SCHOLASTIC IMPAIRMENTS AMONG TRAUMATIZED ADOLESCENTS

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Summary—This investigation sought to determine if exposure to exceptional stress is associated with academic deficits or whether academic deficits are specifically associated with post-traumatic stress disorder (PTSD). In order to address these questions, the Metropolitan Achievement Test (MAT) as well as a measure of intelligence were administered to three groups of Lebanese adolescents. The first group met diagnostic criteria for PTSD. The second group had been exposed to qualitatively and quantitatively similar stressors but did not meet diagnostic criteria for PTSD. The third group consisted of non-traumatized controls. Data analysis using IQ as a covariate determined that the MAT scores of the PTSD subjects were significantly lower than the scores of the stress exposed PTSD negatives and controls. No significant differences were observed when the MAT scores of the stress exposed PTSD negatives and controls were compared. © 1997 Elsevier Science Ltd

INTRODUCTION

A number of studies have examined the differential validity of the post-traumatic stress disorder (PTSD) classification in recent years (Saigh, 1992). Whereas these investigations support the validity of the classification among adults (Blanchard, Kolb, Gerardi, Ryan & Pallmeyer, 1986; Fairbank, Keane & Malloy, 1983; Orr & Pittman, 1993; Zimmering, Caddell, Fairbank & Keane, 1993), adolescents (Sack et al., 1995; Saigh, 1985, 1988; Saigh, Mroueh, Zimmerman & Fairbank, 1995), and children (Diamond, Saigh & Fairbank, in press; Ornitz & Pynoos, 1989; Saigh, 1989b, 1991), information regarding functional impairments among stress exposed populations is limited (Sack et al., 1995).

While research involving war veterans with PTSD suggests that these individuals manifest cognitive impairments (Bremner et al., 1994; Goldstein, van Kammen, Shelly, Miller & van Kammen, 1987; Sutker, Winstead, Galina & Allain, 1991), contradictory findings have been observed relative to the academic achievement of stress exposed youth. For example, Carey-Trefzer (1949) examined 212 British youth who had been exposed to a host of war-related events (e.g. the London blitz) and observed that 30.6% experienced academic difficulties. Terr (1979) conducted an extensive case study involving school age children (age range 5–14 yr) who had been abducted, forced into a pit, and buried alive. Terr reported that "changes for the worse in school performance were observed in 8 children, and changes for the better occurred in 2" (p. 573). In a similar vein, Tsui, Dagwell and Yule (1993) compared the academic performance of school-age survivors of a nautical accident to the achievement of a matched control group. Data analysis determined that final examination scores of the stress exposed group were appreciably lower than those of the control group. More recently, Sack and his colleagues (1995) examined the academic functioning of 206 Cambodian youth (age range 13–25 yr) 12 yr after they immigrated to the United States. In contrast to earlier research, Sack et al. (1995) examined for PTSD and reported that 18% of their Ss met DSM-III-R criteria for the disorder. The investigators subsequently compared the grade point averages of the Cambodian youth with and without PTSD and observed that the averages of the two groups were not significantly different.

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Given the somewhat limited and seemingly contradictory information regarding the scholastic functioning of traumatized youth, this investigation sought to determine if exposure to exceptional stress is generally associated with academic deficits or whether academic deficits are specifically associated with the PTSD. In order to address these questions, the standardized achievement scores of adolescents with PTSD were compared to the scores of stress exposed adolescents without PTSD and the scores of adolescents without a history of stress exposure. In-as-much as PTSD is partially indicated by concentration and sleep impairment (American Psychiatric Association, 1994), and as these impairments are inversely related to scholastic achievement (Jensen, Inouye & Arlene, 1980; Linde & Bergstrom, 1992; Swanson, 1994; Williams & Lubin, 1967), it was hypothesized that the academic achievement of the PTSD group would be significantly lower than the achievement of the comparison groups. As the literature also suggests that the majority of individuals who are exposed to extreme stress do not develop long-term emotional or functional impairments (Kettner, 1972; Kulka et al., 1990; Lewis, 1942; Rachman, 1990; Sack et al., 1993; Saigh, 1989a; Saigh, Green & Korol, 1996), it was further predicted that the achievement of the stress exposed PTSD negatives would be comparable to the achievement of the control group.

