

University of Warwick institutional repository: <http://go.warwick.ac.uk/wrap>

A Thesis Submitted for the Degree of PhD at the University of Warwick

<http://go.warwick.ac.uk/wrap/67097>

This thesis is made available online and is protected by original copyright.

Please scroll down to view the document itself.

Please refer to the repository record for this item for information to help you to cite it. Our policy information is available from the repository home page.

Philosophical reflections on the nature of psychosis

Matthew R. Broome BSc (Hons) MBChB (Hons)

MRCPsych PGCAP PhD

Department of Philosophy, University of Warwick

**Submitted to the University of Warwick for the degree
of Doctor of Philosophy (PhD) by Published Works**

June 2014.

Table of Contents

Acknowledgements	3
Declaration	4
Statement of Contribution	5
Covering Document	8
Introduction	8
Paper 1	10
Paper 2	23
Paper 3	31
Paper 4	42
Intersections between the publications	48
Appendix 1 – bibliography of publications by candidate	51
Appendix 2 – full text copies of published works submitted for degree	69

Acknowledgments

I am very grateful to the University of Warwick in enabling me to submit published work in philosophy as part of the requirements for a PhD in philosophy. I have been fortunate in being able to work philosophically as well as empirically in my psychiatric research and would like to thank those who have inspired and collaborated with me over the years, including Gareth Owen, Matteo Mamelì, Tim Thornton, Mark Sprevak, Rachel Cooper, Keith Frankish, John Campbell, Havi Carel, Matthew Ratcliffe, Paolo Fusar-Poli, Bill Fulford, Giovanni Stanghellini and, most of all, Lisa Bortolotti. Lisa has been a wonderful friend and collaborator and I very much hope our research together will continue. I'd also like to thank Professor Matthew Soteriou and Ms. Susan Podmore for helping me to navigate a PhD at Warwick and I would particularly thank my supervisor, Dr Johannes Roessler, for his support, insight, enthusiasm, and accessibility over the course of preparing the thesis.

I'd like to thank my family, Louisa, Edward and Matilda, for all their love and support.

Declaration

I declare that the submitted material as a whole is not substantially the same as published or unpublished material that have been previously submitted, or are currently in the process of being submitted, for a degree, diploma, or similar qualification at any university or similar institution.

Explicitly, none of the submitted material, or the published work, has previously been submitted for any such qualification.

Statement of contribution

The following four papers are submitted as part of the requirement for the award of PhD by published work:

Broome, M. R. (2006). "Taxonomy and Ontology in Psychiatry: A Survey of Recent Literature " Philosophy, Psychiatry, and Psychology **13**(4): 303-319.

Broome, M. R. and P. K. McGuire (2008). Imaging and delusions. Persecutory delusions: assessment, theory and treatment. D. Freeman, R. Bentall and P. A. Garety. Oxford, Oxford University Press: 281-301.

Bortolotti, L. and M. R. Broome (2009). "A role for ownership and authorship in the analysis of thought insertion." Phenomenology and Cognitive Sciences **8**: 205-224.

Broome, M. and P. Fusar-Poli (2012). "Philosophical Issues in the Prodromal Phase of Psychosis." Current Pharmaceutical Design **18**(4): 596-605.

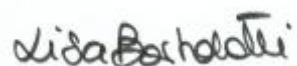
Of these four published papers submitted as part of the requirement for the award of PhD by published work, three of the papers have been co-authored. The co-authors on these papers are Professor Lisa Bortolotti (University of Birmingham), Professor Philip McGuire and Dr Fusar-Poli (both Institute of Psychiatry, King's College London).

The paper, *Imaging and delusions* (Broome, M. R. and P. K. McGuire (2008) in Persecutory delusions: assessment, theory and treatment. D. Freeman, R. Bentall and P. A. Garety (eds). Oxford, Oxford University Press: 281-301) was drafted by the candidate, with comments by McGuire and joint revisions from both authors, prior to submission.

The paper, *Philosophical Issues in the Prodromal Phase of Psychosis*, (Broome, M. and P. Fusar-Poli (2012) Current Pharmaceutical Design 18(4): 596-605) was drafted by the candidate, with comments by Fusar-Poli and joint revisions from both authors, prior to submission.

The paper, *A role for ownership and authorship in the analysis of thought insertion* (Bortolotti, L. and M. R. Broome (2009). Phenomenology and Cognitive Sciences 8: 205-224) was a jointly written paper by both authors, with each author contributing equally to the manuscript, but with Bortolotti being the corresponding author and leading on submission and revisions.

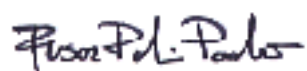
Signatures of collaborators confirming the above statement of contribution

A handwritten signature in black ink that reads "Lisa Bortolotti". The script is cursive and somewhat stylized.

Professor Lisa Bortolotti

A handwritten signature in black ink. It starts with a large, stylized "M" followed by the name "Broome" in a cursive script.

Dr. Matthew Broome

A handwritten signature in black ink that reads "Fusar-Poli Paulo". The signature is written in a cursive, somewhat slanted style.

Dr. Paulo Fusar-Poli

A handwritten signature in black ink. It features a large, stylized "P" followed by a cursive script that appears to be "McGuire".

Professor Philip McGuire

Covering Document

Introduction

The papers included in the thesis, and summarized in this covering document, were selected, in discussion with my supervisor, Dr. Roessler, from papers I have published in the philosophy of psychiatry. In parallel to this philosophical work, I have worked clinically as a psychiatrist and academically as a research psychiatrist. My clinical work has largely been working with Early Intervention Services, both in South London and in Coventry and Warwickshire, and this work has been acting as a psychiatrist in clinical teams who work with young people who may either be at risk of developing a psychotic illness, or are in the earliest stages of such an illness. My empirical work has been in the same clinical group and has used functional neuroimaging and cognitive neuropsychology to characterize those at risk of psychosis and to chart the onset of psychosis and the formation of delusions. As required by the university guidelines, a full list of publications, both empirical and philosophical, is detailed in appendix 1. The papers included in the thesis hence parallel many of these clinical and empirical interests: papers 2 and 4, in particular, examine the role neuroimaging may play in studying delusions and relate the prodromal phase of psychosis to

both the neurodevelopmental and continuum models of psychosis. Paper 3 is one of two papers written with Lisa Bortolotti drawing on Richard Moran's work and examining delusions. Paper 1 is perhaps the paper least connected to my empirical and clinical work as it has a wider focus and tries to examine what mental illnesses are and to begin to describe a position Lisa Bortolotti and I later expanded on and referred to as 'psychological realism', with Paper 2 being a case example of this account being applied to a particular area of psychopathology, namely delusions. The papers form a progression with Paper 1 outlining a general conception of mental disorder, Paper 2 being a case study of this approach specifically in the area of delusion. Paper 3 takes the example of thought insertion and develops ideas from Paper 2 that reasoning is a crucial feature that helps highlight what is pathological about certain experiences. Paper 4 brings together the philosophical concerns regarding a wholly neuroscientific conception of psychopathology, and how this is of clinical and scientific relevance when we use psychopathology to demarcate the various stages of psychotic experience and illness.

Paper 1: Taxonomy and Ontology in Psychiatry

This paper was an early publication in philosophy and psychiatry and doesn't explicitly focus on psychosis or schizophrenia unlike the other papers, but rather the nature of mental disorders. However, given my own empirical and clinical work with psychotic illnesses, these are drawn on as examples to illustrate points in the argument. The main claim of the paper is that mental disorders are real and that an enriched conception of reality is required to do justice to the complexity of the phenomenon. The paper argues for parallels in the literature on the nature of mental disorder with the problem of intentionality McDowell addresses in *Mind and World*. The paper distinguishes between three views in the philosophy of psychiatry literature and concludes by enriching a conception of realism with the understanding of the importance of conceptual capacities in characterizing mental disorder. I argue that these existing accounts of mental illness do not wholly chart the logical space of the options available and offer an alternate account that might be termed naïve realism. This view can be summarized in the claim that mental disorders are real, and that they are characterized in psychological terms, and this characterization does nothing to hinder their objectivity. Further, this allows mental disorder and psychopathology to remain areas where research can be carried out, and clinical expertise developed, within an expanded notion of objectivity and science.

The paper summarizes various writers' ways of conceptualizing mental disorder and attempts to group such accounts into three broad categories – 'essentialist/realist', 'anti-essentialist/pragmatic' and 'eliminativist'. In this survey 'realism' is used in a traditional sense to denote views that both argue for the existence of mental illness and that the existence of such illnesses is independent of the beliefs, linguistic practices, and conceptual schemes of people. However, notions of belief may be integral to the characterization of a given disorder, for example, the role delusions play in defining psychotic illnesses. 'Realism' is the term used to group writers who endorse ontological and scientific realism with respect to mental disorder. The paper opens with a brief historical overview of the metaphysics of illness and disease, contrasting Platonic conceptions of illness, with more contemporary Virchowian accounts as illnesses as 'disease-as-lesion', i.e. illnesses being understood as derangements of normal physiology or anatomy, rather than as autonomous agents that enter the body from without. This model of illness from Virchow is crucial as the nature of illness becomes linked to the co-dependence of pathological process and normal physiology and anatomy. This notion from Virchow is a spur to what has been referred to as the 'first biological psychiatry' of the second half of the nineteenth century and Greisinger's view that mental illnesses were diseases of the brain, as well as

the successes of Alzheimer and the identification of *Treponema pallidum* as the aetiological agent in neurosyphilis . However, the scientific optimism of Greisinger and his contemporaries was short lived, coming to an end in the 1880's, with successors characterizing disorders by clinical course and outcome (Kraepelin) or by psychological understanding of onset (Jaspers) rather than neuropathology. The paper argues that there has been a return to Greisinger's view of mental illness with the advances in neuroscience and technology, and the strength of neuropsychiatry as an explanatory framework.

