

Consciousness Disorders in Schizophrenia: a Forgotten Land for Psychopathology

José M. Villagrán

Hospital de Jerez, Cádiz, España

ABSTRACT

The scientific study of consciousness has been boosted in the last two decades, especially from philosophical and neuroscientific realms. Before that, the topic was neglected, particularly in psychiatry in which, either out-of-consciousness experiences were emphasized (as in psychoanalysis) or consciousness was viewed as epiphenomenic to the underlying organic disorders that had to be studied. This situation has hardly improved in modern psychiatry, perhaps due to the persistence of two competing metaphors of consciousness and of psychiatric constructs (such as kraepelinian dementia praecox) from which consciousness disorders were originally excluded. Accordingly, the role of a disordered consciousness in schizophrenia, which nevertheless was contemplated by Continental psychiatry, has hardly been considered by recent psychopathology research. However, there is growing data showing that certain functions that modern science considers to be part of consciousness (sense of agency, self, episodic and autobiographic memory, executive functions, insight, monitoring) could be impaired in certain schizophrenics and that this may account for symptoms such as thought insertion, depersonalisation, auditory hallucinations, self fragmentation, disorders of episodic and working memory, passive experiences and delusions of control. In this paper the conceptual history of consciousness in psychology, neurology and psychiatry is outlined, and the most prominent recent approaches to the study of its role in schizophrenia are reviewed. *Key words:* psychopathology, schizophrenia, consciousness, conceptual history.

RESUMEN

En las últimas décadas han proliferado los estudios sobre la conciencia, tanto desde la filosofía de la mente como desde las ciencias cognitivas o las neurociencias. Sin embargo, los resultados de estos estudios apenas han tenido resonancia en el campo de la psiquiatría donde, bien se priman los aspectos que escapan al campo de la conciencia (como en las orientaciones psicoanalíticas), bien se considera ésta como un epifenómeno de otras alteraciones subyacentes cuyo estudio debe ser primado. La persistencia de dos metáforas rivales para describir la conciencia y la persistencia casi inalterada de constructos como el kraepeliniano de *dementia praecox*, del cual se excluía la posibilidad de alteraciones de la conciencia, es posible que hayan contribuido a esto. En virtud de ello, el papel de las alteraciones de la conciencia en la esquizofrenia, que la tradición continental nunca descartó, apenas ha sido contemplada en la investigación psicopatológica reciente, a pesar de que existen indicios para pensar que, precisamente en los cuadros esquizofrénicos, existen anomalías en funciones de la conciencia (sensación de agencia, *self*, memoria episódica, planificación de acciones, *insight*, monitorización, etc) que podrían explicar fenómenos clínicos como la inserción del pensamiento, la despersonalización, las alucinaciones auditivas, la fragmentación del *self*, las alteraciones en la memoria episódica o de trabajo, o determinados trastornos formales del pensamiento relacionados con la sensación de agencia y planificación de acciones. En este artículo se esboza la historia conceptual de la conciencia en psicología, neurología y psiquiatría y se revisan algunos de los más importantes modelos recientes sobre el papel desempeñado por la conciencia en la esquizofrenia.

Palabras claves: psicopatología, esquizofrenia, conciencia, historia conceptual.

¹ Reprints may be obtained from the author. Hospital de Jerez, Carretera de Circunvalación s/n, 11407 Jerez de la Frontera, Cádiz (España). E-mail: jvillan@maptel.es

The scientific study of consciousness has been boosted in the last two decades, especially from philosophical and neuroscientific realms. Before that, the topic was neglected, particularly in psychiatry in which, either out-of-consciousness experiences were emphasized (as in psychoanalysis) or consciousness was viewed as epiphenomenic to the underlying organic disorders that had to be studied. This situation has hardly improved in modern psychiatry. Reasons have been suggested, referring to characteristics of the phenomenon (fuzzy boundaries, conceptual confusion, epistemological controversies on first/third person description) but also to the evolution of psychiatry itself during the twentieth century (Anglo-Saxon psychiatry supremacy with its emphasis on third person descriptions, modular modelling of mental symptoms, descriptive psychopathology considered to be transparent, etc).

Accordingly, the role of a disordered consciousness in schizophrenia, which was contemplated by Continental psychiatry (Dagonet, Janet, Berze, Ey), has hardly been considered by recent psychopathology research. However, there is growing data showing that certain functions that modern science considers to be part of consciousness (sense of agency, self, episodic and autobiographic memory, executive functions, insight, monitoring) could be impaired in certain schizophrenics. From different realms (neurophenomenology, neuropsychology and neurosciences), the study of consciousness and its role in schizophrenia has been approached in recent years, and clinical phenomena such as thought insertion, depersonalisation, hallucinations, self fragmentation, disorders of episodic and working memory and sense of agency and action planning have been accounted for from the perspective of a putative disorder of consciousness.

CONCEPT OF CONSCIOUSNESS.

It can be stated that consciousness is one of the most baffling, enigmatic and mysterious phenomena in nature. Much has been written, especially in the last decade, about it and, however, little is known about what it really is, its origins and how to study it. One source of confusion is its polysemic meaning. It may be that consciousness refers to a more or less heterogeneous group of phenomena (Wilkes, 1988; Block, 1994). To make things worse, the use of analogous terms (awareness, perception, attention, inner knowledge) is of no use to conceptual clarification: some refer to different phenomena (Block, 1996; Baars, 1997) and some refer to each other in a circular manner (Güzeldere, 1995). Nevertheless, circularity in definition is not an exclusive problem of consciousness since other basic scientific terms such as energy, in physics, or stimulus, response or reinforcement, in psychology, cannot be analysed by looking at their components and need to be explained by referring to other terms (Velmans, 1996). In this sense, it may be the case that consciousness is a term that should not be defined beforehand but only after having been used in a specific context (Valentine, 1999).

Two main uses of consciousness can be distinguished (OED, 1971): (1) the *ethical or social* usage, applied to individuals (moral consciousness or knowledge or own misdemeanours) or groups (shared knowledge): it is the oldest use, stemming from the original Latin term and, by extension, it has led to other uses (consciousness of class, political consciousness, consciousness-raising); (2) the *psychological* usage,

individual, also with two senses: on the one hand, consciousness as the faculty or state of *being conscious of something*, which is a necessary condition to any cognition, feeling or volition; on the other hand, the *state of being conscious*, condition of normal wakefulness. The former, derived from the modern conception of consciousness originated in 17th century with Descartes and Locke, implies a transitive or intentional component (consciousness of) and also allows for new facets of consciousness (self-consciousness, consciousness of self, *qualia*) to be studied separately.

