The consistency with the personality traits from the questionnaire and of PC by the Reaction Time.

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Introduction

In this experiment, the reaction time (RT) to the trait terms was used as an index of measurement of personality traits. This report was to relate RT to the traits measured by the Big Five personality inventory as a questionnaire. In particular, we analyzed the Yes or No RTs to the trait terms from the viewpoint at the varying of RTs and the suitability of the traits obtained in the questionnaire.

The *pRT* model was based on each participant's RT to a stimulus in a simple response session. In the simple-response session, we measured individual differences of RT each stimulation. We considered that given a certain mental performance, the individual RTs was greater than the intra-individual mean RT. As shown in Formula 1, we set up a simple response session of each individual to match the auditory stimulus and the visual stimulus in the experiment, and consider it as the mean response time to the stimulus of each individual. The mean RTs of the simple response session was defined as the inter-individual difference of the response to the stimulus of each individual, and considered the time varying from that standard to be the time for each intra-individual difference in self-rating personality.

Therefore, in this research, we examined whether it is possible to identify a certain personality feature as the mental performance of personality self-rating by using the *pRT* model. The each *pRT* was calculated by the following equation from the intra-individual mean RTs of simple RT for each traits term.

$$pRT_k = \frac{RT_k - mrt_k}{RT_k}$$

Formula 1. *where, mrtk was an intra-individual means of simple reaction time RTk in session 1 of each traits term k.*

Purpose

The reaction time (RT) for personality traits terms have trends within individuals, and there are differences among individuals by trait factors. Therefore, the intra-individual difference was defined by the *pRT* (rating time increase model) , as the degree of confidence. The *pRT* was calculated by the rate of variance from the mean RT of the simple RT to the stimulus terms. The purpose was to measure personality traits by intra-individual differences in RT. The two hypotheses were examined by *pRT*. H1: the variation in *pRT* to traits term is the intra-individual difference. H2: the *pRT* varies with personality traits and response keys (Yes/No) matching.

Method

Participants 53 graduate students, aged 18 to 30 years.

Experiment period May-July 2013

Equipment a laptop computer (Dell-Vostro 3360), E-prime 2.0 (psychology software tool), Headphone.

Experiment stimulus We used twenty trait terms extracted from the Big Five Personality Inventory.

Procedure

We measured the Reaction Time （RT) in each Personality self-rating condition, both term session and sentence session.

1. Interview & Questioner 1:POMS from 'Profile of Mood States-Brief Form Japanese Version' (Douglas M. McNair & Maurice Lorr,2005).
2. PC condition1: Simple response session. (Figure 1)
3. PC condition2: Personality self-rating session by trait term.
4. PC condition3: Personality self-rating session by sentence.
5. Questioner 2: 'Scale construction of a Big-five personality inventory.' (Murakami & Murakami, 2001). Participants rated whether they liked/disliked the twenty terms of experimental stimuli by questioner.
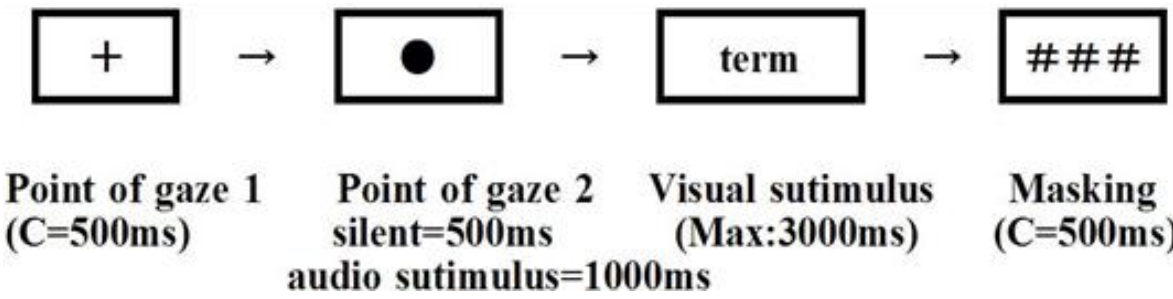

Point of gaze 1 (C=500ms) → Point of gaze 2 silent=500ms audio sutimulus=1000ms → Visual sutimulus (Max:3000ms) → Masking (C=500ms)

Fig. 1. **Stimulus sequence of simple response session.**

Analysis

We analyzed each participant from the matching of PC key response with the questionnaire based on RT. For accurate matching, PC stimuli were classified into positive words that matched the traits of the Big-Five and negative words that were reversed, shown in Table 1. In each participant's, we apply in combination the relationship between **A: a**greeableness, **C: c**onscientiousness, **E: e**xtroversion, **N: n**euroticism and **O: o**penness to experience measured in T-score by Big-Five questionnaire and the key response Yes or No at the simple response session on the PC.

Table 1. **Stimulus terms of personality traits used in experiment**

	Positive terms		Negative terms	
Agreeableness	kindly	affable	headstrong	tightwad
Conscientiousness	capable	conscientious	sloppy	unreliable
Extroversion	active	sociable	passive	restrained
Neuroticism	easy-going	sedate	irascibleness	worrier
Openness to experience	intelligent	clever	conservative	naiveté

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Table 2 showed the traits measured on the questionnaire and the consequence of the response in the PC session. Since, the Big-Five value was given by T-score, each trait obtained from the questionnaire value was classified into 55 or more as high and 45 or less as low.