The paper charts the existing answers to the question of what mental disorders are. Reviewing recent writings, the 'realist' or 'essentialist' position is described as one that views the existing categories of mental disorder and psychopathology as being real, existing, kinds in nature, discrete, and being amenable to scientific study such that each will have some 'essence', in that their properties will be independent of the linguistic and cognitive states of individuals who both study, treat, and suffer from, such disorders. In these writings, realist positions are also often seen to be essentialist but this need not be the case: a non-essentialist realism about mental illness may be possible. Both phenomenological and biological approaches can demonstrate a realist and essentialist position. These invariant properties, or essence, could be neuroscientific (for example, a particular neurochemical change) or experiential (for example, a particular subjective psychological state). Despite

the failures of research to clearly identify such invariant features of disorders, many psychiatric theorists, both historically and contemporaneously, have been scientific optimists. Although they believe in the existence of such essential properties defining mental illnesses, they are frequently willing to admit that we do not know what they are at present but that they will be discovered, pending appropriate scientific advances, in the future. This realist-essentialist stance is prevalent in the writings of both biological psychiatrists, as well as those from the phenomenological and hermeneutic traditions. The former advocated a discrete genetic change or neural circuit alteration underpinning the disorder, whereas the phenomenologist would offer a particular subjective experience, such as an alteration of the Husserlian 'natural attitude'. The biological essentialist position is compelling as it offers a picture of certainty and clarity and the possibility of progress. However, to date, this approach has largely failed and there are increasing concerns that the assumption that the entities of the existing psychiatric taxonomies will be amenable to such an analysis is extremely unlikely. These concerns coalesced prior to the publication of the 5th editions of the Diagnostic and Statistical Manual (DSM-5) (but several years after the paper was written) with the National Institute of Mental Health (NIMH) arguing for researchers to study psychological states more amenable to scientific investigation rather than those employed by the American Psychiatric Association (APA). The phenomenological essentialist position is also criticized as it can draw on

Husserl's idea of the eidetic reduction and hence relies on mental disorders having clear criteria and being like the entities of mathematics and geometry, a view that is not consistent with the empirical and clinical findings of psychiatry.

The second perspective that seems to be dominant in the literature is one I termed 'anti-essentialist' or 'pragmatic' – here the taxonomy of disorder is not primarily designed to capture and describe nature, but rather to address certain concerns and purposes, some of which may be in conflict. These approaches can be seen as 'instrumentalist'. There may well be empirical generalizations about such groupings, such as prognosis and response to various treatments, but these are not linked to essential characteristics of the disorder. This approach is in some ways appealing as it makes no major claims regarding the metaphysics of mental disorder. The problem with it is that it can lead to a view where the reality of mental illness is doubted, the suffering of those with psychological distress is denied, where expertise and progress is problematic, and other ways of dealing with people with psychiatric disorders become dominant, such as criminalization. The third approach, and one that perhaps can be seen to link to recent views of the NIMH and the RDoc criteria mentioned above, is an eliminativist approach to the entities of psychiatry. Analogously to the work of the Churchlands on folk psychology, this view holds, unlike the realist position, that the entities

that make up current psychiatric taxonomies are a fiction, albeit useful for a time, and those entities may be eliminated when the biology of mental illness is wholly described. Primacy will be given to neurological accounts and the entities that make up such accounts. The position of NIMH is rather more nuanced than the 'eliminative mindless' psychiatry position described by Kendell – the NIMH advocate a stepping backwards so as to continue forward. Rather than continuing optimistically with the categories we have, as the realist essentialists do, we step back to functions such as attention and memory, for example, and study them using the full resources of neuroscience and genetics, prior to re-conceptualising psychiatric illnesses with these simpler, atomistic elements. Problems for the eliminative mindless view are that, neurologically, psychiatric illnesses are 'silent'. For many neurological conditions, they present with symptoms that cause distress or disability such as headache, weakness, problems in gait, sensory disturbance, change of vision etc. Psychiatric disorders are typically not associated with such motor and sensory problems, but instead manifest either in one's own awareness of a psychological change, or others' awareness of that change (where insight is lost). Hence, for an eliminative mindless psychiatry to work, then a new vocabulary would need to be developed, that allows help seeking to be obtained via the patient using the language of neuroscience. For RDoC the current taxonomy of psychiatry may be rebuilt such that the new symptom complexes generated may be very different from what has come

before. Hence, a patient who reports feeling 'depressed' will need their experiences to be re-described in the new terminology. For the eliminative mindless psychiatrist, this process of translation into the new idiom is harder given the elimination of folk psychology vocabulary, and no assumption that such vocabulary maps neatly onto neural states.

Thus, the three main answers to the nature of mental disorders are found to have problems, yet there remains a need to have a view regarding mental illness. I then review the purpose and function of classification in science, medicine and psychiatry, and relate this to classical taxonomic strategies utilizing natural kinds, such as the periodic table of elements. However, rather than disorders being defined by a single criterion (such as atomic number for the periodic table), they may have several robust criteria used to determine their identity. I use this approach to characterize the classical essentialist position. The paper moves to discuss the work of Kendell.

Kendell argues that the nature of mental disorder is not homogenous: he suggests that some mental disorders may be able to be explained by a classical taxonomic strategy, i.e. that some disorders will have a clear demarcating criterion or criteria that allows them to be crisply demarcated from other disorders, and grouped by the nature of these criteria, whereas other disorders may not be like this. Kendell suggests the disorders that are grouped as dementias as possible candidates for such an approach, others

may be natural kinds, and amenable to this strategy, but we will only know this when scientific advances into the aetiology and pathophysiology of such disorders are made, and hence such disorder are seen to be natural kinds.

Kendell's approach is broadly optimistic, as mentioned above, in that he sees that this may be achievable for all disorders, but there is the thought that there may be some disorders, as currently characterized, where progress is unable to be made in terms of demarcating them using robust criteria, and hence elimination or redescription may be required for those illnesses to be classified in a classical, natural kind, manner.

I The essentialist realist strategy has failed empirically, yet there are also conceptual reasons why such an approach will be unable to capture the important features of mental disorder. Additionally to biology, what is needed for an illness to be an illness and the paper reviews some of the work by Wakefield on 'harmful dysfunction'. A particular point in Wakefield's argument is picked up: namely, that a strength of his approach is that it connects psychiatric illness to medical illnesses more generally. However, I suggest that it is not clear why we need to rely on notions from physical illness to describe mental illness: the term disorder could still be used, but applied to the realm of the mental, rather than the physical. Hence, there would be no need for disorder to be based upon 'disturbed biological mechanisms', but instead on psychological processes and states, that need not

be linked to biology. One could have the notion of disorder of the mental as an autonomous realm. Wakefield's work is important as it underlines the importance of 'harmful' and how that needs to be cashed out for a state of affairs to be an illness, but it need not be the case that the disorder has to be based on biological mechanisms going awry – the disturbance could be at alternate level of description, at the psychological level, and we should resist the assumption that psychiatric illnesses need be analogues of medical illnesses.

Returning to natural kinds, the paper reviews the work of Cooper, Thornton and Haslam, and particularly their analysis of the 'kinds of kinds' that may make up the psychiatric taxonomy, including the idea of 'partial kinds', (cases of disease that may be similar to one to one another in some, but not all, characteristics), and that of cases of some disorders which do not share a fundamental property in common that may be amenable to natural scientific study. Haslam expands Cooper's lists of kinds further with non-kinds, practical kinds, fuzzy kinds, and discrete kinds. Haslam and Cooper agree with the thought that however well symptoms and signs co-segregate as syndromes, there should be no assumption that there is a discrete natural substance or change that underlies such a pattern. Despite the prevailing view that natural kinds may be infrequent in psychiatry, the classical taxonomic is appealing and considered more scientific and objective than

other approaches, and drawing on Thornton's work, I examine the notion of objectivity in relation to psychosocial, ethical and legal concepts, and the work of Bernard Williams and John McDowell. This examination of objectivity is a crucial step in the paper as it allows an expanded logical space to be developed that enables an enriched naturalism to be developed in relation to mental disorders. McDowell examines the 'absolute conception of the world' described by Williams in his book on Descartes, a reality that is independent of any thought or experience. The paper discusses McDowell's critique of Williams as leaving us with a notion of science and objectivity that can be abstract and lacks determinate content. McDowell's critique of the 'absolute conception of the world', coupled with the importance of 'extra-biological' notions such as 'harmful' and 'dysfunction', and the resistance to making psychiatric illness identical to medical illness, are the key ideas that allow an extra logical space to be developed in thinking about what mental disorders are.

Before elaborating on these ideas of objectivity and science with reference to Williams and McDowell, the paper explains the phenomenological approach to nosology and, as mentioned above, argues that this approach shares some of the essentialist goals of a realist biological psychiatry. Both approaches seek to identify a single defining essence of a disorder, with some viewing phenomenology as a necessary step to clarify the psychological data prior to

its reduction to biology. The work of Parnas and Zahavi is drawn upon as an example of phenomenological psychiatry and as an example of an approach that seeks to determine the subjective essence of a mental illness, prior to it being reduced to biology. The paper surveys their proposed method, in particular examining the seeming conflation of Weberian Ideal Types with Husserlian Essences, and how empirical data relates to both of these approaches. The section concludes that most mental disorders are not amenable to Husserlian eidetic analysis, and hence, this method cannot be assumed to generate an essence in any ontology, and that a more Weberian approach lacks the essentialism desired by the phenomenologists. Schizophrenia may be an ideal type but lacks the crisp and discrete boundaries, and invariant and essential properties, which are required for the eidetic reduction.

