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Inner Speech

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Inner speech refers to the silent conversation with the self that many people report. Also termed *internal monologue*, *inner dialogue*, *inner speaking*, *verbal thinking*, and *covert self-talk*, inner speech is increasingly researched as an important feature of human conscious experience. New cognitive and neuroscientific methods mean that some of the most challenging questions about the forms and functions of inner speech are opening up to scientific inquiry. Inner speech has been proposed to function as a cognitive tool, enhancing performance on various tasks by enabling regulation of the self through language. Outstanding questions and controversies include how different forms of inner speech are adapted to particular self-regulatory functions, and how methodological advances might improve understanding of individual differences in inner speech use.

History

Although the idea of a silent conversation with the self has been part of Western philosophical inquiry since the time of Plato (Jowett, 1953) in Ancient Greece, the scientific study of inner speech has been a relatively recent phenomenon. The Russian psychologist Lev Vygotsky (Vygotsky, 1934/1987) was among the first to study inner speech systematically, viewing it as the endpoint of a developmental process whereby social exchanges gradually become internalized. These social exchanges are mediated by language and initially shared between individuals before they are eventually taken within to form an internal conversation with the self. An interim stage in this process is *private speech*, in which preschool-aged children frequently talk to themselves out loud while solving a cognitive challenge.

With the emergence of modern cognitive psychology in the latter part of the 20th century, scholars began to understand inner speech as the functioning of the phonological loop component of a larger working memory system (Baddeley & Hitch, 1974) [see Working Memory]. Within the same period, researchers in sports psychology conducted research on how sports performers talk to themselves, although in this body of research silent self-directed speech (or *covert self-talk*) is not typically distinguished from overt (i.e., audible) speech to the self. Empirical support has emerged for many aspects of these three theoretical approaches to inner speech (Alderson-Day & Fernyhough, 2015).

Core concepts

Inner speech as a cognitive tool

Inner speech is thought to confer cognitive benefits by providing a means for self-regulation through language. Evidence suggests that this can occur through its role in focusing attention, enhancing rational decision-making by providing distance from the self, enhancing cognitive flexibility, and boosting working and long-term memory (Fernyhough & Borghi, 2023). Inner speech has also been implicated in the acquisition and use of abstract concepts (Borghi & Fernyhough, 2022), with more mixed findings emerging for its role in categorization (Gerwien et al., 2022; He et al., 2019) [see Cognitive Development; Word Learning]. As might be expected from its self-directed nature, inner speech is also involved in

processes related to the self, such as enhancing humans' ability to reflect on their own self's activities (Morin, 2018).

Internalization and externalization

Internalization describes the process whereby social speech is taken within to create an internal conversation with the self, maintaining some of the structural features (e.g., *dialogicality,* the feature that gives inner speech the to-and-fro structure of a conversation) of the social exchanges that gave rise to it. In the opposite direction, *externalization* refers to the process whereby silent inner speech is converted back into its audible form. These processes continue to occur flexibly throughout the lifespan, helping researchers to make sense of relations between overt and covert forms of self-talk (see Figure 1).

