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TRANSIENT RESPONSE OF HUMAN BRAIN

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Abstract: This aim of the study is the improvement of the relationship between the operators and robotics in CIM room, and teahing room and students. It is said that we human beings are controlled by the left brain for the intelligent quality (IQ) and by the right brain for the emotional quality (EQ). The blood pressure and frequency, the face temperature and 1/f music taste and odor, the several music are supplied for alpha1 waves (8-10 Hz for the reluxation) and alpha2 waves (10-13 Hz for the concentration). Changing the tacct time of the testee's liking suitable music is better for making tha alpha1 waves and the alpha2 waves for the right brain. For example changing Allegro (133 c/min) to Andante (70 c/min) of Mozart's Piano Concert No.21 , K 467 or Mendelssohn's Concert for violin and orchestra in E minor, Op.64 ior Tchaikovsky's Concert for violin and orchestra in D major, Op.35 is suitable making alpha1 and alpha2 waves in the right brain.

Keywords: alpha waves, music and transient response

I.. INTRODUCTION

The aim of the study is as follows:

1.1 The unknown measuring and control object that is human body and human brain should be analyzed using engineering methods.

The relation between the conditions of body and brain and the environments should be found out. The reasons why we human beingd can feel to be cool using wind bell and can be concentrated using moderate music sound should be found out. It is said that the generation of alpha waves in the right brain make the ability on the emotional quality for human relation.

1.2 The efforts of the discovery of the suitable environmentts are applicable for study rooms or production rooms or CIM or the relation between the human brain waves, face temperatures, and continuous blood conditions and the environments of the human body and brain, same as the sound, light, odor, stimulation, taste, and room temperature. Alpha waves are classified as alpha1 (8-10 Hz) for the reluxation and alpha2 (10-13 Hz) for the concentration..

2. EQUIPMENT AND TEST CONDITIONS

The authors used NEC-SANEI's SYNAX ER1204 (4 ch) and DP1100A (16 ch) brain wave analyzer, and CX-1 Bodysonic chair, TH1101 Cd-Hg-Te infra-red thermography, TH103 thermotracer, FINAPRESS2300 nonintrusive continuous blood pressure monitor. And a dark room well temperature controlled for testee students.

The signal is reject the value above 50 micro V as an abnormal condition. The clock cycle 8 ms and sweep time 4 seconds and No.8 (P4) based on FFT intensity is selected for the noise rejection of sensing cap. The face thermography and the continuous blood pressure and frequency are measured for 23 minutes. The transient response for the several tastes are also measured. **Figure 1-1** and **Figure 1-2** show positions of brain waves sensors for four channels and positions of brain waves sensors for sixteen channe1s.

3. EFFORTS OF EXPERIMENTS

A sample of the face temperature of the forehead (1), the nose (2), the chin (3), the right cheek (4), and the left cheek (5) based on the thermography for the moderate music sound is shown in **Figure 2** The summation of the amplitude of the alpha1 waves (8-10 Hz) and the alpha2 waves (10-13 Hz) for 23 minutes is shown in **Figure 3.**

Figure 4, **5** and **6** in the next page show the transient response of the brain waves for a sweet candy, a little bit of hot red peppers and sour plum. **Figure 7** and **8** in the fourth page show the brain waves response for the odor as an aromatheraphy Lavender and Rosemary and the perfume of Japanese Tea Theremony Kyara, Zinkou and Byakudan (Paidan), respectively.

Figure 9 and **10** in the fifth page show the brain wave response for the frequently music series and for Mozart's Piano Concert No.21 K46 Allegro toAndante, respectively.

