Psychological trauma and post-traumatic stress disorder

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The empirical foundation for post-traumatic stress disorder has continued a pattern of steady development over the past 10–12 years. This review reveals that the immediate past year was marked by particularly strong work in the areas of epidemiology, health-related aspects of the disorder, and identification of risk predictors. In contrast, treatment interventions for post-traumatic stress disorder remain a research target that warrants greater attention.

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Introduction

The early mainstay of trauma-related investigations was assessment, and this focus on development of strong measurement tools enabled the field to progress rapidly. The emerging maturity of the field is currently being demonstrated by outstanding work on the prevalence of post-traumatic stress disorder (PTSD) and the identification of risk factors and potential causal mechanisms of stress-related maladjustment. Combat veterans and disaster victims were the predominant target populations for early development of the field, and they continue to be so. However, investigation of new populations is broadening our perspective on the range and form of adjustment problems that result from the all too common experiences of extreme stress.

Assessment

Psychometric tests, interviews, and diagnosis

Advances in assessment this year were led by Foa *et al.* [1] who developed the PTSD Symptom Scale to assess the 17 major diagnostic symptoms from DSM-III-R. The measure demonstrated strong psychometric properties in its initial evaluation. Watson *et al.* [2] evaluated the relative performance of four existing PTSD measures: the Mississippi Scale, the PTSD Interview, the Keane PTSD (PK) Scale of the Minnesota Multiphasic Personality Inventory, and the Diagnostic Interview Schedule's PTSD module. All four measures functioned comparably in detecting the presence or absence of PTSD. However, the Mississippi Scale and PTSD Interview surpassed the others as measures of symptom severity. King *et al.* [3•] used item response theory, a promising new method for psychometric development, to test the relative diagnostic contributions of each of the Mississippi Scale's 35 items. Recommendations for scale improvements were presented. Zimering *et al.* [4•] evaluated the DSM-III criteria for PTSD by operationalizing key symptoms using experimental tasks. This study provided important validational information regarding the diagnostic criteria.

An additional set of issues that received attention this year included dissociation, personality characteristics, and neuropsychological functioning of individuals with PTSD. Bremner *et al.* [5] demonstrated the performance of a new DSM-IV structured interview for dissociative disorders, and Talbert *et al.* [6] applied the NEO Personality Inventory to combat veterans. The former study showed the expected higher rates of dissociative disorder among PTSD patients and the latter showed PTSD patients to be extremely high on neuroticism and low on extraversion, openness, and agreeableness. Finally, three studies [4•,7,8] examined the extent to which memory problems, a common clinical complaint among PTSD patients, were observable on standardized neuropsychological tests. The data indicate only mild impairments which may be a byproduct of attentional problems or depressed affect, or both.

Finally, the important issue of gender bias in the assessment of PTSD was addressed by Becker and Lamb [9]. They found that diagnostic impressions of mental health clinicians varied depending on the gender of the patient and of the clinician. Overall, if an abused patient was described as female, they were more likely to receive a diagnosis of borderline personality disorder. Across clinicians, women were relatively more likely to apply a PTSD diagnosis instead.

Psychophysiological methods

Two articles which appeared during the past year [10,11] move beyond the diagnostic use of psychophysiological

Abbreviation

PTSD—post-traumatic stress disorder.

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34. Lucey JV, Butcher G, Clare AW, Dinan TG: **The Anterior Pituitary Responds Normally to Protirelin in Obsessive Compulsive Disorder: Evidence to Support a Neuroendocrine Serotonergic Deficit.** *Acta Psychiatr Scand* 1993, **87**:384–388.

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Short-term reductions in free plasma trytophan were induced in 15 obsessive–compulsive patients who had profited from treatment with serotonin reuptake inhibitors in a double-blind, placebo-controlled crossover design. Tryptophan depletion produced elevations in depressed ratings, but not in rated obsessions and compulsions.

