure.

In 2007, Mollica, Caridad, and Massagli (2007) presented one of the rare studies of trauma memory consistency conducted in a refugee setting. Data on 376 Bosnian adults living as refugees in Croatia, interviewed at a 3-year interval, showed that most changes in trauma memory were in the form of decreased reporting, as if participants were ‘putting the past behind them’ to enhance everyday social functioning (pp. 576–7). However, refugees who screened for PTSD showed increased trauma reporting, consistent with the conclusion that PTSD
was associated with the failed extinction of traumatic memories. Because increased trauma reporting was unassociated with depression, the authors suggested that PTSD had a ‘singular relationship with traumatic memory’ (p. 578). Indeed, trauma memory has important neurobiological and physiological foundations (Masten & Narayan, 2012; Southwick et al., 2011; Torres, Southwick, & Mayes, 2011).

This body of research suggests that forgetting or creating more benign memories are important components of resilience to adverse experiences. The literature on child and adolescent trauma memory, however, is very sparse. Thus far, research on conflict-affected youth has shown that the impact of war on mental health depends upon whether youth are able to make sense of collective violence (Barber, 2008, 2013; Jones, 2002; Jones & Kafetsios, 2002; Jones, 2013; Nguyen-Gilham, Giacaman, Naser, & Boyce, 2008) and the nature of postwar social experiences (Betancourt et al., 2013a; Tol, Rees, & Silove, 2013a; Tol, Song, & Jordans, 2013b). Such emphasis on subjective meaning and social context takes the field of global mental health beyond a narrow focus on trauma exposure (Barber, 2013; Hobfoll & de Jong, 2013; Jones & Kafetsios, 2005; Miller & Rasmussen, 2010; Panter-Brick, Eggerman, Gonzalez, & Safdar, 2009).

Studies of war-affected youth have also tracked the relative stability of mental health trajectories over time, using prospective longitudinal data and dynamic modeling techniques. Thus Betancourt et al. (2010) used latent class growth analyses for three-wave data collection in Sierra Leone with a cohort (75% male) of 529 former child soldiers: combining measures of depression and anxiety symptom scores, they identified four distinct trajectories characterized by low (41.4%), moderate but declining (47.6%), severe (4.5%), or increasing (6.5%) levels of internalizing problems over time. Sustained problems were associated with both war and postwar difficulties – notably, with the loss of a caregiver, family abuse and neglect, and community stigma. With respect to PTSD, Betancourt, Newnham, McBain, and Brennan (2013c) analyzed two-wave data (n = 243) over a 4-year interval to show that cohort-level PTSD symptoms declined over time, while a subgroup of youth showed worsening symptoms in association with parental death and community-level stigma. Indeed, the loss of resources related to nurturance, family stability, social capital, and neighborhood safety is considered to have a disproportionate influence on mental health outcomes over time (Hall, Tol, Jordans, Bass, & de Jong, 2013; Hobfoll, 2011, 2012; Hobfoll et al., 2007). The ability to model mental health symptom trajectories with prospective data has thus considerably enriched epidemiological understanding of risk and resilience in response to adversity (Hobfoll, Mancini, Hall, Canetti, & Bonanno, 2011).

This study has two main objectives: to examine the consistency of trauma reporting for two-wave data on Afghan youth (n = 331) and to analyze how the nature, level and malleability of trauma predict changes in posttraumatic distress or depression over time. We anticipated finding significant associations between symptom trajectories and (a) overall trauma exposure, (b) consistency of trauma recall, and (c) nature of violence and loss of family/home, in addition to gender differences in mental health and comorbidity between posttraumatic distress and depression.

Methods

Study design

The study was conducted in Kabul (Afghanistan) and the Afghan refugee camps in Peshawar (Pakistan). The ‘Back to School’ campaign, initiated after the fall of the Taliban regime, has seen large numbers of children and adolescents enrolling for the first time in primary schools (Oxfam, 2006). We situated the survey within primary schools: this allowed us to reach a community-based sample, negotiate strict dictates regarding access to women and girls, and secure interview safety and privacy for respondents within the school walls. We interviewed 11–16 year old students as well as their principal caregivers: we corroborated data across respondents, as well as secured data on caregiver mental health, with child/adult informed consent. At baseline, we adopted a two-stage stratified sampling design (Panter-Brick et al., 2009), randomly selecting schools with probability sampling proportional to size, with stratification for gender and geographical representation, and randomly selecting students in grades 5–10 of primary education. One year later, we sought to reinterview all participants: we traced just 64% in Kabul (115 boys and 119 girls) and 31% in Peshawar (55 boys and 42 girls), due to the impossibility of tracing school-leavers and repatriated refugees, and detected no attrition bias in mental health outcomes (Panter-Brick, Grimon, & Eggerman, 2014). Building on previous analyses, we focus this paper on trauma reports for youth interviewed at two time-points. The study received both local and international ethical approval.