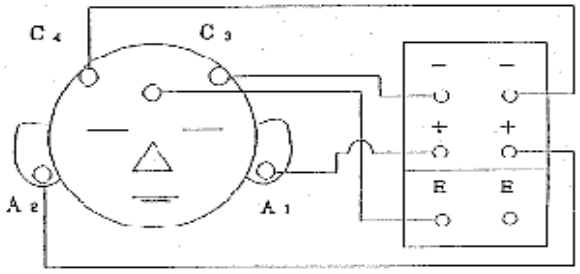

Figure 1-1 Positions of brain waves sensors for 4 ch

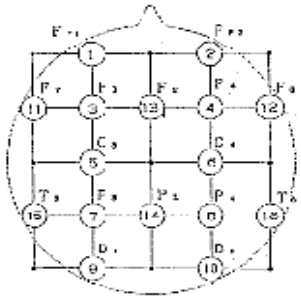

Figure 1-2 Positions of brain waves sensors for 16 ch

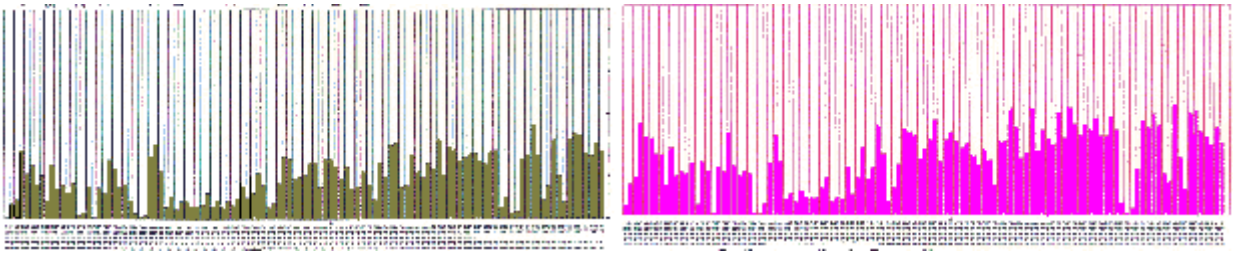

Figure 2 Trends on alpha waves in the left brain waves and right brain waves

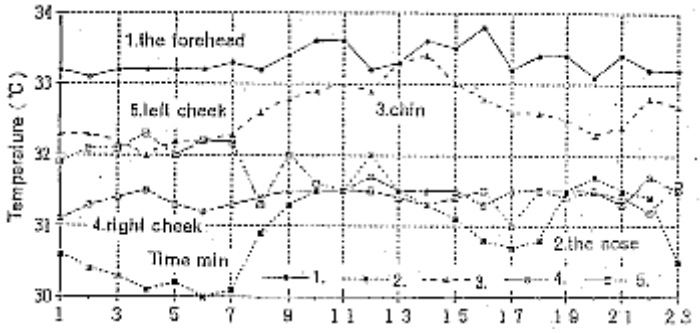

Figure 3 Face temperatures (1.f orehead, 2. nose, 3. chin, 4. right cheek and 5. left ch