The paper turns to the roles of values and how psychiatric classificatory systems are created, and returns to McDowell and a non-foundational conception of objectivity that is not inconsistent with values, perspectives, history, and local concerns. Given the view of the paper that biology and essentialism will only go so far, the paper closes by examining how far biology may be able to go in characterizing psychiatric disorders and psychopathology and explores the notion of an 'eliminative mindless psychiatry', described, but not endorsed, by Kendell. The paper argues, with

McDowell, that to do full credit to studying mental illnesses, natural phenomena, we should not be constrained by the scope and methods of natural sciences. Rather, we need an expanded conception of nature that allows reasons and norms, the space of reasons, to be as real and objective as any construct of natural science. I suggest that thinking on the nosology and taxonomy of psychiatry parallels the problems McDowell addresses in his *Mind and World*, with coherentism approximating to pragmatism/anti-essentialism, the 'Myth of the Given' to essentialist/realist views, and bald naturalism to identity reduction or Kendell's Churchlandian eliminative mindless psychiatry. The solution to the nature of mental disorders is McDowell's: a reminder of the second nature and conceptual capacities, and an enriched conception of realism. Hence, the paper concludes with a realist conception of mental disorder, but one that has broken away with the traditional picture of realism. This approach could be termed a naïve realism. Mental disorders are real and are described using the terms of common sense psychology because such terms have explanatory power, with such explanatory power not being attainable by a purely biological description. Someone with anxiety will tend to remove himself or herself from a feared object, a patient with an auditory hallucination may reply to that voice or carry out what the voice asks of him or her. Mental disorders are defined by psychological terms and will manifest as patterns of change in conceptual

capacities and the space of reasons, patterns that are real, stable and based upon the shared understanding we have of rationality and reason.

Paper 2: Imaging and delusions

This paper is part of a volume examining persecutory delusions and specifically deals with how neuroimaging can help the understanding and study of persecutory delusions. The paper can be seen as an illustrative case example of the approach taken in Paper 1, when applied to a specific area of psychopathology. The central claim of the paper is that the prior strategies of cognitive neuropsychiatry that have been employed successfully to study other areas of psychopathology are likely to fail when studying delusions. Cognitive neuropsychiatry, as described by Halligan and David, is an example of a sophisticated realist conception of mental disorder as discussed in Paper 1. Cognitive neuropsychiatry views the symptoms of mental disorder as consequent upon changes in normal cognitive processes, and in turn, views those processes as being located in a certain anatomical area of the brain. An example of a cognitive neuropsychiatric approach would be to explain psychopathy as due to a change in normal processes, such as the individual's response to, and recognition of, facial affects, and how those processes may be differentially mediated in the brain in those with the disorder.

Delusions have been resistant to this approach with studies either focusing on demarcated experiences (that may then be subject to delusional elaboration)

such as the experience of a passivity of a limb, or examining reasoning tasks purportedly linked to the genesis and/or maintenance of delusions, such as the 'jumping to conclusions' reasoning style. A key reason for the difficulty in the study of delusions is the variety of psychological continua, many of which are normatively constituted, that are utilized in thinking about delusions.

Psychological continua are variables whose range of values can be described using continuous statistics, so variables that are continuous will have a mean, a standard deviation, and the frequency of either extreme of the distribution being less common. Many disorders in medicine are based on continua, such as hypertension with the variable being blood pressure, or diabetes mellitus, where the variable is blood glucose. Delusion, however, relies on how the extremes of several of these continua, for example unfoundedness, conviction, plausibility, distress inter-relate and demarcate delusions from other mental states. In addition to several continua being considered for delusions to be identified, the continua themselves are not clearly marked by reference to a biological fact (such as the concentration of blood glucose) but are determined by reference to normative considerations, and hence cannot be reduced to a biological variable. This is a crucial issue for a wholly brain-based cognitive neuropsychiatric account of delusion. Delusions, however, are often more complicated than even this: rather than being the endorsement of a given propositional attitude ("The FBI believe I am Osama bin Laden"), those who are deluded experience a radical shift in their experience of the world,

themselves, and of meaning and causality. Their whole experience is coloured by the delusion.

To understand the technical aspects of cognitive neuropsychiatry and functional neuroimaging, the paper opens with a brief review of the physics and physiology that underpins functional magnetic resonance imaging (fMRI) and how the technique has been used to great effect to study another key symptom of psychosis, namely auditory hallucinations. The research paradigm of 'cognitive neuropsychiatry' is introduced as an approach that explicitly approaches psychopathology as a change in normal cognitive neuropsychological function and in turn, tries to relate these functions to anatomical areas in the brain. Traditionally, fMRI works either by 'capturing' the psychopathological symptom by the participant button-pressing in the scanner when the experience is occurring or by examining the neural correlates of a task thought to reflect a process linked to the mechanism which produces the symptom. An example of the former would be that of a patient who has frequent auditory verbal hallucinations. 'Capturing' would consist of that patient entering the MRI machine, undergoing the scan and being instructed to button-press whenever their voice occurred. This allows a time series of the experiences to be created that can be used to interrogate the fMRI data such that can see the neural correlates of when the experience occurred, activations of the brain, as measured by BOLD, are linked by temporal co-

occurrence with the timing of the experience under investigation. A more frequently used approach of using fMRI to study psychopathology is to first, develop a cognitive model of the experience and secondly, to get the participant to undertake a task that utilizes processes from the model. Both these approaches have problems: the former limits the generalizability of the findings. This approach is only useful to the study of those who have insight into their experiences (i.e. are aware, for example, that the hallucination is pathological), or those who can clearly demarcate the experience of interest from others, and are able to identify it reliably, and this group of participants may differ systematically from those who lack such insight or discrimination. Further, the 'capture' method relies on the experience being temporally and phenomenologically discrete, such that the analysis can proceed by categorizing the fMRI signal as to when the experience is present or absent. The second approach, studying psychopathology using a cognitive task that is thought to reflect processes that underpin the experience, relies on cognitive models of symptoms existing, and on a deeper assumption that it is correct that psychopathological states are the results of quantitative changes from normal cognitive neuropsychological processes, as opposed to the idea that mental illness may be accompanied by the existence of new mechanisms and processes that underpin symptom formation. A more scientific problem is that the analysis of such tasks typically involves the method of 'subtraction' - i.e. the activations at 'rest' are subtracted from those when the participant is

‘active’ and performing the task. Hence, creating the rest or control task is equally as important as creating the active task, and needs to ensure that the only element of the tasks that differs between the control and active task is the element under investigation. Returning to psychopathy, if the researcher wishes to test the hypothesis that those with antisocial personality disorder tend to activate areas of the brain associated with anger when they view fearful faces, they will need to use non-fearful faces as the ‘rest condition’ and also ensure that the same degree of concentration, attention, visual scan etc. is present in the rest as the active condition.

After this overview of the methodology and difficulties of using fMRI to study psychopathology, the paper focuses on delusion. Delusions are not discrete, either temporally or from other parts of the mental state and hence the ‘capture’ approach outlined above is not feasible. The instruction ‘please press this button when deluded’ seems unlikely to be useful. A delusion is suspected when certain characteristics of a belief may be present– such as implausibility, conviction, being unfounded, distressing, preoccupying, or not being shared by others. Further, the person with a delusion has a radically changed experience of the world that goes beyond the mere holding of a false propositional attitude. I argue that normative, socially-conditioned rules for linking reasons, causes, and explanations are disrupted in those with psychosis and delusions, and hence, and linking with Paper 3 and work with

Bortolotti, the reasons the deluded give for their beliefs either do not look very much like reasons or appear to be not very good reasons when presented to another.

The chapter then examines cognitive models of delusion formation and how they have been examined using neuroimaging. This chapter predates the current interest in prediction-coding models of delusions and hence examines delusion formation with reference to the two-step model of delusions. This model views delusions as being consequent upon generation of an anomalous experience (step one) and with a bias or deficit in reasoning (step two) that impacts upon the appraisal and explanation of the experience. The biases are viewed as constraining, and skewing, the search for explanations of the experience. Hence, on this account, the delusion is an explanation of an unusual experience.

Reviewing mechanisms purported to underpin Step One, the chapter describes the work of Hemsley, Gray and Kapur who draw upon dopamine's role in generating salience for events, and utilizes PET to study dopamine in vivo. For those with psychosis, there is elevated mesolimbic dopamine and its release can be context-independent. Hence, salience can be granted to otherwise innocuous events and stimuli. Experientially, this may lead to the person having the experience of significance and novelty of previously benign

or unnoticed events. This state is linked to previous accounts of the entry into psychosis and the phase of 'delusional mood'. The second 'anomalous experience' reviewed in the chapter is the phenomenon of voice-hearing. Functional neuroimaging has been used to great effect to examine Chris Frith's model of auditory hallucinations, namely that the experience of voice-hearing is due to the mis-recognition of a voice as externally generated when it is in fact self-generated. The 'alien voices' or 'self-monitoring' cognitive task, and its use in the scanner, is then described.

Following on from this, biases thought to be part of Step Two are reviewed that have been employed in neuroimaging studies. These biases include the 'jumping to conclusions' (JTC) bias, whereby less evidence is called on prior to making a decision in a probabilistic reasoning task, the externalizing attributional bias (a neutral or self-caused negative event is more likely to be thought to be externally caused) and problems in social cognition and/or Theory of Mind (here, the idea is that an individual is unable to determine the intentions of another towards him or her and thus posits a negative intent). Imaging may be used to study the formation of delusions via approaches not tightly linked to the two step model, for example, by examining the role of affect in delusions, and given that delusions are part of the definition of a psychotic episode, how imaging has characterized illness onset. The latter section of the paper reviews important findings in structural neuroimaging

that have characterized anatomical changes linked to onset of psychotic illness.