METHOD

Subjects

An MA-level counsellor who had completed a graduate course involving the history, epidemiology, and assessment of PTSD with special reference to children and adolescents received extensive training involving the administration and scoring of the Children's PTSD Inventory (Saigh, 1989b). The counsellor administered the Children's PTSD Inventory to 95 randomly selected non-referred Lebanese students. The students were enrolled in six private Lebanese schools where English constituted the primary language of instruction. It is to be noted that the Lebanese system of education is centralized and that the same curriculum is taught across schools (Saigh, 1984). None of the Ss were receiving psychopharmacological medication or psychotherapy. Moreover, none of the Ss had a history of gross head trauma, neurological disorders, alcoholism or drug abuse. The data collection took place on 4 and 7 June 1991 and on 4, 6 and 18 November 1991. At that time, highly stressful incidents were occurring on a regular basis throughout the Lebanon (e.g. a terrorist attack destroyed the 125-yr-old administration building of the American University of Beirut, the arms depot of Lebanon’s largest Christian militia exploded killing 5 people and wounding 21 others, and rival Christian and Moslem militias regularly traded artillery fire).

PTSD positives

Of the 95 students that were initially assessed, 14 met criteria for PTSD. As subsequent data analysis (see Results) led to the identification of two outliers among the PTSD positives and as the scores of these cases were excluded from the data analysis, 12 Ss constituted the PTSD positive group (6 males and 6 females; mean age 17.64 yr, SD = 0.90 yr). Given that religious affiliation is a significant demographic variable in the Lebanon, it was determined that 6 Ss were Christian and 6 were Moslem. Three (25.0%) of these individuals developed PTSD after they had been personally exposed to life-threatening war-related events (e.g. a 17-yr and 2-month old female reported that "The house that I was in was destroyed during a bombardment and I was badly cut by falling glass"). Six (50.0%) developed PTSD after observing situations that constituted a clear threat to the life or well being of a close friend or relative (e.g. a 17-yr and 3-month old male whose parents were away reported that the "enemy entered my village and I saw them killing people"). The remaining 3 (25.0%) developed PTSD through exposure to multiple forms of extreme stress (e.g. a 16-yr and 8-month old male reported that he had to drive through an artillery barrage in order to deliver an injured neighbour to a hospital). On the basis of the Ss' responses to the Children's PTSD Inventory, it was established that the average time since the PTSD positives had been traumatized was 4.2 yr (SD = 2.9 yr). In response to structured clinical interview questions, all of the PTSD Ss reported that they had not experienced
academic problems before they were exposed to extreme war-related stressors. Whereas 9 Ss (75.0%) verbally acknowledged that they developed "poor marks in school" following their stressful experiences, 5 others (41.7%) said that they had not. Teacher reports indicated that none of the PTSD Ss had below average grades before they were exposed to extreme forms of war-related stress.

**Stress exposed PTSD negatives**

Of the 95 individuals that were initially assessed, 16 (7 males and 9 females; mean age = 17.21 yr, SD = 0.55 yr) had been exposed to extreme forms of war-related stress and did not meet the necessary criteria for a PTSD diagnosis. Six were Christian and 9 were Moslem. Five (31.25%) were personally exposed to life-threatening war-related stressors (e.g. a 17-yr and 1-month old female reported that "I was hit in the arm by shell fragments and had to be rushed to the hospital. While I was there, the hospital was hit by a shell"). Eight (50.0%) observed situations that constituted a clear threat to the life or well being of someone else (e.g. a 16-yr and 5-month old male reported that "My next door neighbours were killed when their house was shelled. I saw their bodies"). Three Ss (18.8%) were exposed to multiple forms of traumatization. On the basis of their responses to the Children's PTSD Inventory, it was established that the average time since the traumatized PTSD negatives had encountered extreme stress was 4.6 yr (SD = 2.6 yr). Structured clinical interview questions determined that all of these Ss had not experienced academic problems before they were exposed to extreme forms of war-related stress. Three of the stress exposed PTSD negatives (18.75%) verbally acknowledged that they experienced poor marks in school following their stressful experiences and 13 others (81.25%) said that they had not. Teacher reports indicated that none of the stress exposed PTSD negatives had below average grades before they experienced war-related stressors.

