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Thinking Out Loud or Speaking In Loud: A Review on Inner Speech.

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ABSTRACT

Talking to oneself is not heard by anyone but us. So many terms have been used to indicate “inner speech”: inner voice, self-talk, verbal thoughts, etc. This psychic phenomenon refers to the silent production of words in one’s mind. Inner speech plays a central role in human consciousness, providing guidance for the growth of the individual. Sharing Vygotsky’s ideas, a central aspect of his theorizing is that inner speech is developmentally the internalisation of the external dialogues between children and their parents or other caregivers. This process follows four stages of internalization: external dialogue (level 1), private speech (level 2), expanded inner speech (level 3), condensed inner speech (level 4). Children’s private speech represents, indeed, a waystation on the developmental path between external and inner speech. Thus, the socio-cultural tool or symbol system of language, first used for interpersonal communication, is used by the child overtly not for communication with others but for intrapersonal communication and self-guidance. A monitoring deficit in inner speech may result in auditory verbal hallucinations (AVH), have in common neurobiological correlates. History and art have shown for a long time the power of this phenomenon as a guide for creativity and growth of society.

RIASSUNTO

Il parlare con se stessi non è ascoltato da nessuno tranne che da noi. Sono stati usati così tanti termini per indicare il "discorso interiore": voce interiore, dialogo interiore, pensieri verbali, ecc. Questo fenomeno psichico si riferisce alla produzione silenziosa di parole nella propria mente. Il discorso interiore svolge un ruolo centrale nella coscienza umana, fornendo indicazioni per la crescita dell'individuo. Condividendo le idee di Vygotsky, un aspetto centrale della sua teoria è che il discorso interiore è evolutivamente l'interiorizzazione dei dialoghi esterni tra i bambini, i loro genitori o altri caregiver. Questo processo segue quattro fasi di interiorizzazione: dialogo esterno (livello 1), discorso privato (livello 2), discorso interno espanso (livello 3), discorso interno condensato (livello 4). Il

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discorso privato dei bambini rappresenta, in effetti, una stazione di passaggio sul percorso di sviluppo tra discorso esterno e interno. Pertanto, lo strumento socioculturale o il sistema simbolico del linguaggio, usato per la prima volta per la comunicazione interpersonale, viene usato dal bambino apertamente non per comunicare con gli altri ma per la comunicazione intrapersonale e l'auto-guida. Un deficit di monitoraggio nel linguaggio interno può provocare allucinazioni verbali uditive (AVH), che hanno in comune neurobiologici correlati. La storia e l'arte hanno dimostrato a lungo il potere di questo fenomeno come guida per la creatività e la crescita della società.

INTRODUCTION

Sometimes we all hear a voice inside our brain, a sort of inner dialogue directed by oneself to oneself and produced in one's mind: it is commonly called "inner voice" or "inner speech" or referred to as "verbal thoughts". That silent verbalizing is crucial in thinking and self-awareness, and helps in so many cerebral activities, i.e. planning, problem-solving, self-motivating, reading, writing, calculating and autobiographical memory. However, excessive negative self-reflecting or mental rumination can interfere with cognitive performance; it is supposed to be a risk factor for depression and anxiety disorders. Furthermore, an inner speech monitoring deficit may result in auditory verbal hallucinations (AVH), where one's own verbal thoughts come to be perceived as external voices (Perrone-Bertolotti, Rapin, Lachaux, Baciù, & Løevenbruck, 2014).

This review aims at shedding light on a psychic phenomenon, not well-known and misinterpreted over the past years. Furthermore, it is examined more specifically its interpersonal and relational nature.

