

ALIEN CONTROL: FROM PHENOMENOLOGY TO COGNITIVE NEUROBIOLOGY

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ABSTRACT: People experiencing alien control report that their thoughts, movements, actions, and emotions have been replaced by those of an “other.” The latter is commonly a perceived persecutor of the patient. Here I describe the clinical phenomenology of alien control, mechanistic models that have been used to explain it, problems inherent in these models, the brain deficits and functional abnormalities associated with this symptom, and the means by which disordered agency may be examined in this perplexing condition. Our current state of knowledge implicates potentially reversible dysfunction in certain key brain regions (especially the right parietal cortex), which is temporally related to the presence of symptoms. Alien control is quintessentially a disorder of agency.

KEYWORDS: alien control, delusion, psychosis, motor control, action, agency, parietal lobe, internal-monitoring

INTRODUCTION

ALIEN CONTROL COMPRISES a group of symptoms united by the common feature that a person’s subjective sense of agency is replaced (or directly interfered with) by that of another. It may affect thoughts, movements, ac-

tions, and emotions. The external influence reported does not occur through “normal” means, such as empathy, intimidation, or coercion. What patients describe is a marked disturbance of their subjectivity so that their most intimate thoughts are “interfered with” directly, their physical movements “belong to” another, and their moods are “put into them” from outside. The explanations offered may invoke the technology of the day (e.g., satellites or computers) or spiritual entities. These experiences have been regarded as “un-understandable” to the “normal” interviewer. Yet they are so characteristic and are found so widely across the populations studied that they have remained central to contemporary theories of schizophrenia (e.g., Crow 1998).

A problem for the schizophrenia researcher is that these symptoms are not confined to this disorder. They are found in a range of other conditions, such as psychotic depression and some forms of epilepsy. Thus in the present context, it is pragmatic to consider the neural mechanisms underpinning the symptoms of alien control specifically, rather than to address the broader syndrome of schizophrenia, a condition that may well comprise multiple patho-physiological processes.

In addition, when considering psychopathology (abnormalities of mind), it is important to

acknowledge that the brain functions at the level of integrated systems, rather than isolated foci of neural tissue. Hence, an apparent dysfunction within a given system may be attributable to a “lesion” or defect in any one of a number of component parts within that system (Masterman and Cummings 1997). In addition, dysfunction may be consequent upon a variety of pathological mechanisms, e.g., the modulation of activity by a psychotropic substance (a drug) or the chance localization of a lesion. Hence, both the site and the cause of a dysfunction may vary between subjects, although their phenomenology (their symptom) may “look” similar.

In this paper, I will examine the following:

- (1) The clinical phenomenology of alien control as described by patients
- (2) The mechanistic explanations that have been offered by clinicians and scientists
- (3) The problems with one very influential psychological theory of symptom-generation
- (4) The subtle neuropsychological deficits associated with alien control
- (5) The neural correlates of the sense of agency
- (6) The evidence for disturbance within these neural systems coinciding with alien control

We begin with the phenomenology.

CLINICAL PHENOMENOLOGY

On a psychiatric ward in an inner city, a man who elicits fear in those around him sits at the center of a ward round. He has been in prison and secure units in the past. His speech is loud. He is preoccupied with God and the Devil. He believes at times that he is God but at other times, he believes that God is inside him. He usually avoids social contact, tending to stay in his room. He is unable to cope with money and cannot function in the community. In addition, he has tardive dyskinesia: involuntary movements affecting his face and tongue.

At one point, this man can hardly speak and his protruding tongue seems to trip him up as his words falter. The interviewer makes a remark about the difficulty that he is having. The patient answers that the Devil is trying to prevent him from speaking. Over the course of some minutes, he is unsure whether the interviewer might be

possessed and doing these things to him. At one point, he storms out of the room. Two or three minutes later, he is back to apologize. He has concluded that God is in the interviewer as well.

On the same ward, there is a young woman who has schizophrenia and whose symptoms are centered on eyes. She stares closely at people but asks that they do not look back at her. If they do, she seems to hear “voices” in the perceived movements of their eyes, or to experience others’ thoughts as entering her head. She asks repeatedly what this means. She is constantly looking for reassurance: “Can this kind of thing really happen?”