Table 2. **The combination of PC key and questionnaire.**

Consequence	BIG Five scores	PC Yes or No key and Terms
Yes Match (matched)	55 or more	Yes key to Positive term
	45 or less	No key to Positive term
	45 or less	Yes key to Negative term
	55 or more	No key to Negative term
No Match (unmatched)	45 or less	Yes key to Positive term
	55 or more	No key to Positive term
	55 or more	Yes key to Negative term
	45 or less	No key to Negative term
Intermediate	46 to 54	both Yes of No key

When the trait value from the questionnaire is 55 or more in response to the Yes key for the positive term presented on the PC, it was assigned as matched response. Also, the case where the trait value from the questionnaire was 45 or less in response to the No key for the negative term presented on the PC, it was assigned as matched response.

When the trait value from the questionnaire is 45 or less in response to the Yes key for the positive term presented on the PC, it was assigned as unmatched response. Also, the case where the trait value from the questionnaire was 55 or more in response to the No key for the negative term presented on the PC, it was assigned as unmatched response.

When the trait value from the questionnaire was 46 to 54, both Yes or No PC key responses were assigned to an intermediate as question mark. Even more so, pressing either Yes or No key on the PC was classified as an intermediate.

Result and Discussion

In this experiment, we examined whether it is possible to identify a certain personality feature as the mental performance of the personality self-rating session by using the *pRT* model. The each *pRT* was calculated by the Formula 1 as a decision increase model for each traits term. The personality self-rating had two types, one was the term session, and the other was sentence session.

According to Table 2, we classified *pRT* with the traits from the questionnaire and the consistency of Yes or No answers on PC key. The *pRT* was analyzed by the 2-way ANOVA (analysis of variance) with Big-Five traits factors (A, C, E, N and O) and reaction consistencies (matched, unmatched and "?" as intermediate) as independent variables.

In the term session, as a result traits factors showed $F(4, 5268)=2.92, p<.05$, the consistency also showed $F(2, 5268)=17.27, p<.01$ and the interaction was $F(8,5268)=3.64, p<.01$.). Moreover, when the trait from the questionnaire were 46 to 54 intermediate the intra-individual fluctuations of *pRT* were noticeable in all five traits. This result supported the hypothesis that the variation in *pRT* to traits term is the intra-individual difference. .

The results from sentence session tow-way ANOVA, the main effect of the trait term was $F(4, 3155)=7.58, p<.01$, which was significant.
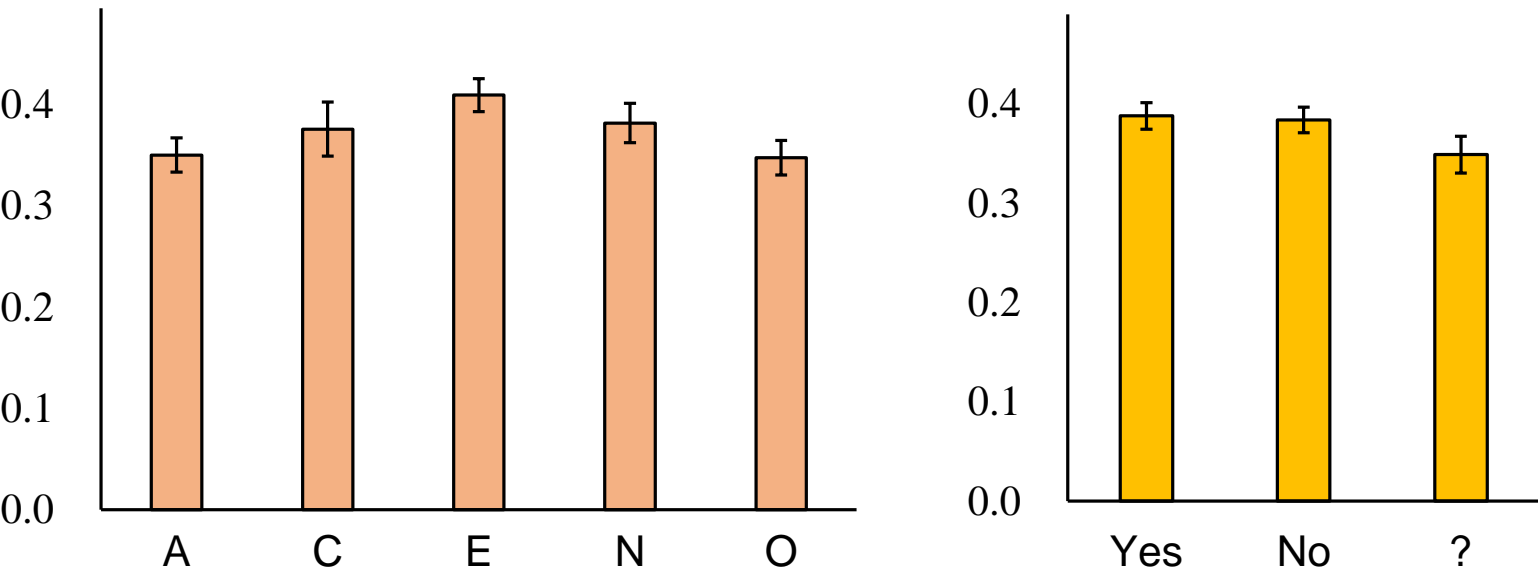

Fig. 1. Traits form sentence session.

