



Short Communication

Self-awareness deficits following loss of inner speech: Dr. Jill Bolte Taylor's case study[☆]

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ABSTRACT

In her 2006 book *"My Stroke of Insight"* Dr. Jill Bolte Taylor relates her experience of suffering from a left hemispheric stroke caused by a congenital arteriovenous malformation which led to a loss of inner speech. Her phenomenological account strongly suggests that this impairment produced a global self-awareness deficit as well as more specific dysfunctions related to corporeal awareness, sense of individuality, retrieval of autobiographical memories, and self-conscious emotions. These are examined in details and corroborated by numerous excerpts from Taylor's book.

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1. Introduction

A growing number of researchers are suggesting that language plays an important role in consciousness (e.g., Carruthers, 2002; Dennett, 1991; Rosenthal, 2008). Some are proposing that it is inner speech *per se* that should be linked to higher cognitive abilities such as self-awareness, as opposed to more general language functions (Briscoe, 2002; Leary, 2004; Morin, 2004; Nelson, 2005). That is, to some it may appear unclear how the broad act of language could participate in the processing of self-relevant information; however, it seems easier and more conceivable to connect speech-for-self to self-awareness, where one engages in attempts to subvocally analyze and describe the self. In this view, inner speech can be seen as a cognitive process that may (1) internally reproduce social mechanisms leading to perspective-taking, (2) create a psychological distance between the self and mental events it experiences (thus facilitating self-observation), (3) operate as a problem-solving device where the self constitutes the problem to be solved and self-information the solution to the problem, and (4) verbally label aspects of one's private life that would otherwise be difficult to objectively identify (see Morin, 2005, for details; see Burns & Engdahl, 1998; Clowes, 2007; Stamenov, 2003; Steels, 2003, for additional theoretical accounts).¹

Empirical evidence supporting the existence of a connection between self-awareness and inner speech is still limited yet promising. To illustrate, a significant positive correlation has been found between validated measures of frequency of self-

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¹ Although this paper specifically emphasizes the postulated role played by inner speech in the processing of self-relevant information, the reader is reminded here that inner speech serves various additional functions that have been extensively studied, among which verbal self-guidance (or self-regulation) (see Fernyhough & Fradley, 2005; Fuson, 1979; Vygotsky, 1943/1962), language production (Levine, Calvanio, & Popovics, 1982), verbal short-term memory (Baddeley & Hitch, 1974), task switching performance (Miyake, Emerson, Padilla, & Ahn, 2004), planning, problem-solving, and remembering the goals of action (Meacham, 1979). Also note that dysfunctional inner speech is frequently implicated in various forms of psychological disorders such as schizophrenia, social anxiety, and depression (e.g., Allen, Aleman, & McGuire, 2007; Beazley, Glass, Chambless, & Arnkoff, 2001).

focus and self-talk (e.g., Schneider, Pospeschill, & Ranger, 2005; Siegrist, 1995). This indicates that the more one engages in introspection to acquire self-information and develop a self-concept, the more one talks to oneself (about oneself), and vice-versa (Morin & Joshi, 1990). Studies measuring brain activity during processing of self-information consistently show activation of the medial prefrontal cortex and various additional areas that often include the left inferior frontal gyrus (LIFG). This suggests inner speech activity during some self-awareness tasks because the LIFG reliably gets activated when participants are asked to silently articulate sentences (McGuire, Silbersweig, Murray, et al., 1996) or single words (McGuire, Silbersweig, Wright, et al., 1996). Indeed, Morin and Michaud (2007) reviewed 59 studies measuring brain activity during processing of self-related stimuli and found that 60% of all studies reported LIFG (and presumably inner speech) activity during self-awareness tasks. This supports the view of a relative involvement of inner speech in self-reflective processes, especially those with conceptual, as opposed to perceptual, components.