These distinctions are relevant to the systematic study of consciousness specially in its application to cognitive sciences, firstly because separating social and psychological uses allows the delimitation of our main area of interest (psychological usages) (Sommerhoff, 2000), irrespective of the fact that social and psychological uses may eventually be intrinsically related (Mead, 1964; Jaynes, 1976; Vygotsky, 1978; Oatley, 1988; Dennett, 1991). Moreover, the different psychological uses also allow the possibility of referring to at least two types of consciousness that need to be studied separately, eventually dissociated, and correlated to different neural circuits (Block, 1996).

CONSCIOUSNESS IN PSYCHOLOGY.

The modern concept of consciousness (called *epistemological*) has its origins in 17th century, evolving from the older notion of moral conscience, once this was secularised (Lewin, 1930). It seems that there was no concept in ancient Greek to describe the capacity of mind to know the functioning of its own faculties (Wilkes, 1988; Hamilton, 1859; Abbagnano, 1961). Aristotle (1968) questioned the existence of a separate sense that perceived what was going on in other senses, and considered this capacity as a general feature of the psyche. Hannay (1990), however, suggests that, although Greeks did not possess the term to refer to the modern notion of consciousness, they distinguished between *syneidesis* (ethical knowledge, either individual or shared) and *synaesthesia* (unity of apperception). It was Plotino who, by adopting the latter to refer to the self-reflective function of consciousness, widened the concept (Hamilton, 1859). With Saint Augustine the self-reflective function soon gained a moral dimension thus unifying the individual and collective sense of shared knowledge (Abbagnano, 1961). Since then, the epistemological and moral meanings were to travel together (Berrios, 1996) until the seventeenth century, when they became fully distinguished by French and English authors that tried to get rid of scholasticism (Lewin, 1930).

Descartes

With Descartes, a radically new sense of consciousness is introduced. Consciousness ceases to be a fact amongst facts or a particular aspect of the soul to become its essential or central feature and characterizes a particular type of substance (*res cogitans*) which differs from the external world -including the body itself (*res extensa*). By the word thought (*pensée*) the French philosopher understands *all* that of which we are conscious (knowledge, desires, imagination, feelings) and therefore makes it co-extensive with the entire mental and spiritual life of the person. As a consequence of Descartes's

ontological mind/body dualism consciousness became imprisoned in a mentalistic and solipsist discourse that, by calling into question the certitude about the knowledge of the external world, prevented the development of meaningful links with the material or bodily part of the subject (Cohen, 1984). By attempting to figure out the way the mind acquires knowledge about the world, Empiricism recognized the dichotomy and perpetuated dualism and its notion of consciousness in the forthcoming psychology (Boring, 1953).

This psychological approach to consciousness, as hinted in the work of Descartes and British empiricists, was developed during the nineteenth century, and the new experimental psychology that would then appear assumed the *psychophysical parallelism*, a philosophical theory that, facing the Cartesian dualism, tried to account for the relationship between mind or consciousness and body (Berrios, 2000). Authors such as Fechner, Lotze, Wundt or Mach viewed psychology as the study of consciousness and introspection was postulated as the main mechanism to examine its content (Boring, 1953). However, the question of whether self-reflective consciousness was an independent faculty of the mind (supported by philosophers such as Hutcheson or Reid or the French Garnier) or not (supported by the mainstream of British philosophy at the time Hamilton, Bain or Mill), was very much present during the century. These two views of consciousness were developed differently, leading to two notions of consciousness that were of relevance respectively to neurology and psychiatry (v. infra).

William James

James wrote extensively on consciousness but, although he emphasized its importance in psychology, he did not provide a definition of it. In *Principle of Psychology* (James, 1890) he assumes the immediacy of conscious experience and the robustness of the epistemological status of introspection. However, fourteen years later he rejects the existence of consciousness as an entity and proposes to consider it as a function which allows the study of the states of consciousness (James, 1904). This change in James's views seems to reflect the important shift that took place by the end of the 1910s with the inception of behaviourism and the fall of introspection in psychology.

Introspectionism

Although introspectionism was severely criticised by behaviourism as being a scientifically baseless enterprise, it really was an attempt to bring psychology up to par with natural sciences with ideas and methods inspired largely by chemistry and its taxonomy of elements (Güzeldere, 1995). Its main tenet was that the subject matter of psychology was the systematic study of mental acts *as they were experienced* by the person. These would be accounted for only after an exhaustive inventory of the simplest sensitive impressions the subject could discriminate (like in a kind of mental periodic table of elements) was completed (Kulpe, 1901; Titchener, 1915). Descartes and the empiricists rendered unquestionable the content of mind so it is not surprising that Wundt considered the outcome of introspection as an immediate experience (Wundt, 1897). Brentano also stated that it is precisely this feature what makes psychology

superior to physics (Brentano, 1973). However, this view of introspection was soon questioned, among others, by James, J.S. Mill and, especially, by Comte who, by pointing at the limitations of introspection to fulfil the positivistic science requirements, paved the way to the strong criticism of behaviourism (Boring, 1953). Internal and external causes led to the disappearance of introspection in psychology (Lyons, 1986) but its ontological assumptions about consciousness and how to study it were to influence the *gestalt* school (Koffka, Köhler, Wertheimer), especially, the development of descriptive psychology (vid. *infra*.)

Behaviourism

Behaviourism was the reaction against introspectionism and its ontological and epistemological assumptions about consciousness. The subject matter of psychology was, for behaviourism, publicly observable behaviour, and that meant the rejection of consciousness as a useless concept and of introspection as a valid methodology. As far as the term consciousness had never figured in the vocabulary of any natural science, it had to leave the vocabulary of the scientific psychology as well (Watson, 1913). This led to an important ontological consequence as it stated not only that whatever psychology –the scientific discipline– could study, it could be studied by observing behaviour, but also that *all there was to psychology –the phenomenon– was observable behaviour* (Güzeldere, 1995). Even with this fierce opposition, the fact is that consciousness was always present in the research agendas of behaviourist psychologists, either as a hidden variable, or, as time went on and a more conciliatory stance appeared, as an unavoidable ontological requirement (Tolman, 1927; Skinner, 1974). However, its influence in English-speaking psychology during the second half of the twentieth century led to the disappearance of the terms consciousness and introspection from dictionaries and textbooks. As Jaynes much later stated (Jaynes, 1976), behaviourism was only a refusal to talk about consciousness.

Cognitivism

The advent of cognitive psychology marked a new era in psychology (Neisser, 1967) and led to a timid overture towards the recovery of consciousness as a subject matter. Although consciousness became a kind of component or aspect of information processing models, it had no central role in them. It was precisely the success of these computational models in explaining memory, learning or problem solving that brought some attention to consciousness itself (Güzeldere, 1995; Mandler, 1975; Shallice, 1972). By assuming that the basic phenomenological concept (consciousness) could be mapped onto an information-processing concept, some authors attempted to represent it as one of the boxes in their flowcharts (Shallice, 1972; Neisser, 1976; Norman, 1968; Atkinson & Shiffrin, 1968; Johnson-Laird, 1983; Baars, 1988). Phenomenological and subjective features of consciousness were, however, neglected (Searle, 1992). Consciousness had to wait until the ascent of neuropsychology research and the so-called cognitive science before it could again be central to explanatory models (Güzeldere, 1995).