Following transcultural research procedures (van Ommeren et al., 1999), we developed official Dari and Pashto versions of mental health screening instruments for the Children and War Foundation (www.childrenandwar.org) and the Strength and Difficulties Questionnaire website (www.sdqinfo.com). We featured independent translation and back-translation, and vetting by an expert panel that included trilingual fieldworkers and academics with multidisciplinary expertise (Panter-Brick et al., 2009). Interviews were conducted in private, by the same team of local interviewers at baseline and follow-up.

Lifetime trauma and past-year stressors

At baseline and follow-up, we implemented a Traumatic Events Checklist adapted from the Harvard Trauma Questionnaire previously used in Afghanistan (Cardozo et al., 2004). It featured 20 trauma items differentiating personal experiences from witnessing or hearing about events, and one item to report ‘any other’ event not explicitly itemized. Afghan academics in our expert panel excluded one question on rape, on the grounds that it was culturally offensive and would not yield accurate data; the objection regarded the specific question on rape, not other items on frightening experiences of violence or thinking one’s life was in danger. The Checklist included an open-ended section to give participants time and opportunity to narrate and contextualize their experiences.
and to identify which lifetime trauma was currently the most distressing.

At follow-up, we implemented a second Checklist to assess past-year risk and protective events; these were identified from thematic analyses of baseline interviews and covering individual, family, and area-level variables (Eggerman & Panter-Brick, 2010). We used 4-point flash cards, depicted as glasses relatively empty or full, to record whether events were not-at-all, a little, mostly, or very stressful. Given that harsh physical punishment is normative, we used a culturally relevant expression to detect abusive violence (‘has anyone in your family been bad khulki’ (lit: ill-natured, amoral) or violent toward other family members?), and conservatively coded for past-year domestic violence where the child or caregiver reported that it was ‘mostly’ or ‘very’ stressful (Panter-Brick, Goodman, Tol, & Eggerman, 2011).

Mental health

We chose screening instruments on the basis of their simplicity, reliability, psychometric properties, and widespread usage in low-income or conflict settings (Panter-Brick et al., 2009). We tested instruments during extensive field surveys, including 7-day test-retest reliability (Panter-Brick et al., 2011). To measure the impact of traumatic experiences, we implemented the Child Revised Impact of Events Scale (CRIES, 4 point scale, for intrusion, avoidance, or arousal responses in the past 7 days). As recommended by the Children and War Foundation, we summed responses on eight items for intrusion and avoidance to screen for levels of distress consistent with posttraumatic stress. Given multiple trauma exposures, we implemented CRIES for the event identified as the current most distressing experience.

In addition, we implemented the Depression Self-Rating Scale (DSRS, 3-point scale, 18 items for past-week responses) developed for 8–14 year olds (Birleson, Hudson, Grey-Buchanan, & Wolff, 1987). We also used the Strength and Difficulties Questionnaire (SDQ), an effective screening tool providing balanced coverage of emotional, behavioral, and social difficulties. We present here only the Prosocial scores, indicative of social functioning, since the ‘difficulties’ scores have close correlations with DSRS and CRIES (Panter-Brick, Goodman, Tol, & Eggerman, 2011).

Descriptive analyses

At cohort-level, we compared the frequency of total and single-item Checklist reports, using Chi-square to test for significant changes from baseline to follow-up. Two authors independently reviewed the verbatim English/Dari/Pashto descriptions of the most distressing trauma to categorize events into six major categories: (a) severe physical injury to self, (b) witnessed severe violence to another person, (c) death or disappearance of a close relative or friend, (d) living in a combat zone or witnessed military action, (e) forced displacement from home, and (f) any other trauma.

To examine the consistency of recall, we identified youth who reported (a) the same type of distressing trauma at both time-points, (b) a change in distressing trauma, (c) no distressing trauma at either time-points, (d) disappearance of trauma (reported at baseline, but not at follow-up), or (e) appearance of trauma (reported at follow-up). Because trauma exposures were often multiple, we confined analyses of recall consistency to the most distressing lifetime event.