DEFINITION

Inner speech, silent speech, subvocal speech, imagined speech, covert-speech, verbal thought, inner talk, self-talk, mental verbalisation, internal monologue, internal dialogue, self-statements: these are some of the terms used to refer to as the silent production of words in one's mind, or the activity of talking to oneself in silence. It could not be heard by an external observer, nor would muscular activity coordinated with the speaking be visible (Hurlburt, Heavey, & Kelsey, 2013; Perrone-Bertolotti et al., 2014). Inner speech plays a central role in human consciousness at the interplay of language and thought. It is a pervasive and significant human mental activity, estimated to characterise at least one quarter of people's conscious waking life (Perrone-Bertolotti et al., 2014). Been suggested to interact with working memory in order to enhance the encoding of new material, inner speech is also involved in rehearsing past communication, situation and emotions or in past situation recall (autobiographical memories). Inner speech also plays a crucial role in future

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situation planning, in thinking and in consciousness, self-awareness and self-regulation. It is also implicated in reading and writing.

HISTORY

William James (1890) made his observations on the ongoing interplay of verbal images that characterizes human thought: he called it “stream of consciousness”.

Long before him, in *Theaetetus* Plato spoke about Socrates, heard such a voice throughout his life, advising him against certain actions that were not in his best interest. Socrates referred to this voice as daimon, or "the divine".

Even the history of religion has been characterised by hearing inner voices. Christian mystics heard those voices which they attributed to divine sources such as angels, the Holy Ghost, and deceased saints. The Incas spoke directly to the gods via inner voices. Shamans throughout the world also conversed with inner voices. Saul experienced a “heavenly light” from which God spoke to him while walking to Damascus. Muhammad heard an inner voice attributed to the archangel Gabriel (Liestner, 1996).

Saint Augustine heard a voice that he interpreted to be a command from God. Later on, even Sigmund Freud and Carl Gustav Jung have been touched by similar experiences, the latter holding conversations with an inner voice throughout his life – which he called "Philemon".

PHENOMENOLOGY

Jaspers (1913/1997) looked into phenomena regarded as (1) auditory imagery and the special form of imagery termed pseudo-hallucination, (2) hallucination proper.

The inner voices designated as imagery in general satisfy the criteria laid down by Jaspers. They have the character of subjectivity, in that the “voice” or “loud thought” is heard “within the mind”; it is the subject's “own thought” or “own conscience”. No patients expected the “thought” or “voice” to be received or heard by others or to come from others. Indeed, that experience does not belong to a schizophrenic “passivity experience”. The characteristics of inner voices considered as hallucination proper were that the patients experienced them as something divorced from their ego; despite the inner location they were really arising in external subjective space (Sedman, 1966).

Considering that sensory experiences exist on a continuum, Heery (1989) identified three categories of inner voice: 1. Inner voice experiences as a fragmented part of the self; 2. Inner voice experiences characterized by dialogue, providing guidance for the growth of the individual; 3. Inner voice experiences where channels opened toward and beyond a higher self.

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Hurlburt and colleagues (2013) centred the core of inner speaking, showing it to have these features:

- Speaking meaningfully without producing any sound or bodily movement.
- The speakings are generally apprehended to be in the person's own naturally inflected voice, in the same rhythm, pacing, expressivity, tone, hesitations, and style as external speaking.
- The experience is typically apprehended to be just like speaking aloud.
- Inner speaking, just as speaking aloud, conveys emotion, curiosity, outrage, interest, boredom, and a potentially unlimited list of nuanced feelings.
- Inner speakings are generally in complete sentences. The significance is generally understood.
- Inner speaking is generally in the same kinds of words that the person would use in external speech.
- Sometimes inner speaking is aimed at some particular other, similarly to external speaking.
- Inner speakings are generally apprehended primarily as being produced rather than heard. That is, inner speaking is more a phenomenon of created action than of received audition. There is some understanding of being the “driver of” the words.

Stepping back in the first years of psychology, Vygotsky still remains the inspiration of much modern studies of inner speaking. His theorizing states the inner speech to be the developmental internalization of external dialogs between children and their parents or other caregivers. Hurlburt and colleagues (2013) suggest that inner dialogues do occur occasionally, but it is much more typical either that the person will innerly speak in her own voice both parts of the dialog or will innerly hear (not speak), either the entire dialogue including her own voice or will innerly speak one's own voice and innerly hear the response. Moreover, Fernyhough (2004) noted that inner speech can be dialogical without involving more than one voice.