The dichotomy conscious/unconscious

Although the Freudian conception was an important precedent of more recent cognitive models, the fact is that the notion of unconscious of current cognitive psychology differs greatly from that of Freud (Erdelyi, 1985): both processes are opaque to introspection but whilst the Freudian unconscious exists because of past events explainable by repression and other mechanisms, and is not, in principle, inaccessible, the cognitive unconscious exists due to the way our cognitive/perceptual system is built and lies, in principle, out of our access (Güzeldere, 1995). Current cognitive psychology research has included the study of unconscious processes as a fruitful way to study mind (Johnson-Laird, 1983). The study of the *cognitive unconscious* (Kihlstrom, 1987), namely, the mental processes which underlie cognition but are themselves not conscious, has become a common ground for research paradigms of language, attention and perception. Thus, the dichotomy conscious/unconscious goes along the same line as many others such as explicit/implicit (learning and memory) (Schacter, 1987; 1988), automatic/controlled (language and action planning and control) (Umiltà, 1988; Tzelgov, 1997; Tzelgov et al., 1997), supra/subliminal (perception) and declarative/procedimental (knowledge and memory) (Marcel, 1983a,b; Holender, 1986). They attempt to delineate mental processes that are directly available to the subject (and therefore, susceptible of introspection and reportable) from others that are transparent and unavailable (Baars, 1997; Güzeldere, 1995).

CONSCIOUSNESS IN NEUROLOGY AND PSYCHIATRY.

The psychological notion of consciousness, as described above, was developed during the nineteenth century along two opposed views: on one hand, that of those who, following the Cartesian and empiricist tradition, consider the term consciousness as tantamount to the entire mental life of the subject; on the other hand, that of those who defended that consciousness was an independent faculty which contemplated what was going on in other faculties of mind. The former, supported by authors such as Hamilton, Mill or Bain, was more extended in the English-speaking world, was rapidly *physiologized* (that is, its main interest shifted to the putative mechanisms that originated mental life and whose interruption would turn the organism into a vegetative state) in the work of Bain (1859), Laycock (Leff, 1991), Carpenter (Davies, 1873) or Bastian (1870) and given relevance in neurology -for example in the work of Jackson (Riese, 1954). The latter, on the other hand, was defended by Hutchenson, Reid and, through Reid's influence, by French philosophers such as Garnier (1852), remained *psychological* until the end of the century and favoured the inception and development of a rich descriptive psychopathology (Berrios, 1984). It is of no surprise that it was French alienists who started to ask whether there were primary disorders of the faculty of consciousness and what role did they play in mental disorders (Dagonet, 1881), a question that was asked only much later by British authors (Shaw, 1909; Berrios, 1996).

At the turn of the century, the decline of introspection (Lyons, 1986) and the arrival of philosophical (Ryle, 1949) and methodological (Watson, 1913) behaviourism

expelled consciousness out of psychology but not out of psychiatry due to Chaslin's reconceptualization of confusion (until then considered a disorder of thought association) and delirium (once separated from the rest of psychoses) as primary disorders of consciousness (Chaslin, 1895; Berrios, 1996).

The above mentioned distinction between the two views of consciousness had its reflection on the metaphors used to describe them. Traditionally the psychological approach to consciousness was based on the metaphor of the inner eye and hence visual perception was central to it, possibly because of its relevance to seventeenth century psychological considerations. In this sense, consciousness was depicted as something with a central focus and a periphery, either of which could become disordered. Moreover, the disorders of perception were attributed to consciousness (restricted, diminished, narrow, oscillating or clouded consciousness) (Berrios, 1996).

However, at the end of the nineteenth century two competing metaphors of consciousness can be found (Bruner & Feldman, 1990): on the one hand, that of the torchlight that illuminates psychic life; on the other hand, that which describes consciousness as the part of psychic apparatus oriented to experience. The former was rapidly adopted by English-speaking science and, thus, disorders of consciousness were restricted to the sleep/waking axis. It was first believed that this was bound to the cerebral cortex but Von Economo's studies on *encephalitis lethargica* (Von Economo, 1918) and, especially, Moruzzi and Magoun's description of the reticular activating system in cats (Moruzzi & Magoun, 1949) gained relevance to certain subcortical structures. Terms such as *vigilance* (Head, 1923), *alertness* or *arousal* began to be used as synonyms of consciousness (Frederiks, 1969), thus neglecting its phenomenal or subjective features. The second metaphor was adopted by Continental (particularly German) psychiatry through its subjective (Kant) and phenomenological (Husserl) approaches and interestingly influenced the development of the concept of schizophrenia.

CONSCIOUSNESS IN SCHIZOPHRENIA: FROM DAGONET TO EY.

The history of the schizophrenia concept is not as lineal as it is usually described in textbooks and conceptual continuity between Morel and Kraepelin is not taken for granted (Berrios, 1996b). In the middle of 19th century the distinction between delirium (that old syndrome well known from the Greeks) and madness or insanity was not clear and, thus, a unitary conception of psychosis was favoured in which all mental disorders were distributed along a continuum that was the expression of the same underlying dysfunction (Berrios & Beer, 1994). Only by the end of the 19th century with the redefinition of psychosis, the disorder of consciousness is considered the official criterion to differentiate between delirium and insanity (Berrios, 1996a; 1997; Villagrán, 1997).

Nevertheless, a number of authors have been influenced by the philosophical context above mentioned and by the fact that delirium was the psychopathological template out of which the salient symptoms of psychosis were described (Berrios, 1997). They have continued to consider that, underlying insanity, there might exist a primary disorder of consciousness.

Dagonet (1881), in his classical paper *Conscience et aliénation mentale* wrote: “to comprehend mental illness further it is indispensable to examine the mental symptoms in themselves (...) and the first to study amongst the latter should be the disorders of consciousness” (p.369). Dagonet borrowed Littré’s definition of consciousness as it was found in his 1877 Dictionary (intimate, immediate and constant monitoring of the activities of the self in every aspect of moral and intellectual life) (Littré, 1877) and considered as one of its functions the detection of change. “Consciousness captures all the phenomena of our internal life and commits them to memory; this includes the feeling of totality of the person. Consciousness should thus sense any transformation in the latter caused by mental illness” (p.370). “In the different forms of mental illness consciousness disorders will depend upon what other faculties are involved (...) only in exceptional cases can cerebral automatism occur in clear consciousness” (p.389). Following Littré once more, Dagonet also stated that “consciousness, far from being a primordial principle which the rest of psychological properties depend on, is the product of the association and conjunction of them” (p.391).

