

DETECTING CHANGES OF AFFECTS BY ACCELERATED PLETHYSMOGRAM

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Received February 2008; revised June 2008

ABSTRACT. *We have tried to detect changes of affects by measuring accelerated plethysmogram. We gave 9 kinds of mental stimuli to 22 subjects and measured their accelerated plethysmograms. We chose the power spectrum of a-wave intervals of accelerated plethysmogram as an index to detect changes of affects. The accumulated powers in a low frequency region measured in many kinds of stimuli were significantly smaller than that measured in the light chatting condition which we assume as a base condition in this research, whereas the accumulated powers in a high frequency region measured in some passive kinds of stimuli were significantly bigger than that measured in the base condition. We also analyzed the correlations of the accumulated powers between measured in the different stimuli. The correlation coefficients of the powers between almost all stimuli in the low frequency region are high, whereas these in the high frequency are high between some kinds of similar stimuli.*

Keywords: Affect, Accelerated plethysmogram, Mental stress, Amusement

1. Introduction. Detections of disease and stress by measuring the accelerated plethysmogram have been studied [1-3]. In these studies, the main purpose is to detect some physical or mental bad conditions in the medical viewpoint.

In this paper, we attempt to apply this method to detect changes of affects caused by both tense and relaxed stimuli, such as calculating task, games, music and movies.

Brain activities have been researched by MRI (magnetic resonance imaging) or brain waves in general [4-6]. However, these methods need to use expensive devices or to follow complicated procedures and sometimes to force subjects to endure unpleasant restriction. In MRI measurement, the subject cannot move freely because his or her head is fixed to the device. In brain wave measurement, many electrodes have to be attached to the surface of the subject's head with low electrical resistance, so special treatments are applied to the subject's head skin, such as wetting or applying conductive paste. Subjects are not forced to endure such unpleasant conditions under the proposed method. The accelerated plethysmogram can be measured easily and lightly.

2. Experimental Method. Subjects, stimuli and procedures in the experiment are as follows.

(1) **Subjects.** The number of subjects is 22, whose ages are from 18 to 22, 9 males and 13 females. All subjects are university students.

(2) **Stimuli.** The stimuli given to subjects are shown in Table 1. Stimulus 1 is light chatting and we assume this as a base condition in this research. In the base condition, the subject can act freely. The observer does not speak to the subject actively. If the subject speaks to the observer, the observer replies to the subject. Stimulus 2 is a task loaded to the subject. Stimuli from 3 to 9 are amusements.