The chapter ends with a cautionary note concerning the likely heterogeneity of delusions and the difficulty in providing a definition. The central claim of the paper is that if the nature of delusion is not appreciated fully, then any attempts to study the phenomenon scientifically will be at best partial. I argue that perhaps the term delusion does not pick out a discrete psychological state or kind, with delusions being characterized by several continua. These include things like plausibility, distress, conviction, and sharedness. Linking back to issues of normativity earlier in the chapter, I discuss how judgments about beliefs being on these continua rely on normative criteria, some of which may be more socially constructed, whereas others may be more linked to rationality and judgment, and that understanding of neuropsychology and brain function is likely to interact with these processes in generating the clinical phenomenon of delusion. The scientific study of delusion thus demonstrates an example of the limitation of the cognitive neuropsychiatric paradigm, an exemplar of the biological essentialist approach, in studying psychopathology. Further, given the role of psychological continua in constituting delusions, rationality, judgment, and social norms, McDowell's conceptual capacities and features of the second natures, are needed to study this area of psychopathology adequately.

Paper 3: A role for ownership and authorship in the analysis of thought

insertion

This paper was co-written with Lisa Bortolotti and links to the prior papers in that it utilizes concepts such as intentionality, rationality, and self-knowledge, together with the work of the philosopher Moran, to analyse the passivity experience and delusion of thought insertion. Specifically, it takes forward a theme from paper 2: it is not by analysing a brain scan that one determines the presence of delusions, but rather by talking with someone or observing their behaviour. The paper looks at a particular psychotic experience and delusion of interest to philosophers, thought insertion. The central claim of the paper is that the prior philosophical analyses of the phenomenon of thought insertion have either failed to grasp the experience correctly, or have failed to demarcate thought insertion wholly from other areas of psychopathology, including passivity of action, and some normal mental states. This paper focuses on issues of self-ascription and why that is needed alongside other facets (spatiality, introspection, interpretation of behaviour) to characterise what is so perplexing and distressing about thought insertion. Thought insertion offers philosophers a real world example of a thought that is inside one's head, can be introspected yet is neither owned, self-ascribed, nor endorsed.

Claims of the paper:

1. Previous philosophical analyses of thought insertion have been unsuccessful.
2. An account that draws on the ownership and authorship of thoughts alongside introspection and self-interpretation is required.
3. Reason giving and authorship supplement self knowledge obtained by introspection and interpretation of behavior and aid self-ascription of thoughts.
4. Thought insertion is where introspection and spatiality conditions are met, yet ownership is not present due to the lack of authorship. However, the secondary delusional belief explaining the inserted thought may be authored.
5. Those with thought insertion have a breakdown of a capacity relevant to judgments of first person authority and rationality

One can know one's own beliefs and attitudes by two main means: one we term 'epistemic', and is due to direct access and introspection as well as self interpretation of one's own behavior. This 'epistemic route' can be supplemented by 'self-ascription' of thoughts, and this self-ascription utilizes the notions of ownership and authorship of thoughts (Bortolotti, 2009). One is usually in a condition to self-ascribe those thoughts that can be accessed directly or inferred from one's own behaviour, and ownership is one's

capacity to acknowledge a thought as one's own which leads to ascribing the thought to oneself. Ownership is achieved on the basis of epistemic access to the content of one's own thoughts, with thought insertion serving as an important exception. Self-ascription can also be attained via using other capacities: in some circumstances, one can ascribe a thought to oneself on the basis of an act of authorship. One is the author of a thought if one forms it or justifies it on the basis of what one takes to be one's best reasons. Reason giving is thus linked to the ability to be authors of thoughts and hence self-ascription. This account forms the basis of Claim 2 and 3.

The paper begins to apply some of these distinctions to psychopathology and opens with a discussion of reason-giving in delusions generally, and suggests that those with persecutory delusions can be both the owner and the author of their beliefs: they typically will claim their belief as their own and ascribe it to themselves, and can also demonstrate authorship by offering reasons to support it. For example, a patient with a persecutory delusion may defend their belief that they are under threat from government assassins with a further belief that their life is in risk due to them knowing the secret conspiracy. Many of those with typical delusions can be both the owners and the authors of these thoughts. This may not be so clear in other cases of delusions. The purpose here to make clear that not all delusions are the same, and that thought insertion itself is usually a two-stage phenomenon (the

experience of the inserted thought, and then delusional elaboration as to how it arose) The paper suggests that considering ownership and authorship in psychopathology is important as the cognitive neuropsychiatric paradigm of research relates delusions to normal beliefs and assumes the presence of ownership and authorship, yet both of these are important to determine the ascription of intentionality and self knowledge and may be lacking in key psychotic experiences. Although many delusions do feature endorsement, reason giving and authorship, some do not (see Bortolotti and Broome, 2008). An example would be a primary delusion where a given delusional belief is held incorrigibly but no reason can be given as to why the person believes what they do ("I just know that I am the next Messiah, doctor"). Such a belief state is not authored. With belief states that are not owned nor authored, they are less able to be integrated into a wider narrative conception and further, and those isolated abnormal beliefs may engender certain societal attitudes. Patients with such beliefs can be aware that they cannot integrate these thoughts into wider narratives and after being met with bafflement and perplexity, frequently withdraw and give up on communication with others.

Thought insertion is an important symptom of mental illness, and is listed as one of Schneider's First Rank Symptoms of Schizophrenia. This list was thought to indicate certain key symptoms that were pathognomic of schizophrenia, in the absence of brain disease. However, subsequently these

symptoms have been shown to be less diagnostically specific (they can occur in a manic psychosis, for example) and the latest iteration of the DSM doesn't weight Schneider's symptoms differentially in the diagnosis of schizophrenia.

In addressing Claim 1, the paper discusses conventional characterizations of thought insertion. The paper argues that in these accounts ownership of thoughts in the philosophy literature has been defined in two ways. First, by what we term the spatiality and introspection condition, that is to say, the thought is within one's spatial boundaries and can be accessed directly and first-personally. Secondly, that ownership should be considered as being due to both the introspection condition and self-ascription condition – acknowledging the thought as one's own. We suggest that for thought insertion previous accounts are incorrect as they tend to assume that ownership goes along with the introspection and spatiality conditions: we argue that it is in thought insertion precisely where they dissociate. Those with inserted thought can introspect their contents, believe they occur within their personal space but will fail to self-ascribe and own. In these accounts, ownership has been characterized previously based around a spatial condition ("this thought, that is not mine, is in my head"), coupled with direct access, and hence a swift move is made to ownership without explicit consideration of self-ascription. It could, instead, be seen that the core, primary experience of thought insertion is that an 'episode of thinking' has

occurred in one's mental life but which one does not ascribe to oneself, despite the criteria of the thinking being amenable to introspection and occurring within one's spatial boundaries. Thus thought insertion serves as an important real life counter example where ownership is absent despite first person introspective access and hence a failure of self-ascription. It is this feeling of alien intrusion, what used to be termed 'disturbance of ego boundaries', and lack of privacy in one's mental life, that can make psychosis so distressing and is not captured in prior accounts of thought insertion. In addition to the problem of ownership, we also discuss how the spatiality conception of thought itself is somewhat problematic more generally in that it relies on a dubious metaphorical conception of mental life and psychology, 'mind as a spatial container', that may not be an accurate guide to the epistemology and metaphysics of thought.

Moran's work is useful due to his notion of being a deliberator – there is something special about first person narrative accounts, as the process of reason giving for actions and choices demonstrates that one has come to a decision based upon considering the best reasons, deliberating. Through this mechanism, the deliberator has first person authority over the content of the decision via reflecting on the reasons that led to it. As mentioned earlier, Moran suggests authorship supplements self knowledge as being an additional means of knowing one self alongside direct access and self-

interpretation of behavior. Reason giving offers an additional route to knowledge of the content of one's mental states and to the knowledge that one has mental states with that content.

If it is possible for a person to answer a deliberative question about his belief at all, this involves assuming an authority over, and a responsibility for, what his belief actually is. Thus a person able to exercise this capacity is in a position to declare what his belief is by reflection on the reasons in favor of that belief, rather than by examination of the psychological evidence. In this way . . . avowal can be seen as an expression of genuine self-knowledge. (Moran, 2004, p. 425)

Of course, deliberation and authorship does not apply equally to all conscious mental states, and there can be degrees, for example the degree of deliberation employed regarding breakfast choice or course of study at university, as well as beliefs that are accepted and not deliberated upon (for example, believing climate change is irreversible without examining the reasons for that claim). Failure of authorship, where it should be present, can be seen as evidence of lack of self-knowledge and/or an obstacle to ascribing intentional behavior and rationality to the individual. The notion of authorship we are primarily concerned with is one of endorsement, measured by capacity for reason giving. Using Moran, we can see that for the experience of thought insertion, the inserted thought itself is likely to be non-authored and not endorsed – it

will be rather like a perceptual belief – whereas the delusional belief that explains the inserted thought may well be authored, along the lines of other persecutory delusions. This analysis captures the uncanny experience of thought insertion – the experience of a thought in one’s own head (spatiality condition), that one can access via introspection (first person access), yet is not owned or authored. Hence, this additional route of self knowledge is absent in the case of thought insertion (Claim 4).