This view was less popular in England. Maudsley (1895) defended the opposite view: “it has been very difficult to persuade speculative psychologists who elaborate webs of philosophy out of their own consciousness that consciousness has nothing to do with the actual work of mental function; that it is the adjunct not the energy at work; not the agent in the process, but the light which lightens a small part of it (...) we may put consciousness aside then when we are considering the nature of the mechanism and the manner of its work...” (p.8).

On the other hand, Shaw (1909) was one of the first English alienists to consider the role of consciousness in mental illness, well into the twentieth century. He suggested the possibility of a primary disturbance of the “faculty of consciousness” and distinguished two presentations of acute psychosis: one of them affecting the upper intellectual faculties with memory unimpaired and clear consciousness, and the other one affecting lower forms of consciousness with poorly elaborated delusional systems and lack of memory”.

Another important author was Charles Blondel. In his 1914 classical book *La Conscience Morbide. Essai de psychopathologie générale*, one of the five seminal books on psychopathology in the twentieth century, he discussed the distinction between the consciousness of normal state and mental illness. Blondel, influenced by three great French authors –Durkheim, Lévy-Brühl and Bergson–, envisaged consciousness as a psychological database formatted by social frames. In individual consciousness, there coexists a double input: on the one hand, stable and personalized patterns of proprioceptive information (*cénesthésie viscerale*); on the other hand, information from the senses which is integrated and grounds the subject in his personal and social context (Courbon, 1939). Human beings with “normal” consciousness partake in a collective form of consciousness (*conscience socialisée*) that includes a public language inadequate for the description of their subjective events and hence suppress their own *cénesthésie*. The onset of mental disorder is marked by an increase in *cénesthésie* which forces the attention of the subject who soon realizes that his experiences have no equivalent in the collective consciousness. The ensuing affective restlessness (*conscience morbide*) is handled by the patient by attempting a description. To do it, he borrows from “normal”

discourse and, for example, delusions are formed with a content made out of “recognizable” material. This attempt to make sense out of ineffable experiences by recurring to normal forms and mechanisms also leads the observer to try and understand it in similar fashion in what Courbon called the *normomorphic illusion* (Courbon, 1939). But Blondel’s *conscience morbide* cannot be translated into collective frames of reference. The referential function of such content is *manqué*, in that it has no real referent and, therefore, delusion may be an “empty speech act” for its content is irrelevant to anything in the patient’s present state whereas the *conscience morbide* itself is informative of the patient’s actual experiences and their origin (Berrios, 1996a).

Josef Berze, an Austrian psychiatrist, believed that the basic disturbance underlying schizophrenia was what he called the primary insufficiency of psychic activity (1914) or *hypotonia* of consciousness (1929) from which primary or processual symptoms (incoherence, primary hallucinations, disturbances of self and sense of activity, basic feelings and sense of insufficiency –Grundstimmung and Wahnstimmung) are derived. These primary symptoms but not the secondary to brain lesion are subjectively registered by the patient.

Friedrich Mauz (1931), in the same sense, emphasized the fact that earlier stages of psychosis may be accompanied by a feeling of “increased awareness and lucidity” due to an accompanying feeling of “transformation of the self or psychological annihilation”. Mauz also believed that this “awareness of subjective change” was the hallmark of the schizophrenic process for it was “the apperception of a threat to the self or an experience of insufficiency”. He also stated that the quality of awareness may have a prognostic value, namely, the more “lucid” the subject is in regard to his state, the worse the prognosis will be. In a similar sense, the Spanish neuroscientist Gonzalo Lafora (1931) supported the view that this sensation of transformation may be an important source for the primary symptoms of schizophrenia (Berrios, 1996a).

Another important Spanish psychiatrist, Bartolomé Llopis (Alicante, 1906-1964), first published his ideas in 1939 in a chapter on pellagra psychosis in the book edited by M. Ortega *Vitaminas como biocatalizadores*. At around the same time Bussow reported a case series of psychosis related to *pernicious anaemia*, and a few years later Ey and Rouart developed their organo-dynamic model of psychosis. Llopis, himself, presented the final version of his views in his book on pellagra psychosis published in 1946. It is remarkable that all these authors entertained similar mechanisms independently from one another in a period in which Europe was completely destroyed by World War II (Colodrón 1991). Llopis believed that de-structuring of consciousness was central to all mental disorders. He called *axial syndrome* the central disturbance underlying all psychoses, whose clinical expression was a “clouded” consciousness. Different intensities of the latter would give rise to a panoply of clinical states (syndromes of the *state or level* of consciousness) and, subsequently, reflect changes in the quality of the data coming from within and contained *in* consciousness (syndromes of the *content* of consciousness). The former results from pathological variations in the degree of precision with which consciousness reflects reality, this determining the severity of the axial syndrome. Llopis defines consciousness as the ability to know and consequently the syndromes of the state of consciousness (from obnubilation to maximum clarity) consisted

in quantitative shifts in this ability. In contrast with these, the syndromes of the content of consciousness were disorders of the *coenesthesia*, that is, of the prothopatic and affective awareness of the sensation of the body. Whereas the former are true mental disorders, the latter reflect their pathoplastia. *Ab initio*, psychoses cause somatic changes or affects experienced by patients as *as-if* experiences (the subject is aware of the fact that these sensations do not have external reality). But once the level of consciousness is altered patients no longer can hang on to the *as-if* qualification, blurring the boundaries between internal world and reality.

Rümke (Leiden, 1893-1967), being professor of psychiatry in Utrecht, published in 1941 a study in which he described the *praecoxfeeling* (*praecoxgevoel*) or feeling induced in the clinician when in contact with the schizophrenic patient. Rumke followed Minkowski's hint (Minkowski, 1968) and considered this *praecoxfeeling* as the main diagnostic feature, common to all the traditionally described schizophrenic symptoms. This feeling was the direct consequence of a failure or weakening of the "rapprochement instinct" (inclination to establish contact with others, usually below the level of consciousness, but made conscious when impaired) in schizophrenics due to the reduction of energy that affects, unlike Janet's *tension psychologique*, exclusively the instinctive life. In this sense, Rumke followed Berze's ideas and was one of the many authors that consider the pathology of energy as central to psychosis (Rumke, 1990).

The Spanish psychiatrist Cabaleiro Goas (1966) also considered the disturbance of awareness as central to the development of psychosis and, hence, of delusions and hallucinations. In exogenous psychosis, consciousness will be clouded and in schizophrenia it will be *hypotonic*. Even in the pathological affective experiences (for example, in the delusional mood or *wahnstimmung*) there is a hypotonia of consciousness in the sense of a qualitative impairment of the awareness of the activity of the self (p.974, II).