Latent transition analyses

We conducted two latent transition analyses (LTA) on CRIES and DSRS. LTA is an extension of latent class analysis that features a longitudinal autoregressive model to describe changes in latent status membership between two periods of time (Collins & Lanza, 2010). LTA estimates both latent status membership probabilities at each time, and transition probabilities (i.e. the proportion of individuals who transition from high to low, or low to high, symptom scores between a first and second wave of data collection). We sought models that provided conceptual clarity, as well as statistical fit (following Nylund (2007)), in terms of grouping participants into different patterns of change over time. Using standard options in Mplus, we evaluated between two to five class solutions. To achieve greater statistical power for CRIES analyses, we combined youth reporting no trauma exposure with reporting no or low distress, and cohorts from Kabul and Peshawar, after sensitivity analyses demonstrated similar findings (data not shown).

Multinomial logistic regressions

We used multinomial logistic regressions to test whether LTA trajectories differed according to (a) individual-level, (b) family level, and (c) area-level variables. For (a), we included gender, age, trauma exposure at baseline/follow-up, loss of a loved one, and loss of a home. For (b), we assessed socioeconomic position, mother literacy, domestic violence, and changes in caregiver mental health over the intervening year. For (c), we used research site (Kabul vs. Peshawar) and reports of better interactions with neighborhood. Other variables were not retained in final models because they did not predict latent class membership at the 5% significance level. Regression models for DSRS were restricted due to limited data variation.

Results

The sample included 331 Afghan youth (170 boys, 161 girls), averaging 13.23 (SD = 1.55) years. Forty percent lived in food insecure households; the remaining lived in families characterized as poor (17%), average (22%), or better-off (21%). Only a fourth (28%) had a literate mother. Two-thirds (71%) were resident in Kabul, one-third (29%) in Peshawar. The cohort-level decline in CRIES scores (7.95 (SD = 10.05) to 5.91 (SD = 8.36), p = 0.005) was entirely driven by youth whose baseline distress had alleviated at follow-up. DSRS scores declined (9.51 (SD = 4.63) to 7.31 (SD = 4.14), p < 0.001) and prosocial scores correspondingly increased (8.99 (1.24) to 9.40 (1.01), p < 0.001) over time.

Cohort-level changes in trauma reports

At baseline, common traumas included ‘having a close relative or friend wounded or killed’ (reported by 25% of youth, Table S1, available as online supplementary material); ‘living in a refugee camp’ (22%); ‘directly witnessing a bombardment or rocket explosion related to war’ (17%); and experiencing ‘a very serious accident or fall’ (16%). Other notable trauma included ‘being homeless’ (14%), ‘been severely beaten’
Table 1 Lifetime trauma exposure: number and types of events reported by Afghan youth (n = 331)

| Lifetime exposure, N events | Baseline n (%) | Follow-up n (%) | p value |
|-----------------------------|----------------|-----------------|---------|
| No event reported           | 106 (32)       | 145 (44)        | <0.001  |
| 1–2 events                  | 130 (39)       | 141 (42)        |         |
| ≥3 events                   | 95 (29)        | 45 (14)         |         |
| Nature of experience, type of events |               |                 |         |
| Experiencing violence/injury to self | 112 (34)    | 59 (18)         | <0.001  |
| Witnessing violence to another person | 87 (26)  | 54 (16)         | 0.002   |
| Witnessed military action    | 71 (21)        | 77 (23)         | 0.576   |
| Loss of a close relative/friend | 99 (30)    | 62 (19)         | 0.001   |
| Loss of home or displacement | 102 (31)       | 65 (20)         | 0.001   |
| Other                       | 15 (5)         | 9 (3)           | 0.215   |

Aggregate level frequencies refer to the number of children reporting any trauma of this nature. Chi-square tests compare frequency changes between baseline and follow-up.

(13%) and ‘seen someone else severely beaten’ (12%). One year later, changes in reporting were significant for 12 of 22 Checklist items (Table S1).

We observed a decreased reporting of trauma exposure. The proportion of youth reporting multiple (≥3) events decreased from 29% to 14% (p < 0.001, Table 1). There were fewer reports of violence to self (p ≤ 0.001), violence to another person (p = 0.002), and loss of a close relative/friend or home (p = 0.001). By contrast, reports of witnessing military action (bombardment, explosions, searches and demolition of homes by police or armed militia) did not change. At cohort-level, the proportion of youth reporting no lifetime trauma increased from 32% at baseline to 44% at follow-up (Table 1).