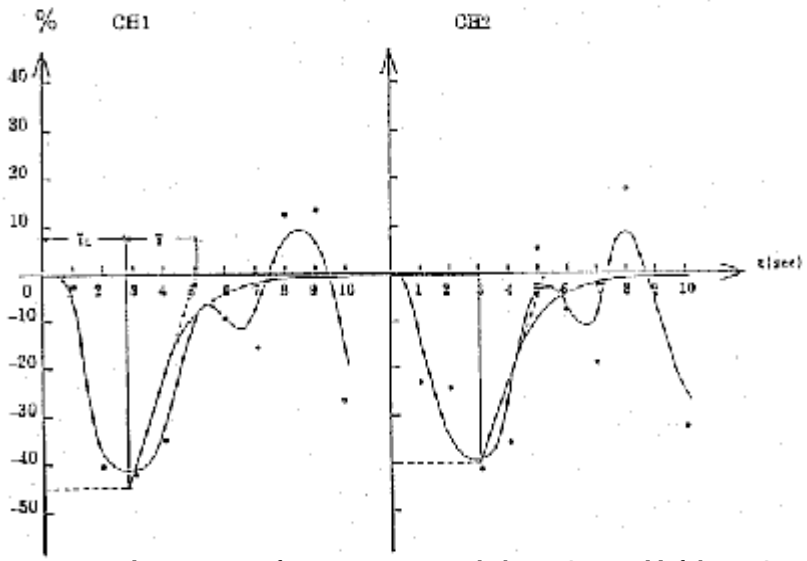

Figure 4 Impulse response of a sweet taste in right brain CH1 and left brain CH2

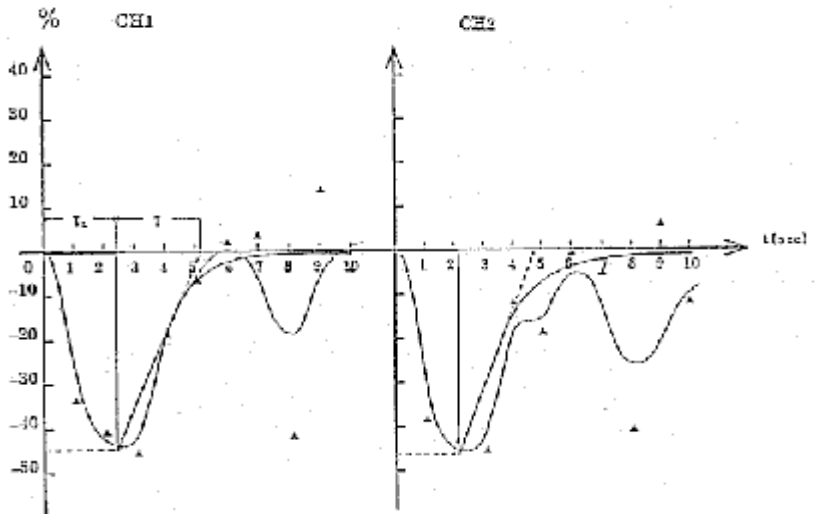

Figure 5 Impulse response of hot taste in right brain CH11 and le ft brain CH2

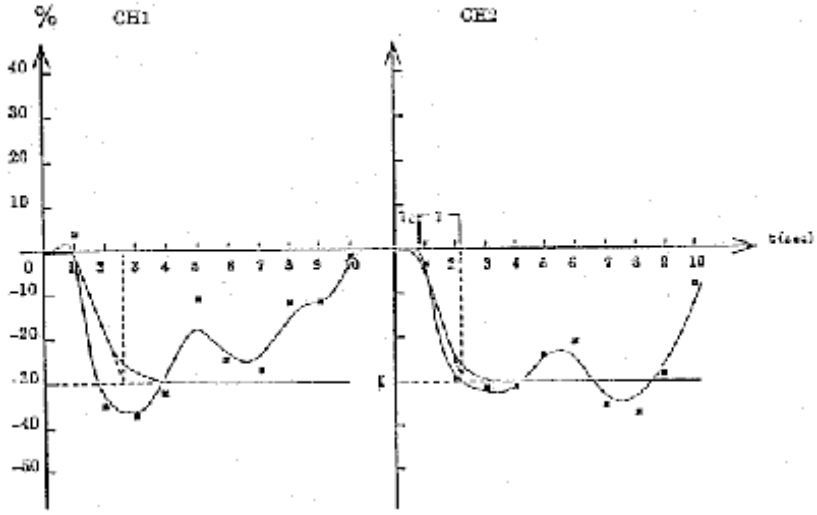

Figure 6 Impulse response of sour taste in right brain CH1 and left brain CH2

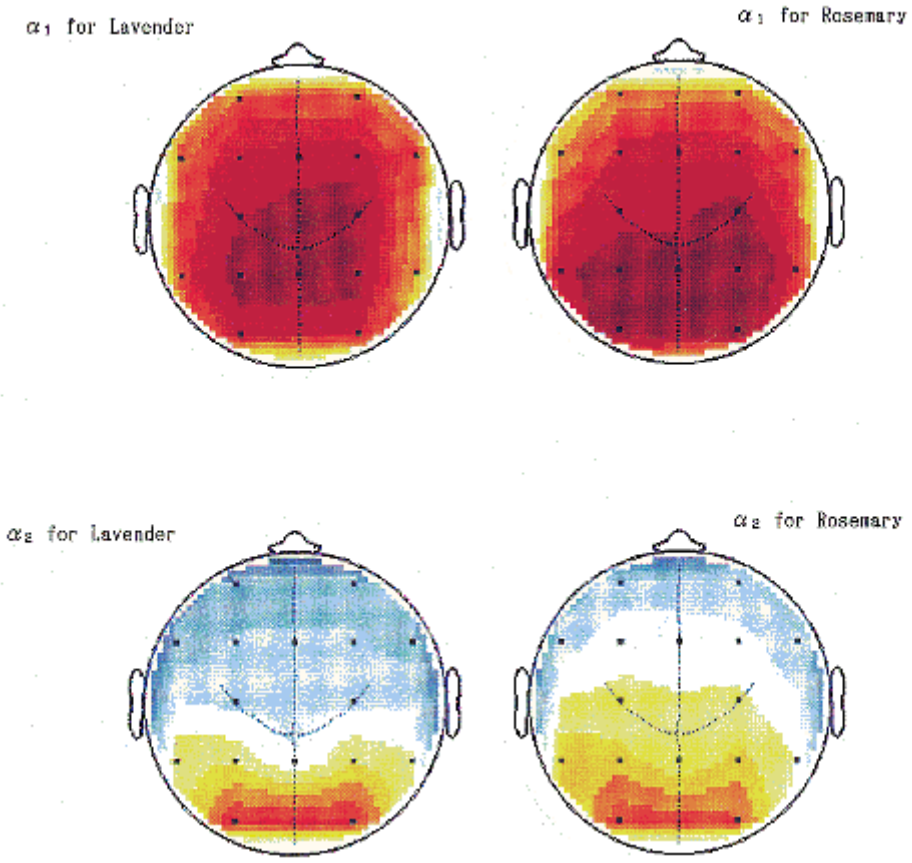

Figure 7 Response for Lavender and Rosemary as aromatheraphy

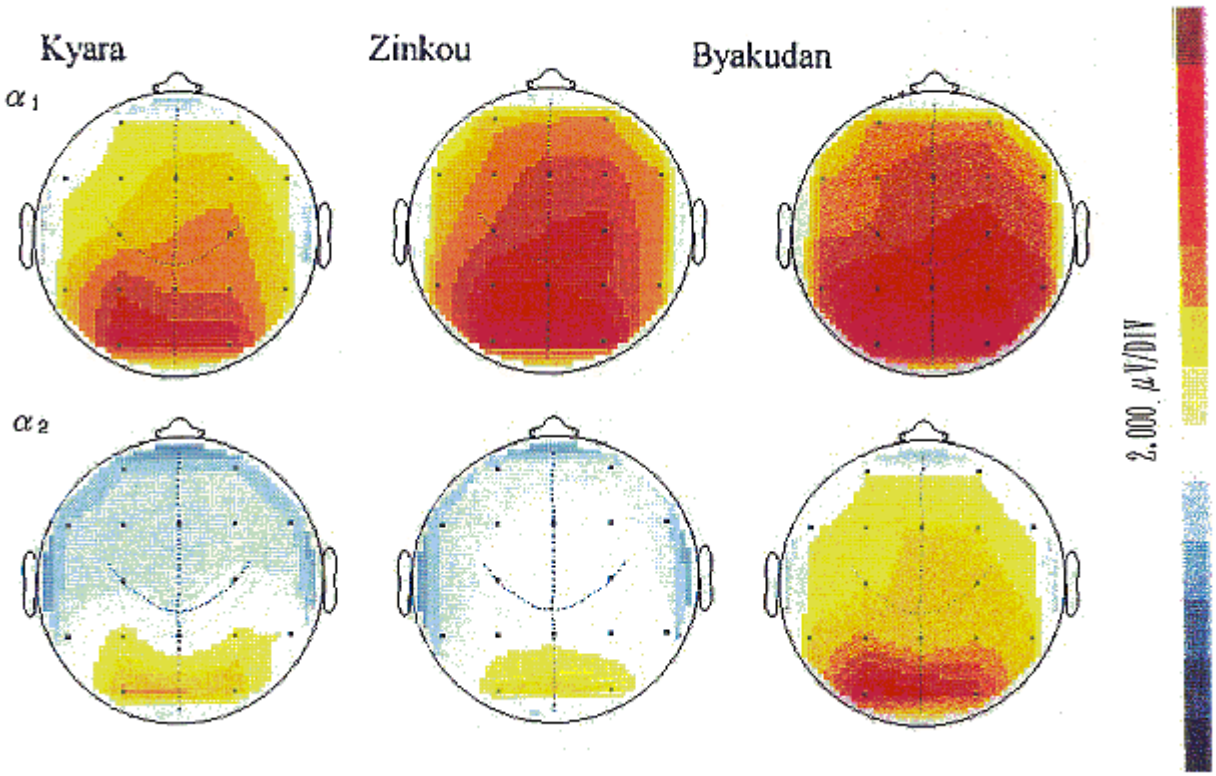

Figure 8 Response for perfume of Japanesetea tea emony

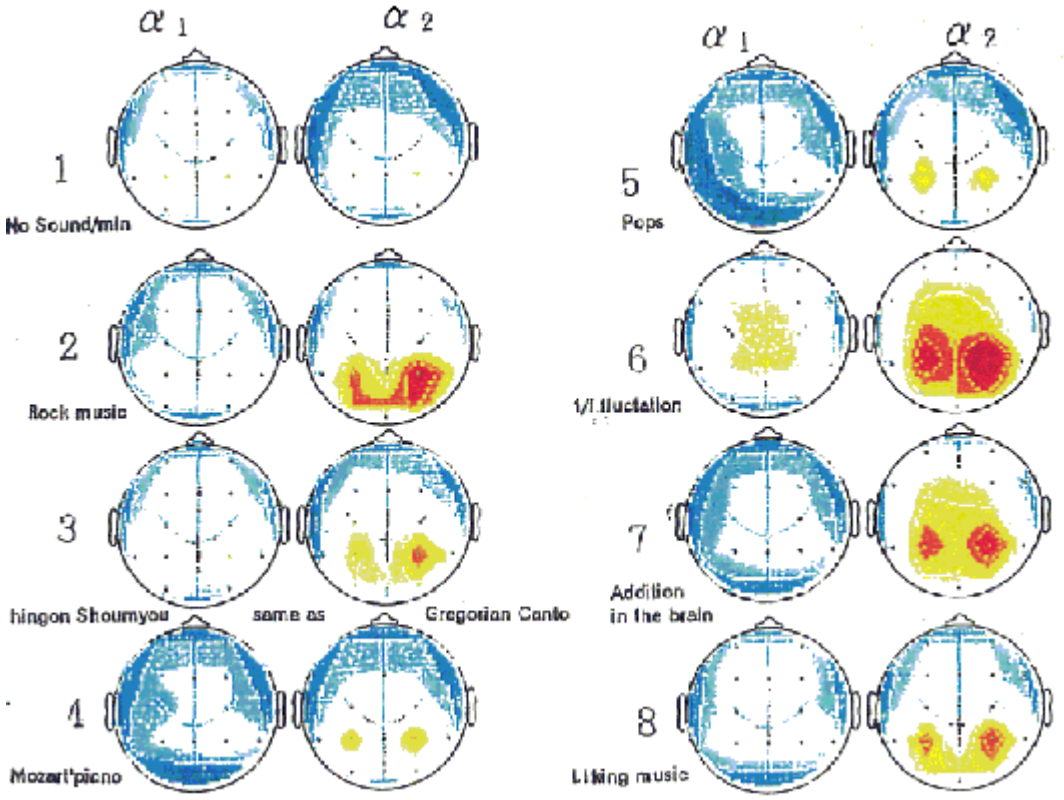