Dialogue that originally exists on the inter-psychological plane, as an exchange between individuals, is reconstructed on the intra-psychological plane as inner speech or verbal thought (Jones & Fernyhough, 2007).

NEUROBIOLOGICAL CORRELATES

In 1976 Julian Jaynes proposed a neurological model for the “Bicameral Mind” which relies on the structural and functional differences between the two cerebral hemispheres that emerged from brain laterality studies. Jaynes' speculations derived from the early studies on “split-brain” patients by Sperry (1968). The unexpected findings about the independent functionality of the two hemispheres after the surgical removal of the corpus callosum (commissurotomy)

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led some neuroscientists to postulate the coexistence of two parallel streams of consciousness (Cavanna, Trimble, Cinti, & Monaco, 2007).

Recent findings (Brück, Kreifelts, Gößling-Arnold, Wertheimer, & Wildgruber, 2014) connecting temporal voice area (TVA) activation with processes of auditory mental imagery suggest that the TVA may not only represent a processing site integral to the acoustic analysis of voice information, but may also store acoustic information related to different vocal sounds, re-activated during perceptual simulations. Recalling, recombining and modifying this stored sound information may give rise to auditory imagery, and thus the experience of hearing an inner voice.

In general, both overt and covert speech tasks induce activation of essential language areas (Broca's and Wernicke's areas, inferior parietal lobule) in the left specialised hemisphere. Greater activation was observed in inner speech relative to overt speech (external speech) in several regions including the left precentral gyrus, left middle frontal gyrus, left or right middle temporal gyrus, left superior frontal gyrus, right cingulate gyrus, left or right inferior parietal lobe, left dorsal frontal cortex, left parahippocampal gyrus, right cerebellum. These observations simply that covert speech generation cannot be simply equated to overt responses minus articulatory motor execution (Perrone-Bertolotti et al., 2014).

In line with what mentioned above, the activation of Broca's area during hallucinations is interesting because a PET study in normal subjects has implicated the same region in the production of inner speech (McGuire, Murray, & Shah, 1993).

INNER SPEECH: FROM INTERPERSONAL TO INTRAPERSONAL

Vygotsky's view (1934/1962) of the development of inner speech formed part of a broader theory of how individual mental processes are developmentally determined by the interpersonal interactions from which they derive. In his "general genetic law of cultural development", he proposed that every mental function appears firstly on the inter-psychological plane, and secondly on the intra-psychological plane, as an internalised version of that previously external function. This process passes through a transitional phase where the child asks questions of himself/herself out loud and then proceeds to answer them. As Berk and colleagues confirm (Berk & Díaz, 1992), this stage of private speech represents a way station on the developmental path between external and inner speech, far from being just a mere copying of external speech onto the intra-psychological plane.

More than ten years ago, Fernyhough (2004) published a review in which deeply analysed the structure of Vygotsky's theory. He wrote of the three semantic properties that distinguish inner speech from external dialogue and private speech. Firstly, the predominance of sense over meaning refers to the way that the personal significance of words in inner speech takes precedence over

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their conventional meanings. Secondly, the process of agglutination involves the development in inner speech of hybrid words signifying complex, subject-specific concepts. Thirdly, the infusion of sense into a word describes the process whereby a word in inner speech becomes loaded with more associations than are inherent in its conventional meaning, and thus acquires a richness for the subject that is not shared by others using the same word. The result of these syntactic and semantic changes is that inner speech loses most of the acoustic and structural qualities of external speech and becomes a process of “thinking in pure meanings”.