These two vignettes illustrate some of the day-to-day phenomenology of schizophrenia. In the first case, the male patient experiences interference with his movements, particularly those involved in speech. We can see that the phenomenology changes rapidly over a relatively short period. In addition, the phenomenology implicates the immediate social environment: It is not just that this man’s movements are being interfered with, it is that those surrounding him may be implicated (although, ultimately, it is God and the Devil with whom he is concerned). He is unusual in that we do not normally see grossly abnormal movements in those with alien control. Although they experience their movements as abnormal, these movements do not usually appear objectively unusual.

Turning to the female patient, we can see that she has “thought insertion” on occasions, which is secondary to the movement of other peoples’ eyes. Other people’s thoughts seem to enter her head. However, this symptom also changes rapidly, and by its very nature, it implicates a relationship between the subject and those whom she observes.

These cases were taken from a single day’s practice and comprise the two cases of alien control seen that day but are not chosen according to any other criteria. They serve to emphasize the rapidly changing nature of an acute psychotic episode. To this author they also highlight the “organicity” of schizophrenia. These patients seem to be assailed by rapid, yet quite specific, changes in subjectivity, relating to the movements of speech and the perception of eye move-

Table 1. Patient reports of alien control of movement (from Spence et al. 1997)

Verbatim report

“I felt like an automaton, guided by a female spirit who had entered me during it [an arm movement].”

“I thought you [the experimenter] were varying the movements with your thoughts.”

“I could feel God guiding me [during an arm movement].”

ment, respectively. These may be rapid and distressing, but they are not chaotic: They affect specific domains. Importantly, these changes also implicate *inter-subjectivity*, implied between the patients and those “others” whose agency they seem to experience. They do not simply lose awareness of their own agency or sense of volition. They are implicated in a relationship with those around them (the interviewer, staff, and other patients) or believed to be at a distance (God or the Devil).

The phenomena of alien control, by their very nature, implicate “others”: those (allegedly) exerting control. We have also seen this in our own experimental subjects. In a functional neuroimaging study of alien control, using positron emission tomography (PET), we specifically studied people (with schizophrenia) who experienced their limb movements as being controlled by outside forces (Spence et al. 1997). In this way, we hoped to constrain the neural systems studied (to those involved in limb movement). Some examples of the phenomenology recounted are given in Table 1. Again, it is the agency of an “other” that is common to these accounts, an agency variously attributed to a “female spirit,” the experimenter (i.e., me), or God.

INTERPRETING ALIEN CONTROL

Many theories of psychotic symptoms have highlighted two features: an absence of one normal mental function and an abnormal or excessive elaboration of another, giving rise to the florid symptoms of psychosis (e.g., hearing voices or being controlled). Thus, in the oft-quoted example from Hughlings-Jackson (1931), a man who mistakenly identifies his *nurse* as his *wife* (a

delusional “misidentification”) has made two errors. He has erroneously identified his wife, but he has also failed to identify his nurse. In the Hughlings-Jackson conceptualization of psychosis, the false identification (of his wife) is a “positive” phenomenon, whereas the failure to identify his nurse constitutes a “negative” phenomenon, i.e., a function that should be present but is “missing” (see Berrios 1996).

We can follow the same dichotomy through other theories of psychosis. Angyal, writing in the 1930s, proposed that the positive symptoms of schizophrenia were due to a lack of proprioception (joint position sense), leaving the patient unaware of his own movements. Because of this lack of awareness, the patient falsely attributes his movements to external agents. Angyal (1936) provides a long and detailed account of one such patient:

Some of the thoughts he has are not his thoughts, “somebody gives them [to him] silently; they put them into [his] head.” It seems to him also as if someone else thinks in him, “as if I had two or three people with me.” “[W]hen I am chewing it seems that another tongue comes and takes the food.” When the patient intends to do one thing, “they try to make me do something different,” he feels like a “mechanical man.” “It is hard to control the tongue, they just drop some words on your tongue” (Angyal 1936, 1036).

Notice how similar these symptoms are to those of our contemporary patients (above).

