

Understanding individual differences through self-relevance effects in information processing

Background

Have you ever wondered how two people can look at the same situation and walk away with two completely different stories? How can we explain that different people can interpret the exact same information completely differently, such as in the case of the famous illusion of #theDress (Brainard & Hurlbert, 2015)? Such individual differences in information processing (perception, cognition, action) are elusive - yet, explaining HOW individual differences are shaped, and whether they are stable across contexts remains a topic of strong interest to many researchers in the field.

One way to understand this is by studying how the self, the things that make you "you", affects how we process information. The self is not a static identity, but affects how we perceive the world around us at any moment in time. It acts as a filter, through which we perceive, think, and act. As such, it is a focal point of human experience, and an anchor in the way we process information (Scheller & Sui, 2022a).

For instance, the self acts as a gatekeeper to perceptual processing, directing limited attentional resources toward stimuli that hold direct personal relevance (Scheller et al., 2026). This may be as the sound of one's name in a busy environment (cocktail party effect) or even a looming physical threat. Similarly, the self can affect how we integrate information from the environment into coherent perceptual representations (Scheller & Sui, 2022b), likely by modulating pre-existing biases (Scheller et al., 2024).

Importantly, these changes in perception and cognition can create a foundation for **inter-individual differences** that permeate into higher cognitive and conceptual domains. No two people "see" the same environment - rather, they inhabit unique sensory worlds shaped by

their own histories and goals. Hence, the way they process and evaluate information will likely differ across different domains: from perceptual biases, over conceptual evaluations, to emotion processing and mental health.

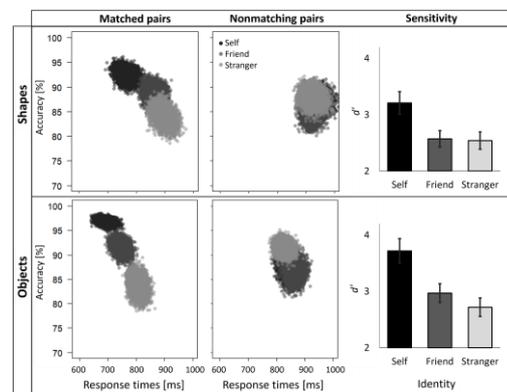


Figure 1: Self-prioritization effects in perception, shown by more accurate and faster processing of self-related information (black), relative to friend- (dark grey) and stranger-related information (light grey). Processing benefits are present and stable across different stimulus domains (based on data from Scheller & Sui, 2022a)

By studying how the self modulates information processing, we move beyond generic human patterns to understand the specific "choice architecture" that makes one person a bold risk-taker and another a cautious observer, revealing that our differences are not just in what we do, but in how our brains fundamentally construct the world around us.

Aims and Methods

The suggested project aims to better understand how a coherent and stable sense of self leads to pervasive inter-individual differences in information processing. It will involve multi-measure studies to investigate how individuals process information and make judgements about physical and psychological information in their environment, linked to

themselves or to other people. Tasks include psychophysical, behavioural, physiological, survey, and virtual reality measures. By combining multiple different measures from the same individuals, we will assess how different components of the self affect perception and cognition across a range of processing stages.

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Relevance

The project addresses fundamental questions of individual differences, and bridges interests and expertise of various psychology-related disciplines, including social cognition, cognitive neuroscience, social psychology, and quantitative modelling.

Training

The candidate's research activity will be based in Durham, Psychology. Besides a training in general research skills, the candidate will develop a deeper understanding of studying individual differences through multi-measure tasks, including cognitive, perceptual, and virtual reality tasks, as well as questionnaire data. The candidate will receive advanced training in multivariate statistics hierarchical modelling.

Suitable for

PhD and MSc by Research students.

References and Further Read

Brainard D.H. & Hurlbert, A.C., 2015: Colour Vision: Understanding #TheDress. *Current Biology*, 25(13).

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Scheller, M., Fang, H., & Sui, J., 2024: Self as a prior: The malleability of Bayesian multisensory integration to social salience. *British Journal of Psychology*, 115, 185–205.

Scheller, M., Tünnermann, J., Fredriksson, K., Fang, H., & Sui, J. (2024): Self-association enhances early attentional selection through automatic prioritization