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40. • Montgomery SA, McIntyre A, Osterheider M, Sarteschi P, Zitter W, Zohar J, Birkett M, Wood AJ, Lilly Europeon OCD Study Group: **A Double-Blind, Placebo-Controlled Study of Fluoxetine in Patients with DSM-III-R Obsessive Compulsive Disorder.** *Eur Neuropsychopharmacol* 1993, **3**:143–152.

Three fixed daily doses of fluoxetine were compared in a double-blind, multi-center, placebo-controlled study of 218 patients with OCD. Results indicated efficacy of fluoxetine for treating OCD, and no difference between fluvoxamine and placebo in the rates of reported side effects.

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A meta-analysis was conducted on the results of four large, multi-center, placebo-controlled trials of clomipramine, fluoxetine, fluvoxamine, and sertraline for the treatment of OCD. The efficacy of all four active compounds was demonstrated, with clomipramine superior to the other three, that did not differ among themselves.

42. Rasmussen SA, Eisen JL, Pato MT: **Current Issues in the Pharmacologic Management of Obsessive Compulsive Disorder.** *J Clin Psychiatry* 1993, **54**:4–9.

43. Foa EB, Kozak MJ, Lievbowitz M, Gorfinkle K, Campeas R, Stehle S, Street L, Riggs D, Franklin M, Davies S, Hearst D, DelBene D, Nixon W: *Treatment of Obsessive Compulsive Disorder by Behavior Therapy, Clomipramine and their Combination: Preliminary Results of a Multicenter Double Blind Controlled Trial.* Poster presented at the Annual meetings of Association for the Advancement of Behavior Therapy, Atlanta, Georgia; November, 1993.

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52. Cooper M: **A Group for Families of Obsessive Compulsive Persons.** *J Contemp Hum Serv* May 1993:301–307.

53. Goodman WK, McDougle CJ, Barr LC, Aronson SC, Price LH: **Biological Approaches to Treatment Resistant Obsessive Compulsive Disorder.** *J Clin Psychiatry* 1993, **54**:16–26.

54. •• Jenike MA, Rauch SL: **Managing the Patient with Treatment Resistant Obsessive Compulsive Dsorder: Current Srategies.** *J Clin Psychiatry* 1994, **55**:11–17.

Pharmacologic, behavioral, and neurosurgical approaches to patients with treatment-resistant OCD are reviewed, and recommendations are offered.

55. Drummond LM: **The Teatment of Severe, Chronic, Resistant Obsessive–Compulsive Disorder.** *Br J Psyhiatry* 1993, **163**:223–229.

56. Browne M, Horn E, Jones T: **The Benefits of Clomipramine-Fluoxetine Combination in Obsessive Compulsive Disorder.** *Can J Psychiatry* 1993, **38**:242–243.

57. • McDougle CJ, Goodman WK, Leckman JF, Lee NC, Heninger GR, Price LH: **Haloperidol Addition in Fluvoxamine-Refractory Obsessive Compulsive Disorder.** *Arch Gen Psychiatry* 1994, **51**:302–308.

Thirty-four people with OCD, who were refractory to fluvoxamine, were given adjunctive haloperidol or placebo in a double-blind, randomized trial. Only patients with chronic tic disorders showed reduction of OCD symptoms with adjunctive haloperidol.

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measures into hypothesis testing about the hormonal, subcortical, and cortical mechanisms of PTSD. Another psychophysiological study [12] is only the second to examine information-processing features of PTSD from an electrophysiological perspective using event-related potentials. This work offers a measurement link to attention and concentration problems associated with the disorder.

Epidemiology

Recent years have seen several outstanding studies of prevalence and risk factors associated with PTSD. This year, three new studies were published. Resnick *et al.* [13••] reported on the prevalence of potentially traumatic events and PTSD in a nationally representative US sample of women. Lifetime probability for exposure to any potentially traumatic event was an astonishing 69%; lifetime and current rates of PTSD were 12.3 and 4.6%, respectively. Furthermore, over 35% of the sample reported exposure to some type of crime over the course of their lives, and PTSD was three times more likely to occur following exposure to a crime than any other type of potentially traumatic event studied.

A second study [14•] assessed the prevalence and effects of potentially traumatic events among undergraduates. Findings showed that 84% of students had experienced at least one potentially traumatic event and over 30% had experienced four or more.