The paper then reviews the psychopathology of thought insertion and disorders of the self, and distinguishes between beliefs about control or insertion of thoughts by a third party, and the thought itself. Thought insertion is one of a wider group of passivity experiences that occur in psychotic illnesses and a strength of our account is that it allows thought insertion to be differentiated from other passivity experience. Passivity, in psychiatry, refers to a group of experiences typically seen in schizophrenia. They include passivity of thought, of action, and of emotion, with the unifying feature that these actions, thoughts, or emotions arise without the involvement of the person who experiences them. As mentioned above, thought insertion is typically a dual experience: the passivity experience (a thought that is not mine) and the delusional explanation (this has entered my head due to MI6). Thought insertion typically covers these two elements but

it is with the former element, the thought being other than mine, that raises issues of ownership and authorship. As mentioned above, the latter delusional elaboration may well be authored. The subject will know the inserted thought first personally and have direct access to it, but it will feel alien or not under control. Hence, there is a disjunction between first person, introspective, access and self-ascription. We argue, contra Gallagher and Gerrans, who rely on a spatiality conception of ownership, based upon location and first person access, and suggest, with Campbell, that instead the subject does not own the thought: they have direct access and it is 'in their head', but it is not theirs as it is not self-ascribed. In addition to our concerns about linking ownership to spatiality, we also argue that the absence of ownership and self ascription seems to ring true with the puzzling and distressing features of thought insertion, namely, that one can introspect a thought without acknowledging it as one's own. Thought insertion hence becomes characterized by a lack of ownership as defined by absence of self-ascription. This feature distinguishes thought insertion from other areas of psychopathology. Unlike passivity of motor action, or alien hand syndrome, it is not the organ or body part that is not owned, but the process. In thought insertion you do not fail to acknowledge that the brain is yours because it has engaged in an act of thinking that was not willed by you. Rather, you explain that others are using your brain and take distance from the product of that thinking activity, ascribing it to someone else. Ownership and authorship are

the end product of deliberating on the reasons for a belief and this deliberation will not occur for individual inserted thoughts – this is similar to deliberation as not occurring as part of our experience of individual perceptual-driven beliefs.

We then move to relate the passivity of thought with the passivity of agency that can also occur in psychotic illnesses. In passivity of thought, there is a thought being thought that one has not thought, in passivity of action, one's body can move but the move has not been initiated or generated by the person. Thought insertion is a subtype of passivity as it carries the extra claim that not only is there a thought in our heads that is not ours, but that it has been inserted from without by some kind of agency. Our analysis, we argue, can allow us to distinguish between: (a) delusions of passivity and ordinary beliefs when they are formed in absence of explicit deliberation; (b) the role of intentional causation and production in disorders of activity and in disorders of thinking; (c) the phenomenology of thought insertion and that of delusions of control with respect to thoughts. Moreover, this account can make sense of the claim that thought insertion is a failure of self-knowledge independently of a reference to the breach of personal boundaries. The loss of agency account fails to distinguish between thought insertion and some ordinary beliefs, such as spontaneous thoughts that come to mind without deliberation.

Agency is lacking, but there is no delusional elaboration regarding insertion. Passivity regarding thought formation cannot be at the core of the phenomenology of thought insertion. However, such spontaneously arising thoughts are self-ascribed. Our account also allows distinctions to be drawn within unusual thought experiences – such as between thought insertion and control, again, self ascription helps as in thought control the thoughts remain mine, even if under external control. What distinguishes thought insertion is the violation of self-ascription and typically a failure of authorship. The paper concludes that those with thought insertion have a breakdown of a capacity relevant to judgements of first person authority and rationality (Claim 5). Clinically, the issue is of importance as patients may have unusual, distressing thoughts that they are able to self-ascribe despite being highly upsetting and disabling (for example, obsessions). This raises the point that causal generation is not so much the issue in delineating psychopathology as self-ascription – the obsessive has little control over his obsessive ruminations yet has no doubt that they are his own thoughts.

Paper 4: Philosophical Issues in the Prodromal Phase of Psychosis

This paper was part of a special issue of a journal devoted to the topic of the prodromal phase of psychosis. A central claim of the paper is that the prodromal phase of illness is not a discrete, well-demarcated period in the course of illness, a view held by clinicians and researchers who question continuum accounts of psychosis, and view psychosis as have a clear early trajectory from pre-illness to onset. Indeed, on one hand the nature of the prodrome of psychosis is challenged by the continuum model of psychosis and those who have psychotic experiences yet are not at risk of developing illness, and on the other hand by the somewhat arbitrary nature of the definition of transition from prodrome to frank illness and the reliance on assessing positive symptoms to make that judgement. The paper discusses several inter-related philosophical themes: these include issues of the nature of the prodrome, and how this was conceived both in terms of full-blown psychotic illness, but also continuum models of psychosis. The paper also discusses how one can study the prodrome purely using neuroscience and hence links with themes in papers 1 and 2 particularly. Finally, the paper discusses the ethics of screening and monitoring those who have not as yet developed an illness, and some of the debates regarding the inclusion of the prodromal phase in the, at that time unpublished, DSM5.

The paper opens with an overview of the neurodevelopmental model of schizophrenia, linking the prodromal phase to early developmental changes noted in cohorts at childhood who may go on to develop schizophrenia as young adults. The prodromal phase of psychosis is characterized by psychotic experiences that are insufficiently intense, frequent or distressing to meet diagnostic criteria – yet, having these experiences may predict the onset of frank illness within the next 6-12 months. However, there are also people who have psychotic experiences yet who are not distressed, do not need services, and who do not develop a psychotic illness. A crucial issue for the early identification of psychotic illness is how to distinguish an individual who may be at risk of developing the illness, based upon their experiences, from an individual who may have similar experiences yet not be at risk of developing the illness. Hence, one of the critiques of the prodromal high-risk research strategy is that these two groups get mixed up or perhaps are not distinguishable. In the paper, we introduce the notion of the ‘at risk mental state’ (ARMS), a mental state determined by a semi-structured interview that predicts the onset of psychosis and as such is a prospective means to aid the identification of those who may be in the prodromal phase of illness, and we argue that the ARMS is a segment of the continuum of psychosis. Individuals in this segment have the psychotic experiences of the members of those with benign experiences on the continuum, but will have additional risk factors, some of which will be demographic but others may be linked to drug use,

trauma, and comorbid psychopathology such as anxiety and depression. We then discuss sampling concerns and how much service design contributes to risk of psychosis rather than symptoms and clinical presentation.

The discussion moves on to criticize the neurodevelopmental model as failing to explain the onset of psychosis in late adolescence/early adulthood, given its focus on risk factors in very early life, rather than factors more proximal to the transition to frank psychosis onset. The relatively arbitrary nature of this transition is noted and that certain symptoms are used to determine onset.

This demonstrates how crucial in the current measures key positive symptoms, such as hallucinations and delusions, are in indexing onset. The standardized research tools used to define the onset of psychosis largely do this by measuring positive symptoms and their intensity. Once they have reached a certain level (typically defined by their intensity, belief in their reality, and the concomitant distress caused) and by their duration (at least one week) then the threshold for a first episode of psychosis is met. Somewhat paradoxically, there can be profound neuropsychological and functional impairment without the threshold to psychosis having been crossed.

We then argue, based upon arbitrariness of transition and relation to the continuum of psychosis, that first episode of psychosis may not be able to be defined narrowly using biological, psychological, or clinical criteria. This

leads to thinking of psychosis as a collection of continua, rather than as discrete stages, and that it may be more useful if we employ normativity to define psychopathology. The paper utilizes some arguments made in Paper 2 around delusions and their dependence on a variety of dimensions. Further, that delusions are only recognizable as disorders of behavior and communication, referenced to norms, rather than as distinct invariant neuroscientific or psychological kinds. What is pathological in delusion cannot be captured by purely biological investigations such as a brain scan. We broaden some of these criticisms by addressing non-biological features linked to psychosis and the return of social psychiatry. The paper reviews the important AESOP study, as well as ecological studies of psychotic experiences and the urban environment and suggests that external factors to the brain are important in the genesis of psychosis. Here, the paper draws on Andy Clark's notion of 'the extended mind' and vehicle or active externalism. A key idea is that objects external to the physical boundary of the body can serve as a functional part of the mind, and should be considered as such. The mind is extended outside of the body and into the world. An example given would be the role a notepad and pencil may serve in carrying out arithmetic: the notepad and pencil are part of the mind when the individual undertakes arithmetic. To carry this idea into psychosis, one could suggest that when reasoning about threat to oneself certain features in the external world are used. Features such as busy crowds, traffic noise, and other features of urban

life may act as the notepad and pencil in subserving, and guiding, the reasoning about threat to oneself. Hence, structural external features of the world may be part of a mind that becomes psychotic.

The paper then moves to clinical and ethical implications of studying the prodromal phase. We review issues around stigmatization and the risk that clinical monitoring may itself cause anxiety in a patient, anxiety that may itself lead to an increase in the intensity of psychotic experiences and hence theoretically hasten the onset of psychotic illness. Here, screening for psychosis is different to other screening programs in medicine as the anxiety caused by the screening may be causally potent in causing the illness being screened for. This concern is linked to the debate active at the time of the writing of the paper regarding the inclusion of an 'attenuated psychosis syndrome' in the DSM5, and we offer some reasons against inclusion of the syndrome in the main body of the manual.

The paper ends by discussing a clinical staging model of psychosis that may help in leading clinicians in titrating their interventions and guiding risk-benefit analyses for clinicians and concludes by reiterating a view expressed in other papers that psychological notions that impact on rationality and self knowledge are crucial for identifying mental states as pathological and how features of the external environment may also impact on such social, moral

and epistemic norms. As well as studying the brain, studying continua of experience, epidemiology and normativity is also needed to understand psychosis in a way that does justice to the complexity of the phenomenon.