Individual-level changes in trauma recall

We identified different types of traumatic memory (see recall consistency, Table 2). Ten percent (n = 34) of the cohort reported the exact same trauma as their most distressing lifetime experience (in equal measure, the death/disappearance of a relative/friend, severe physical injury, and forced displacement). Thirty-one percent (n = 101) switched the event they had identified as the most distressing lifetime experience; commonly, forced displacement was appraised as a more benign experience at follow-up relative to baseline. Other youth forgot a distressing trauma (n = 84), experienced new trauma (n = 47), or reported no trauma exposure at both time-points (n = 65).

Posttraumatic distress trajectories

We used latent transition analyses (LTA) to identify several CRIES trajectories for two-wave data. In comparing potential models, the fit statistics based on likelihood ratio tests provided support for the choice of a 2-class model (Table S2), while other fit information criteria proved inconclusive (Figure S1). Only the 2-class model featured meaningful sample sizes within latent transition groups. It showed clear discrimination of PTSD symptomology (CRIES = 1.46 vs. 19.18 points for low vs. high symptom groups).

Figure 1 illustrates the four trajectories identified as low (n = 171), declining (n = 70), rising (n = 49), and sustained high (n = 41) distress. Our LTA categorized one-third of the sample (n = 111) with high distress and two-thirds (n = 220) with low distress at baseline, and one-quarter (n = 90) with high distress and three-quarters (n = 241) with low distress at follow-up. Transition probabilities show that a majority (77%) of youth with low distress at baseline remained in the same category at follow-up, while 67% with high distress at baseline transitioned to low distress at follow-up. Smaller numbers (33%) with high distress at baseline showed high distress at follow-up, while 24% with low distress at baseline transitioned to high distress at follow-up.

Girls comprised two-thirds of youth in rising and sustained distress groups (69% and 66%, respectively), relative to 30% in declining distress and 46% in low distress groups (Table 2). Youth with sustained distress were also 1 year older (mean 14.10 years, SD = 1.45) than peers. They reported 3.59 (SD = 2.06) lifetime trauma events at baseline, as compared to 1.04 (SD = 1.48) traumas in the low distress group. Seventy-three percent (n = 30) switched the event they regarded as the most distressing, while 27% (n = 11) recalled exactly the same trauma over time. Youth with sustained distress were more likely to report ongoing domestic violence (41%), relative to low (26%), declining (20%),
or even rising (24%) distress groups. Their depression scores averaged 12.88 symptom scores (SD = 6.11) at baseline, compared to 8.37 (SD = 3.52) in the low distress group.

Table 3 presents the results of multinomial logistic regressions to assess the main protective and risk factors for posttraumatic distress. Regarding individual level variables, gender and lifetime trauma exposures made a robust impact on latent class membership. Girls were more likely to have rising and sustained levels of distress (OR = 6.66, \( p \leq 0.01 \), and OR = 5.78, \( p \leq 0.01 \), respectively), and conversely boys more likely to show declining distress (OR = 0.44, \( p \leq 0.05 \)). As expected, youth with sustained distress reported higher trauma exposures at both baseline and follow-up (OR = 1.55, \( p \leq 0.05 \) and OR = 5.96, \( p \leq 0.01 \)), youth with rising distress reported higher exposures at follow-up (OR = 5.63, \( p \leq 0.01 \)) but not baseline, and youth with declining distress reported higher levels of trauma exposure at baseline (OR = 1.56, \( p \leq 0.01 \)) but not follow-up. Youth with declining distress were, at baseline, more likely to report the traumatic loss of a close relative/friend (OR = 2.62, \( p \leq 0.01 \)).

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We found no independent associations with loss of home, or any other Checklist trauma items.

We also noted associations with family level domestic violence, mother literacy, poverty, and caregiver mental health. Youth with sustained distress were more likely to live in families with ongoing stressful domestic violence compared to the low distress group (Table 3 OR = 4.84, p ≤ 0.01), and the declining and rising distress groups (Table S3, p ≤ 0.05 and p ≤ 0.10 respectively). Ongoing domestic violence thus left children at a higher risk of a chronic distress trajectory. With regard to other family level characteristics, youth with rising distress were more likely to have a literate mother (OR = 3.32, p ≤ 0.05) and live in poorer households (OR = 0.67, p ≤ 0.05) relative to the low distress group (Table 3). Conversely, youth with declining distress were marginally more likely to have a nonliterate mother (OR = 0.48, p ≤ 0.10), and a caregiver with improving mental health (SRQ-20) scores (OR = 0.92, p ≤ 0.05). Father literacy made no independent impact on CRIES trajectory. Children of literate mothers exhibited lower scores at baseline (5.70 vs. 8.83, p = 0.01) but regressed to the mean at follow-up (6.59 vs. 5.64, n.s.), accounting for associations between transient trajectories and maternal literacy. With respect to past-year stressors, families with literate mothers were twice more likely to report a loss of salaried employment (25% vs. 11%, p = 0.001); baseline data showed that literate mothers were more likely employed (26% vs. 6% of nonliterate mothers, p < 0.001), residing with fewer extended relatives (p = 0.01) in households with above-average wealth (p < 0.001). With respect to the most distressing trauma, children of literate mothers reported different events at follow-up (p = 0.002), namely a preponderance of ‘violence/injury to self’ and ‘witnessing violence to another person.’ These differences were not confounded by site or gender. Regarding area-level variables, associations were statistically weak: youth with rising distress were likely to live in Peshawar refugee camps (OR = 4.18, p ≤ 0.10) and less likely to report better neighborhood interactions (OR = 0.41, p ≤ 0.10).