Norris and Kaniasty [15••] assessed victims of violent crimes, victims of property crimes, and nonvictims at three points over a 15-month period. Most crime victims had problematic emotional reactions following the experience that persisted for at least 3 months, although many improved by 9 months. Those who did exhibit problems at 9 months continued to be distressed at the 15-month assessment; this was most true for those who had been exposed to violent crime.

Psychopathology: symptoms

Effects on memory

One of the most prominent issues from the past year is the question of forgotten and recovered memories of childhood trauma, especially sexual abuse. One aspect of its importance is the fact that inability to specify an event (even if due to forgetting) technically precludes the PTSD diagnosis. The issues in the forensic realm are presented by Loftus [16•], with particular emphasis on the potential role of suggestion by psychotherapists in the process of memory (re)construction. An empirical attempt to address the normative frequency of childhood abuse that is forgotten and then recalled was also published [17•].

Comorbidity

The well-documented high rates of co-occurrence of other mental disorders with PTSD was extended to personality disorders. Southwick *et al.* [18] demonstrated comorbidity rates as high as 83% for borderline personality disorder among an inpatient sample of combat veterans with PTSD.

Neuroendocrine features

Ongoing investigation and theorizing by Yehuda *et al.* [19•,20] in relation to hypothalamic–pituitary–adrenal axis alterations in PTSD was extended in the past year by an integrative review and an empirical study. This work promotes the perspective that enduring hormonal changes are associated with chronic forms of PTSD and these changes are intimately tied to adjustment.

Implications for physical health

A particularly interesting set of studies addressed the relationship between physical health and sexual assault or childhood sexual victimization. Two studies recruited medical outpatients [21•,22] and found that patients with functional disorders report more sexual trauma than do those with organic disorders. A third study [23] recruited adult sexual assault victims from a rape crisis center and found that physical complaints and use of medical services were higher for the assault victims in relation to the comparison group. In addition, the assault victims sought medical services to relieve their distress rather than mental health services. The fourth study [24••] used a large community-based sample to examine reports of sexual assault and their relationship to current health status. Findings indicated that women with a sexual assault history rated their health status as lower and reported more symptoms across various organ systems relative to women without such a history.

Psychopathology: populations

Children in disasters

The effects of technological and natural disasters on the mental health of children have received relatively little attention. To address this deficiency, Division 12 of the American Psychological Association issued task force reports [25,26] summarizing the literature on the untoward effects of disasters on children and the related literature on treatment intervention.

A longitudinal study of the effects of disasters by Green *et al.* [27••] showed that children who survived the Buffalo Creek dam collapse, West Virginia, USA, had reduced prevalence of PTSD 17 years later (from 32 to 7%). Pynoos *et al.* [28] studied the effects of the 1988 Armenian earthquake on children from three cities and found that those from towns closest to the epicenter reported more PTSD symptomatology [29]. Shannon *et*

al. [30] examined over 5600 children who were exposed to Hurricane Hugo in the USA and found that 5% of the sample reported sufficient symptoms to reach PTSD criteria. Further negative effects of disasters on children were found by Durkin *et al.* [31] who observed negative changes on measures of incontinence and aggression by children after a flooding disaster in Bangladesh.

Combat and war-zone survivors

Findings from research conducted on the veterans of the Persian Gulf War include several studies that confirm the noxious effects of exposure to graves registration duty [32•,33,34,35•]. Perconte *et al.* [36] also studied the effects of this war and found increased trauma symptoms among those reservists deployed to combat areas compared with nondeployed reservists. Impairment was a direct function of war-zone stress exposure. Similarly, Southwick *et al.* [37] found some distress at 1 month after return to the USA, but observed a gradual increase in stress symptoms and likely cases of PTSD at the 6-month follow up.