Intersections between the publications

The papers detailed above relate to my empirical and clinical work as set out in the Introduction. However, there are also connections between them and other philosophical publications of mine. One of the over-arching themes of the papers is an attempt to offer a form of realism about psychiatric illness and psychopathology that doesn't equate such disorders and symptoms wholly to neuroscience. This view has been detailed in subsequent publications (Broome and Bortolotti 2009, 2010). Paper 1 begins some of this work in surveying various ways of thinking of mental disorders and offers a realist conception of mental illness, drawing on McDowell, which relies on an enriched conception of nature that includes our second nature and conceptual schemes. On this account, mental disorder can be seen to be real and part of its reality is a change in the 'space of reasons'. Paper 2 takes forward this strategy and applies the approach to a specific area of psychopathology. The chapter focuses on the role imaging can play in studying delusions and links with paper 1 as it discusses elements of delusion that may not be amenable to the cognitive neuropsychiatric paradigm as simply applied. The thought here is that what makes delusions pathological relates to more socially normative criteria about what interlocutors find to be normal or abnormal beliefs, and the role rationality plays in how we judge the reasons people give for holding those beliefs. A delusion is identified by speaking with someone, rather than by studying a brain scan. Paper 3 is a partner paper to another published

with Bortolotti (Bortolotti and Broome, 2008) that goes into greater detail as to the reasons the deluded give for holding their beliefs and how such reasoning relates to self-knowledge. Paper 3 takes forward one of the key points from paper 2 - that it is in talking to someone, and listening to the reasons that they give for their beliefs, that psychopathology and mental disorder is manifest. In this paper, the symptom of Thought Insertion is specifically focused on. Paper 4 draws together many of the themes detailed in the prior publications as it seeks to examine the prodromal phase of psychosis in relation to both the neurodevelopmental account of schizophrenia and the continuum model of psychosis. It stresses the seemingly arbitrary nature of demarcations between different stages of psychosis and illness, and how such stages (echoing back to paper 1, and 2) are unlikely to be wholly cashed out purely neuroscientifically. These are not trivial issues: how one defines stages of psychopathology – and differentiates someone who is at risk of psychosis, from an individual who has unusual experiences that are not distressing and from someone who has developed the disorder - are hugely important in terms of titrating treatment, commencing medication, predicting prognosis, managing risk to the individual, and determining responsibility for action. On this latter point, some legal jurisdictions view the diagnosis of psychosis as necessarily abrogating the individual from criminal responsibility, regardless of the nature of the connections between their experiences and the offence.

The thesis as a whole revolves around several interconnected themes: the realism of the mental, its irreducibility, and the importance of normatively constituted mental life in thinking about psychiatric disorders and psychopathology. As can be seen, the work of McDowell has been an influence in my approach, particularly his conception of a wider view of nature. The papers have led to further work not presented in the thesis that develops some of these ideas further, including papers detailing Jaspers' discussions of understanding psychopathology 'psychically' or 'somatically' (Broome, 2013), the relationship between neuroscience, diagnosis, and criminal responsibility (Bortolotti, Broome and Mamelì, 2013) as well as examining the phenomenological tradition in psychopathology in relation to contemporary neuroscientific psychiatry (Broome et al., 2013). Finally, since my initial empirical work into delusions, Bayesian approaches to delusions, and psychosis more generally, have become a large part of the research program and I am developing studies both philosophically and empirically with Lisa Bortolotti and colleagues in Oxford into how these approaches relate to the prior 'two factor' model of delusional formation, and to the onset of psychosis.

Appendix 1: bibliography of publications

2014

Goghari, V. M., Brett, C., Tabraham, P., Johns, L., Valmaggia, L., Broome, M., . . . McGuire, P. (2014). Spatial working memory ability in individuals at ultra high risk for psychosis. *Journal of Psychiatric Research*.

doi:[10.1016/j.jpsychires.2013.12.010](https://doi.org/10.1016/j.jpsychires.2013.12.010)

2013

Bortolotti, L., Broome, M. R., & Marnett, M. (2013). Delusions and Responsibility for Action: Insights from the Breivik Case. *Neuroethics*, 1-6.

doi:[10.1007/s12152-013-9198-4](https://doi.org/10.1007/s12152-013-9198-4)

Broome, M. R. (2013). Jaspers and Neuroscience. One Century of Karl Jaspers' General Psychopathology. G. Stanghellini and T. Fuchs. Oxford, Oxford University Press.

Broome, M., Harland, R., Owen, G. S., & Stringaris, A. (2013). *The Maudsley Reader in Phenomenological Psychiatry*. Cambridge University Press

Broome, M. R., P. Wuyts and P. Fusar-Poli (2013). Philosophical and Ethical Issues in the Prodromal Phase of Psychosis. Oxford Handbook of Philosophy

and Psychiatry. K. W. M. Fulford, M. Davies, G. Graham et al. Oxford, Oxford University Press.

Guo, S., Kendrick, K. M., Zhang, J., Feng, J., Broome, M., Yu, R., . . . Liu, Z. (2013). Brain-wide functional inter-hemispheric disconnection is a potential biomarker for schizophrenia and distinguishes it from depression. *NeuroImage: Clinical*, 2(1), 818-826. doi:[10.1016/j.nicl.2013.06.008](https://doi.org/10.1016/j.nicl.2013.06.008)

McCarthy-Jones, S., Fernyhough, C., Krueger, J., Larøi, F., & Broome, M. (2013). Stop, look, listen: The need for philosophical phenomenological perspectives on auditory verbal hallucinations. *Frontiers in Human Neuroscience*, (MAR). doi:[10.3389/fnhum.2013.00127](https://doi.org/10.3389/fnhum.2013.00127)

Marwaha, S., Broome, M., & Parsons, N. (2013). Mood instability, mental illness and suicidal ideas: Results from a household survey. *Social Psychiatry and Psychiatric Epidemiology*, 48(9), 1431-1437. doi:[10.1007/s00127-013-0653-7](https://doi.org/10.1007/s00127-013-0653-7)

Marwaha, S., Broome, M., Flanagan, S., & Parsons, N. (2013). The prevalence and clinical associations of mood instability in adults living in England: Results from the Adult Psychiatric Morbidity Survey 2007. *Psychiatry Research*, 205(3), 262-268. doi:[10.1016/j.psychres.2012.09.036](https://doi.org/10.1016/j.psychres.2012.09.036)

Marwaha, S., He, Z., Broome, M., Singh, S. P., Wolke, D., Scott, J., . . . Eyden, J. (2013). How is affective instability defined and measured? A systematic review. *Psychological Medicine*. doi:[10.1017/S0033291713002407](https://doi.org/10.1017/S0033291713002407)

Ratcliffe, M., Broome, M., Smith, B. & Bowden, H. (2013). A Bad Case of the Flu? The Comparative Phenomenology of Depression and Somatic Illness. *Journal of Consciousness Studies* **20**(7-8): 198-218

Shaikh, M., Schulze, K., Dutt, A., Li, K., Williams, I., Walshe, M., . . . Rijdsdijk, F. (2013). Effect of DISC1 on the P300 waveform in psychosis. *Schizophrenia Bulletin*, 39(1), 161-167. doi:[10.1093/schbul/sbr101](https://doi.org/10.1093/schbul/sbr101)

2012

Allen, P., Luigjes, J., Howes, O. D., Egerton, A., Hirao, K., Valli, I., . . .

McGuire, P. (2012). Transition to psychosis associated with prefrontal and subcortical dysfunction in ultra high-risk individuals. *Schizophrenia Bulletin*, 38(6), 1268-1276. doi:[10.1093/schbul/sbr194](https://doi.org/10.1093/schbul/sbr194)

Bortolotti, L., & Broome, M. R. (2012). Affective dimensions of the phenomenon of double bookkeeping in delusions. *Emotion Review*, 4(2), 187-191. doi:[10.1177/1754073911430115](https://doi.org/10.1177/1754073911430115)

L Bortolotti, R Cox, M Broome and M Mameli (2012). Rationality and self-knowledge in delusions and confabulations: implications for autonomy as self-governance. In Radoilska (ed.) *Autonomy and Mental Disorder*. Oxford University Press, chapter 5, 100-122

Broome, M. (2012). Reality, realness, and the natural attitude. *Philosophy, Psychiatry and Psychology*, 19(2), 115-118. doi:[10.1353/ppp.2012.0022](https://doi.org/10.1353/ppp.2012.0022)

Broome, M. R., Day, F., Valli, I., Valmaggia, L., Johns, L. C., Howes, O., . . . Garety, P. (2012). Delusional ideation, manic symptomatology and working memory in a cohort at clinical high-risk for psychosis: A longitudinal study. *European Psychiatry*, 27(4), 258-263. doi:[10.1016/j.eurpsy.2010.07.008](https://doi.org/10.1016/j.eurpsy.2010.07.008)

Broome, M., J. Dale, C. Marriott, C. Merino and L. Bortolotti (2012). Neuroscience, continua and the prodromal phase of psychosis. Vulnerability to psychosis: from psychopathology to neurosciences. Edited by P. Fusar-Poli, S. Borgwardt and P. K. McGuire, Routledge: Oxford. 1-22.

Broome, M., & Fusar-Poli, P. (2012). Philosophical issues in the prodromal phase of psychosis. *Current Pharmaceutical Design*, 18(4), 596-605. doi:[10.2174/138161212799316190](https://doi.org/10.2174/138161212799316190)

Carletti, F., Woolley, J. B., Bhattacharyya, S., Fusar Poli, P., Valmaggia, L., Broome, M. R., . . . Perez-Iglesias, R. (2012). Alterations in white matter evident before the onset of psychosis. *Schizophrenia Bulletin*, 38(6), 1170-1179. doi:[10.1093/schbul/sbs053](https://doi.org/10.1093/schbul/sbs053)

Fifield, P., & Broome, M. (2012). Intimations of immortality. *Philosophy, Psychiatry and Psychology*, 19(2), 141-144. doi:[10.1353/ppp.2012.0017](https://doi.org/10.1353/ppp.2012.0017)

Lord, L.-D., Expert, P., Howes, O., Turkheimer, F. E., Allen, P., Fusar-Poli, P., . . . Broome, M. (2012). Functional brain networks before the onset of psychosis: A prospective fMRI study with graph theoretical analysis. *NeuroImage: Clinical*, 1(1), 91-98. doi:[10.1016/j.nicl.2012.09.008](https://doi.org/10.1016/j.nicl.2012.09.008)

Shaikh, M., Valmaggia, L., Broome, M. R., Dutt, A., Lappin, J., Day, F., . . . Bramon, E. (2012). Reduced mismatch negativity predates the onset of psychosis. *Schizophrenia Research*, 134(1), 42-48. doi:[10.1016/j.schres.2011.09.022](https://doi.org/10.1016/j.schres.2011.09.022)

Stoyanov, D., Stanghellini, G., & Broome, M. (2012). Conceptual issues in psychiatric neuroimaging: An update. *Current Topics in Medicinal Chemistry*, 12(21), 2348-2356.

