Chapter 10

Subjective Fatigue in Children and Adults: Evidence From the Research on Speech Perception and Cognitive Abilities

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ABSTRACT

Fatigue is a common yet poorly understood topic. The psychological, physiological, social, emotional, and cognitive wellbeing of a person may be affected due to fatigue. Despite a century of research in understanding the effect of fatigue on human systems, there is no concrete explanation as how fatigue affects the perception of speech. Fatigue impairs auditory cognition and the reduced cognitive abilities further increase mental and physical fatigue. Since cognition is markedly affected in individuals experiencing mental fatigue, its consequences are widespread. According to the top-down approach of auditory processing, there is a direct link between cognition and speech perception. Thus, in the present chapter, the influence of fatigue on perception is reviewed. It is noted that the impact of fatigue on cognition and quality of life is different for children and adults. Training in music, meditation, and exposure to more than one language are some of the measures that help to reduce the effect of fatigue and improve cognitive abilities in both children as well as in adults.

INTRODUCTION

Our fatigue is often caused not by work, but by worry, frustration and resentment. Dale Carnegie (1888-1955)

Fatigue is a complex construct which can be defined in many ways. There is no universal definition of fatigue. The definition may vary with reference to the focus of the study and the person defining it. For

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e.g. for a layman, fatigue is the feeling of tiredness after coming back from work place, and it fades off after sufficient rest; but for a clinical psychologist/psychiatrist, fatigue is a pathology which is often secondary to many neuro-psychological conditions, and require appropriate medical/rehabilitative attention. In general, fatigue is a subjective feeling of tiredness which is gradual in nature (Hawley and Reilly, 1997). It is a common symptom of almost every medical and psychiatric health condition as well as in non-pathological physical and psychological strain and stress (Radovic and Malmgren, 1998). Fatigue is not a disorder by itself, however, its existence may indicate multiple physical, physiological, psychological, cognitive and related disorders. Fatigue can be classified as being physical or mental in origin. Physical fatigue refers to the transient inability of the body muscles to maintain optimal physical performances (Gandevia, 2012), whereas mental fatigue may cause a temporary or permanent reduction in the cognitive abilities due to prolonged mental activities (Marcora, Staiano, and Manning, 2009).

Fatigue influences daily life and it is experienced by all human beings at many points throughout their lifespan. It is the most common complaint heard in primary healthcare settings (Wessely, Hotopf, and Sharpe, 1999). Yet, fatigue is seldom being studied and is poorly understood. Researchers do not really know much about fatigue despite more than 100 years of research. Still there is no mature theory of its origin or function (Hockey, 2013). The impact of fatigue is widespread and varies with children or adults. Thus, it is essential to understand the physiology behind fatigue and the effect of fatigue on speech perception and auditory cognition of the human beings. In the meantime, it is also important to discuss certain evidence-based measures to reduce the effect of fatigue and to improve the quality of life. In the present chapter, the authors tried to review some of the studies showing the effect of fatigue on cognitive abilities in children and adults, while high lighting the interconnections between cognition and speech perception, and possible measures to reduce the negative impact of fatigue.

**CLASSIFICATION OF FATIGUE**

Fatigue can be caused because of physical and/or mental exertion. Physical fatigue is the temporary inability of a muscle to perform optimally, and is usually reversible, i.e. the fatigue disappears after taking sufficient rest. It is usually due to excessive physical exertion, sleep deprivation, and may be because of poor overall health. This results in the lack of energy in the muscles, and the overall reduction in the control of the central nervous system over the peripheral body organs (Gandevia, 2001). Mental fatigue, on the other hand, is defined as temporary or permanent inability of the human brain to maintain optimal cognitive performances. Mental fatigue has also shown to be increased after excessive physical exercise (Marcora et al., 2009). But, unlike physical fatigue, mental fatigue results in more rigorous neuro-physiological changes.

Physical and mental fatigue is governed by different underlying processes. They are separate biological functions, but they may co-exist. For e.g. If one is physically exhausted, he/she may have difficulty in running, lifting, or playing, but their alertness and concentration will remain intact. On the other hand, when a person is mentally exhausted, his/her alertness will suffer but physical performance will be preserved. However, in certain circumstances, when a person is physically exhausted, his/her mental performance is affected, and vice versa. Experimental evidences suggested that mental fatigue limits the exercise tolerance in human beings and results in reduced threshold of physical fatigue (Marcora et al., 2009). The researchers attributed the co-morbidity of physical and mental fatigue as a consequence of neuro-physiological changes regulating fatigue in the human brain.