Project number 33

Neural correlates of 'Need for Cognition' in association with social cognition

［１］**Research group**
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［２］**Research setup**
Cognitive activity plays an essential role in successful 'Smart-Aging' and has also been identified as a mediating factor in longevity (Bavishi et al., 2016). Although most cognitive functions decline in late adulthood, the intrinsic motivation to engage in cognitive activity appears to remain relatively stable across the adult lifespan (Soublet & Salthouse, 2017). The intrinsic motivation for cognitive activity can be measured by Need for Cognition (NfC), which is a relatively stable, situation invariant, social-cognitive personality trait, predicting the intrinsic pleasure of engaging in challenging intellectual activity (Cacioppo and Petty, 1982; Cacioppo et al., 1996). People with high NfC are more likely to seek out information to make sense of conflicting situations, whereas low NfC people are likely to rely on others' opinions (Cacioppo et al., 1996).

As one approach for better psychological well-being, maintaining connections with society is crucial in later life. Multiple types of information processing (e.g., verbal and non-verbal social cues) are required for successful social interactions, also featured in people high in NfC. Although NfC represents the ability for multiple information seeking, no study has investigated the direct associations of NfC and social cognitions. Therefore, the present joint research aims to test whether higher NfC individuals also prefer to engage in effortful thinking in socially challenging contexts (Figure 1).
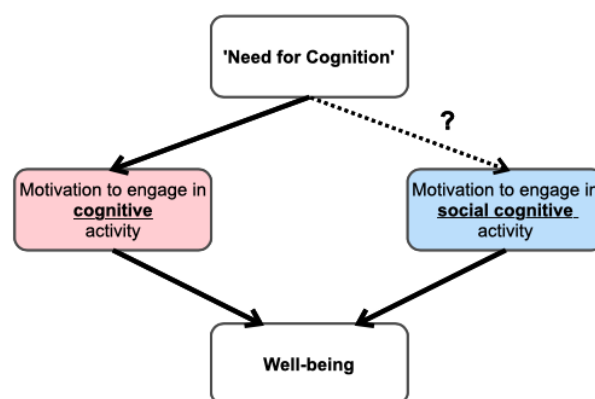

Figure 1. Concept of the study.

For this, we separated conditions into 'Non-social' and 'Social' cognitively challenging contexts, to see whether neural pathway during social cognitive thinking is associated with NfC trait in relation to psychological well-being. The present research aimed to create scenarios in each condition, and to validate the feasibility to apply for the functional brain imaging task in the future fMRI study. We setup the present study containing three phases: (1) develop the scenarios, (2) validate the scenarios, and (3) conduct behavioural experiment (Table 1).

Table 1. Descriptions of Study Phases.

Study Phase	Descriptions
Phase 1	Create stimulus scenarios of cognitive and socially challenging situations.
Phase 2	Validate the scenarios by having participants rate their difficulties across conditions to select 40 scenarios in total.
Phase 3	Investigate the behavioural relationships of motivations for cognitive and social engagement by having participants rate their willingness to engage in the situations described in the scenarios.

To determine the details of the present joint research, text-based discussions (e.g., emails) were made on regular basis, and online meetings were held multiple times before starting Phase 2 of this study, mainly to discuss and clarify the rules for scenario validation, with host researcher at IDAC.

［3］ Research outcomes
（3−1） Results

This year, we continued to focus on the development of the stimuli, and completed Phase 2 of this project. For the purpose of controlling the difficulties of the scenario which might affect the ratings of willingness to engage in Phase 3, we validated 40 scenarios and separated into high and low difficulty scenarios by asking participants to rate how difficult they felt about each scenario for both 'Social' (e.g., '*I'm finally taking out my girlfriend for the first time. As we've only known each other for few months, I'm not very certain of what she likes and what she doesn't. However, because it's our first date, I'd like to escort her perfectly to impress her. How would I solve this matter?*') and 'Non-social' (e.g., '*The ice maker in our refrigerator is broken. It has been especially hot this summer which I urgently need to repair. However, we have exceeded our budget for this month and hoping to repair by myself. How would I solve this matter?*') conditions. The survey platform was created using Qualtrics (https://www.qualtrics.com), a web-based software tool to build and distribute survey for online data collection. Two hundred participants aged 20 to 70 years were recruited online through Lancers outsourcing website (https://www.lancers.jp). Furthermore, by analyzing the 'willingness to engage' rating, we explored if there were difference between Social and Non-social scenarios. For this,

we compared high and low difficulty for both Social and Non-social condition individually. The results of the t statistics revealed that there was significant differences between high and low difficulty for both Social and Non-Social conditions, showing that high difficulty scenarios were rated higher for willingness to engage ratings for both Social $t(209) = -7.733$, $p < .001$, and Non-social $t(209) = -8.651$, $p < .001$ conditions. However, there was no difference between Social and Non-social conditions $t(209) = 0.919$, $p = .359$.
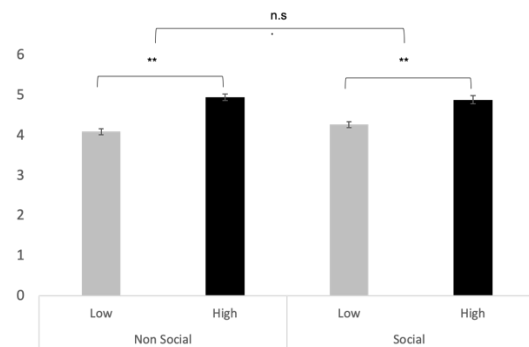

Figure 2. Willingness to engage rating

（3−2） Future perspectives

Because we did not find differences between Social and Non-social conditions, we consider to explore reflecting the socialness rating when separating the two conditions to see if that would change participants' desire of engagement. Once confirmed, we then aim to further investigate the cultural differences that might have impact the motivation of social engagement in relation to NfC. We also aim to further investigate the neural associations of how desire for engaging in effortful thinking associated with the rewarding system and social interactions with their individual difference using fMRI. If the present study provides the link for NfC and social cognition, we will have made a significant advance for future research to untangle the motivations of social involvement. As social interactions are considered critical factors for a better quality of life and longevity, we expect our outcomes to benefit society by possibly increasing well-being and life expectancies.

［4］ List of research achievements

We have not presented or published the outcome of this year.