It has been observed that in brain damaged patients who eventually recover from their trauma, conscious experience often returns in parallel with inner speech (Ojemann, 1986); conversely, healthy individuals report inner speech inhibition when they shift from wakefulness to sleep (Rusalova, 2005). Not surprisingly then, loss of inner speech caused by brain injury negatively affects self-awareness, as the following quotation by Scott Moss, a former aphasic patient, suggests:

I had lost the ability to converse with others, I had also lost the ability to engage in self-talk. In other words, I did not have the ability to think about the future—to worry, to anticipate or perceive it—at least not with words. Thus for the first 4 or 5 weeks after hospitalization *I simply existed*. (Moss, 1972, p. 10; italics added)

The above citation from Moss' book represents the only occasion he mentions his inner speech impairment; furthermore, he does not directly address the issue of the impact of this deficit on his self-reflective abilities. Jill Bolte Taylor (2006) recently published a book in which she relates her experience of suffering from a stroke in the left hemisphere, which led to a severe language and inner speech deterioration. As a Ph.D. in neuroanatomy who was fortunate (and strong) enough to recuperate from this ordeal, she presents in her book a detailed phenomenological account of how it felt to experience total silence in her mind. Importantly, and unlike Moss' report that remains vague in that respect, Taylor frequently discusses various forms of self-awareness deficits allegedly produced by the loss of inner speech. More specifically, she describes a global self-awareness disturbance, corporeal awareness deficits, a distorted sense of individuality, problems with retrieval of autobiographical material, and lack of self-conscious emotions. All the above (with the possible exception of corporeal awareness) are postulated to depend on intact inner speech, where one can verbalize to oneself one's current emotions, values, goals, traits, behaviors, physiological sensations, perceptual experiences, etc. (global self-awareness and sense of individuality—e.g., Who am I?, What kind of person am I? Why do I feel that way? Why did I do that?); where one verbally narrates to oneself past episodes of one's life (autobiography—e.g., Last summer I spent 1 month at my brother's...); and where one verbally worries about impressions made on others (self-conscious emotions—e.g., I probably look very foolish...).

Taylor's testimony, although unavoidably subjective and based on retrospective recall,² can be taken as additional evidence for the existence of a link between self-awareness and inner speech. This evidence is presented below.

2. Jill's stroke and its impact on her inner speech

Jill was 37 years-old when she suffered from a hemorrhagic stroke in her left hemisphere caused by a congenital arteriovenous malformation. The hemorrhage originated at the fronto-temporal junction right in between Broca's and Wernicke's areas, and in the space of a few hours a large blood clot had formed and disabled both these language regions, at which point "... my brain chatter began to disintegrate..." (p. 41). "Where was my language... what had become of the brain chatter, which was now replaced by a pervasive and enticing inner peace?" (p. 47).

Although it is clear from Jill's personal account that she rapidly lost most of her ability to engage in self-talk as a result of her hemorrhage, it should be emphasized that she did not entirely lose inner speech, at least in the early phase of the stroke. In the chapter "Morning of the stroke", Jill provides numerous examples of what appears to be inner speech "left overs", all in italics, e.g., "*What is going on?*" (p. 41), "*What is it I am trying to do?*" (p. 44), or "... resounding like thunder from deep within my being, a commanding voice spoke clearly to me: *If you lie down now you will never get up!*" (p. 45). She never explicitly refers to these passages as inner speech occurrences, but recently confirmed to the present author in a personal communication that they actually are. In addition, at times Jill uses the expression "moments of clarity" to designate episodes when "... I could see, I could identify, I could remember what I was doing, and I could discriminate again between the varied incoming stimuli" (p. 57). She also specified in a personal communication that these moments of clarity were remnants of inner speech in the early period of her stroke. Once completely deteriorated, inner speech was gone for 5 weeks. Jill reports that imagery then replaced inner speech:

The most notable difference between my pre- and post-stroke cognitive experience was the dramatic silence that had taken residency inside my head. I just didn't think in the same way. Communication with the external world was out. Language with linear processing was out. But thinking in pictures was in. (pp. 75–76)

² Taylor specifies that "Post-stroke year two was spent reconstructing, as best I could recall, the morning of the stroke. I worked with a Gestalt therapist who helped me verbalize my right hemisphere experience of that morning..." (p. 126).

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