The notion that a normal awareness of inner functioning is lost in the psychotic process also forms the basis for Feinberg’s (1978) contribution. In his “corollary discharge” model, Feinberg postulates that thoughts and movements involve a “feed forward” component, such that their initiation gives rise to a re-afference signal. This signal essentially labels the thought or move-

ment as being “internally generated” (“belonging to me”). Such a theory has its antecedents in the writings of many previous authors (e.g., Helmholtz, James, Janet, Anokhin, Bernstein and others reviewed by Berthoz 2000). Feinberg hypothesizes that if there were a breakdown in this feed-forward mechanism, then it might give rise to psychotic phenomena. A thought or movement might appear to be initiated *de novo*, without the subject experiencing agency. However a problem for this theory is the prerequisite that “normal” thoughts be labeled as “internally generated” (“mine”). Campbell and others have argued cogently that there is no necessity for thoughts to be labeled in this way, as we do not normally expect thoughts to arise from anywhere else except our own minds (for reviews, see Campbell 1999; Spence 2000).

Another aspect of the Feinberg model is the requirement that thinking be associated with a sense of “effort,” which provides the subjective sense of agency. This seems to lack face validity: Much of the time we do not have any sense of effort regarding our own thinking. This may certainly apply in specific situations, such as attempting mental arithmetic or trying to remember a name, but it cannot be generalized to most of our thinking. This same problem recurs in a highly influential contemporary theory of alien control, which again stresses the effort of thinking (Frith 1987). It is postulated that if the sense of effort is missing for some reason, then a thought may be attributed to an external force. This has also been questioned, most recently by Campbell (1999). See Spence (2000, 129–143) for a consideration of the predictions that would follow from such a theory.

In the following section, I address Frith’s “action” theories of schizophrenia in some detail, as they have provided the theoretical underpinning for many recent psychological and functional neuroimaging studies of schizophrenia.

THE PARADOX IN FRITH’S ACTION THEORIES

Frith’s theories may be understood as an iterative attempt to build on Feinberg’s central thesis:

Psychotic symptoms arise because patients are unaware of key processes taking place in their brains (minds). Un-awareness of these processes gives rise to abnormal experiences and false beliefs, which attempt to account for these experiences. A central problem for both Feinberg and Frith is how the absence of a function can explain a “positive” symptom. For instance, if the man in Hughlings-Jackson’s example cannot recognize his nurse, why does he see his wife? If Angyal’s patient (above) cannot feel his tongue, why does he think that it is controlled by another? Perhaps the emergence of action is the key.

Frith’s solution was to propose that the symptoms of schizophrenia could be understood in terms of “action” (Frith 1987). Positive symptoms (like alien control) were hypothesized to be due to the patient’s inability to monitor his own intentions (to act), while negative symptoms (such as poverty of speech and apathy) were due to a failure to generate action. This is an elegant and highly influential theory.

Frith defines actions in the same way as Macmurray (1991). They are movements that are chosen by the agent. When Frith uses “intention,” he is specifying “prior” intentions in the sense used by Searle (1983); he is specific that they *precede* action. There are two forms of intention: those that are “willed” (and conscious) and those that are “stimulus-dependent” (which are probably unconscious). See Spence (2000, 131–143) for a full critique of Frith’s apparent meaning.

Frith proposes that there is an internal monitoring system, which monitors three things: stimulus intentions, willed intentions, and the action that has been selected. It monitors the latter via the corollary discharge (a form of feedback). It can detect mismatches between intentions and their consequent actions at a very early stage, thus permitting rapid error correction. Because it maintains the distinction between willed (conscious) intentions and stimulus (automatic, unconscious) intentions, it can provide information about the type of error occurring and thus facilitate correction (Frith 1987, 635).

With respect to positive symptoms such as alien control, Frith proposes that there is a fail-

ure to monitor willed intentions: “The classic . . . symptom of a “made” volitional act [alien control] corresponds particularly closely to an inability to monitor the intention to act . . . [T]he experience of thoughts being initiated without any apparent intention to have them would be described by the patient as thought insertion” (Frith 1987, 639).

This model contains a number of problems, not least of which is the proposal that the subject (experiencing alien control) may be performing “actions,” which are preceded by “intentions to act” of which he or she is unaware. Using Frith’s own definition of action as necessitating prior intention, a paradox is revealed:

These schizophrenic acts are volitional “acts” because they are preceded by (conscious) willed intentions. These intentions are conscious. Yet, the patient is (hypothesized to be) unaware of this (conscious) intention to act. This line of argument suggests that “somewhere” in the affected brain there is a conscious “intention to act,” but despite its being conscious the patient is unaware of it.

It is important to emphasize that Frith is not suggesting that there is simply an absence of a willed intention. Such an absence (or lack) of intention forms the basis of the second part to his theory, pertaining to negative or deficit symptoms (such as poverty of speech). For positive symptoms, he is quite specific that there *is* an intention (associated with alien control), but it is not being monitored.