Victims of transportation disaster

Three studies [38–40] were published as part of a continuing series related to the Herald of Free Enterprise ferry disaster in the UK. Another rapidly developing target for trauma research is the so-called person-under-train incident and its effects on railway drivers. Collectively, four studies [41–43,44•] indicated that (1) witnessing, and having indirect responsibility for violent injury, dismemberment, or death, produces heightened biological stress and psychological distress; (2) approximately 17% of the affected drivers may meet criteria for a PTSD diagnosis in connection with a person-under-train incident; and (3) a tendency exists for initial reactions to recede over the period of a few months to 1 year. Two complementary studies concerning the impact of motor vehicle accidents [45•,46•] indicate that chronic psychosocial morbidity, including PTSD, often follows these accidents.

Victims of torture

An excellent study [47••] examined the chronic adjustment of political prisoners who had been tortured in Turkey. Key features included the creation of a control group of nontortured political activists who were matched to the torture group on the basis of age, sex, marital status, sociocultural status, as well as political ideology and involvement. The group comparisons revealed diagnostic differences exclusively limited to the PTSD category, with lifetime and current PTSD rates of 33 and 18%, respectively.

Psychopathology: individual differences

Variations in exposure to potentially traumatic events

Three studies with children and adolescents added to the evidence that event characteristics influence the course of postevent adjustment. The first [48•] determined that longer duration of sexual abuse and the use of threat or violence by the perpetrator were associated with a greater likelihood of PTSD. The second study [49] also showed that event-exposure variables (perceived hurricane severity and self-rated damage to the home) were associated with greater symptom reports. The third study [50] demonstrated that juvenile offenders may experience substantial (24%) rates of PTSD and that severity of symptoms is related to degree of exposure to violence.

With regard to traumatized adults, Fontana and Rosenheck [51] found that war-zone stress had the strongest impact on development of chronic combat-related PTSD. Similarly, a creative study by Smith *et al.* [52] combined data from three disasters and found a dose-response relationship between exposure to the disasters and psychological symptomatology.

Genetic factors

Skre *et al.* [53] found that, when compared with a proband group which met criteria for exclusively nonanxiety disorders (primarily mood and substance abuse disorders), only co-twins of anxiety probands had a PTSD diagnosis. Importantly, from the genetic perspective, the prevalence for PTSD was twice as high for monozygotic co-twins as for dizygotic co-twins.

Gender

Several studies have continued the trend of findings that indicate both girls and adult women are at higher risk for developing PTSD after a potentially traumatic experience. In the past year, the bulk of these findings were in relation to disasters of various sorts [27••,28,30,52].

Previous potentially traumatic experiences

Findings from crime victims [15••], railway accidents [42], motor vehicle accidents [46•], and college students [14•] add to a growing body of evidence that multiple lifetime encounters with extreme stressors place individuals at increased risk for developing PTSD. Compatible evidence is also found in samples of combat veterans [54•,55].

Previous major depression

Blanchard *et al.* [46•] and North *et al.* [56•] provided complementary evidence that major depression is a risk

factor for PTSD diagnosis following a potentially traumatic experience.

Postevent mediators

Mayou *et al.* [45•] identify 'horrific' intrusive memories in the first weeks after an accident as a strong predictor of PTSD at 1 year. Baum *et al.* [57] also summarize prospective findings from the Three Mile Island incident, Pennsylvania, USA, which indicate that intrusive memories have a negative impact on long-term adjustment. In a similar vein, Norris and Uhl [58] identify ongoing stress in areas such as marital and family relationships, finances, and physical health as mediators of the impact of natural disaster. Data from two other studies [39,59] support similar conclusions.

Treatment

Solomon *et al.* [60] reviewed the few empirically based clinical trials of treatment for PTSD; little has changed in the past year. Conceptually, Keane *et al.* [61] proposed a cognitive–behavioral treatment model, and Shalev *et al.* [62] presented a heuristic biopsychosocial treatment model. In terms of psychopharmacology, Davidson *et al.* [63] reported further on their study of amitriptyline to treat combat-related PTSD. They found that patients who initially reported fewer symptoms and less distress improved the most in an 8-week trial. Finally, scientists and clinicians continue to debate the relative merits of eye-movement desensitization and reprocessing [64] for treating PTSD, awaiting evidence from randomized treatment outcome studies.

