

ADDRESS BY PROFESSOR CHRIS D. FRITH
RECIPIENT OF THE INTERNATIONAL PRIZE 2009
OF THE FYSSSEN FOUNDATION

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The Fyssen family cannot receive too much praise for their support for research on the relationship between the mind and the brain. It is very encouraging for all of us who work on this topic to receive recognition. There are still some who feel that the mind is not an appropriate topic for scientific study. There are even others who believe that the mind has nothing to do with the brain. So I want to thank the Fyssen Foundation and their scientific committee for choosing me as the recipient of the 2009 award. I must also thank the British Academy, especially the members of section 6 for nominating me for this award. I am also most grateful to Nadia Ferchal for her help in organising my visit and also to Jean Daunizeau for making the French translation of this talk.

Of course, any successes in my career could not have been achieved without the collaboration of many friends and colleagues. In particular I want to thank my collaborator of more than 40 years, Uta Frith. It is also my pleasure to thank my colleagues from the MRC research unit at Northwick Park Hospital and from the Wellcome Trust Centre for NeuroImaging at UCL. On behalf of everyone who wants to know more about the relationship between the mind and the brain I am honoured to accept the 2009 Fyssen Prize.

I must apologise to you all for delivering this speech in English. If I were to attempt to speak in French I am confident you would all be switching to the English channel of your simultaneous translation devices. But in spite of my lack of proficiency in languages other than English and FORTRAN IV I consider myself a European at heart. I am especially proud that my two books have been translated into French. And I have many friends and collaborators in France, as well as in Italy, Germany and Denmark.

The big problem confronting 21st century science is to explain the relationship between the mind and the brain: to understand how mental activity in the mind can emerge from physical activity in the brain. By mental activity I mean conscious thought, subjective experience, what it is like to taste a really good wine. It would nice if people could say of me, 'he studied consciousness at a time when it was neither profitable nor popular.' But this would not be accurate. Psychologists may have been discouraged from studying consciousness in the United States, but in Europe such study always remained popular.

When I left university, *en route* to training as a clinical psychologist, I worked in some of the large institutions for the chronically insane. Most of the patients in such places had a diagnosis of schizophrenia.

Such a diagnosis depends upon the presence of hallucinations and delusions. A hallucination is a false perception: *hearing your own thoughts spoken aloud*. A delusion is a false belief: *believing that other people can hear your thoughts*.

You can't tell if patients are hallucinating or deluded just by studying their behaviour. These are subjective experiences. You can only know about them because the patient describes them to you. Schizophrenia is a disorder of conscious experience. Patients have experiences that other people don't have.

Some years later, when I was working for the MRC, we showed that these symptoms could be altered by treatment with drugs that block dopamine receptors. This is clear evidence that subjective phenomena can be directly linked with physical processes occurring in the brain. I slowly came to realise that, by studying behaviour and subjective experience, I was actually studying how the brain worked. Once I had joined the Centre for NeuroImaging I was able to study the interactions between mind and brain directly. If *will* or *self* or *consciousness* were products of the brain then we would be able to locate them.

Many of the most typical symptoms associated with schizophrenia seem to reflect confusion between what the patient is doing and what other people are doing. For example, a patient with delusions of control believes that the actions he is performing are actually being controlled by someone else.

This raises the interesting question of why the rest of us are not confused in this way. How is that I know that the voice I am hearing at this moment is my voice and not that of some one else?

The answer is that, when I speak, I can predict what I am going to hear on the basis of the motor commands I am sending to generate the speech. As a result I am hardly aware of the sound of my own voice when I speak. The same process happens when I move. I am not aware of the sensations in my muscles and skin when I move my arm. And there is a corresponding reduction in activity in brain areas concerned with awareness of bodily sensations.

My brain is certainly using all this information to exert precise control over my movements, but there is no need for any conscious awareness of sensations that are entirely predictable. On the other hand, if someone else moves my arm, then I cannot predict accurately in advance what sensations I will experience. As a result I am far more aware of the sensory signals.

There are now a number of experiments demonstrating that patients with schizophrenia are abnormally aware of sensations that accompany their movements. For me, a particularly important aspect of this account is that it gives us a glimpse of what it is like to experience a delusion of control. This delusion is a disorder of conscious experience. As such a patient, when you move your arm, it really does feel as if someone else is moving it.

Hallucinations and delusions are intensely social experiences. Typical hallucinations involve hearing people talking to the patient or talking about the patient.

Delusions of control involve other people controlling the patient's action, while patients with paranoid delusions falsely believe that other people have malicious intentions towards them. To fully understand these symptoms we need to explore the cognitive and neural basis of social interactions.

I was very fortunate that Uta Frith was already studying this topic in her work on autism. This disorder is characterised by specific difficulties with social interactions. Uta & I now have a long-standing collaboration on the neural basis of social interaction. We have used a number of different paradigms and have identified a system of brain areas that seem to be key players in the social brain.

Although we are officially retired from UCL we are continuing to work vigorously on the topic of human social interactions with our collaborators in the University of Aarhus in Denmark. I have identified two projects to occupy me over the next few years. The first is to develop a computational account of social interactions. Only through such models will it be possible to identify the brain mechanisms that enable such interactions and pinpoint where they go wrong in autism and schizophrenia. I believe that a fundamental property of these models will be that they depend upon prediction. We predict what people are going to do next and adjust our assessment of them in the light of the accuracy of our prediction. This is the same mechanism that allows us to distinguish between the sound of our own voice and those of other people.

My second project is to explore the role of conscious awareness in human social interactions. In particular I am interested in those special social interactions in which a group of two or more people can achieve more than any of the individuals on their own. My hypothesis is that such advantages are achieved through our ability to share our subjective experiences. This applies to collective activities as diverse as wine tasting, detecting distant galaxies with an optical telescope or developing moral codes. I would go so far as to say that the main function of our conscious experience is to enable these kinds of social interactions that are uniquely human.

You will not be surprised, therefore, to hear that foremost among my many plans for using the award is to extend my possibilities for wine tasting, European travel and interacting with all my scientific friends and colleagues. Thank you very much.