Figure 9 Response of frquently music series

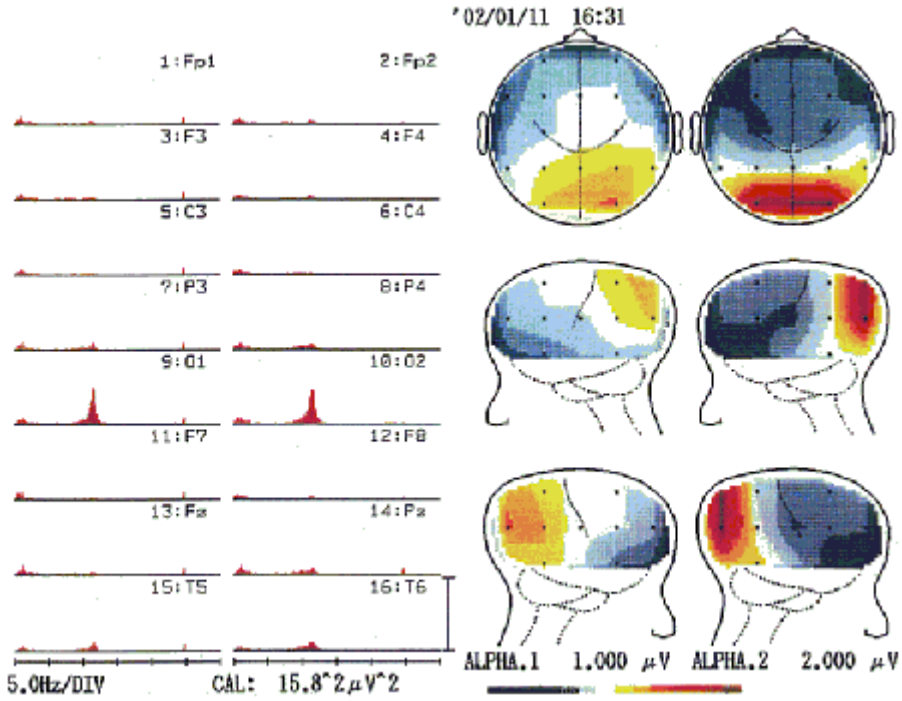

Figure 10 FFT and topography of response for Mozart's Piano Concert No.21 K467 Allegro to A ndante

4 CONCLUSIONS

The conclusions are as follows:

4.1 The standard menue of conditions for many tastees of alpha brain waves making for the right brain could not yet find out.

4.2 The blood pressure and frequency decrease for the moderate music sound for several minutes.

4.3 The face temperature (nose and cheeks) increase for the same conditions for several minutes.

4.4 The dead time for several taste is a few second.

4.5 The Lavender and Rosemary for an aromatheraphy is not suitable. The byakudan in Japanese tea tea ceremony is the best alpaha1 (reluxation) brain wave making.

4.6 The frequently music series is suitable for 1/f music.

4.7 Changing tact time of the testee's liking music is better for making alpha1 and alpha2 waves in the right brain immediately. For example Mozart's Piano Concert No.21 K467, Mendersshon's Concert for violin or orchestra in E minor, Op.64 or Tchaikovsky's Concert for violin and orchestra in D major, Op.35 from Allegro to Andante is suitable.

4.8 The metronome (133 c/min to 70 c/min) is not so good. The authors assume the resonant sound of the standers formant makes suitable sound as the famous instruments and the player and the echo or kobusi in Japanese vocal song. cf: Reference [

5 FUTURE STUDY

5.1 Ergonomics (Sensitybity engineering recommended by Dr. Euu Hee Joon / KRISS in IMEKO XV, Tampere will be test.

5.2 Musictheraphy will be studied with the Faculty of Music in our Tokushima Bunri University.

5.3 Resonant voice in 2-4 k Hz will be applied for the inprovement of the the favorable music to make alpha waves of the right brain.

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