Conclusion

At this time one can readily conclude that PTSD is a very common psychological disorder in the general population with overall prevalence rates ranging from 6–10% for a lifetime diagnosis. Among survivors of specific events, the prevalence rates are clearly much higher, often extending to 30% of all those who survive catastrophes such as combat military experiences and rape. As a result, the development of assessment and treatment methods are clear public health priorities. Efforts to identify survivors provide interventions designed to prevent the onset of disabling symptomatology, and to empirically study their efficacy are important future directions for research.

References and recommended reading

Papers of particular interest, published within the annual period of review, have been highlighted as:
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- •• of outstanding interest

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A novel approach to evaluating the effectiveness of individual test items for accurate measurement of PTSD. Item response theory may bolster current approaches for psychometric test development because it is able to determine the extent to which each test item contributes to the overall measurement of the construct under study. Using the Mississippi PTSD Scale, these authors demonstrated the usefulness of this psychometric method in developing and refining measures of diagnostic constructs.

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An experimental, laboratory-based study validating the diagnostic criteria for PTSD using objective measures in both a neutral and primed (emotionally activated) state. Results supported the inclusion of the various criteria as the tasks were generally able to distinguish PTSD individuals from those without PTSD.

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of women. Results for sexual assault indicated a prevalence rate of nearly 27% even though a strict definition of this crime was employed.

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This secondary analysis of data from the Los Angeles component of the Epidemiologic Catchment Area project capitalizes on a sophisticated household sampling strategy and the use of face-to-face interviewing for data collection. An additional strength is the extensive questioning with regard to nature, characteristics, and consequences of their somatic symptoms. Overall, it provides an important perspective on the range of physical complaints and functional limitations of sexual assault victims who were not exclusively seeking treatment.

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26. Vernberg EM, Vogel JM: **Part 2: Interventions with Children after Disasters.** *J Clin Child Psychol* 1993, **22**:485–498.

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44. • Theorell T, Leymann H, Jodko M, Konarski K, Norbeck HE: **Person Under Train Incidents from the Subway Driver's Point of View: A Prospective 1-Year Follow-Up Study: The Design, and Medical and Psychiatric Data.** *Soc Sci Med* 1994, **38**:471–475.

This research team is generating a series of papers from data collected on 40 subway drivers who were at the controls when their train struck a pedestrian, usually a suicide attempter. This particular paper provides prospective evidence about subjective distress, sickness absenteeism, substance use, blood pressure, and serum cortisol and other hormones. Mention is also made of a forthcoming companion paper that examines the individual patterns of psychological adjustment and predictors of those patterns.

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A 1-year prospective examination of consecutive road accident victims treated at an emergency department of a British hospital. It is noteworthy for its relatively unbiased sampling, prompt postaccident evaluation (less than 10 days in the key groups), and two follow-up evaluation points.

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This study sets a particularly high standard for the assessment of post-traumatic stress disorder and other psychiatric disorders. It includes a matched control group of individuals who had not been involved in recent motor vehicle accidents and it uses extensive state-of-the-art interview assessment of DSM-III-R Axis I and II disorders.

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This study combines strong experimental methodology with a target population that has not been adequately studied to date. Three specific strengths are a control group that is closely matched to the torture victims on demographic variables, including political involvement, an interview-based PTSD diagnostic evaluation, and a range of additional measures for anxiety, depression, and somatic symptoms. The study is a 'must-read' on its own merits, and a companion report in the future will hopefully provide data for an additional control group.

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The use of interview information to create a set of PTSD diagnostic criteria appropriate for children is a particular strength of this study. It also deserves attention for highlighting the fact that substantial proportions of children who come to the attention of authorities because of sexual abuse may not experience PTSD. This could reflect limited applicability of the diagnosis to this population, the operation of resilience or vulnerability factors, or both.

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Efforts to understand who does and does not develop combat-related PTSD have focused on degree of combat exposure as the primary etiological variable. This study observed a prevalence rate of childhood physical abuse of 45% among PTSD patients. Inclusion of these factors in the assessment and treatment of PTSD will be critical to a more comprehensive understanding of the status of combat PTSD patients.