Fig. 2. The consistency.

The main effect of consistency showed F(2, 3155)=10.04, p<.01, which was also significant. These results were shown in Figure 1 and Figure 2 with the standard error range line.

The interaction from sentence session between the personality traits and the response consistency showed a significant difference in $F (8,3155) = 3.64, p<.01$. The interaction was shown in Figure 3 with the standard error range line. This result supported the hypothesis that the *pRT* varies with personality traits and response keys (Yes/No) matching.
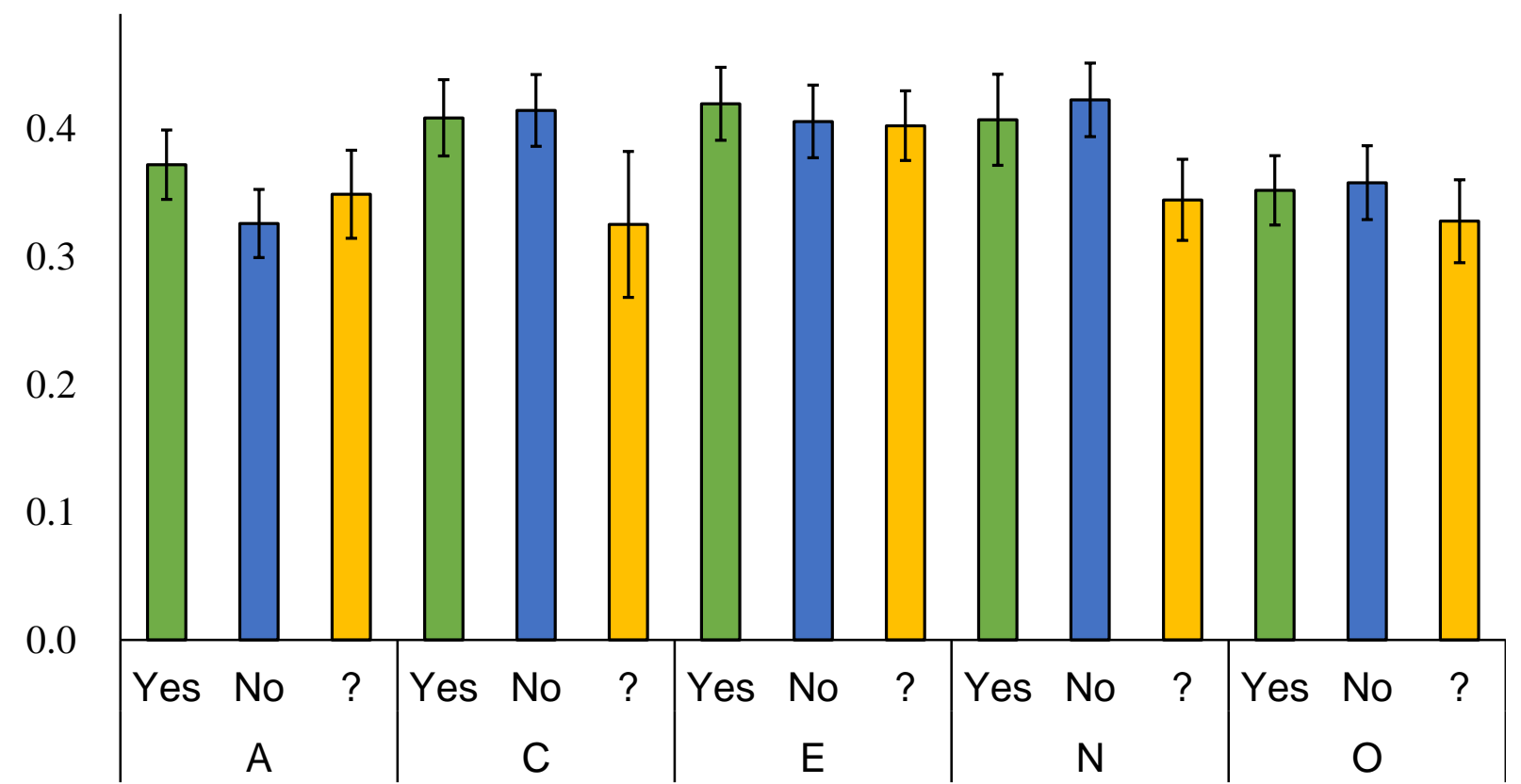

Fig 3. The interaction of sentence session.

Conclusion

The variation or the fluctuation in RT to traits term was the intra-individual difference and the *pRT* varied with personality traits consistency on questionnaire with PC key responses combination and reaction time. As the conclusion, *pRT* was related to the degree of confidence at one's own personality rating.

Acknowledgments