**Controls**

Fifteen (7 males and 8 females; mean age = 17.74 yr, SD = 0.88 yr) of the 95 students that were initially assessed reported that they had not been exposed to war-related stressors. Seven were Christian and 8 were Moslem. Although these individuals were enrolled at the same schools that the PTSD positives and stress exposed PTSD negatives were attending, they had previously emigrated to avoid war-related situations or had resided in areas of the Lebanon that had not experienced direct military conflict. Given that PTSD may be induced by non-war related stressors (e.g. motor vehicle accidents or natural disasters), the control group completed the Children's PTSD Inventory and it was established that they had not been exposed to extreme forms of stress (see criteria below). As such, these cases did not meet diagnostic criteria for PTSD. As based on semi-structured interviews, it was also determined that the control Ss had not experienced academic problems in the past.

The remaining 50 individuals were excluded from the study if they did not: (a) experience a serious threat to their lives or physical integrity, (b) witness a serious threat to the lives or physical integrity of their relatives or friends, or (c) if they had not observed another person being injured or killed as a result of an accident or intentional violence.

**Diagnostic measure**

*Children's PTSD Inventory (Saigh, 1989a)*. The Children's PTSD Inventory was developed on the basis of the DSM-III criteria for PTSD. The instrument consists of four subtests that are scored on a dichotomous basis (i.e. 1 for the presence and 0 for the absence of symptoms). The first subtest assesses traumatization through experiential, vicarious, or verbal mediation. The second subtest assesses unwanted anxiety evoking recollections of the trauma. The third assesses general affect, and the fourth subtest assesses a number of symptoms that were not apparent before the trauma. In an earlier field trial involving Lebanese youth, Saigh, 1989a clinically identified youth who met criteria for Acute PTSD, Chronic PTSD, as well as youth with a PTSD negative classification. Three MA-level counsellors who were not aware of the S's history or classification administered the index to these youth and correctly classified 90%, 83%, and 80% of the respective cases. A series of Cohen's coefficient kappas were calculated on the basis of the criterion-examiner diagnoses and coefficients of 0.84, 0.81, and 0.73 were observed for
the Acute, Chronic, and negative PTSD classifications. Taken collectively, the aggregate ratings reflected agreement on 84% of the cases with a corresponding Cohen’s kappa of 0.78. The counsellors reassessed the Ss 21–25 days later and agreements of 87%, 83%, and 80% were observed with corresponding kappas of 0.81, 0.76, and 0.73. Examined collectively, the aggregate interrater level of agreement was 83% with a corresponding kappa of 0.77 (Saigh, 1989a).

Dependent variable

Metropolitan Achievement Test, 6th edition, Advanced 2 Form L (Prescott, Balow, Hogan & Farr, 1986, 1988). The Metropolitan Achievement Test (MAT) is a standardized index of academic achievement that is intended for group administration. Whereas the instrument presents nine measures that are arranged according to a spiral omnibus multiple choice format, two measures (Social Studies and Research Skills) were eliminated because their content was not indicative of the Lebanese national curriculum. The measures that were used included: Vocabulary (24 items involving the selection of a word from a series of alternatives in order to accurately complete sentences with missing words); Reading Comprehension (50 items involving factual questions regarding the content of a series of reading passages); Mathematics (55 items involving addition, subtraction, multiplication, division, fractions, decimals, square roots, algebra, plain geometry, and graph analysis); Spelling (25 items involving the selection of correctly spelled words to correspond with missing sections from a series of sentences); Language (48 items involving English punctuation, capitalization, usage, and written expression); and Science (50 items reflecting factual information and concepts relative to physical, earth, space, and life sciences) subtests. In-as-much as the psychometric properties of the MAT had not been established in the Lebanon, the reliability of the MAT subtests in terms of Kuder–Richardson Formula 20 coefficients was calculated according to the responses of the selected sample. Viewed in this context, the following reliability coefficients were observed by subtest: Vocabulary ($R_{20} = 0.85$, $P < 0.01$); Reading ($R_{20} = 0.92$, $P < 0.01$); Mathematics ($R_{20} = 0.95$, $P < 0.01$); Spelling ($R_{20} = 0.77$, $P < 0.01$); Language ($R_{20} = 0.84$, $P < 0.01$); and Science ($R_{20} = 0.86$, $P < 0.01$). It is important to note that these coefficients are comparable to the Kuder–Richardson Formula 20 coefficients that Prescott et al. (1986) observed after the MAT was administered to national standardization samples of American eleventh ($n = 2808$) and twelfth graders ($n = 2126$). It is also important to note that coefficients of 0.75, 0.75, 0.80, 0.49, 0.75, and 0.80 were reported when the respective MAT Vocabulary, Reading, Mathematics, Spelling, Language, and Science scores were correlated with Otis–Lennon School Ability scores (Prescott et al., 1986, 1988).

