

Consider The Agentic Self of Japan Youth

– International Comparative Approach Based on Dopaminergic activity and Working Memory –

Presenter : Mahiro TAKAZAWA (National Hospital Organization Tokyo Medical Center)
Workshop planner : Fumihiko ITAGAKI (Asia University)
Kenji ITOH (National Hospital Organization Tokyo Medical Center)
Speaker : David TURK (University of Bristol)
Discussor : Koichi TSUNODA (National Hospital Organization Tokyo Medical Center)

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【Aim】 The White paper on Children and Young people (2019) found that compared with European, North American or Korean participants the youth in Japan reported lower levels of self-satisfaction (45% compared to around 80%) and experienced lower self-efficacy (40% compared to 80%). Given the detrimental impact from Covid-19 on self-development following this report, it is important that we explore self, agency, and cognition in young people today. In this presentation, we will discuss a novel cognitive neuroscience approach to exploring cross-cultural differences in self between Japan and the UK.

So far, we have developed a unique random number generation paradigm as a culture-free working memory task. With this method, it is possible to estimate the components of executive functions which is recently regarded as a representation of the “agentic self.”

Dr Turk will present the results of a preliminary experiment exploring the relationship between dopamine, agency ownership effects in memory and we will then discuss how this methodology can be used to explain differences in working memory performance.

【Self, Ownership, Agency & Dopamine】 Extensive research over the past 50 years has shown that the self has a significant impact on cognition, which may have yielded important benefits in our evolutionary past. A widely studied phenomenon in this area is the ‘self-reference effect’ (SRE) on memory, whereby information explicitly encoded in relation to self is more likely to be subsequently remembered than similar information associated with others. Turk and colleagues also showed memory biases for information that was incidentally presented with self-cues (e.g., face), indicating automatic, unconscious affective and attentional processes may underpin these memorial advantages. These memorial advantages have been mostly associated with long-term memory, but more recently, Ahmed et al. (2021) showed that self-processing also impacts on children’s working memory performance.

Recent research has employed more naturalistic forms of self-association using object ownership (Cunningham et al., 2008). This paradigm has shown reliable ownership effects in memory in children, adults, and amnesic patients. These memorial effects are enhanced when participants have a choice over the items they own (Cunningham et al., 2011). The concept of ownership is fundamental to Western, capitalist societies and instilled

into socio-cultural norms. The importance of material possessions to the self has been further illustrated by the endowment effect, whereby self-owned items are ascribed a higher monetary value and viewed more positively than similar items owned by others, as extensions of the self. Turk, Itagaki, and colleagues (Collard et al., 2020) utilized a novel endowment task to show a relationship between endowment bias and ownership effects in memory in UK, but not Japanese participants.

Functional imaging studies have identified a network of cortical midline brain regions, and areas associated with hedonic reward via dopaminergic pathways that appear to differentiate self-owned items from those possessed by others (Turk et al., 2011). Dopamine may therefore hold the key to explaining individual differences in ownership effects, both within and across cultural boundaries. Dopamine has been shown to play a significant role in the sense of personal agency and to exogenous attention towards cues indicating reward or personal salience. It is also important in working memory performance.

Recent research has shown that it is possible to measure tonic levels of cortical dopamine from human tear samples (Sharma et al., 2019) employing the Schirmer’s test protocol analysed using a direct competitive chemiluminescent enzyme - linked immunosorbent assay (ELISA). We will present the results of a preliminary experiment exploring the relationship between dopamine, agency and ownership and discuss how this may be applied to studying individual differences in working memory performance.

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