Perhaps it was Henry Ey, the French psychiatrist, who best sponsored the view that the psychoses were a reflection of a subtle disorder of consciousness. Based on the hierarchical model of Hughlings Jackson and on classical French psychopathology, Ey proposed that all mental disorders resulted from changes either in the longitudinal/diachronic or in the cross-sectional/synchronic *structure* of consciousness (Ey, 1954). Ey argued that consciousness could neither be reduced to vigilance nor expanded to equal all psychic activity and he elaborated a dynamic model of consciousness in terms of the organization of experience (Evans, 1972). He proposed two dimensions of consciousness, one synchronic (*field of consciousness*) and the other diachronic (*personality or self*). The former is viewed as the dynamic organization of actuality and not only as the identification of external objects and, from sleep to wakefulness, it implies three successive organizational levels (*presence* or opening to the world, *representation* or ordering of space and *present* or control of affect). In acute psychoses (manic-depressive states, acute delusional and hallucinatory states and confusional states) the field of consciousness is disorganized and the pathological processes liberate each succeeding organizational level. Thus, manic-depressive states would be at one end of the hierarchical scale and endure the loss of ethical control over time, the latest ontogenetically acquired component of the field of consciousness delusional and hallucinatory states would be intermediate and characterized by a disorder of existential space, and confusional states

would be at the deepest level of disorganization with involvement of vigilance and the loss of the ability to confront reality. In chronic disorders (character disorders, neuroses, chronic psychoses including schizophrenia and dementia), there will be a disorder of the diachronic dimension of consciousness, namely, of personality and that part of it which ensures integration with reality: the self.

The above authors agree on the view that disorders of consciousness are essential to the development of psychosis. They differ, however, on how to define consciousness and on the manner it becomes disordered (for some authors, "hyper or hypothyrophy", for others, dislocation of its structure). In general, the view that psychoses result from an alteration of consciousness is an important issue in Continental psychiatry, but it is not altogether intelligible to English speaking psychiatrists (with a few exceptions, for example Sherwood, 1957, Anscombe, 1987) due to the fact that definitions and clinical markers for "disorder of consciousness" differ between English speaking and European psychopathology. Whilst in the former the crucial criteria are disorientation, confusion and attentional syndromes, in the latter, subtle markers as dysphoria, irritability, minor loss of cognitive grasp, situational as opposed to temporal disorientation and hyperaesthetic states are also important (Berrios, 1996a).

TOWARDS A PSYCHOPATHOLOGY OF CONSCIOUSNESS IN SCHIZOPHRENIA: RECENT PROPOSALS.

All the above mentioned attempts to consider consciousness as an important area in functional psychoses fell into oblivion by the second half of the twentieth century when English-speaking psychiatry became pre-eminent. Emphasis on objective, third-person descriptions, instead of subjective, first-person ones, contributed to the neglect of some symptoms in which self-reflected verbalizations were central (depersonalisation, fragmentation of self, passivity experiences, dissociation). Although interest in these symptoms never faded in Continental psychiatry (Koehler & Sauer, 1984), only after the appearance of neuropsychology and the contemporary reconceptualization of consciousness, hegemonic psychiatry came to consider that, precisely in disorders such as schizophrenia, the functions somewhat related to awareness (agency, self, episodic and working memory, action planning, insight, monitoring, etc) might be impaired.

In the last decades and from different realms (neurophenomenology, Varela, 1996; neuropsychology, Jeannerod, 1997, and Weistkrantz, 1986; neurobiology, Stuss, 1991) it has been claimed that consciousness can be crucial in the psychopathology of schizophrenia. Clinical phenomena such as thought insertion, auditory hallucinations, depersonalization, self fragmentation, working and episodic memory disorders, or certain formal thought disorders related to the sense of agency and action planning, have gained memento on the basis of a putative consciousness impairment. Some of the most salient recent proposals are summarized in what follows.

Hemsley

Hemsley (1987) attributed the basic cognitive dysfunction of schizophrenia to defective filtering out of irrelevant stimuli, particularly in acute states with positive

symptoms. This defective filter is the consequence of the weakening of the influence of stored past regularities of previous inputs on current perception. This view is based on Broadbent's concept of *pigeon-holing* (Broadbent, 1958), that is, in the type of attention which selects, in a given situation, certain interpretations that a person holds about the world and rejects others. This attentional mechanism integrates information from the current context and from past experiences in similar contexts. It also biases the interpretation of both the current perceptual input and the preparation of responses to it according to the expected probabilities of the events derived from that integration. Normally, the consciousness of redundant information is inhibited to reduce the requirements of information processing in a limited capacity system. In schizophrenia, a conscious ability is required to process tasks that normally would be performed automatically and, therefore, due to the weakening of influence of stored past regularities on current perception, the intrusion of irrelevant, preattentional stimuli (*overattention*) in consciousness takes place and gives rise to formal thought disorders in speech, and hallucination and delusions in perceptual experience. This informative overload (Hemsley, 1977) forces the schizophrenic to develop long-term adaptive strategies to minimize its effects. This would be expressed by negative symptoms (social withdrawal, retardation, poverty of speech). In summary, it is the basic perceptive disruption that produces the disorders of consciousness and hence the positive symptoms in schizophrenia, according to Hemsley's model.

Frith and Jeannerod

These authors endorse two theories in which schizophrenia is conceptualised as a disease which is, at least in part, constituted by a perturbed *monitoring of action* (Grivois & Proust, 1988; Proust 2000). By *action monitoring* they understand a set of complementary operations such as instigating an action in the correct time and place, exerting a feedback control on the movement toward the goal or target event, or stopping the movement when the goal is reached or when crucial preconditions fail to be met. Action is defined not on the basis of its source (beliefs, desires) but as a process that develops from an internal model toward a goal with an appropriately monitored execution. A movement has to be guided in an internally controlled way up to the goal in order to be called an action. Consequently, feedback is central to action. Source (i.e., the external or internal cause that triggers action) and the way it is carried out (consciously or automatically) are extrinsic properties of action that are not essential to its definition. Thus, one could separate, at least conceptually, the control of action from the conscious access to control mechanisms. Another essential component of action is a comparator through which a system can modify the current steps toward the goal as a function of the difference between observed and predicted output (Proust, 2000).

Frith and Jeannerod explain all the major signs and symptoms of schizophrenia within this general framework but, whereas Frith broadens the executive hypothesis by encompassing proper action as well as the mental activity related to action and, subsequently, extends the hypothesis still further by considering the previous abnormalities as special cases of a general metarepresentational capacity, Jeannerod, on the other

hand, explains the symptoms of schizophrenia in a more parsimonious way, in terms of lower-level mechanisms (Proust, 2000).