Covariate

Lebanese General Ability Scale (LGAS: Saigh, 1986). As intelligence tests may have moderate to high correlations with measures of academic achievement (Perlman & Kaufman, 1990), the LGAS (a measure of mental ability that was developed and standardized in the Lebanon) was used as a covariate. The LGAS was developed with the view that subjective environmental experiences may prevent otherwise able university scholarship applicants from succeeding on curriculum-based admission tests. As such, the LGAS consists of items involving analogies, logic, numerical concepts, and schematic reasoning. The internal consistency of the LGAS is rather robust with a Kuder–Richardson formula 21 coefficient of 0.90 ($P < 0.01$). Moderate to low coefficients were observed when the LGAS scores were correlated with secondary school marks in geography [$r(22) = 0.36$, $P < 0.05$]; history [$r(22) = 0.35$, $P < 0.05$]; English [$r(22) = 0.36$, $P < 0.05$]; Arabic [$r(22) = 0.31$, $P < 0.10$]; biology [$r(22) = 0.48$, $P < 0.02$]; and chemistry [$r(22) = 0.49$, $P < 0.02$] (Saigh, 1990).

Stress intensity measure

Severity of Psychosocial Stress Scale: Children and Adolescents (SPSS: American Psychiatric Association, 1987). The SPSS is incorporated in the DSM-III-R and presents a 6-point Likert-type index for rating the severity of exposure to stressful events. The scale is used to formulate DSM-III-R Axis IV ratings and provides specific examples reflecting a continuum of stressful events. For example, the ‘Death of both parents’ (American Psychiatric Association, 1987, p. 11) is listed as an example of a ‘catastrophic stressor’ and accorded a rating of 6. Analogously,
'Recurrent sexual or physical abuse' (American Psychiatric Association, 1987, p. 11) is characterized as an 'extreme' form of stress and rated as a 5. Less intense forms of stress such as an unwanted pregnancy or an arrest, are regarded as 'severe' and rated as a 4. Stressors such as school expulsion, or the birth of a sibling are viewed as 'moderate' stressors and accorded a rating of 3. Appreciably less stressful events such as changing schools or breaking up with a boyfriend or girlfriend are characterized as 'mild' stressors and given a rating of 2. Finally, the SPSS indicates that situations wherein no acute or enduring circumstances are apparent should receive a 0 rating.

Whereas the directions for the Children's PTSD Inventory clearly indicate that examiners should determine "if the stressor was outside the range of usual human experience" and if the stressor is "of sufficient intensity to invoke significant symptoms of distress in almost everyone" (Saigh, 1989b, p. 84), an added measure of assessment integrity was achieved through independently derived ratings. Two psychiatrists each with more than 10 years of experience in diagnosing and treating war-related PTSD who were not aware of the purpose of the study or the diagnostic status of the Ss independently rated the S's verbatim responses to the stress exposure questions of the Children's PTSD Inventory (these statements were previously transcribed by the MA-level counsellor during the actual interviews) according to the DSM-III-R SPSS criteria.

RESULTS

A Pearson product-moment correlation coefficient was calculated between the psychiatrists' ratings and a significant correlation coefficient was observed for the overall sample \([r(40) = 0.90, P < 0.01]\).

