

MEASUREMENT OF FUNCTIONAL AUDITORY INTELLIGENCE IN HUMANS BASED ON INTERMITTENT AUDIO SIGNALS

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ABSTRACT. *The human auditory system possesses intelligence characteristics such as the ability to extract information from a missing or damaged voice signal, and these characteristics correlate with brain function. If the relation between auditory intelligence and brain status can be identified, it will be possible to evaluate brain health status according to an auditory intelligence test. At present there are no integrated measurement and evaluation standards for auditory intelligence. We presented an experimental method for the measurement of auditory intelligence based on intermittent audio signals and found the quantitative relation between percentage correct recognition and the extent of intermittence. Then we made a primary physiological measurement of correlative brain area by a near infrared spectroscopy instrument correspondingly, and confirmed that the activation of brain area is correlated to intermittent audio signals and also can be improved by it possibly.*

Keywords: Auditory intelligence, Audio signal recognition, Periodic erasure processing, Near infrared spectroscopy, Hemoglobin concentration

1. Introduction. Since the 1990s, research on the human brain has accelerated, and great advances have been made in anatomy physiology of the brain and neuropsychology [6,12]. Attention has been focused on brain health, and correspondingly some methods of brain health promotion and assistance systems were proposed and implemented. Auditory function and intelligence is an important field of brain science, and many gains in this field have also been made [3,4,9].

The human auditory system possesses many intelligence characteristics. For example, at a loud party, people can usually communicate with each other comfortably without being disturbed by the noise; and during a phone call with a poor connection, the conversation can still be understood. These characteristics indicate auditory intelligence, and correlation with brain health. With increasing age, brain function develops, matures, and declines, and auditory intelligence status changes correspondingly. Auditory intelligence differs according to differences in brain development and to factors that damage the brain. To be conscious of the brain's health decline, the actual diagnostic methods are physiological diagnosis by CT, PET, or fMRI. Moreover, psychological methods, such as SSW, are also employed. However, the physiological method needs special experts, facilities and places. And as for the psychological method, there exist many limitations, for example, test vocabularies are necessary and the subject's education level has to be