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International Journal of Psychophysiology 48 (2003) 97–113
INTERNATIONAL JOURNAL OF PSYCHOPHYSIOLOGY
www.elsevier.com/locate/ijpsycho

On reversible deafness, generalized anxiety disorder, and the motoric brain: a psychophysiological perspective

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Accepted 23 December 2002

Abstract

Electromyographic (EMG) recording during presentation of loud sounds revealed central motor inhibition in a rare case of conversion disorder with deafness. Two subjects in whom hypnotic deafness was induced resembled the patient. In contrast, patients with generalized anxiety disorder (GAD) showed a significantly delayed return of EMG to baseline, compared with normals and schizophrenics following administration of auditory startle stimuli. Blood pressure (BP) of GAD patients was also slower to return to baseline than that of normals and schizophrenics. BP recorded continuously during seven consecutive tests revealed a striking difference between GAD patients and controls. While the controls' BP generally decreased during the session, pressure of the GAD patients remained at their initial levels. These data are interpreted in relation to allodynamic autonomic regulation as affected by vagal blockade, which appeared to decrease in controls while remaining undiminished in GAD patients. It is suggested that intrusions of uncontrollable worry in GAD patients, and their consequent overuse of certain rostral neural pathways involved in preparation for action prolonged their vagal blockade. A GAD case with typically high frontalis EMG is presented. Frontalis EMGs may provide an exceptionally sensitive indication of neural activity of relevance to GAD. EMG gradients in normal subjects draw attention to Sperry's motoric brain concept, whose influence is strong throughout the paper. Sperry's principle states that the main function of the brain is that of moving the animal in ways that are advantageous for satisfying basic needs and avoiding dangers. Also, with a focus on the motoric brain, some discoveries resulting from brain-recording experiments in freely moving rats are described.

Keywords: Anxiety; Generalized anxiety disorder; Electromyographic recording; Blood pressure; Motor control

From its inception as a scientific specialty, perhaps the most exciting aspect of psychophysiology has been its ability to blend not only human and animal research, but basic and clinical research, sometimes allowing a distinct perspective on the development of a particular illness. An interesting example is provided by a psychophysiological assessment conducted a number of years ago on a young woman suffering a conversion disorder with deafness (Malmo et al., 1952). At the time of the study, Anne (pseudonym) was a

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0167-8760/03/$ - see front matter © 2003 Elsevier Science B.V. All rights reserved.
doi:10.1016/S0167-8760(03)00048-5

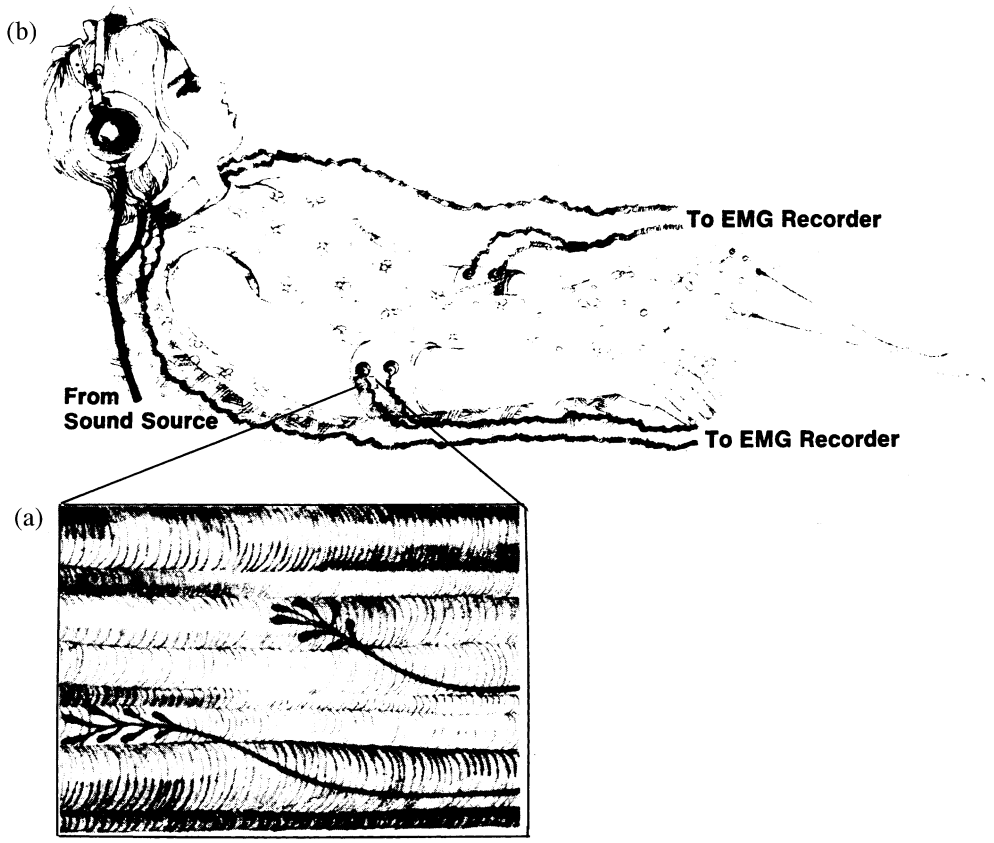

Fig. 1. Electromyograms (EMGs). Electrodes are placed on the skin over the muscle, and signals they pick up are amplified and recorded as electromyograms or EMGs. The strength of a muscular contraction correlates with the amplitude (vertical movement) in the EMG tracing. The greater the muscular activity, the greater is the amplitude of the tracing. The EMG can be used to measure muscle contraction that produces movement (isotonic contraction) or muscle tension without motion (isometric contraction). Each time an electrical impulse passes along a muscle fiber, some of the electrical activity spreads from muscle to skin. The more muscle fibers that contract simultaneously, the greater is the total voltage to the skin. EMG measurements are particularly valuable because they can reveal responses that produce no visible movement. From Malmo (1970) (Art by Joyce Fitzgerald). Reprinted with permission from Psychology Today. Copyright© 1970 (Sussex Publishers, Inc.).

19-year-old single woman of middle-class Scottish parentage, the youngest of three daughters. She attended school until the age of 16, completing the 10th grade, and subsequently was employed as an office worker.

Approximately 6 weeks prior to admission, Anne awoke one morning to find herself totally deaf. Two weeks earlier she had left home following an altercation with her mother, an altercation related to long-standing and pronounced family conflict, and stayed with a girl friend. However, she returned home 2 days prior to the onset of deafness, complaining of spells of faintness and dizziness. She consulted the family physician, who prescribed some medication, but after taking it for 2 days she perceived a buzzing in her ears and the next morning became deaf. There was no reason to believe that her tinnitus (or her deafness) was due to medication. When she became deaf, all the other symptoms of faintness, dizziness and tinnitus disappeared. The deafness lasted for several weeks and forced her to give up her job. However, she did acquire considerable proficiency in lip reading, which made it possible for her to communicate