Frith (1992) states that both the monitoring of action (of goals) and the monitoring of the intentions to act would be disturbed in schizophrenia, and that would explain certain positive and negative symptoms and signs. Behavioural abnormalities or signs in schizophrenia (poverty of action –including of speech and thought, perseverative or stereotyped action and inappropriate stimulus-driven action) can be understood in terms of a fundamental defect *in the generation of willed action* whereas the mechanisms underlying stimulus-driven actions remain largely intact. This defect can lead to abnormalities (a) in the step from goals to willed intentions (poverty of action or negative signs), (b) in the inhibition exerted by goals of stimulus-driven intentions to act (incoherent behaviour or positive signs) and (c) in the step from willed intentions to action (perseverative and stereotyped action). These three types of abnormalities can be observed in patients with frontal lobe lesions and can be explained in terms of a defect in the Supervisory Attentional System (SAS) described by Shallice (1988) (see below).

Abnormal experiences or symptoms of schizophrenia (auditory hallucinations, thought insertion, delusion of control) can also be explained in terms of a defect *in monitoring willed intentions*. Any mental or physical activity is perceived as originating in self thanks to the information carried by a signal, telling whether a movement was effected by the individual. When the signal is absent, the system interprets a movement as unwilled. This relevant signal is supposed to help compare reafferent signals with the signals that are expected on the basis of the current willed action. It has been proposed that such a signal could be delivered by a mechanism underlying active perceptual activities called corollary discharge (Sperry, 1950) or efferent copy (von Holst & Mittelstaedt, 1950) which has been used to explain ocular saccades. The subjective correlate of the corollary discharge for action could be a *sense of effort* which would thus be a major component of our conscious sense of agency. Frith suggests that the same sense of effort could be present when a thought is produced and the loss of such a sense would issue in a experience of thought insertion. (Frith, 1992).

Finally, delusions of reference, paranoid delusions and third person hallucinations occur because the patient makes incorrect inferences about the intentions of other people, due to an inability to monitor their beliefs and intentions.

Frith suggests that all disorders described above could, after all, express deeper-rooted problems having to do with the structure of conscious experience. He calls that single mechanism underlying schizophrenia (despite its many surface manifestations) *metarepresentation*. The crucial feature of conscious awareness is, thus, the representing of the self being conscious. For example, to be consciously looking at a tree you must form the thought representing the fact that you look at the tree, and hence, you must form a metarepresentation or second-order representation of your looking at a tree. Conceptually, Frith relies in what philosophers call a “higher-order theory of conscious states” (Rosenthal, 1997). Empirically, he proposes that what is disturbed is not only some kind of low-level mechanism (such as the efference copy model mentioned above) but also the ability to recognize that one is in a certain mental state. This ability could

depend on a high-level, general-purpose mechanism responsible for a large part of metarepresentational performances, similar to the supervisory attentional system (SAS) described by Shallice (1988). This system is a set of control functions involved in nonroutine, willed operations. Pursuing a goal may be a matter of a routine that is performed by “contention scheduling”. This implies a low level representation or first order proposition that gives primary information about a movement to be performed (like “do X”) and is activated in the motor cortex. But the SAS modulates the lower level by representing this goal, that is, making it the content of a conscious intention. Deliberate intentional action implies a connection between the lower level primary representation and this metarepresentation for the function that is allocated to the former (like “I intend to do X”), and areas such as prefrontal cortex, supplementary motor area and the basal ganglia would be implicated.

In summary, for Frith, monitoring one’s action presupposes not only monitoring one’s goals, but also one’s intentions which in turn presupposes being conscious of having those intentions. In this metarepresentational framework, schizophrenic symptoms result from the underlying disorder in the ability to metarepresent mental states, both in the self and in other people. This ability can be the responsibility of a specialized module in the brain: the theory of mind module. Autistic patients have no access to this module but schizophrenics had it in their earlier life, but became unable to use it (Frith 1994, 1995).

Proust (2000), following Jeannerod, distinguishes at a conceptual level several types of attribution that may contribute to action awareness: *agency awareness* (a conscious realization that one did or did not perform an action, a state that is activated when interpreting input signals -afferences or reafferences- that in turn allow achieving a veridical perception of the environment), *goal awareness* (which individuates the action through its intentional content, allows categorizing action according to their adaptive meaning and focuses on the motive that drives its execution); and *sensorymotor awareness* (related to the motor content of an action, it is the form of awareness that identifies an action through its dynamics, that is, via the spatial and temporal properties of the bodily movement involved in the action). In normal subjects these three forms of action awareness are generally present. A lower-level theory of schizophrenic symptoms would explain how the three components of action awareness can be pathologically dissociated. Whereas Frith offers an explanation in terms of a metarepresentational disorder, Jeannerod (1999) suggests that the problem stems from the representational structure of action. In normal subjects, goal representation is in itself agent-neutral and it is coded in allocentric coordinates, sensorymotor representations are egocentrically coded but short-lived, activated mainly at nonconscious level, often not (or poorly) memorized when the action is completed. On the other hand, agency representation is effected separately, through an inference based on both internal and external cues. The altered conscious states may appear at each functional level where signals are received and used to monitor action. If the signals used for controlling motor execution are not the same as those used for generating a conscious judgment on the action, then subjects may have a poor conscious model of what they do, at least at the sensorymotor level. If the signals used in identifying a goal representation are different from those used in

attributing an action to oneself, then patients may have a conscious representation of the goal of an action while rejecting their role in executing. Jeannerod suggests that the same representational format or internal model is used to imagine, plan, memorize, prepare the action and guide its execution. This internal model can be run beforehand to test the viability of the action, on-line to guide it, and also be activated by the perception of some external performance of this very same action.

The target event of an action normally includes both the object on which the action is exerted and the final state of the organism in relation to this object. The representation of the goal of an action must also code the dynamics of the action as a function of the properties of the target object. This aspect of goal representation is called by Jeannerod (1994) *pragmatic* because it draws on the pragmatic information in visual cortex devoted to the properties of the object relevant for action. Jeannerod suggests that this type of representation includes both a visuo-spatial component (where the object is found) and an object-centred component (how to interact with it) (Pacherie 1998). Whilst the semantic type of representation is mapped in ventral stream as cues for symbolic categorization, the pragmatic type is represented in the dorsal stream as *affordances* (Proust, 2000).

According to this view, consciousness of action is intrinsically related to the representational format for action and, thus, the awareness of an action being performed by the self is the subjective, felt correlate of the representation on which the execution relies, and is functionally equivalent to the representation used to prepare the action. In this sense, a number of studies show that mental imagery (Decety et al., 1991) and mental simulation of an action (Bonnet et al., 1997) share several key physiological correlates with the corresponding real action. It seems as if a common network of neurons is activated for all conditions involving action: intending, imitating, observing, and preparing: inferior parietal lobe, ventral premotor area and part of supplementary motor area. Moreover, an overlap in specific areas can be observed between performing and simulating, simulating and observing, and performing and observing a particular action, which suggests close functional links between these activities (Proust, 2000).

