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The relationship between Cerebral blood flow and Reaction time by Personality traits.

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What's prefrontal cortex activity ?

Personality traits represent tendencies to manifest particular patterns of cognition, emotion, motivation, and behavior, in response to a variety of eliciting stimuli (Fleeson, 2001). Individual differences in RT were reactive biological individual differences as reactions to the stimuli.

Purpose

This experiment examined the relationship between changes in cerebral activity and RT.

Method

Participants The participants were 21 graduate students (13 males, 8 females)
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)
Inventory Big5(Murakami and Murakami, 2008), BIS/BAS, Lie scale for Japanese.

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. Saliva amylase 1
2. Questioner-condition1: Big5
3. Simple response session.
4. Personality self-rating session by trait term.
5. Personality self-rating session by sentence.
6. Questioner-condition2:
   BIS/BAS and Lie scale by MMPI.
7. Saliva amylase 2

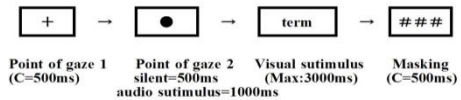

Figure1. Simple response session

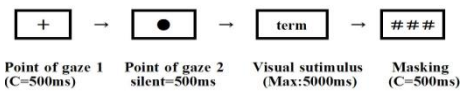

Figure2. Personality self-rating session by term and sentence.

ANALYSIS:

We examined the cerebral activity mean of each condition measured by electroencephalography. We performed cluster analysis and *ANOVA of* cerebral blood flow at the personality rating .

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Result and Discussion

1. Cluster Analysis by cerebral blood flow

We performed cluster analysis based on case wise standardization with Euclidean distance as the index of similarity using the ward method by nIR-HEG of each session. The dendrogram showed participants were divided into hierarchical two major clusters and five minor clusters by nIR-HEG.

2. Analysis of variance

ANOVA shows the significant differences in RT to the personality traits terms by major two clusters without any interaction. There was the significant differences Extraversion and Openness by major tow cluster. Extraversion was *(F(1, 55) = 4.33, p<.05)*, and Openness to Experience was *(F(1, 55) = 7.73, p<.01)*.

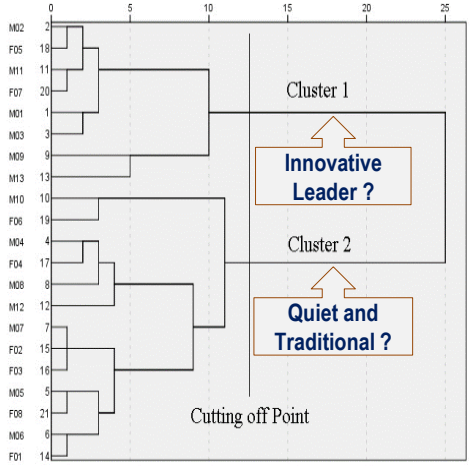

Fig.1. Dendrogram

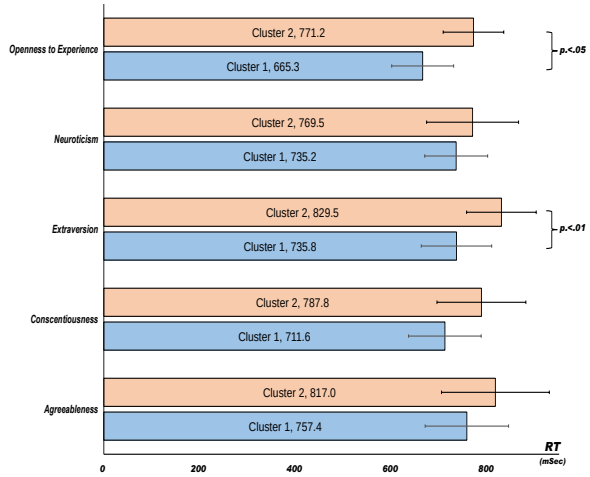

Fig. 2. Means of RT by cluster

Conclusion

This result showed the difference in the RT of personality trait words was based on the Cluster classified by nIR-HEG. It suggested the possibility of measuring personality traits by physiological and behavioral indicators.

Action / Impact

- ✓ The personality assessment could be done without personality questionnaire.
- ✓ We found that the relationship between reaction time and frontal cerebral blood flow is a difference by personality.
- ✓ This experiment found new findings by experimental method in personality psychology.