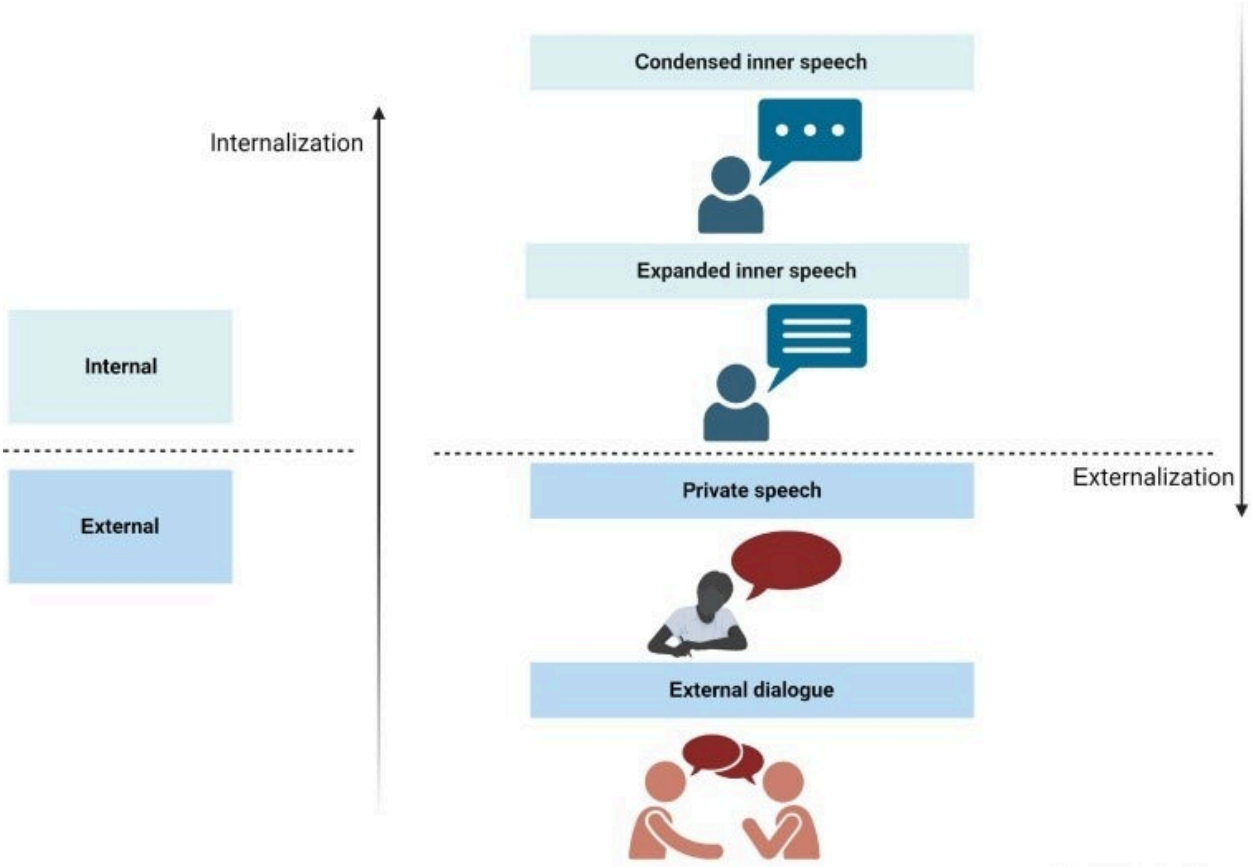

Figure 1
From external dialogue to inner speech. Reprinted from **Fernyhough and Borghi (2023)** (CC BY 4.0).

Phenomenological variation

Inner speech varies from featurally rich forms (including features of speech such as tone, timbre, accent, and pitch) to more abstract forms in which phonological features (e.g., speech sounds or similar) are diminished or absent (Alderson-Day & Fernyhough, 2015; Fernyhough & Borghi, 2023) [see Phonology].

According to a prominent theory, inner speech should take different phenomenological (i.e., qualitative) forms reflecting the developmental processes that give rise to it (Vygotsky, 1934/1987). The systematic study of this variation began with the Varieties of Inner Speech Questionnaire (McCarthy-Jones & Fernyhough, 2011), which identified several key features of inner speech quality. These include *condensation* (the extent to which inner speech is compressed or abbreviated relative to overt speech), *dialogicality* (the feature that gives inner speech the to-and-fro structure of a conversation), and *motivational and emotional quality* (reflecting the adaptation of inner speech to positive and negative effects on the self). A key challenge for future research is to link distinct forms of inner speech to specific cognitive, emotional, and motivational functions.

Questions, controversies, and new developments

Methodological issues

A range of methods have been used to investigate inner speech, from self-report questionnaires to neuroscientific methods such as functional magnetic resonance imaging (Fernyhough & Borghi, 2023). Particularly important are varieties of experience sampling such as Descriptive Experience Sampling (Hurlburt, 2011), in which participants gain skill in describing what they were experiencing right before the sound of a random beeper. Methods such as descriptive experience sampling reveal phenomenological nuances that are sometimes missed by other methods, such as the important distinction between *inner speaking* (in which one has the sense of being the author of the internal utterance) and *inner hearing* (in which the experience is of listening to the inner voice; Hurlburt et al., 2013).

Individual differences

Inner speech varies greatly both within and between individuals. Research involving atypically developing populations, such as individuals with autism or developmental language disorder, has suggested potential avenues for therapeutic training (Bauman et al., 2025) [see Autism; Developmental Language Disorder]. Atypical experience of inner speech has been implicated in the auditory verbal hallucinations that accompany many psychiatric conditions (Toh et al., 2022), with some studies using community samples linking particular profiles of inner speech subtypes to proneness to hallucinations (McCarthy-Jones & Fernyhough, 2011). It is likely that some typically developing individuals do not engage in inner speech at all, but current empirical approaches are probably insufficient to detect such cases (Lind, 2025).

What is internalized?

Within the framework of predictive processing, which sees the brain as continually generating and updating predictions to minimize error, inner speech has been understood as the prediction of sensory consequences of an act of producing fully articulated overt speech. Such accounts typically fail to take into account the processes of transformation (such as condensation) that accompany internalization,

which entail that inner speech should not be viewed simply as external speech minus the articulation. Although predictive processing accounts have generally had limited success at modeling offline psychological phenomena such as inner speech, such models have begun to emerge (Grandchamp et al., 2019). These preliminary studies demonstrate the value of understanding inner speech as a process that takes varied forms through development, rather than as an endpoint of cognitive maturation.

Broader connections

Inner speech has begun to be modeled as a feature of artificial systems (Fernyhough & Borghi, 2023). Developmental psychology research has inspired the modeling of intra-agent speech, allowing artificial intelligence agents to answer questions about a novel object without direct experience of it (Yan et al., 2022). Cognitive architectures have been developed to implement inner dialogue in large language models (Hsing, 2025) [see Large Language Models]. Computational models for classifying simple inner speech utterances from electroencephalography signals have had some success (Macías-Macías et al., 2023), suggesting applications for enhanced brain–computer interfaces for neurorehabilitation.

Further reading

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