2011

Fusar-Poli, P., Stone, J. M., Broome, M. R., Valli, I., Mechelli, A., McGuire, P. K., . . . McLean, M. A. (2011). Thalamic glutamate levels as a predictor of cortical response during executive functioning in subjects at high risk for psychosis. *Archives of General Psychiatry*, 68(9), 881-890.
doi:[10.1001/archgenpsychiatry.2011.46](https://doi.org/10.1001/archgenpsychiatry.2011.46)

Fusar-Poli, P., Crossley, N., Woolley, J., Carletti, F., Perez-Iglesias, R., Broome, M., . . . McGuire, P. (2011). White matter alterations related to p300 abnormalities in individuals at high risk for psychosis: An MRI-EEG study. *Journal of Psychiatry and Neuroscience*, 36(4), 239-248. doi:[10.1503/jpn.100083](https://doi.org/10.1503/jpn.100083)

Fusar-Poli, P., Crossley, N., Woolley, J., Carletti, F., Perez-Iglesias, R., Broome, M., . . . McGuire, P. (2011). Gray matter alterations related to P300 abnormalities in subjects at high risk for psychosis: Longitudinal MRI-EEG study. *NeuroImage*, 55(1), 320-328. doi:[10.1016/j.neuroimage.2010.11.075](https://doi.org/10.1016/j.neuroimage.2010.11.075)

Fusar-Poli, P., Broome, M. R., Woolley, J. B., Johns, L. C., Tabraham, P., Bramon, E., . . . Williams, S. C. (2011). Altered brain function directly related to structural abnormalities in people at ultra high risk of psychosis: Longitudinal VBM-fMRI study. *Journal of Psychiatric Research*, 45(2), 190-198.
doi:[10.1016/j.jpsychires.2010.05.012](https://doi.org/10.1016/j.jpsychires.2010.05.012)

Fusar-Poli, P., Howes, O. D., Allen, P., Broome, M., Valli, I., McGuire, P., . . .

Grasby, P. M. (2011). Abnormal prefrontal activation directly related to pre-synaptic striatal dopamine dysfunction in people at clinical high risk for psychosis. *Molecular Psychiatry*, 16(1), 67-75. doi:[10.1038/mp.2009.108](https://doi.org/10.1038/mp.2009.108)

Fusar-Poli, P., Broome, M. R., Matthiasson, P., Woolley, J. B., Mechelli, A., Johns, L. C., . . . Williams, S. C. (2011). Prefrontal function at presentation directly related to clinical outcome in people at ultrahigh risk of psychosis. *Schizophrenia Bulletin*, 37(1), 189-198. doi:[10.1093/schbul/sbp074](https://doi.org/10.1093/schbul/sbp074)

Wuyts, P., McGuire, P., & Broome, M. (2011). Assessing the mental state through a blog: Psychiatry in the 21st century?. *Psychiatrist*, 35(10), 361-363. doi:[10.1192/pb.bp.110.030825](https://doi.org/10.1192/pb.bp.110.030825)

2010

Broome, M. R., Fusar-Poli, P., Matthiasson, P., Woolley, J. B., Valmaggia, L., Johns, L. C., . . . Chitnis, X. (2010). Neural correlates of visuospatial working memory in the at-risk mental state. *Psychological Medicine*, 40(12), 1987-1999. doi:[10.1017/S0033291710000280](https://doi.org/10.1017/S0033291710000280)

Broome, M., & Bortolotti, L. (2010). What's wrong with mental disorders?.

Psychological Medicine, 40(11), 1783-1785. doi:[10.1017/S0033291709992352](https://doi.org/10.1017/S0033291709992352)

Broome, M. R., Bortolotti, L., & Mamelì, M. (2010). Moral responsibility and mental illness: A case study. *Cambridge Quarterly of Healthcare Ethics*, 19(2), 179-187. doi:[10.1017/S0963180109990442](https://doi.org/10.1017/S0963180109990442)

Broome, M. R., Matthiasson, P., Fusar-Poli, P., Woolley, J. B., Johns, L. C., Tabraham, P., . . . Chitnis, X. (2010). Neural correlates of movement generation in the 'at-risk mental state'. *Acta Psychiatrica Scandinavica*, 122(4), 295-301. doi:[10.1111/j.1600-0447.2009.01524.x](https://doi.org/10.1111/j.1600-0447.2009.01524.x)

Fusar-Poli, P., Broome, M. R., Matthiasson, P., Woolley, J. B., Johns, L. C., Tabraham, P., . . . Williams, S. C. (2010). Spatial working memory in individuals at high risk for psychosis: Longitudinal fMRI study. *Schizophrenia Research*, 123(1), 45-52. doi:[10.1016/j.schres.2010.06.008](https://doi.org/10.1016/j.schres.2010.06.008)

Fusar-Poli, P., Broome, M., & Stanghellini, G. (2010). From Brentano to mirror neurons: Bridging phenomenology and clinical neuroscience. *Psychiatry Research - Neuroimaging*, 183(3), 245-246. doi:[10.1016/j.pscychresns.2010.02.002](https://doi.org/10.1016/j.pscychresns.2010.02.002)

Fusar-Poli, P., Howes, O. D., Allen, P., Broome, M., Valli, I., McGuire, P. K., . . .

Grasby, P. M. (2010). Abnormal frontostriatal interactions in people with prodromal signs of psychosis: A multimodal imaging study. *Archives of General Psychiatry*, 67(7), 683-691. doi:[10.1001/archgenpsychiatry.2010.77](https://doi.org/10.1001/archgenpsychiatry.2010.77)

Johns, L. C., Allen, P., Valli, I., Winton-Brown, T., Broome, M., Woolley, J., . . .

McGuire, P. (2010). Impaired verbal self-monitoring in individuals at high risk of psychosis. *Psychological Medicine*, 40(9), 1433-1442.

doi:[10.1017/S0033291709991991](https://doi.org/10.1017/S0033291709991991)

Pretorius, J. L., Albeniz, A., & Broome, M. (2010). Olive Tree community treatment centre for individuals with personality disorder: Naturalistic service evaluation. *Psychiatrist*, 34(1), 12-20. doi:[10.1192/pb.bp.108.023192](https://doi.org/10.1192/pb.bp.108.023192)

2009

Benetti, S., Mechelli, A., Picchioni, M., McGuire, P., Broome, M., & Williams, S. (2009). Functional integration between the posterior hippocampus and prefrontal cortex is impaired in both first episode schizophrenia and the at risk mental state. *Brain*, 132(9), 2426-2436. doi:[10.1093/brain/awp098](https://doi.org/10.1093/brain/awp098)

Bortolotti, L., & Broome, M. (2009). A role for ownership and authorship in the analysis of thought insertion. *Phenomenology and the Cognitive Sciences*, 8(2), 205-224. doi:[10.1007/s11097-008-9109-z](https://doi.org/10.1007/s11097-008-9109-z)

Broome, M. and L. Bortolotti (2009). "Mental illness as mental: in defence of psychological realism." *Humana Mente*(11): 25-43.

Broome, M. and H. Carel (2009). "The Ubiquity of Moods." *Philosophy, Psychiatry, and Psychology* 16(3): 267-271.

M Broome and L Bortolotti (eds.) (2009). *Psychiatry as Cognitive Neuroscience: Philosophical Perspectives*. International Perspectives in Philosophy and Psychiatry series, Oxford University Press.

Broome, M. R., Matthiasson, P., Fusar-Poli, P., Woolley, J. B., Johns, L. C., Tabraham, P., . . . Chitnis, X. (2009). Neural correlates of executive function and working memory in the 'at-risk mental state'. *British Journal of Psychiatry*, 194(1), 25-33. doi:[10.1192/bjp.bp.107.046789](https://doi.org/10.1192/bjp.bp.107.046789)

Crossley, N. A., Mechelli, A., Fusar-Poli, P., Broome, M. R., Matthiasson, P., Johns, L. C., . . . Williams, S. C. R. (2009). Superior temporal lobe dysfunction and frontotemporal dysconnectivity in subjects at risk of psychosis and in

first-episode psychosis. *Human Brain Mapping*, 30(12), 4129-4137.

doi:[10.1002/hbm.20834](https://doi.org/10.1002/hbm.20834)

Fusar-Poli, P., Broome, M., Barale, F., & Stanghellini, G. (2009). Why is psychiatric imaging clinically unreliable? Epistemological perspectives in clinical neuroscience. *Psychotherapy and Psychosomatics*, 78(5), 320-321.

doi:[10.1159/000229771](https://doi.org/10.1159/000229771)

Fusar-Poli, P., Howes, O., Valli, I., Allen, P., Broome, M., Grasby, P., . . .