With regard to that, Vygotsky proposed four levels to explain the process, structured as follows:

- At Level 1 (external dialogue), children and caregivers engage in overt dialogue which displays the characteristic give-and-take of conversation.
- At Level 2 (private speech), children conduct these dialogues in their own overt (and then gradually subvocalised) private speech.
- At Level 3 (expanded inner speech), private speech is fully internalised and covert, but the give-and-take of normal conversation is still manifested internally as the process of talking silently to oneself.
 - At Level 4 (condensed inner speech), the syntactic and semantic transformations of internalization ensure that inner speech retains few if any of the accoutrements of external language and has become a dialogic interplay between alternate perspectives on reality—that is, the stage of the above mentioned “thinking in pure meanings”. This model allows for movement between the levels at any given point in development.

PRIVATE SPEECH

Flavell (Flavell, Beach, & Chinsky, 1966) coined the term “private speech” that is now widely used and almost universally preferred to “egocentric speech”, introduced by Piaget in *The Language and Thought of the Child*(1923/1962). Flavell observed that children would often use private speech in the form of spontaneous verbal rehearsal of to-be-remembered information in the context of memory experiments. He supposed that it was an effective strategy to maximize performance in memory tasks.

In *Thought and Language*(1934/1962) Vygotsky proposed that private speech, rather than from within the child’s mind, originates from the social world of the child in his/her interactions with others. Social speech from parents and caregivers to the child, which functions in part to guide and regulate children’s behaviour and attention (“other-regulation”), gradually becomes internalised during the preschool years as the child begins to talk to the self out loud to guide his or her own thinking, behaviour, and problem solving (Berk & Díaz, 1992).

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Thus, the social/cultural tool or symbol system of language, first used for interpersonal communication, is used by the child overtly not for communication with others but for intrapersonal communication and self-guidance.

During this process of internalisation, a fundamental transformation of the child's cognitive processes takes place when pre-intellectual language and pre-linguistic cognition fuse to create verbally mediated thought. Children are then allowed to engage in human higher-order cognitive processes, such as self-reflection and self-regulation of behaviour. That is, with the help of private speech, young children are able to distance themselves from the immediate environment and let their own internal plans drive their behaviour and attention. Hence, they can reflect better on their own thinking and behaviour and reach greater levels of control and mastery over their own behaviour.

Vygotsky observed that frequency of private speech showed a curvilinear, inverted-U-shaped relationship with age, with self-talk increasing in frequency during the preschool years and then becoming less common during the early elementary school years, when it is gradually replaced with whispers, inaudible muttering, and silent inner verbal thought (Berk & Díaz, 1992; Winsler, 2009).

According to him, it is not until about age 5 years or even later that children's overt verbal production can become fully internalised. Contrary to his ideas, recent evidence suggests that infants – 18 and 20-month old – may use inner speech (Mani & Plunkett, 2010; Ngon & Peperkamp, 2013).

Even adults use overt self-talk while engaging in problem-solving and other activities. They use two distinct forms of "intrapersonal talk": "expressive statements," used to discharge immediately experienced tension and not aimed at interpersonal communication, and "exocognitive statements", the verbal acts most commonly described as 'thinking aloud' (Duncan & Cheyne, 2002). Alarcón-Rubio and colleagues (Alarcón-Rubio, Sánchez-Medina, & Winsler, 2013) have demonstrated that adults with basic and intermediate literacy levels tended to use less often these types of speech with increasing task difficulty, while those with advanced literacy levels increased the frequency of social speech and externalised PS with the difficulty of the task.

PSYCHOPATHOLOGY

Exploring inner speech's relation to psychopathology leads us into the field of anxiety and depression, known to be associated with ruminative thought processes. Another relation between inner speech and potentially distressing mental experiences can be found in the example of AVHs, also called "hearing voices".

Inner speech models of AVHs propose that the raw material of such experiences is the voice-hearer's own inner speech which is misattributed to an external source (McCarthy-Jones & Fernyhough, 2011).