Figure 2 shows the probability of youth showing rising and sustained high CRIES trajectories, shown as the gender-differentiated predictive margins from one to seven lifetime trauma reports at follow-up; other trajectories are not illustrated. The risks of rising and sustained distress showed steady rises for youth recalling up to four lifetime trauma events, and plateau beyond this level; gender differences faded at higher levels of trauma reporting.

**Depression trajectories**

For LTA analyses on depression scores, we retained a 2-class model with moderate symptom and high symptom groups (7.44 and 15.87 DSRS points) and three latent transition trajectories characterized by moderate (n = 283), declining (n = 35), and sustained high (n = 13) symptom scores. Notably, 11 of the 13 youth with chronically high depression scores were girls, and no youth transitioned to a rising DSRS trajectory. Three variables (gender, age, and lifetime trauma exposure) predicted DSRS latent class membership (Table S4). Youth with sustained high depression were likely to be girls (OR = 5.98, p ≤ 0.05), older (OR = 1.53, p ≤ 0.05), and report more baseline trauma exposures (OR = 1.32, p ≤ 0.05). Statistically weaker associations were detected with stressful domestic violence (OR = 3.89, p ≤ 0.10). Youth with declining depression scores reported more traumatic events at baseline (OR = 1.47, p ≤ 0.01).

We compared how youth were distributed across the three DSRS and four CRIES latent transition classes. Those with moderate DSRS were more likely to show low CRIES, while those with declining or sustained DSRS were more likely to be show rising or sustained CRIES latent trajectories (Chi-square for

**Table 3 Multinomial logistic regressions comparing distress CRIES trajectories relative to reference groups (n = 331)**

| Compared to low distress | Declining | Rising | Sustained |
|--------------------------|-----------|--------|-----------|
| **Individual-level variables** |           |        |           |
| Gender (Boy = 0, Girl = 1) | 0.44**    | 6.66***| 5.78***   |
| Age of child at T1        | (0.16)    | (3.26) | (3.27)    |
| Lifetime trauma exposure, N events at T1 | 1.56***    | 1.28  | 1.55**   |
| Lifetime trauma exposure, N events at T2 | 1.23    | 5.63***| 5.96***   |
| Traumatic loss of a loved one (T1) | 2.62**    | 0.79  | 2.37    |
| Traumatic loss of a loved one (T2) | (1.12)    | (0.47) | (1.48)   |
| Traumatic displacement/loss of a home (T1) | 0.66     | 0.47  | 0.56    |
| **Family-level variables** |           |        |           |
| Mother is literate         | 0.48*     | 3.32** | 2.02     |
| Socioeconomic position     | (0.20)    | (1.56) | (1.16)   |
| Stressor of domestic violence, past-year | 1.01     | 0.67** | 0.69     |
| Change in caregiver mental health (SRQ-20-T2-T1) | (0.14)    | (0.13) | (0.15)   |
| **Area-level variables** |           |        |           |
| Site (Kabul = 0)           | 1.92      | 4.18*  | 4.00     |
| Peshawar = 1               | (1.01)    | (3.05) | (3.38)   |
| Better neighborhood interactions, past-year | 1.63     | 0.41*  | 0.55     |
| **Significance level shown as:** | *0.05 < p ≤ 0.10; **0.01 < p ≤ 0.05; ***p ≤ 0.01.**

Coefficients shown as exponentiated coefficients (odds ratios), and standard errors in parentheses.
LTA distributions of CRIES and DSRS, $p < 0.001$; data not shown). However, numbers were small: 10% of youth ($n = 28$) exhibited moderate DSRS and high CRIES, while only four sustained both high DSRS and high CRIES.