According to this, one and the same representation can normally be used to produce goal-oriented behaviour or to recognize a behaviour in someone else as being goal-oriented. Data report the involvement of neurons in superior temporal sulcus in the recognition of specific movements in other organisms (Perrett et al 1989) and the existence of mirror neurons in F5 in the macaque brain which are able to respond to visual stimuli of an action and to the production of movement by the self (Di Pellegrino et al, 1992; Rizzolatti et al, 1996; Gallese et al, 1996). These mirror neurons respond only when the observed agent acts on an object, but they do not fire in the absence of the object or when only the object is present. Neuroimaging studies in humans suggest that the same kinds of neurons are present in homologous areas of the human brain. Jeannerod (1999) proposes that the existence of mirror neurons suggests that goal representation may be at some level agent-independent and, therefore, becoming conscious of an action does not involve first identifying an agent and then specifying its current activity.

Normal subjects, as well as schizophrenics, have a poor access to the dynamics

or internal feedback of the movement they have effected (Fourneret & Jeannerod, 1998). That is why when they are deprived of accurate visual feedback, and are instead given spurious visual reafferences in the course of their actions, they are quite unable to identify them. Subjects use external cues to consciously identify the sensorymotor content of their own actions, whereas they essentially rely on internal cues to make the necessary adjustments in an unconscious and automatic way. Conscious access to the sensorymotor content of one's action requires two types of additional conditions: first, there must be public, allocentric features to ground the sensorymotor judgment and, second, the action features need to be controlled on-line. Mental imagery does occur in cases of careful motor preparation or execution but does not need to occur in routine tasks in which, once the action is executed, its sensorymotor content is rapidly erased from consciously accessible memory (Proust, 2000).

The agent of an action is inferred from both internal and external cues. One way of testing the ability of a subject to determine whether or not he is the agent of a particular action consists in providing him with an ambiguous visual feedback about the spatial and temporal properties of his actions, in a context where agency attributions cannot be easily inferred, for example in the gloved hand paradigm (Nielsen, 1963). In this experimental context the subject is asked to look at a gloved hand (that can be his own or other's hand) behind a transparent screen. He must carefully compare his own internal representation of the action executed by the hand with the available visual feedback in order to detect possible mismatches. This paradigm was used by Daprati et al. (1997) with schizophrenics to test their ability to attribute to themselves a token of a action on the basis of a visual feedback that can be either veridical (they see their own hand, condition I) or spurious (they see an alien hand making an identical, condition II, or different -condition III- movement). Normal subjects misjudged the alien hand as theirs only in condition II in about 30% of the cases and never misattributed their own hand movement to the experimenter. On the other hand, schizophrenics did not differ from normal subjects in conditions I and III (few errors) but their error rate in condition II was 77% for patients with hallucinations (never misattributing their own hand movement to the experimenter) and 80% for deluded patients (with a slightly stronger tendency to incorrectly identify a gesture of theirs as the experimenter's). It seems as if when a person does a simple action he must compare fine central or proprioceptive details of timing and kinematics in the internal model of the movement effected with the visual cues to detect who the agent is. Normal subjects fail occasionally when the mismatch between clues lies below a certain threshold (and visual clues win over proprioception). They tend to overattribute to themselves visual tokens of movements of the alien hand, perhaps because they are driven to adapt their visual experience to their motor experience by neglecting the possible mismatches.

Two hypotheses have been proposed to account for the degraded performance of schizophrenics in condition II (Daprati et al., 1997). One is that the system fails to produce or use a sufficiently strong copy of the efferent signal and therefore fails to anticipate the feedback that should occur as a consequence of the executed movement. However, this does not explain why they do not fail in condition I (own hand moving) and why they do not have problems automatically correcting their own intentional

movement in simple tasks. Another hypothesis, compatible with the first, consists in examining the relationship between sensorymotor and agency representation. Whilst the former implies a corollary discharge and is *private* in the sense that it has to use egocentric coding, the latter is a perceptual judgment made on the basis of *public* clues represented in allocentric coding. In order to know that I am the agent of my action I need to represent the goal as well as the relevant visual features of a current action and determine whether these correspond to any internal model. The main evidence that I am the agent of an action is that the relevant aspects of the environment and of my body are successfully felt to be affected in the planned way. Therefore, external cues have the main role in agency judgments. Accordingly, schizophrenics may have a special difficulty either in comparing egocentric and allocentric representations (which leads to a reduced ability to use contextual information in a task-relevant way, Cohen & Servan-Schreiber, 1993) or in using the sequence of environmental cues to produce a conscious and verbally reportable agency judgment (a complex or controlled task that implies to keep in working memory the goals of the action, Jeannerod, 1999).

In summary, for Jeannerod and colleagues, altered conscious states in schizophrenics do not result from a general consciousness-related deficit (as per Frith) but from local problems with processing cues relevant for identifying an action and retaining them in working memory. The primary alteration would not be in the processing of first-person information but in context sensitivity, that is, in the way in which context is taken to be relevant and is used for controlling one's action (Proust, 2000). There may not be a uniform notion of self-consciousness and reflexive conscious states may not depend on the operation of some central mechanism generally responsible for metarepresentation. Many different types of information are used in the course of an action to know who did what (corollary discharge, parameters of movement velocity, body/target orientation, etc) and only some can be directly made the content of a conscious experience. Agent-related conscious representations may be distributed, regarding their informational basis, on several levels (proprioceptive and haptic processing, visual perception, inferential capacities and verbal representations) and, thus, third-person accessible information may be crucial to make an agent to become conscious of his own acting. On the other hand, goal representation is agent-neutral and, therefore, can be shared. We do not understand the others by projecting a piece of internal knowledge onto them, but, on the contrary, we determine who the agent is, once the goal is identified.

As it was said above, mentally simulating an action in a first person way, and looking at someone with the intention of imitating his movement, share important phenomenological and cerebral properties (Decety et al., 1994, 1997). This view has important consequences for the theory of mentalization (the theory that tries to account for what makes a human being able to attribute mental states to others and to himself). Frith's theory endorses that the mentalization ability develops as a whole at around 4 years of age and schizophrenics show an impairment of this metarepresentation module. On the other hand, Jeannerod's views defend that this ability results from the interaction of other independent subcapacities and that a theory of mind is not needed to attribute intentional states to others: simulation can do it. According to this alternative view, one

can predict and explain another's behaviour by simulating the decision processes in the other as well as in oneself (Gallese & Goldman, 1998). Thus, mental states such as desires, beliefs and agency would not precede but result from actively simulating others entertaining goals and motivational states. The lack of *mentalism* (Gallese, 2000) in autistic children would be the result of a primary trouble in appropriately simulating the situation in which they are involved.