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Moseley and colleagues (2014) asked themselves about whether inner speech is implicated in AVHs and what elements involved in the production of inner speech experiences are also involved in the production of some AVHs. To answer this question, Jones and colleagues (Jones & Fernyhough, 2007) pointed out that failure of the predicted state, leading to neurological activity associated with passivity experiences, may indeed lead to inner speech being experienced as unintended. However, the unintendedness of the inner speech is a result of the failure of the predicted state and follows from the passivity experience itself. Thus, unintendedness is a consequence, not a cause, of the AVH. Subjects report their experience of an AVH as a perception, internal to themselves, of a voice other than their own. At the same time, the voice is usually accepted to have arisen from within the boundaries of the self. If the subject is simply drawing the boundary between self and other at the wrong location, it is difficult to see how they should also accept the hallucination as being of themselves.

Jaspers (1913/1963) distinguished between “pseudo-hallucinations”, where alien voices are recognised to come from within the boundaries of the self, and “true hallucinations”, where the attribution is entirely external. The key to understanding the strangeness of AVHs lies in the syntactic and semantic changes which, Vygotsky claimed, dialogue undergoes in the process of internalisation. As Fernyhough and colleagues well explained (2004; Jones & Fernyhough, 2007), in normal development, the syntactic and semantic changes envisaged by Vygotsky ensure that fully internalised inner speech bears little superficial resemblance to the external dialogue from which it was derived. One cause of AVHs might be a developmental problem with the transition between Level 3 (expanded inner speech) and Level 4 (condensed inner speech). Thus, inner speech remains excessively and inappropriately expanded. Because these fragments manifest themselves when the subject is not exposed to any external speech input, they are experienced as alien voices. A second possible cause of disturbed internalisation is when the disturbance occurs at Level 1 of inner speech development. If the child has a relatively impoverished experience of balanced, two-way dialogue with a caregiver, the progression through the subsequent levels of inner speech will be disturbed.

Another model of AVHs’ genesis is that they would be experienced when normally abbreviated inner speech becomes re-expanded under conditions of stress and cognitive challenge. In line with this model, AVHs enjoy normal, condensed inner speech under normal conditions. It is only under conditions of stress and cognitive challenge that re-expansion takes place.

ART

Creative arts owe a large debt to inner voices.

Adults acquiring literacy reflect universal processes of appropriation and mastering of a cultural tool, and it is interesting and important that we may

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observe changes in adults' use of private speech as well during such a process. Illiterate adults use private speech as children do, under similar circumstances. Private speech use and evolution may be linked to individuals' mastering in cultural tools for self-regulation linked to specific historical and cultural contexts, and not just a function of ontogenetic processes. (Alarcón-Rubio et al., 2013)

This finding is intriguing because it suggests that it could be experienced with formal education and symbolic systems such as literacy in addition to, or even rather than, age that matters in terms of predicting individuals' use of language as a tool for self-regulation. (Winsler, 2009)

So many artists have experienced these phenomena.

British poet and mystic William Blake said his poem, *Jerusalem*, which was written entirely by an inner voice, came to him.

Jonathan Livingston Seagull's author, Richard Bach heard much of the book's dialogue via an inner voice (Liester, 1996).

TS Eliot's poem, *The Wasteland*: "Who is the third who walks always beside you? When I count, there are only you and I together. But when I look ahead up the white road, there is always another one walking beside you".

In his book *The Third Man Factor*, John Geiger collects together a wide range of third man stories, all involving a strong impression of a felt presence, sometimes with a voice or a shadow-like image, but often without a clear form.

Charles Dickens himself considered his novels to come from some autonomous source beyond volition: "[...]some beneficial power shows it all to me".

To borrow from the narrating figure in *The Unnamable* (1953), the narrative core of Beckett's dark universes seems to be "all a matter of voices; no other metaphor is appropriate".

CONCLUSION

Inner speech is not such a rare psychic phenomenon, not well interpreted during the years of growing psychology and psychiatry. Given its different neurobiological and phenomenological nature from auditory verbal hallucinations, the main effort, over the time, has been to differentiate what's normal from what's abnormal.