The SPSS ratings were subsequently averaged by S for each of the diagnostic groups. The SPSS ratings of the PTSD positives and the stress exposed PTSD negatives ranged from 5 to 6 (i.e. the psychiatrists regarded all of the Ss' experiences as constituting 'extreme' or 'catastrophic' sources of stress). The psychiatrists also concurred that none of the control Ss warranted more than a 'moderate' SPSS rating (i.e. a score of 3). A one-way ANOVA was calculated and a significant effect was observed. Post hoc analyses revealed that the SPSS ratings of the PTSD positive and the stress exposed PTSD negative groups were not significantly different \([t(40) = 0.11, P > 0.05]\). Bonferroni tests also confirmed that the SPSS ratings of the PTSD positive and the stress exposed PTSD negative groups were significantly greater than the SPSS ratings of the controls \([t(40) = 15.37, P < 0.01\) and \(t(40) = 16.25, P < 0.01\)].

A stem-and-leaf display was employed to examine the distribution of the data. These cases were excluded from the subsequent data analysis. The selected MAT subtest (dependent variables) weighted means and standard deviations were subsequently calculated for each comparison group. Likewise, the LGAS IQ (covariate) weighted means and standard deviations were calculated for each comparison group. Table 1 presents the relevant data by diagnostic category.

A multivariate analysis of covariance (MANCOVA) was performed to test for group differences and the null hypothesis of no significant differences on the MAT subtests adjusted for IQ was rejected using a Wilks lambda test \([F(12,68) = 6.63, P < 0.001]\). Univariate F tests were effected and significant differences were observed on the MAT Vocabulary \([F(2,39) = 14.68, 43]

| Table 1. Weighted means and standard deviations across comparison groups |
|-----------------------------|-------------|-------------|               |          |
| MAT subtest                | PTSD        | PTSD negative | Control       |          |
|                            | M           | SD          | M            | SD        |
| Vocabulary                 | 11.66       | 5.07        | 18.81        | 2.56      | 18.60     | 3.20      |
| Reading                    | 27.58       | 6.38        | 43.06        | 3.28      | 43.67     | 6.67      |
| Mathematics                | 22.92       | 7.95        | 39.75        | 11.09     | 43.60     | 12.98     |
| Spelling                   | 12.58       | 3.45        | 19.31        | 2.18      | 18.06     | 4.33      |
| Language                   | 23.17       | 4.71        | 33.75        | 5.67      | 32.13     | 4.77      |
| Science                    | 20.83       | 5.04        | 27.43        | 8.20      | 31.13     | 6.22      |
| LGAS IQ                    | 102.42      | 9.77        | 105.56       | 8.71      | 106.27    | 10.02     |

Note: MAT = Metropolitan Achievement Test, 6th edition, Form L; LGAS = Lebanese General Ability Scale.


A series of comparisons were performed to identify statistically significant differences. As there were only three possible pair-wise comparisons, the $P$ values were not adjusted using a multiple comparison procedure. The MAT weighted means of the controls significantly exceeded the weighted means of the PTSD positives on the MAT Vocabulary [$t(39) = 5.59, P < 0.01$]; Reading [$t(39) = 9.14, P < 0.01$]; Mathematics [$t(39) = 6.22, P < 0.01$]; Spelling [$t(39) = 4.40, P < 0.01$]; Language [$t(39) = 6.34, P < 0.01$]; and Science [$t(39) = 3.64, P < 0.01$] subtests. Analogously, the MAT weighted means of the stress exposed PTSD negatives were significantly greater than the weighted means of the PTSD positives on the Vocabulary [$t(39) = 5.69, P < 0.01$]; Reading [$t(39) = 8.71, P < 0.01$]; Mathematics [$t(39) = 5.14, P < 0.01$]; Spelling [$t(39) = 5.75, P < 0.01$]; Language [$t(39) = 6.82, P < 0.01$]; and Science [$t(39) = 2.62, P < 0.05$] subtests. No statistically significant differences were evident when the weighted means of the stress exposed PTSD negatives and the non-clinical controls were compared on the Vocabulary [$t(39) = 0.87, P > 0.05$]; Reading [$t(39) = 0.36, P < 0.05$]; Mathematics [$t(39) = 1.25, P > 0.05$]; Spelling [$t(39) = 1.36, P > 0.05$]; Language [$t(39) = 1.08, P > 0.05$]; and Science [$t(39) = 1.56, P > 0.05$] subtests.

