The relationship Between Cerebral Blood Flow and Behavior Activation During Personality Assessment.

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Personality Assessment by the nIR-HEG

This experiment aimed to use individual nIR HEG(near infrared hemoencephalography) to develop a measure of cerebral blood flow and behavior activation during personality assessment. The specific individual variation was reflected, so a concentration ratio to a problem thought it could be used as an index of Personality.

Purpose

The purpose of the experiment was not to develop an absolute measure of cerebral blood flow using HEG, but instead to examine if scores in intra-individual variations in evaluations can be made.
Hypothese1. The nIR-HEG in each personality measurement shows intra-individual variability.
Hypothese2. The intra-individual variance of nIR-HEG is indicated by the ratio in the individual.

Method

Participants There were 16 graduate students (9 males, 7 females), aged 19 to 22 years.
Experiment period May-December 2014
Equipment ProComp TM7500(Thought Technology Ltd, Canada) was measured electroencephalography(HEG), a laptop computer (Dell-Vostro 3360), E-prime 2.0 (psychology software tool), and headphones., Saliva amylase (NIPRO;27B1X00045000073)
Experiment Stimulus By referring to a manual of Big5 (Murakami and Murakami, 2008), we selected each four terms for five personality traits.

Table1. The stimuli terms of personality self-rating

Practice Stimuli	sincere	amenable	philosophical	
Extraversion	active	sociable	passive	restrained
Agreeableness	kindly	affable	headstrong	tightwad
Conscientiousness	capable	conscientious	sloppy	unreliable
Emotional Stability Stimuli	easygoing	sedate	irascibleness	worrier
Openness to experience	intelligent	clever	conservative	naivety

Procedure
1. Interview & Big5 inventory.
2. Practice trial（15trials）
3. Simple response condition (S1)
4. personality self-rating condition by term. (S2)
5. personality self-rating condition by sentence. (S3)
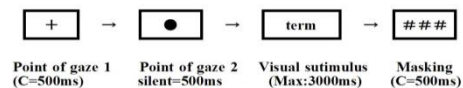6. Inventory: BIS/BAS, Lie scale by MMPI . (SQ)

| + | → | ● | → | term | → | # # # |

Point of gaze 1 (C=500ms) Point of gaze 2 silent=500ms audio sutimulus=1000ms Visual sutimulus (Max:3000ms) Masking (C=500ms)
Fig 1. Simple response session

| + | → | ● | → | term | → | # # # |

Point of gaze 1 (C=500ms) Point of gaze 2 silent=500ms Visual sutimulus (Max:5000ms) Masking (C=500ms)
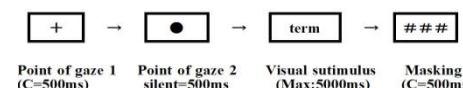**Fig. 2. Personality self-rating session by term and sentence.**

ANALYSIS:
HEG Ratio calculated as a value obtained by dividing the HEG of each session at the average of the HEG. Correlation coefficients were calculated with the personality tests.

Result

1. The HEG Ratio of S1 was significantly and negatively correlated to the BAS (Behavioral Activation System). HEG at the S1 decreased the higher the BAS scores(r=-.561, p.<.05)

2. The HEG Ratio of S1 was significantly and negatively correlated to the FS(Fun Seeking). HEG at the S1 decreased the higher the FS scores(r=-.728, p.<.01)

3. The HEG Ratio of S3 was moderately and positively correlated to the BAS (Behavioral Activation System). HEG at the S3 increased the higher the BAS scores(r=.439, p.<.10)

4. The HEG Ratio of S1 was Insignificant and negatively correlated to the Lie Scale from MMPI.HEG was reduced by the higher score of the LIE(r=-.359)

Discussion

As a conclusion, when the BAS was high, the initial session did not increase the HEG, but the HEG did increase during the second half of the session. **It was suggested, when interest to a subjective problem was low, fictionality was admitted by an answer to the questionnaires.**
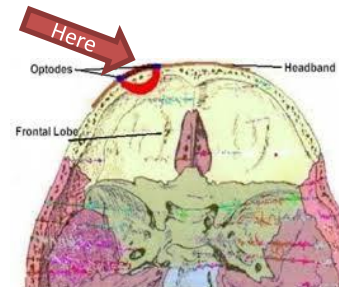

Here
Optodes — Headband
Frontal Lobe

Table 2. Correlations between questionnaires and hemoencephalography

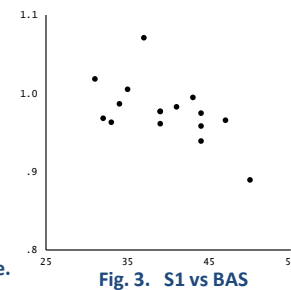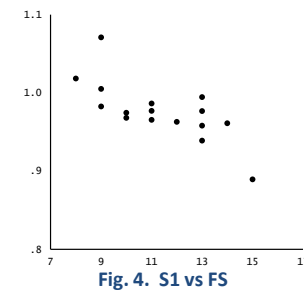| Questionnaires	S1	S2	S3	SQ
Lie Scale from MMPI	-.359	-.331	-.019	.375
BIS (Behavioral Inhibition System)	.380	.268	-.002	-.343
BAS (Behavioral Activation System)	**-.561**	-.247	**.439**	.242
D (Drive)	-.403	-.365	.210	.319
RR (Reward Responsiveness)	-.231	-.180	.375	.059
FS (Fun Seeking)	**-.728**	.011	.410	.204

Fig. 3. S1 vs BAS
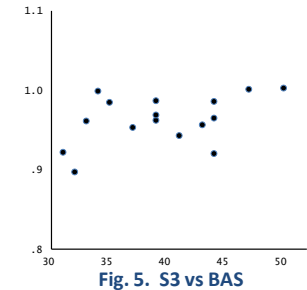
Fig. 4. S1 vs FS

Fig. 5. S3 vs BAS

This result clarified that In high stimulation events, the HEG decreased, but in the latter half of the session though the personality assessment, the HEG increased. A possibility that a subjective arbitrary answer gets mixed was indicated by personality evaluation by the questionnaires.