Gray

Gray et al (including Hemsley), propose an integrative theory of positive symptoms of schizophrenia that tries to reconcile Hemsley's and Frith's models and integrates four levels of description: (1) a structural abnormality in the brain (in the limbic forebrain, affecting the hippocampal formation, amygdala, and temporal and frontal neocortex) causes (2) a functional neurochemical abnormality in the brain (specially hyperactivity of transmission in the ascending mesolimbic dopaminergic pathway). (3) This, in turn, disrupts a cognitive process (the integration of past regularities of experience with current stimulus recognition, learning and action), and so produces (4) the positive symptoms characteristic of acute psychosis (Gray et al., 1991). This model assumes that limbic forebrain uses stored regularities of previous inputs to compute a prediction of the next state of the perceptual world, given the subject's current motor program, and compares this prediction to the actual state of the world in the following time period. The outcome of this matching process is transmitted via the projection from the subiculum to the nucleus accumbens, which is part of a motor programming system in the basal ganglia. This programming system uses a *match* message from the subiculum to continue the current motor program and a *mismatch* message (something novel or unexpected has occurred) to interrupt it. Schizophrenia disrupts the normal input from the subiculum to the nucleus accumbens leading neurochemically, to a functional imbalance equivalent to hyperactivity in the mesolimbic dopaminergic pathway and, psychologically, to an overoccurrence of apparently novel events which give rise to positive symptoms. Paradigms such as latent inhibition, the Kamin blocking effect or sensory preconditioning are used to support the model, given that the first two seem to be abolished in acute psychosis and the three of them are impaired with the administration of amphetamine and recovered with the administration of neuroleptics. The disruption of these effects could be interpreted as *overattention* by dopaminergic hyperactivity.

Holden

Holden (1989) puts forward an integrative hypothesis from various explanatory levels (from social to biological). He integrates Frith's early theory of schizophrenic symptoms as failures in perceptual filtering (1979), Luc Cadet's view of schizophrenia as one of the disorders (with Parkinson and Alzheimer diseases) of the IDCB (isodendritic core of the brain) (Luc Cadet, 1984), and post-mortem studies of glia disorders in reticular formation and adjacent areas (Fisman, 1975). According to Holden, schizophrenia is, first of all, a disorder of consciousness. Consciousness is the mental state or process

that makes possible the subjective apprehension of externally and internally generated stimuli. The electrophysiological correlate of consciousness is the interference pattern generated when the sensory event-related potential is superimposed on the basal alpha rhythm, both being projected to the cortex through specific thalamic nuclei. The ICDB, which integrates structures such as hypothalamus, innominate substance, superior coliculi, raphe nuclei and certain medullar nuclei, corresponds with the reticular activating system which is responsible for the alpha rhythm. Damage to the sensory pathways implicated in event-related cortical potentials produces specific deficits of consciousness but does not alter consciousness itself. On the other hand, the alteration of RAS functional integrity (for example, by viral infection which produces gliosis in ICDB or adjacent areas), creates a global distortion of consciousness in which irrelevant stimuli are allowed to enter it (defective filter) and give rise to hallucinations, delusions and formal thought disorders.

Andreasen

Andreasen (1999a,b) also proposes a unitary model or theory of schizophrenia that integrates aetiological (multiple convergent factors from genetic predisposition to gene expression via environmental factors such as viruses, toxins, birth injury, nutrition, psychological experiences), pathophysiological (abnormality in neural development), *lathomenological* (impairment in a fundamental cognitive process) and phenomenological (impairment in second-order cognitive processes and symptom expression) levels of description. The fundamental cognitive impairment she points at the *cognitive dysmetria*, a disconnection in the circuitry that links cortical regions with thalamic nuclei and cerebellum (Andreasen et al, 1996), which she calls cortico-cerebellar-thalamic-cortical circuit (CCTCC) (Andreasen et al, 1998) and considers to be the substrate of consciousness. Once this fundamental cognitive process is impaired, most second-order cognitive processes are also impaired, and this accounts for the generalized cognitive deficits that have been found in neuropsychological studies in schizophrenia (including disorders of memory, attention, language, executive functions, motor skills, etc). According to Andreasen, it is this level of lathomenology (rather than the aetiological or phenomenological ones) which should be the target of psychiatric research as it is disconnection, disturbance of synchrony or cognitive dysmetria in the neuron discharge of the above mentioned interconnected areas, that leads to the diverse cognitive impairments and symptoms characteristic of schizophrenia (Andreasen, 1999a,b).

Charlton

Recently, in a thought-provoking text, Charlton (2000) suggests that schizophrenia may not be a unitary disease and therefore a more fruitful strategy would be to discover the pathological processes which are at work in and give rise to different signs and symptoms. Moreover, it may be the case that Kraepelin was wrong and "clear consciousness" is not a necessary condition for schizophrenia. Charlton defines consciousness as a special type of awareness, and the latter as the ability to direct

attention selectively to specific aspects of the environment, and to be able to manipulate these aspects cognitively over a more prolonged time scale than normal cognitive processing would allow. Awareness implicates attention plus working memory and consciousness would thus be the specific awareness of inner body states. Traditionally the term delirium has been reserved for only the most severe end of the spectrum characterized by disorientation and clouding of consciousness. However, delirium can be conceptualised as a continuum and therefore, milder (but significant) forms of the disorder can be contemplated. In fact, some symptoms of delirium are strikingly similar to those of acute schizophrenia. Accordingly, Charlton argues that all types of hallucinations and some delusions (particularly bizarre delusion) in schizophrenia take place in a disordered consciousness whose subtle fluctuations (preferably in prefrontal cortex) could be recorded by serial EEGs. The clinical picture of schizophrenia is therefore a variable mixture of delirium (acute schizophrenia) superimposed on dementia (chronic schizophrenia) with the possible complication of neuroleptic side-effects and, therefore, there is really no good scientific reason to assume that varied symptoms of schizophrenia can be attributed to a single cause.

CONCLUSIONS

Schizophrenia may not be a unitary concept and therefore might not apply to a single disease. Heterogeneity in clinical aspects can be accounted by the implication of different neural circuits and by psychosocial/pragmatic sources of *noise*. Since Kraepelin, schizophrenic clinical picture is supposed to spare consciousness, unlike other organic psychoses. But, what if schizophrenics and other psychotic patients have precisely a disturbed capacity to monitor and describe their mental states and thus their reported content of consciousness is partly or totally the expression of an altered consciousness, rather than a conscious report of alterations somewhere else? This idea was already postulated by French alienists and continued by Continental psychiatry but not by Anglo-Saxon one. Whereas the latter used a metaphor to describe consciousness as a torchlight that illuminates psychic life, the former envisaged consciousness as the part of the psychic apparatus concerned with experience. In the last decades, however, through the impact of recent neurocognitive research, consciousness has been paid heed again and its role in the psychopathology of different symptoms of schizophrenia (involving functions such as memory, agency, self, etc) has gained relevance.

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