**Discussion**

This study makes two original contributions to the literature on global mental health and adverse childhood experiences, in examining the malleable nature of traumatic memory and the heterogeneity of posttraumatic distress trajectories over time. We demonstrated that Afghan youth significantly changed their recollection of trauma. At cohort-level, they forgot or repressed memories of lifetime events: we saw a significant decrease in reported overall exposures ($p \leq 0.001$; Table 1), including violence against self, violence against another, loss of a close relative/friend and loss of a home. Only witnessing military action was recalled with consistency. Changing one’s recollection of trauma (other than having lived in a war zone) is not so surprising in the context of young people coping with the multiple stressors and traumas of poverty, insecurity, and violence. Yet unexpectedly, a third of the cohort ($n = 106, 32\%$) reported no trauma exposure at baseline (Table 1), including violence against self, violence against another, loss of a close relative/friend and loss of a home. Only witnessing military action was recalled with consistency. Changing one’s recollection of trauma (other than having lived in a war zone) is not so surprising in the context of young people coping with the multiple stressors and traumas of poverty, insecurity, and violence. Yet unexpectedly, a third of the cohort ($n = 106, 32\%$) reported no trauma exposure at baseline (Table 1), including violence against self, violence against another, loss of a close relative/friend and loss of a home. Only witnessing military action was recalled with consistency. Changing one’s recollection of trauma (other than having lived in a war zone) is not so surprising in the context of young people coping with the multiple stressors and traumas of poverty, insecurity, and violence. 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notwithstanding changes in trauma reporting. We found that youth who reported four or more lifetime trauma were at elevated risk of sustained PTSD, regardless of gender, age, family, or area-level characteristics (Figure 2). This finding resonates with the results of larger (retrospective) studies linking adult health disorders with adverse childhood experiences. Using WHO Mental Health survey data from 21 countries, Kessler et al. (2010) found that the number rather than the type of childhood adversities predicted the odds of adult-onset mental health disorders, with consistently strong odds ratios associated with ‘maladaptive family functioning.’ The Adverse Childhood Experiences (ACE) study, undertaken in relatively affluent US neighborhoods, found that four or more adverse events reliably predicted medical conditions ranging from obstructive pulmonary disease to suicidality and depression, turning children with healthy potential into diseased adults, or ‘gold into lead’ (Felliti, 2002). Similar results were found in US neighborhoods where violence is the leading cause of years of life lost (Burke, Hellman, Scott, Weems, & Carrion, 2011). Thus, screening for adverse childhood experiences has proven medical and public health significance.

Nevertheless, the observation that memories of trauma are inconsistent over time is troubling from both research and clinical standpoints. Does screening for consistent or inconsistent trauma recall help identify people likely to experience persistent posttraumatic distress? Those who report the very same trauma over time may be vulnerable individuals ‘who are unable to put the past behind them’ (Mollica et al., 2007). Those who switch trauma events may also be vulnerable if they experience overlapping and likely confusing traumatic events. If so, screening for both consistent and inconsistent recall as an index of risk in the context of multiple adversities seems important (Mollica et al., 2007, p. 573). Still, we might only find relatively tenuous relationships between PTSD and exposure to war (Southwick, 1997).

The ‘science of resilience’ leads us to expect heterogeneity in mental health trajectories, which has important implications for interventions to enhance coping, treatment, and prevention (Masten, 2011; Obradovic, Shaffer, & Masten, 2012; Southwick & Charney, 2012; Southwick et al., 2011). In this study, we identified four trajectories of posttraumatic distress: 12% of youth sustained high distress, 15% showed rising distress, 21% showed declining distress, and 52% maintained low distress. Such results resonate with literature reviews that conclude that ‘posttraumatic resilience’ is often the norm, where measured by the absence of clinical psychopathology (Barber, 2013; Klasen et al., 2010; Tol et al., 2013b). In addition, we identified only a very small number of youth (n = 13) with sustained high depression, with risk factors (female gender, lifetime trauma exposure, and stressful domestic violence) similar to the risk factors for sustained posttraumatic distress. Given these small numbers, we found only weak evidence of comorbidity between posttraumatic distress and depression, where the ‘overall chronicity of adversity becomes a major signature’ of distress and depression (Miller & Rasmussen, 2010).

