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Alzheimer's disease and impairment of the Self

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ABSTRACT

Impairment of the Self has been described in frontal–temporal dementia but little research has been carried out in patients with Alzheimer's disease (AD).

Objective: The aim of this study was to explore changes in the self in patients with AD.

Method: Forty-seven patients with mild to moderate AD were examined using a semi-structured scale designed to assess the self-concept along three dimensions, namely, the Material Self, the Social Self and the Spiritual Self.

Results: The majority of patients (43 out of 47) presented impairment of at least one dimension of the Self. When only one dimension was affected, it was always the Social Self. The severity of impairment of the Self was correlated to the impairment of the semantic autobiographical memory and apathy.

Conclusion: The Self is impaired in AD and the Social Self dimension appears to be more vulnerable in AD than other dimensions.

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1. Introduction

The Self, which is constructed throughout childhood (Kagan, 1982), combines the behavioral, psychological, emotional and social features that distinguish each individual from any other, and are the basis for the individuality and uniqueness of each human being. Like our world, our Self is a construction of our minds. But we do not live in isolation and the Self is also a construction of our relations with other selves and most intriguingly, the Self is a construction of its relation with itself. In this way the Self can be examined as self consciousness or as self-behavior. Behavior of the subject (how she/he dresses, speaks, acts etc.) reflects his/her identity and constitutes his/her Self, as it is recognized by his family and his/her social background. We are going to examine first the self as self consciousness (or self-recognition) and then self as self-behavior.

Self-consciousness (SC), or self-awareness, or ontogenic consciousness, which is “the most fundamental issue in psychology” (Rochat, 2003), is the subject's ability to understand his own states of consciousness (Lechevalier, 1998) and dependent in the first instance on self-recognition. Gallup (1982) hypothesized that organisms that can conceive of themselves, as evidenced by their ability to recognize themselves in mirrors, ought to also be capable of engaging in mental state attribution. In other words, self-recognition and social intelligence may be a reflection of a common underlying process, namely the ability to conceive of one's self in the first place. According to this model, being self-aware (i.e., becoming the object of one's attention, being aware of being aware, being aware of own existence), should, in principle, put one in a position of using one's own experience to infer the existence of comparable experiences in others.

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Different aspects of Self-Consciousness and particularly self-recognition are variously affected in cerebral diseases and in Alzheimer's disease (AD). Grewal 1994 compared self recognition in patients with moderate ($n = 20$) and severe ($n = 19$) AD. Severe dementia (MMSE < 6) was significantly associated with the inability of patients to recognize themselves in a mirror while those with moderate dementia (MMSE > 15) still retained this capacity. This study supports the idea that awareness of the body, self-recognition, is not always affected in AD. However, Breen, Cain, and Coltheart (2001) disagree and suggest that the inability to recognize one's own reflected image, may be a stable and persisting symptom signaling the onset of a progressive dementing illness.

In support of the theory that self-recognition or the capacity to conceive of oneself is what paves the way for making inferences about mental states in others, some studies have tried to show that self-awareness and mental state attribution are localized in roughly the same or at least very similar areas of the human brain. More specifically, it appears that the frontal cortex (often the right prefrontal cortex) is involved in self-recognition and autobiographical episodic memories. Thus, Keenan, Nelson, O'Connor, and Pascual-Leone (2001a) reported data suggesting that self-recognition was the result of right hemispheric activity. However, the right hemisphere appears also dominant for tasks involving theory of Mind (ToM) (Keenan, Rubio, Racioppi, Johnson, & Barnacz, 2005). Using functional magnetic resonance imaging and event related potentials, Keenan, McCutcheon, and Pascual-Leone (2001b) reported that the presentation of self-faces selectively activates areas in the right prefrontal cortex. Likewise, patients who are incapable of identifying their own faces but show no prosopagnosia or severe dementia often have damage to the right prefrontal cortex (Spangenberg, Wagner, & Bachman, 1998). However, the fact that self-recognition is the result of right hemispheric activity does not imply that the same hemisphere is responsible for Self-Consciousness (Morin, 2001).

