Consciousness and Cognition 22 (2013) 1361–1374

Contents lists available at ScienceDirect

Consciousness and Cognition

journal homepage: www.elsevier.com/locate/concog

Review

Experiences of activity and causality in schizophrenia: When predictive deficits lead to a retrospective over-binding

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ARTICLE INFO

Article history:
Received 23 July 2013
Available online 3 October 2013

Keywords:
Schizophrenia
Experiences of activity
Grandiose delusions
Predictive deficits
Causal perception
Intentional binding
Sense of agency

ABSTRACT

In this paper I discuss an intriguing and relatively little studied symptomatic expression of schizophrenia known as *experiences of activity* in which patients form the delusion that they can control some external events by the sole means of their mind. I argue that experiences of activity result from patients being prone to aberrantly infer causal relations between unrelated events in a retrospective way owing to widespread predictive deficits. Moreover, I suggest that such deficits may, in addition, lead to an aberrant intentional binding effect i.e., the subjective compression of the temporal interval between an intentional action and its external effects (Haggard, Clark, & Kalogeras, 2002). In particular, it might be that patient's thoughts are bound to the external events they aimed to control producing, arguably, a temporal contiguity between these two components. Such temporal contiguity would reinforce or sustain the (causal) feeling that the patient mind is directly causally efficient.

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http://dx.doi.org/10.1016/j.concog.2013.09.003

1. Introduction: defining experiences of activity

Imagine that you become able to directly control some events in the world by means of your mind alone. Imagine that you can now control all the behavior of the US president, such as his gestures, his words, his thoughts and so on; or, again imagine that your thoughts control the flight of the pigeon escaping the kicking of a child. Some people are convinced and feel that they are exercising some control on people or things just by thinking. The presence of such delusional experiences belong to the so-called *ego disorders* referred to as *Experiences of Activity* (henceforth, EoA), and can be found in people with schizophrenia, (Stanghellini & Monti, 1993). More precisely, in EoA, "patients... intentionally transmit their thoughts... [and] intentionally exert control on objects and events of the outside world" (Stanghellini & Monti, 1993, quoted by Mullins & Spence, 2003, p. 297). Kraepelin (1919) equally stated about schizophrenia: "(...) The patient sometimes knows the thoughts of other people (...). He can also think for others, he passes on the thoughts, carries on conversations, dialogues with his companions, with the people in other houses" (quoted by Stanghellini & Monti, 1993, p. 5). As a final example, Georgieff and Jeannerod (1998) say that in some cases "patients are convinced that their intentions or actions can affect external events, for example, that they can influence the thoughts and the actions of other people" (p. 474; see also Daprati et al., 1997). Based on these experiences of activity people with schizophrenia construct delusional beliefs. One may distinguish different delusional beliefs in EoA, (1) what I will call the *primary belief* that people with schizophrenia caused the event at stake by thinking and (2) what I will call the *secondary (more elaborated) belief* expressing *grandiose delusions* (for a review, see Knowles, McCarthy-Jones, & Rowse, 2011).[1] For instance, the belief that patients are omnipotent or have telekinesis powers. Here are some instances of EoA:

(1) "I can make you move just now, doctor. I can make you touch a table" (How can you do that?) "You did it. I pointed my finger there and you pointed yours. I moved my finger just now and you were looking at my finger and studying it and the brain came from my finger and you put your finger down there just now as if I was guiding it" (Chapman & McGhie, 1964, p. 371).[2]
(2) Stanghellini and Monti (1993) relating the experience of a patient suffering from schizophrenia: "once he was calling inside himself one of his friends and this friend turned his head towards him; when he tried again, his friend turned a second time towards him, confirming that he could hear the patient's thoughts. The patient concluded that he was able to actively transmit his own thoughts" (p. 6).
(3) Chapman and McGhie (1964) describing the experience of another patient: "She expressed bizarre ideas concerning the function of her brain and also delusions referring to other people reading and controlling her thoughts" (p. 368).
(4) "But I also hear (...) the people that I look at, I make them have my own thoughts (...). I can also read in men's souls without mistaking" (Binswanger, 1965, quoted by Stanghellini & Monti, 1993, p. 6).
(5) As a final example, we can quote Weitbrecht (1968) also relating the experience of a patient with schizophrenia: "sometimes the patient also experiences an equivalent magic omnipotence, so that he himself can influence other people and even the cosmos in a supernatural way" (quoted by Stanghellini & Monti, 1993, p. 6).

As such, EoA are a manifestation, among others, of grandiose delusions i.e., the false beliefs about "having inflated worth, power, knowledge or a special identity which are firmly sustained despite undeniable evidence to the contrary" (Knowles et al., 2011, p. 685; see American Psychiatric Association , 2000). As an illustration, a patient confided herself in the following way: "I can communicate and have a special relationship with God. I am also the cousin of Tony Blair and I can fly" (Smith, Freeman, & Kuipers, 2005, quoted by Knowles et al., 2011, p. 685). In schizophrenia, grandiose delusions are one of the most common delusions after persecutory delusions (Stompe et al., 2006).[3] The frequency of grandiose delusions is cross-culturally consistent (Stompe et al., 2006; see, however, Yamada, Barrio, Morrison, Sewell, & Jeste, 2006), but the specific expression of these delusions may vary from one culture to another (Suhail & Cochrane, 2002).[4]

Actually we can find two types of ego disorders in schizophrenia, which are mirror images of each other (Georgieff & Jeannerod, 1998). As we just saw EoA constitute one type; the other type being *Experiences of Passivity* (hereafter, EoP) where people with schizophrenia regard some of their (mental or physical) actions as not being the result of their own willing and, usually, as being controlled by outside forces. All *first rank symptoms* of schizophrenia (Schneider, 1959) manifest EoP, e.g., hallucinations, delusions of control, influencing thinking, thought insertion and so on. Research on the neurocognitive underpinnings of schizophrenia symptoms pertaining to ego disorders has essentially focused on the latter. In comparison, EoA

[1] With respect to the mechanisms leading to the construction of a delusion, it is usually postulated to involve two steps, a neuropsychological impairment leading to an abnormal or non-common experience and a delusional inference (the delusion itself) based on this abnormal experience. Such inference is sometimes considered as a rational non-pathological response to the abnormal experience and sometimes the inferential process itself is taken to be impaired (e.g., Coltheart, Menzies, & Sutton, 2010; Maher, 1992; Mckay, 2012). In the present study I will mainly concentrate on the neuropsychological impairment(s) of EoA, therefore on the experiential part of this symptom and I postpone the discussion about the delusional construction itself to another occasion. However, at some time, the primary delusional belief will be discussed.

[2] I would like to thank an anonymous reviewer for indicating me this reference.

[3] Grandiose delusions are also strongly present in manic states such as bipolar disorder (Appelbaum, Robbins, & Roth, 1999) but the present discussion will only focus on schizophrenia.

[4] For a complete assessment of the prevalence of grandiose delusions in schizophrenia and other psychiatric populations see the Section 3 of Knowles et al. (2011).