

CAN A SILENT MIND KNOW THYSELF? THE ROLE OF INNER SPEECH IN SELF-AWARENESS

Bo Yao

Lancaster University, UK

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Background: Inner speech - the internal monologue within our minds - facilitates self-awareness by translating mental states into verbal thoughts for self-reflection. To elucidate how inner speech shapes consciousness requires mapping its neural foundations, determining its computational role, and investigating how individual differences in inner speech influence self-awareness.

Aims: This research aimed to synthesize neuroimaging findings to develop a dual-mechanistic framework for inner speech, illustrating how different forms of inner speech support the brain to navigate uncertainty in perception and action.

Methods: Activation Likelihood Estimation (ALE) meta-analysis and theoretico-empirical syntheses, grounded in active inference computational principles, revealed distinct neural circuits for inner speech that vary by egocentricity and spontaneity. These circuits support predictive processes for perception and action through spontaneous versus deliberate inner speech. Experimental psychology and neuroimaging methods illuminated the neurocognitive mechanisms of dialogic and other-people inner speech through individual differences approaches, while EEG and Hidden Semi-Markov Modelling identified theta-band oscillations during self-referential processing.

Results: ALE meta-analysis showed that deliberate, egocentric inner speech activated speech production circuits, whilst spontaneous inner speech engaged auditory perceptual regions. The Linguistic Active Inference Theory (LAIT) unifies inner speech's diverse functions, phenomenology and neural substrates through uncertainty-reducing computational cycles of perception and action. The ability to perceptually simulate inner speech sounds predicts the frequency of dialogic and other-people inner speech, with theta oscillations marking inner speech during self-referential processing.

Conclusions: Inner speech dynamically engages language production and perception networks for self-processing, with its neural recruitment patterns and phenomenological forms varying according to computational demands.

Keywords: Inner speech, Linguistic active inference, Neurocomputation, Consciousness

Publications:

- Pratts, J., Pobric, G., & Yao, B. (2023). Bridging phenomenology and neural mechanisms of inner speech: ALE meta-analysis on egocentricity and spontaneity in a dual-mechanistic framework. *NeuroImage*, 282, 120399. <https://doi.org/10.1016/j.neuroimage.2023.120399>
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E-mail contact: b.yao1@lancaster.ac.uk