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Subgroups were created to represent five different levels of exposure to the mass shooting. Exposure ranged from the highest level, which included eyewitnesses who were injured, through the lowest level, which included employees of the restaurant who were off-duty when the shooting took place. This gradient of objective exposure is an important anchor for the analyses related to individual differences in apparent vulnerability to development of PTSD. A prospective follow up to this 1-month postevent evaluation is anticipated.

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Breathing-related disorders

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This article is based on the premise that the study of respiratory psychophysiology provides a bridge between psychology and physiology. Events during the past year which mark significant advances in the study of respiratory psychophysiology are discussed and timely articles on a broad range of topics relevant to disordered breathing are noted. Special emphasis is given to theoretical and clinical studies of hyperventilation-related psychiatric complaints and their treatment, and to new directions in the study of stress and its relationship to breathing.

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Introduction

The relationship between disordered breathing and psychiatric disorders is not broadly understood. Part of the reason for this probably harks back to the traditional separation of body and soul or corpse and spirit: life begins with inspiration (the body incorporating the spirit) and ends with expiration (the body giving up the spirit). Although few scientists would openly support the Descartian notion of body–mind dualism, some would argue that there is a clear distinction between psychology and physiology beyond that of a convenient dialectic convention within biology. A simple example from the study of respiratory psychophysiology that demonstrates how breathing provides a bridge between psychology and physiology is volitional overbreathing. Cognitive initiation of rapid and strong contractions of the diaphragm and intercostal muscles while resting (i.e. low metabolic demand for oxygen) will lead quickly to hyperventilatory hypocapnia (diminished arterial CO_2 and elevated pH) and produce an almost immediate increase in heart rate [1], decrease in parasympathetic activation [2], increase in electrodermal conductivity [3] (Sanderson W, unpublished dissertation), decrease in blood flow to the brain [2] with a decrease in dissociation of oxygen from hemoglobin (cerebral hypoxia) [4••]. If some psychiatric disorders are a manifestation of faulty cognition, if cognition is a product of the brain's activity, and if the brain's activity is dependent on an adequate supply of oxygen, then the connection between disordered breathing and psychiatric disorders should be clear.

Another part of the reason for the narrowly understood relationship between disordered breathing and psychiatric disorders may lie in problems of measurement. Because respiration rate, tidal volume, and minute volume cannot be interpreted independently of metabolic demand, the direct measurement of the reduction in the partial pressure of arterial CO_2 that defines hyperventilation is limited to invasive techniques of assaying samples of arterial plasma. Although the determination of the proportion of CO_2 in the end-tidal peak of expired air by means of gas analyzers provides a very accurate and highly reliable noninvasive estimate of partial pressure of arterial CO_2, this method seems to have escaped the attention of psychotherapists. The reason for this may also lie in tradition: psychotherapists study the mind and physiologists study the body. Perhaps the time has arrived for a rapproachment; perhaps respiratory psychophsyiology provides a bridge [5].

Recent advances in respiratory psychophysiology

The cognitive deficit that results from hyperventilation-induced cerebral hypoxia is a central theme in Fried's recent book [4••,6], one of several noteworthy events in the study of respiratory psychophysiology to occur during the past year. This book's first person singular presentation provides a unique voice which will ease the reader's journey through the complex regions of biological factors involved in breathing (anatomy and physiology of the respiratory system; the circulatory system and the heart, blood, and red blood cells; capnometry; hyperventilation and the endocrine, cardiovascular and nervous system), psychosomatic disorders (and clinical applications of breathing training in their treatment), and neurological hypothetical constructs designed to explain some puzzling symptoms that present in the clinic.

Another timely event which suggests that the study of respiratory psychophysiology has come of age was the formal announcement of the organization of the International Society for the Advancement of Respiratory Psychophysiology. This was put forward at the XIIth International Symposium on Respiratory Psychophysiology held in London, UK, in September, 1993. This 3-day conference, hosted by Lewis Adams of the Char-

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