Hypothesizing a relationship between self-face recognition and theory of mind, Irani et al. (2006) reported activations in a common neuronal network (principally median prefrontal cortex and precuneus) during the realization of ToM tasks. Also, Self-consciousness and consciousness of others could be considered as an interaction at the very bases of both individual identity and the other's knowledge, which regulate behavior and social interactions (Duval, Desgranges, Eusyache, & Piolino, 2009). In phylogenetic terms, studies have used self-recognition to determine the presence or absence of self-awareness in primates (Gallup, 1985, 1998). However, others have challenged this reasoning (Mitchell, 1993; Povinelli, 1995, 1998) claiming that self-recognition does not require introspection and that the subject simply matches the image seen in the mirror with a preexisting kinesthetic representation of it.

The Self is also at the center of subjective identity and the feeling of continuity across time: it is linked with autobiographical memory (Conway, 2005; Conway, Singer, & Tagini, 2004). Self-consciousness is multifaceted (Delacour, 1995; Dennett, 1991; Lechevalier, 1998). It is awareness of the body that is of its morphological characteristics as well as its position and mobilization in space. Self-awareness is also the consciousness of perception. Self-awareness is the consciousness of one's own history, of one's autobiography (Zeman, Grayling, & Cowey, 1997). It is thus inseparable from memory, thanks to which the identity of each human being is constructed. Self-consciousness is the consciousness of one's own projects (Gil et al., 2001). Finally, Self-consciousness is a moral consciousness that allow the human being to make judgment about his thoughts and actions. In the extreme sense, the impairment of Self-consciousness implies that the subject is no longer conscious of existing. Distinguishing between the structural (Self-knowledge) and functional (Self-consciousness) dimensions of the Self, results from the literature suggest that characteristics of the Self are not affected equally by aging, with the functional dimensions being more particularly affected (Duval, Eustache, & Piolino, 2007). Miller et al. suggested that Self depends on three core cognitive domains: semantic knowledge (abstract information about personal attributes); autobiographical memory and will which is defined by motivation to maintain self schemas.

The Self may be considered as self-behavior because the Self is manifested in the behavior, gestures, and in the words of a subject. Changes in the Self are expressed in behavioral changes that alter the consistency and identity of an individual. A few studies have explored changes in behavior relating these to impairments of the Self in subjects with cerebral lesions (Levine et al., 1998; Miller et al., 2001). However, apart from research specifically exploring the Self, other studies have focused on changes in personality in brain-damaged subjects reflecting impairment of the Self. These are often expressed by people close to the subject in the form of remarks such as "He is not the person I used to know". Similarly, the case of Phineas Gage (Damasio, Grabowski, Frank, Galaburda, & Damasio, 1994) supports the idea that cerebral lesions may cause disorganization of personality (Cato, Delis, Abildskov, & Bigler, May 2004). Here, the behavioral changes seen in Phineas Gage following the accident which destroyed much of his brain's frontal lobe led to his colleagues remarking that "Gage is no longer Gage". Again this latter description confirms the idea that we do not live in isolation and the Self is also constructed by our relationship with others through our behavior.

James (1890) distinguished three dimensions of the Self: the Material Self, the Social Self, the Spiritual Self. The body is the innermost part of the Material Self and the clothes come next. And he stated that "the old saying that the human person is composed of three parts – soul, body and clothes – is more than a joke". The human's Social Self is constructed in the recognition which he gets from others by their comportment. The human has the ability to notice that "we have an innate propensity to get ourselves noticed, and noticed favorably, by our kind". Moreover, social behavior of a human allows those who work with him to recognize him and make a mental image of him in their mind. The Spiritual Self includes moral views, political, philosophical, spiritual and religious opinions.

Dementia provides a valuable field of research into impairment of the Self. Miller et al. (2001), using SPECT imaging in 72 patients with frontotemporal dementia found a relation between Self and non-dominant cerebral function. They found that 7 out of 72 patients showed a dramatic change in their Self as defined by changes in political, social, or religious values and

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