A peculiar characteristic of inner speech is the social genesis: starting from an inter-psychological plane, it runs into an intra-psychological one. Family, in particular, leads the way to the future ability of speaking: from the "self-talk" to the "given-and-take" conversation. Beginning with private speech (level 2) in the very young age – also demonstrated to be present in adults –, the individuals internalize what heard from external dialogues (level 1), producing expanded inner speech (level 3) first, and condensed inner speech (level 4) later. Vygotsky's ideas of these stages of internaliation give us a realistic version of the nature of inner speech.

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Furthermore, we ought to learn from history and art, which have for a long time shown to our blind eyes the power of such a psychic phenomenon, useful to creativity and the growth of the individual.

In conclusion, inner speech once more reminds us the importance of systems, relationship and interpersonal dialogue, providing guidance for the well-being of the society.

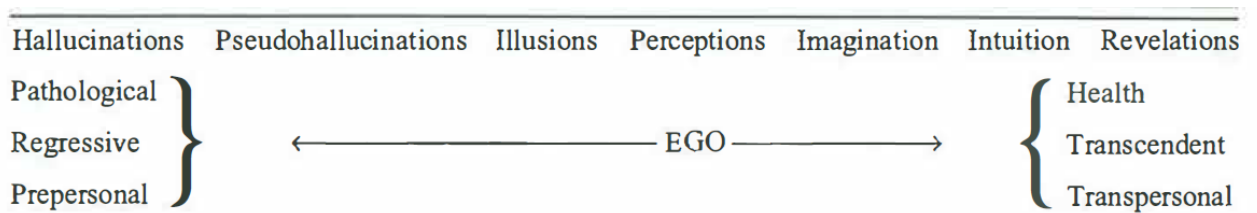


Figure 1. Sensory experiences (from Liester, 1996)

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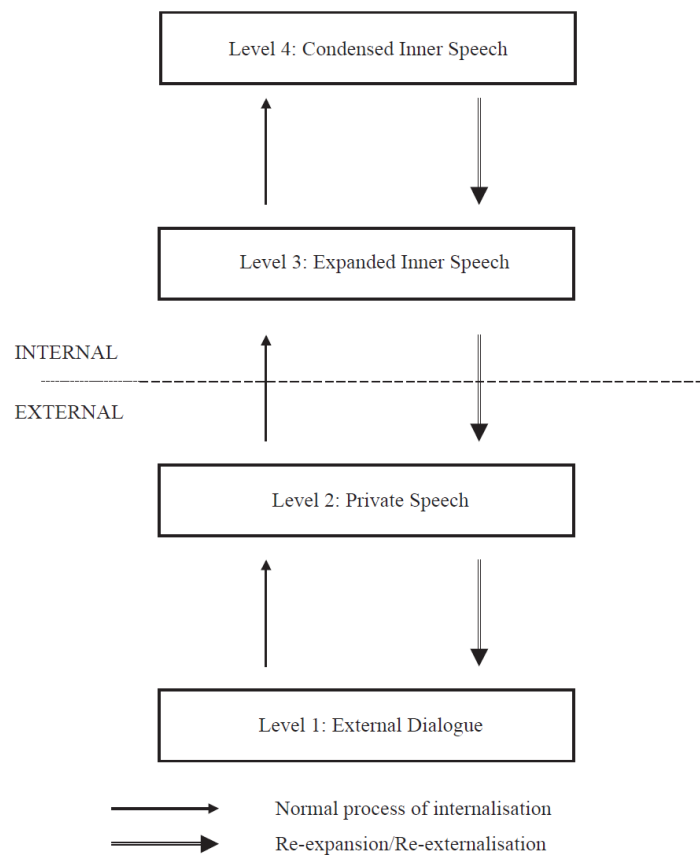


Figure 2. Stages of internalisation (from Fernyhough, 2004)

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