Prospectively, we identified a subgroup with sustained high distress, youth who ‘bucked the trend’ in being unable to forget or extinguish the memory and distress of traumatic experiences. As compared to the low distress group, they were more likely to be girls (OR = 5.78, p ≤ 0.01), report higher trauma exposures (at baseline and follow-up, OR = 1.55, p ≤ 0.05 and OR = 5.96, p ≤ 0.01), and experience ongoing stressful domestic violence (OR = 4.84, p ≤ 0.01; Table 3). Such individual and family level variables are well-known risk factors for mental health in war-related settings, helping us understand the effects of ‘concentrated adversity’ for youth living with stress, harm, and unpredictability (Betancourt & Beardslee, 2012; Betancourt & Khan, 2008; Betancourt, McBain, Newnham, & Brennan, 2013b; Panter-Brick et al., 2011). We also identified potentially transient trajectories of declining or rising distress: these were individuals likely to recover from past events or experience new trauma. We noted intriguing associations with maternal literacy: children with literate mothers were less likely to show declining distress (OR = 0.24, p ≤ 0.05), and conversely, more likely to show rising distress (OR = 3.32, p ≤ 0.05, Table 3). In the Afghan context, maternal literacy is rare and a marker of particular household dynamics. Having a literate mother can help not only to promote the aspirations of youth to assiduously attend school, but also render particularly stressful family-level decisions to anchor them in school at an age when girls are expected to marry and boys to contribute to the household economy (Panter-Brick et al., 2014). Maternal literacy can increase not only the range of options for a child’s life trajectory but also create conflict with extended relatives over gender norms. In our sample, families with literate mothers proved vulnerable to losses of salaried employment, likely to trigger many repercussions and specific psychosocial pressures on children. To give a concrete example, one 11-year-old girl reported that her uncle was threatening to kidnap her for marriage with his son, now that her mother had lost her position working in a UNHCR-funded school. At follow-up relative to baseline, children of literate mothers gave far more detailed trauma narratives as well as more frequent accounts of injury and domestic violence; they reported, for example, that mothers were severely disciplined at the hands of fathers or uncles for expressing the wish to ‘go out of the house.’ In the Afghan context, this points to heightened vulnerabilities in the wake of resource loss, even in households with greater wealth and female literacy.
We had postulated that the nature of traumatic experiences would play an important role in shaping distress or depression trajectories. Loss of a close relative/friend was reported as salient trauma (n = 99, 30% at baseline; Table S1), as was displacement (n = 102, 31% at baseline). These losses are likely to strip individuals of social, economic, or political resources with enduring repercussions for risk and resilience to adversity (Hobfoll, 2011). Our qualitative data had showed that the loss of a close male relative had crucial implications—rendering girls, in particular, vulnerable to unfavorable decisions over the timing and choice of marriage (Eggerman & Panter-Brick, 2010). We did not, however, identify statistically strong relationships between loss variables and mental health outcomes: the nature of trauma events proved secondary to the predictive impact of lifetime exposure, perhaps because the measure of lifetime exposure captured experiences of both loss and violence. Likewise, our evidence was inconclusive regarding the predictive impact of consistent or inconsistent trauma recall. Twenty-seven percent of youth with sustained high distress reported the same distressing trauma over time, yet 16% of those with rising distress and 11% with declining distress also reported the very same trauma as their most distressing lifetime experience (Table 2).

Our qualitative analyses of face-to-face interviews had shown how experiences of suffering, violence, and resilience were embedded in subjective and social experiences (Eggerman & Panter-Brick, 2010). Three narratives from youth who consistently recalled the same trauma illustrate the importance of context for understanding the heterogeneous associations between trauma recall and levels of posttraumatic distress. Thus, one 15-year-old girl recalled that her father threw acid on her mother in a fierce domestic quarrel before he killed himself: this event trumped 10 other lifetime trauma, including her personal experience of domestic physical abuse and losing her home a decade ago. At baseline, she tried ‘to think a lot and remain calm,’ while at follow-up, she ‘tried hard to forget.’ Yet her distress (CRIES scores) rose sharply over the year: her mother was now accused of having caused the death of her father, leaving both mother and child without crucial family support. Her distress escalated because she was placed in a liminal social position as the repercussions of a past tragedy, etched permanently on her mother’s face, unfolded beyond her control. Second, a 14-year-old boy reported nine traumatic events at baseline (including losing his uncle in the war, witnessing rocket explosions, being arrested by the police, and being knifed by a neighbor), yet identified, as his most distressing lifetime experience, severe beatings by his father. He showed chronic distress and depression: he could make no sense of his present life, wished to ‘escape from the house,’ and bluntly described the crux of his misfortune as ‘having been born in such a desolate country.’ Severe interpersonal violence indicated that the family could no longer hold it together in the face of a ‘broken economy,’ such that the trauma of powerlessness proved more salient than the trauma of war in the recollection of violent and frightening events. Third, a 16-year-old boy recalled witnessing Taliban fighting and US-led bombings, losing several relatives in these wars, yet sustained very low PTSD and depression symptom scores. In stark contrast to the previous two examples, this boy drew on a powerful cultural narrative that honors persons killed in jihad as ‘shaheed’ (martyred), giving him the means to create a more benign account of his life experiences.