McGuire, P. (2009). Multimodal functional imaging investigation before and after the onset of psychosis. *International Journal of Neuropsychopharmacology*, 12(4), 579-581. doi:[10.1017/S146114570800953X](https://doi.org/10.1017/S146114570800953X)

Harland, R., Owen, G. S., Murray, R., Antonova, E., Broome, M., Landau, S., . . . Deeley, Q. (2009). A study of psychiatrists' concepts of mental illness. *Psychological Medicine*, 39(6), 967-976. doi:[10.1017/S0033291708004881](https://doi.org/10.1017/S0033291708004881)

Howes, O. D., Montgomery, A. J., Asselin, M.-C., Murray, R. M., Valli, I., Tabraham, P., . . . Grasby, P. M. (2009). Elevated striatal dopamine function linked to prodromal signs of schizophrenia. *Archives of General Psychiatry*, 66(1), 13-20. doi:[10.1001/archgenpsychiatry.2008.514](https://doi.org/10.1001/archgenpsychiatry.2008.514)

Valmaggia, L. R., Woolley, J. B., Broome, M. R., Tabraham, P., Johns, L. C., Prescott, C., . . . Power, P. (2009). Economic impact of early intervention in people at high risk of psychosis. *Psychological Medicine*, 39(10), 1617-1626. doi:[10.1017/S0033291709005613](https://doi.org/10.1017/S0033291709005613)

Zányi, E., Broome, M., Singh, S., Selmanovic, E., Czanner, S., Chalmers, A., . . . Birchwood, M. (2009). Interactive highly realistic virtual reality as a tool for understanding the genesis and treatment of psychotic symptoms. *Studies in Health Technology and Informatics*, 144, 138-140. doi:[10.3233/978-1-60750-017-9-138](https://doi.org/10.3233/978-1-60750-017-9-138)

2008

Bortolotti, L., & Broome, M. R. (2008). Delusional beliefs and reason giving. *Philosophical Psychology*, 21(6), 821-841. doi:[10.1080/09515080802516212](https://doi.org/10.1080/09515080802516212)

Bramon, E., Shaikh, M., Broome, M., Lappin, J., Day, F., Woolley, J., . . . Sham, P. (2008). Abnormal P300 in people with high risk of developing psychosis. *NeuroImage*, 41(2), 553-560. doi:[10.1016/j.neuroimage.2007.12.038](https://doi.org/10.1016/j.neuroimage.2007.12.038)

Broome, M. R. (2008). "Philosophy as the Science of Values: South West NeoKantianism and Psychiatric Interviewing." *Philosophy, Psychiatry, and Psychology* 15(2): 107-116.

Fu, C. H. Y., Brammer, M. J., Yágüez, L., Allen, P., Matsumoto, K., Johns, L., . . . McGuire, P. K. (2008). Erratum to "Increased superior temporal activation associated with external misattributions of self-generated speech in schizophrenia" [Schizophrenia Research 100 (1-3) 361-363] (DOI:10.1016/j.schres.2007.10.023). *Schizophrenia Research*, 105(1-3), 384. doi:[10.1016/j.schres.2008.07.009](https://doi.org/10.1016/j.schres.2008.07.009)

Fu, C. H. Y., Brammer, M. J., Yágüez, L., Allen, P., Matsumoto, K., Johns, L., . . . van Haren, N. (2008). Increased superior temporal activation associated with external misattributions of self-generated speech in schizophrenia. *Schizophrenia Research*, 100(1-3), 361-363. doi:[10.1016/j.schres.2007.10.023](https://doi.org/10.1016/j.schres.2007.10.023)

2007

Beckford, L., & Broome, M. R. (2007). Ethics and the payment of research subjects. *Psychiatry*, 6(2), 83-85. doi:[10.1016/j.mppsy.2006.11.001](https://doi.org/10.1016/j.mppsy.2006.11.001)

Bortolotti, L. and M. R. Broome (2007). "If You Did Not Care, You Would Not Notice: Recognition and Estrangement in Psychopathology." *Philosophy, Psychiatry, and Psychology* 14(1): 39-42.

Broome, M. R., Johns, L. C., Valli, I., Woolley, J. B., Tabraham, P., Brett, C., . . .

Garety, P. A. (2007). Delusion formation and reasoning biases in those at clinical high risk for psychosis. *British Journal of Psychiatry*, 191(SUPPL. 51).

doi:[10.1192/bjp.191.51.s38](https://doi.org/10.1192/bjp.191.51.s38)

Fusar-Poli, P., Broome, M. R., Matthiasson, P., Williams, S. C. R., Brammer, M., & McGuire, P. K. (2007). Effects of acute antipsychotic treatment on brain activation in first episode psychosis: An fMRI study. *European Neuropsychopharmacology*, 17(6-7), 492-500. doi:[10.1016/j.euroneuro.2007.01.003](https://doi.org/10.1016/j.euroneuro.2007.01.003)

Fusar-Poli, P., & Broome, M. R. (2007). Love and brain: From mereological fallacy to "folk" neuroimaging. *Psychiatry Research - Neuroimaging*, 154(3), 285-286. doi:[10.1016/j.psychresns.2006.11.001](https://doi.org/10.1016/j.psychresns.2006.11.001)

Fusar-Poli, P., Politi, P., Barale, F., Broome, M., Borgwardt, S., McGuire, P., . . .

Veggiotti, P. (2007). Neurofunctional correlates of vulnerability to psychosis: A systematic review and meta-analysis. *Neuroscience and Biobehavioral Reviews*, 31(4), 465-484. doi:[10.1016/j.neubiorev.2006.11.006](https://doi.org/10.1016/j.neubiorev.2006.11.006)

Howes, O. D., Weinstein, S., Tabraham, P., Valmaggia, L., Broome, M., &

McGuire, P. (2007). Slang and schizophrenia. *British Medical Journal*, 335(7633), 1294.

Lappin, J. M., Morgan, K. D., Valmaggia, L. R., Broome, M. R., Woolley, J. B., Johns, L. C., . . . McGuire, P. K. (2007). Insight in individuals with an At Risk Mental State. *Schizophrenia Research*, 90(1-3), 238-244.

doi:[10.1016/j.schres.2006.11.018](https://doi.org/10.1016/j.schres.2006.11.018)

Picchioni, M., Matthiasson, P., Broome, M., McGuire, P., Giampietro, V., Brammer, M., . . . Williams, S. (2007). Medial temporal lobe activity at recognition increases with the duration of mnemonic delay during an object working memory task. *Human Brain Mapping*, 28(11), 1235-1250.

doi:[10.1002/hbm.20357](https://doi.org/10.1002/hbm.20357)

Valmaggia, L. R., Freeman, D., Green, C., Garety, P., Swapp, D., Antley, A., . . . McGuire, P. K. (2007). Virtual reality and paranoid ideations in people with an 'at-risk mental state' for psychosis.. *Br J Psychiatry Suppl*, 51, s63-s68.

doi:[10.1192/bjp.191.51.s63](https://doi.org/10.1192/bjp.191.51.s63)

2006

Broome, M. R. (2006). "Taxonomy and Ontology in Psychiatry: A Survey of Recent Literature " *Philosophy, Psychiatry, and Psychology* 13(4): 303-319.

Fusar-Poli, P., & Broome, M. R. (2006). Conceptual issues in psychiatric neuroimaging. *Current Opinion in Psychiatry*, 19(6), 608-612.

doi:[10.1097/01.yco.0000245750.98749.1b](https://doi.org/10.1097/01.yco.0000245750.98749.1b)

2005

Broome, M. R., Woolley, J. B., Tabraham, P., Johns, L. C., Bramon, E., Pariante, C., . . . Murray, G. K. (2005). What causes the onset of psychosis?. *Schizophrenia Research*, 79(1), 23-34. doi:[10.1016/j.schres.2005.02.007](https://doi.org/10.1016/j.schres.2005.02.007)

Broome, M. R., Woolley, J. B., Johns, L. C., Valmaggia, L. R., Tabraham, P., Gafoor, R., . . . McGuire, P. K. (2005). Outreach and support in south London (OASIS): Implementation of a clinical service for prodromal psychosis and the at risk mental state. *European Psychiatry*, 20(5-6), 372-378.

doi:[10.1016/j.eurpsy.2005.03.001](https://doi.org/10.1016/j.eurpsy.2005.03.001)

Broome, M. R. (2005). "Suffering and Eternal Recurrence of the Same: The Neuroscience, Psychopathology, and Philosophy of Time." *Philosophy, Psychiatry, and Psychology* 12(3): 187-194.

2004

Allen, P. P., Johns, L. C., Fu, C. H. Y., Broome, M. R., Vythelingum, G. N., & McGuire, P. K. (2004). Misattribution of external speech in patients with hallucinations and delusions. *Schizophrenia Research*, 69(2-3), 277-287.

doi:[10.1016/j.schres.2003.09.008](https://doi.org/10.1016/j.schres.2003.09.008)

Broome, M. R. (2004). A neuroscience of hysteria?. *Current Opinion in Psychiatry*, 17(6), 465-469. doi:[10.1097/00001504-200411000-00008](https://doi.org/10.1097/00001504-200411000-00008)

Bebbington, P. E., & Broome, M. R. (2004). Exploiting the interface between philosophy and psychiatry. *International Review of Psychiatry*, 16(3), 179-183. doi:[10.1080/09540260400003834](https://doi.org/10.1080/09540260400003834)

Broome, M. R. (2004). "The Rationality of Psychosis and Understanding the Deluded." *Philosophy, Psychiatry, and Psychology* 11(1): 35-41.

2003

Kuperberg, G. R., Goff, D., Ozawa, F., Van der Kouwe, A. J. W., Salat, D. H., Dale, A. M., . . . West, W. C. (2003). Regionally localized thinning of the cerebral cortex in schizophrenia. *Archives of General Psychiatry*, 60(9), 878-888. doi:[10.1001/archpsyc.60.9.878](https://doi.org/10.1001/archpsyc.60.9.878)

2001

Kircher, T. T. J., Broome, M. R., Murray, R. M., McGuire, P. K., Bulimore, E. T., Brammer, M. J., . . . Williams, S. C. R. (2001). Differential activation of temporal cortex during sentence completion in schizophrenic patients with and without formal thought disorder. *Schizophrenia Research*, 50(1-2), 27-40. doi:[10.1016/S0920-9964\(00\)00042-6](https://doi.org/10.1016/S0920-9964(00)00042-6)

1994

Broome, M. R., Collingridge, G. L., & Irving, A. J. (1994). Activation of the NO-cGMP signalling pathway depresses hippocampal synaptic transmission through an adenosine receptor-dependent mechanism. *Neuropharmacology*, 33(11), 1511-1513. doi:[10.1016/0028-3908\(94\)90056-6](https://doi.org/10.1016/0028-3908(94)90056-6)

Appendix 2: full text copies of published works submitted for degree