Hence, although it is frequently invoked without further comment, Frith’s (1987) theory of the defective internal monitor, failing to monitor willed intentions, is problematic. Its construction commits the investigator to a view of consciousness that is obscure, namely, (in the “alien-controlled” patient) intentions are simultaneously conscious (in the brain) and unconscious (to the patient). This apparent paradox might be resolved if the patient were said to be conscious of his intention as one that is “alien,” but then the patient would no longer be unaware of this intention, and so his “unawareness” of it could no longer form the basis of its “alien-ness.” Put simply, Frith’s model “requires” a paradox to

retain its explanatory power (a conscious intention, which is unconscious), yet the paradox cannot explain how an “alien” intention is experienced as “alien” (because it is out of awareness and hence is not “experienced”). An abnormal experience (of alien agency) is not then explained by an absence of experience (of agency). To return to Hughlings-Jackson, we may deduce that the “positive” component of alien control (abnormal awareness) is not reducible to its “negative” component (an absence of awareness of one’s own agency). The psychopathology resisting explication must reside within agency itself.

THE NEUROPSYCHOLOGICAL DEFICIT IN ALIEN CONTROL

Despite the problems characterizing the “intention” component of his theory, Frith and others have demonstrated empirically that there are indeed problems in the “monitoring” of motor activity in people with schizophrenia. In one study, Frith and Done (1989) demonstrated that those experiencing alien control were relatively impaired on tasks requiring them to rely on “internal monitoring” of their movements, as opposed to direct visual feedback. In these studies, patients had to rely on their own proprioception to guide the behaviors. Their performance was worse than others with schizophrenia or affective psychoses (who were not experiencing alien control). They seemed “not [to know] what response they had just made” (Frith and Done 1989). In a subsequent study by Mlakar et al. (1994), the investigators studied patients concurrently experiencing the “first rank symptoms” of schizophrenia (including, but not exclusively, those of alien control). They conducted two experiments involving the generation of visual designs with varying degrees of visual feedback. The patients who were currently experiencing first-rank symptoms exhibited increasing deficit as the necessity for reliance on internal monitoring increased. This deficit was apparent in both the (unguided) copying of an experimenter’s visual design and in the recognition of their own (the patient’s self-generated) design. These deficits were relative to control groups, one of which comprised patients

who had previously experienced such symptoms. Therefore, the *current presence* of these symptoms was temporally related to an *impairment of sensory awareness*.

Thus, in two similar studies (and a third by Stirling et al. 1998), patients with alien control have been shown to be impaired on the performance of motor tasks (necessitating “self monitoring”). Mlakar et al. (1994, 563) suggest that “in certain phases of their illness, [these] patients are lacking a clear, distinct and solid representation of internally initiated mental activity” (congruent findings have also been reported by Daprati et al. 1997; Franck et al. 2001).

It is notable that there is an overlap between these formulations of cognitive impairment during alien control and that offered by Angyal (1936), relating to a lack of proprioception. In terms of their phenomenology, people who experience alien control fail to experience (or to retain a memory of) their motor acts, an abnormality temporally related to the presence of these symptoms.

In a further study, Frith and colleagues (Blakemore et al. 2000) have shown that those who experience alien control have different experiences of self-tickling, compared to healthy controls and other patients with schizophrenic or affective disorders. The point here is that people with these symptoms experience no attenuation in sensory stimulation when they tickle themselves, in contrast to the “normal” state in which tickling oneself is experienced as being less pleasant than being tickled by someone else. One possible explanation for such findings (in patients) is the lack of a “forward model” emerging for the act of tickling: In essence, a failure (by the brain) to anticipate auto-stimulation leads to a relatively enhanced response by the relevant sensory cortex to (self-induced) peripheral stimulation. Hence, a motor mechanism breaking down during movement (“forward modeling”) may have consequences for the subsequent sensory awareness of that movement, and altered sensations may then be attributed to alien sources.

Several details require clarification. First, in the Blakemore et al. (2000) study the subjects were not reported to be experiencing alien con-

trol at the time they were tested. In addition, subjects who experienced alien control comprised only part of the index subject group, the majority of whom did not experience this symptom but suffered from auditory verbal hallucinations (“voices”) instead. Hence, we need to clarify whether one form of pathophysiology is common to those experiencing alien control and auditory hallucinations. Similarly, Stirling et al. (1998), above, combined similar patient groups and summarized their data as referring to “alien control,” when the more robust findings were those specific to auditory hallucinations. Indeed, when IQ and cognitive performance were controlled for, most of the results relating specifically to alien control symptoms lacked statistical significance.