Our study thus points to the subjective and social contexts of trauma that impact recall consistency and changes in mental health outcomes. It has four main limitations. First, we have only two waves of data, and regression analyses do not infer causality. Second, our sample is representative of school-based youth, but excludes those families too poor or socially conservative to have taken up opportunities for child education provided by the Afghan government or UNHCR. It is possible that, at cohort-level, mental health outcomes improved over time because we had sampled families able to anchor children in school (Panter-Brick et al., 2011). Third, our sample size remained small (n = 331), which limited statistical power: we may not have captured all relevant predictors of distress or depression, and we combined low and zero CRIES scores into one reference group once sensitivity analyses demonstrated this did not impact results. Fourth, having designed our study to capture mental health outcomes in relation to lifetime trauma and past-year events, we analyzed a limited number of ‘loss’ variables related to safety, stability, and nurturance. Losses were central to many trauma narratives, yet were trumped in quantitative analyses by more general measures of trauma exposure. This calls for careful evaluation of both qualitative and quantitative data.

Our limitations are balanced by notable strengths. First, we interviewed a gender-balanced cohort of child-adult dyads, in a context where women and girls are especially hard to reach. Indeed, our participation rates were notably high: we built rapport with teachers prior to the survey, found students very keen engage, and secured consent from all but one caregiver through offering basic health checks at no cost to all participants. The health checks provided a valuable service, albeit no treatment, and gave women a legitimate social reason to leave the confines of home. Second, we proceeded with systematic random sampling and in-depth interviews, carefully validating our tools for transcultural research. Third, we used mixed-methods assessment of mental health, trauma, and past-year events, obtaining family level as well as individual-level data.

In conclusion, we found both heterogeneity in trauma exposures and malleability in traumatic memory over time. Trauma is both a clinical and a
social event: family experiences and cultural narratives shape the subjective memories of trauma, which in turn sustain poor mental health where they rupture a sense of coherence in the experience of life. For this reason, we recommend that longitudinal data collection in settings of chronic adversity include repeated measures of lifetime trauma exposure, along with narrative interviews of subjective experiences. This will help provide a fine-grained understanding of multiple childhood adversities in settings of conflict and insecurity. Global datasets have led us to recognize that screening for multiple childhood exposures is a significant predictor of long-term mental health outcomes (Kessler et al., 2010). Indeed, the argument has been made that effective public health interventions could routinely screen for adverse childhood experiences, using four or more events as a reliable predictor of disease risks emerging in later adulthood (Garner & Shonkoff, 2012). Interestingly, our own data indicate that youth who recall four or more trauma events show elevated risks of rising and sustained PTSD symptoms, whilst resilience is fostered by a sense of family unity in the face of adversity. By implication, interventions for children facing multiple and ongoing adversities need to focus on family-level prevention as well as protection: they can, for example, provide support at the family level by enhancing effective parenting, bolstering economic wherewithal, and sustaining feelings of hope or efficacy. These resources are known to be essential for resilience and healthy child development (Hobfoll et al., 2007; Masten, 2014; Panter-Brick & Leckman, 2013; Torres et al., 2011).

Supporting information
Additional Supporting Information may be found in the online version of this article:
Table S1. Types of events reported on the 22-item Trauma Events Checklist (n = 331).
Table S2. Fit statistics of latent class analysis models from 2 class to 5 class for CRIES distress.
Table S3. Multinomial logistic regressions comparing depression CRIES trajectories relative to reference groups (n = 331).
Table S4. Multinomial logistic regressions comparing depression DSRS trajectories relative to reference groups (n = 331).
Figure S1. Fit statistics of latent transition analysis models from 2 class to 5 class for CRIES distress.

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Key points
- Little is known on trauma memories in conflict-affected youth, especially in non-Western populations.
- We identified changes in trauma recall and modeled trajectories of posttraumatic distress and depression with latent transition analyses for two-wave data on 331 Afghan youth.
- One third of Afghan youth reported no trauma exposure, half reported no traumatic distress, and 12% sustained chronic posttraumatic distress. Recalling four or more trauma events raised the probability of experiencing sustained or rising posttraumatic distress.
- We discuss resilience and vulnerability in the context of chronic exposure to violence and multiple adverse childhood experiences.
- Memories of trauma are malleable and embedded in social experiences; this impacts associations with mental health.

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