

Self-Formation Neuroscience

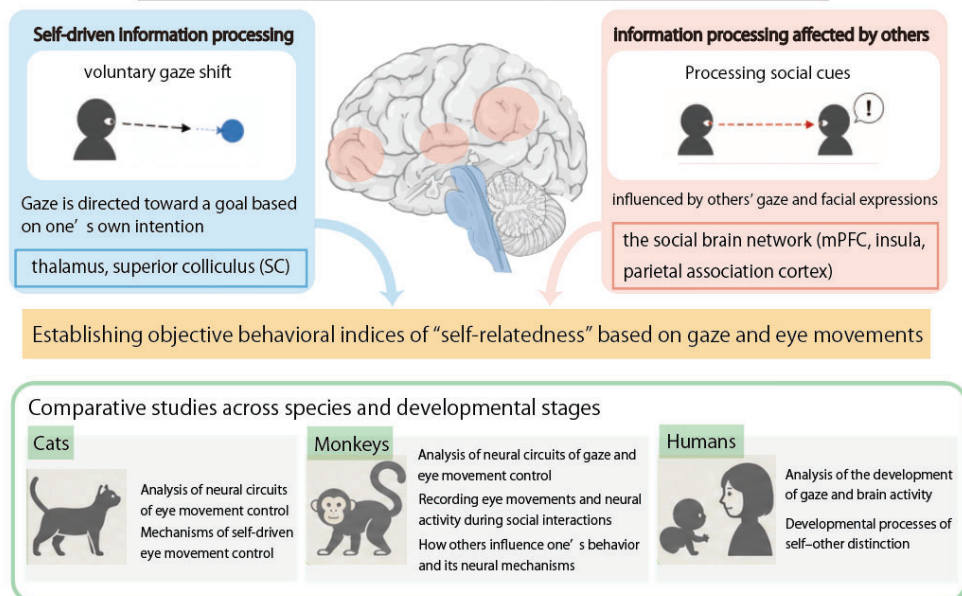
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	Project Information	Project Number : 26B303	Project Period (FY) : 2026-2028
		Keywords : self-presentation, self-other distinction, gaze control, eye movements, neural circuits, interaction, development	

Purpose and Background of the Research

● Outline of the Research

This research area, “Self-Formation Science,” aims to reconceptualize the “self”—an abstract and inherently internal phenomenon—as an objective and experimentally tractable subject. Traditionally, the self and agency have been discussed mainly in philosophy and psychology, and have been difficult to investigate experimentally. To address this challenge, we focus on gaze and eye movements as concrete behavioral measures. Humans voluntarily direct their gaze while also being influenced by others’ gaze and facial expressions. By examining these processes, we aim to clarify how self-related and other-related information processing operate in the brain and how they are distinguished. Furthermore, through comparative studies across species (cats, non-human primates, and humans) and developmental stages from infancy to adulthood, we aim to establish objective quantitative indices of the self.

Overview of the Research Area: “Self-Formation Science”



Establishing a new framework for scientifically understanding the “self” through gaze and eye movements

Figure 1. Overview of our research

● Research Structure and Project Plans

Project A-01 (Tohoku University, Takahashi): Neural circuits underlying voluntary eye movements are examined across cats, non-human primates, and humans to identify the mechanisms of self-driven action.

Project A-02 (NIPS, Ninomiya): In non-human primates, gaze behavior and neural activity are analyzed during social interactions to reveal how the presence of others influences one's behavior and its neural basis.

Project A-03 (Rikkyo University, Wen): In human infants, gaze behavior and brain activity are measured to quantitatively characterize the development of the ability to distinguish between self and others, and to elucidate its neurodevelopmental mechanisms.

Integration: By integrating these projects, the study aims to provide an understanding of the neural mechanisms underlying self-other distinction across species and developmental stages.

Expected Research Achievements

● Aim of the Research Field

This project takes an integrative approach, including physiological, developmental, comparative, social, and behavioral techniques. Its central focus is “gaze control system” as a common and simple behavioral measure. By using gaze as a unifying framework, the project seeks to bridge previously independent fields and establish a new research domain, “Self-Formation Science.” Furthermore, the project aims to develop a framework for a clear representation of the concept of the self.

● Expected Impact

This research will establish an objective method to evaluate the self, enabling cross-species and developmental comparisons. By clarifying the neural basis of self-other distinction, it will advance our understanding of social interaction and development. Using gaze as a non-invasive and scalable measure, the project will provide a versatile framework for data integration and interdisciplinary research, ultimately contributing to a new scientific understanding of the self.

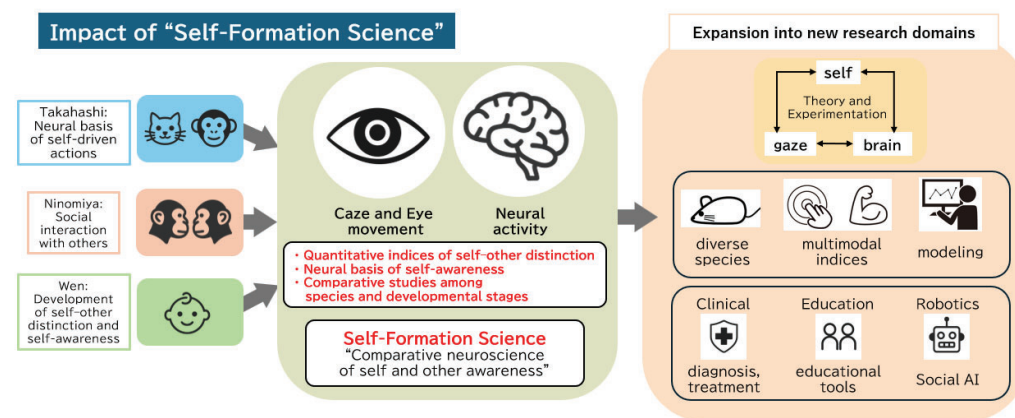


Figure 2. Image of Expected Impact

Website(s)

<https://www.selfform.jp/>