A subtle difference in the later Frith study (Blakemore et al. 2000), is the move away from the alien control of action (affecting the hand “doing the tickling”) towards the sensory awareness of the area tickled (elsewhere on the body). Thus, the forward model no longer refers to the control of a movement (through feedback), but its anticipated (distal) consequences on other body areas.

Since we are primarily interested in why actions are perceived as being under the control of other agents, we will now consider the neural correlates of agency.

THE NEURAL CORRELATES OF AGENCY

In the context of this paper, “agency” refers to the sense of ownership of action experienced by a subject. Hence, the term is being used to refer to a subjective experience, rather than an observer’s attribution of agency to the subject. From the neurological literature, it is clear that a loss of the ability to move, or even to control a limb, does not necessarily lead to a loss of agency. Patients who have suffered strokes, leaving them unable to move their limbs, do not frequently report these limbs as belonging to others.

While the movements of the limb under alien control may appear grossly normal, there is a syndrome in which a limb appears objectively as

if it is out of control: the alien or anarchic limb syndrome (phenomenology described in detail in Spence 1996). However, in this case the hand that cannot be controlled is still mostly recognized as being part of the subject's own body and subject to their "ownership" (Spence and Frith 1999). Two forms of alien hand are seen in which a limb is disinhibited following lesions of either the medial premotor cortex or the corpus callosum. In these cases, subjects admit to difficulty controlling the affected limb (which seems to perform pseudo-purposeful movements, grasping objects in the environment), but they do not generally attribute control of that limb to another.

However, when the alien limb is seen in the context of a right-sided parietal lesion, the phenomenology may be rather different. Hence, the following report by Leiguarda et al. (1993) of a woman with a right-sided parietal lesion, giving rise to epileptic activity associated with intermittent, abnormal movements of the left arm:

She said: "suddenly I had a strange feeling on my left side; later I could not recognize the left arm as my own; I felt it belonged to someone else and wanted to hurt me because it moved towards me"

In this case, both the intentions and the identity of the alien limb are disturbed. The limb is not only beyond the control of the subject (as it might be in the other forms of alien limb) but is also perceived to be under the control of another: "it belonged to someone else." The limb is also credited with a (conscious) intention (to act): "it . . . wanted to hurt me."

This disturbance of ownership (and hence, agency) of a limb (in the context of a right parietal lesion) was also described by Critchley (1953) and first by Gerstmann (1942). In reviewing the literature at that time, Critchley describes "somatoparaphrenia," cases where limbs are said to "belong to someone else," where patients develop erotic feelings for their limbs (which they perceive as those of others), and cases where family members are mistakenly identified as the owners of these affected limbs. A similar case has been described by Nightingale (1982), again associated with right-sided parietal involvement. In addition, Brugger (in press) has provided a

compelling account of the deficits in self-recognition, or "me-ness," which accompany right hemisphere lesions. It seems that the right hemisphere may be particularly involved in recognition of the "self" and, hence by extrapolation, in recognition of that self's agency. One intriguing finding that has been well replicated is that patients with somatoparaphrenia may exhibit temporary remissions in response to vestibular caloric stimulation (where cold water is inserted into the left outer ear). During such stimulation, a patient may again experience the left limb as "their own," but afterwards return to believing that it belongs to another (see Bisiach et al. 1991).

THE FUNCTIONAL ANATOMY OF ALIEN CONTROL

In the alien control of movement, "made movements" are attributed to an external agent, the agency being ceded to the "other" (Table 1). In our study using PET, we found such movements to be associated with hyperactivity in the right inferior parietal cortex and other related areas (Spence et al. 1997). This hyperactivation was relative to other acutely deluded patients, normal controls, and the index group themselves as they recovered (four to six weeks later). This same brain region was hyperactivated whether patients performed freely chosen or stereotypic movements (relative to the resting state).