**DISCUSSION**

The results clearly indicate that the adolescents with PTSD experienced appreciably lower levels of scholastic performance across six different areas of achievement relative to the performance of their counterparts. While exposure to extreme stress was generally not associated with academic deficiencies, scholastic impairments were largely apparent among stress exposed individuals who developed PTSD. It may also be said that the results support the recently adopted DSM-IV (American Psychiatric Association, 1994) provision that PTSD is partially manifested by significant functional impairments.

Clearly, the observed results are not in synchrony with the results that were observed by Sack et al. (1995). The disparity between these findings may be explained by recalling that this investigation involved adolescents who were attending schools in the Lebanon during a period of ongoing hostilities. In contrast, the Sack et al. (1995) study involved Cambodian refugees who were residing in the relative safety of the United States. Given these points it is reasonable to assume that the emotional morbidity of the Lebanese Ss may have been exacerbated by ongoing war-related events and the added distress may have adversely influenced their ability to learn.

It is of considerable interest to observe that a number of the symptoms that were experienced by the PTSD Ss are antithetical to scholastic achievement. An analysis of the Ss' responses to the Children's PTSD Inventory revealed that all of the PTSD Ss reported unwanted and highly arousing thoughts about their experiences. In contrast, only 13.3% of the stress exposed PTSD negatives reported this symptom. Analogously, 91.7%, 33.3%, and 13.3% of the respective PTSD positives, stress exposed PTSD negatives, and non-clinical controls endorsed an item denoting "Difficulty remembering things or paying attention in class" (Saigh, 1989b, p. 190). In a similar vein, 83.3%, 33.3%, and 26.7% of the respective Ss reported that they were experiencing sleep impairment. As concentration and memory are predictors of achievement (Bransford et al., 1982; Jensen et al., 1980; Randall, Main, Seymore & Morris, 1992; Swanson, 1994) and as the literature attests to the negative effects of sleep deprivation on cognitive performance (e.g. Elkin & Murray, 1974; Linde & Bergstrom, 1992; Williams & Lubin, 1967), it would appear that these symptoms adversely affected the PTSD positive group's ability to learn. Given that scholastic achievement is a cumulative process and as the mean interval between traumatization and data collection for the PTSD group was 4.2 yr, the failure to acquire academic prerequisites over time may have further interfered with their ability to master advanced material.

These observations must be tempered with the realization that they are based on the assessment of a limited sample of Lebanese adolescents. Whereas the number of Ss that were studied
provided sufficient statistical power for the detection of differences between the PTSD positive group and the relevant control groups, the non-significant differences that were observed between the stress exposed PTSD negatives and the control group should be interpreted with caution in-as-much as additional statistical power may have produced significant effects on the MAT Math and Science subtests. In view of these points, this report should be replicated with divergent populations (e.g. Western inner city youth who were exposed to sexual or physical abuse as well as youth who were exposed to industrial accidents or natural disasters).

Although student and teacher reports indicated that the stress exposed groups did not have a pre-trauma history of academic problems, scholastic records were not obtained and the possibility of pre-trauma group variations can not be dismissed. As such, future investigators should obtain pre-trauma indicators of scholastic functioning and employ these measures as covariates in order to more comprehensively address concerns regarding preexisting impairments. Future investigations should also attempt to control for the potential influence of historical variables (e.g. attendance rates, transience, and comorbid psychiatric conditions).

Despite these limitations, a number of clinical implications are evident. Initially, it appears that PTSD in adolescents may serve as a critical filter for entry into professional and technical careers that draw heavily on preexisting scholastic skills. As such, the importance of timely diagnoses and intervention are regarded as important functions for mental health practitioners. As PTSD is largely an internalizing disorder, parents and educators may not be aware of the emotional problems (e.g. trauma-related thoughts) that child-adolescent PTSD cases may experience. In view of this, examiners may wish to screen for PTSD when stress-exposed youth are referred for testing due to academic difficulties.

REFERENCES