The right inferior parietal region is an area of heteromodal association cortex implicated in many cognitive functions involved in sensorimotor integration and attention (to egocentric space: Eidelberg and Galaburda 1984; Binkofskiet al. 1998; Mattingley et al. 1998; Banati et al. 2000). It is an area where activity is modulated by caloric stimulation (see above and Bottini et al. 2001). The parietal cortices are also known to be involved in the programming of (unconscious) intentions (those aspects of motor behavior of which we are unaware, e.g., the individual muscle transformations necessary to pick up a cup: Snyder et al. 1997; Jeannerod 1997). Data acquired from non-human primates and human patients suggest that these regions engage in the programming of reaching and grasping and adjusting

limb responses outside normal human awareness. Only after brain lesions may the expression of such “intentions” become manifest—as the disinhibited grasping of an “alien hand” following a medial frontal lesion (above) or the failure of an apraxic hand to grasp an object after a parietal lesion. In the former, the (non-conscious) parietal intention is thought to be “released” from the normal inhibition of the frontal lobe; in the latter, the intention is itself disrupted due to parietal lobe damage; the hand fails to grasp (for review, see Spence and Frith 1999).

These data prompt a question with respect to alien control:

Might the latter be a special case of “intentions” becoming conscious that should otherwise have remained beyond conscious awareness?

Rather than comprising solely a failure to monitor conscious intentions (as in Frith’s theory), does alien control actually involve an *increased* awareness of *unconscious* intentions, automatic programs that should remain outside awareness? Are these the “intentions” attributed to the “other?” This would provide a feasible explanation of the alien agency attributed to the alien limb in Leiguarda’s case (above). Since that limb moved, we may postulate that motor-programming “intentions” (after Searle [1983] and Jeannerod [1997]) were active during that movement. Yet, the patient experienced no sense of agency herself. She thought that the agency was that of another. Parietal cortex dysfunction in alien control may disturb the *sense* of agency associated with voluntary movement. How “agency” is cognitively specified remains unclear, although some recent imaging studies are shedding light on this complex area (e.g., Ruby and Decety 2001).

A number of questions remain unanswered. In a previous paper, I suggested that alien control might involve the misperception of the timing of motor acts (Spence 1996): The relationship between unconscious programming and subsequent conscious awareness of action might be disturbed. In this regard, it is intriguing that the right inferior parietal cortex is also one of the cortical regions involved in subjective perception of time (Harrington et al. 1998). The perception of time

in alien control (and schizophrenia generally) deserves further study. Interestingly, a recent study has shown that patients with alien control exhibit abnormalities in the timing of imagined movements: They fail to obey Fitts’s law (see Maruff and Currie, in press).

The neuropsychological data obtained by Frith and others (Frith and Done 1989; Mlakar et al. 1994; Stirling et al. 1998) and our own PET data (Spence et al. 1997) support the hypothesis that the cognitive neurobiological substrate of alien control is itself dynamic over time. In other words, both the failure to “monitor” movements and the hyperactivation of right parietal cortex accompanying movement appear to come and go. We need to establish the determinants of such intermittent cerebral dysfunction.

Finally, there is an incongruity between the neurological literature cited above and that pertaining to people with schizophrenia. Although right-sided parietal lesions precipitate symptoms on the left side of the body, the symptoms of alien control described in schizophrenia are not so well lateralized. Our patients in the PET study moved their right arms and experienced alien control of these movements (Table 1). However, the complex functioning of the right parietal cortex may be such that it monitors more than just the left (contralateral) side of the body. It is clearly engaged in programming right-sided movements (Spence et al. 1997). This issue requires further investigation. A number of authors have reported an increased prevalence of left-sided somatic (bodily) symptoms in people with schizophrenia, a finding that might also implicate right parietal dysfunction (e.g., Cutting 1989).

CONCLUSION

Alien control symptoms are those in which the patient’s sense of agency is replaced by that of another. Theoretical accounts have had difficulty explaining the emergence of an alien agency within the mind-brain. Empirical findings point to subtle deficits in bodily awareness, and awareness of action, in people with alien control while they are maximally symptomatic. The neurology of alien control currently implicates the right

parietal lobe, although it is likely that more distributed systems are also involved (a subject not addressed here). It is chastening to reflect that Angyal (1936) predicted that alien control phenomena would be linked to a region of the parietal lobes: the “lobulus parietalis inferior” (Angyal 1936, 1047), the same brain region revealed by our PET study some sixty years later (Spence et al. 1997). Perhaps this is a fitting reminder that phenomenology, cognitive neurology, psychiatry, and clinical neuroscience are best understood when they are read together.

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