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Cognitive Sciences and Medieval Studies breaks ground on very important, yet controversial, territory. As its title indicates, this volume primarily explores what we might call the principles of the mind or brain in European medieval society, in unique ways. The editorial introduction defines cognitive sciences as ‘an interdisciplinary field for the study and understanding of the mind’ (p.3) a broad concept, which is expanded even further when it is applied and compared to a long historical period. The diversity of the field of medieval studies would make it particularly challenging to apply ideas from the field of cognitive sciences with a uniform methodology, but contributors resolve this by embracing a variety of disciplines and approaches, demonstrating convincingly that these can be used to understand more about the composition and functioning of the medieval brain. The authors in this edition have experimented within a number of subject areas by bringing them into contact with specific findings in the field(s) of cognitive sciences, making their findings accessible to a broad audience. What this volume primarily advocates, is the need to bridge the gap between modern cognitive sciences and the humanities, in order to shed light on the medieval mind and experience.

A clear and systematic introduction explains the aims and scope of this ambitious project: the endeavour ‘to inspire scholars within the humanities to engage with the tools and investigative methodologies deriving from cognitive sciences, while at the same time striving to address the estrangement that still persists between the sciences and the humanities [...]’ (p.6). The editors are critical of the traditional divide between STEM and the humanities, whilst presenting philosophy and neuroscience as a historically logical and useful combination.

Nonetheless, important warnings are raised in the editorial introduction on the subject of neuro-humanities. The editors and many of the contributors emphasise their awareness that there is a risk in applying biological facts discovered with modern technologies, in order to explain social-historical phenomena. The concept ‘neuro-mania’ describes the tendency to explain all kinds of (historical) mental experiences by looking at modern data of the human brain and this practice is criticised. The neuro-centred approach is potentially problematic, as the introduction to the volume suggests, because there is limited surviving biological evidence for us to investigate from the medieval period. Indeed, there is no living medieval brain available to place under a scanner, no living mind to psycho-analyse and no hormone levels to measure.

One of the contributors, Matthew Rampley, devotes his essay ‘Questions of Value’, to a serious warning against the application of modern neuroscience into the field of the arts and humanities. He explains in detail what modern technologies in the field of neuroscience exactly entail, what the difficulties are in interpreting results of MRI readings (even in a modern context) and which misunderstandings have occurred over concepts such as mirror neurons. This compelling and urgent warning to handle neuroscientific data carefully leaves us to wonder what types of data in the field of cognitive sciences *are* suitable for application in the field of humanities and specifically, medieval studies?

There are methods to access the medieval mind that are considered to be more productive by the contributors of this volume and which do not rely so heavily on the technical tools of modern neuroscience. The editors suggest inclusion of ‘embodied cognition’, or anti-Cartesianism, which locates cognition in the world (p.8). This approach is visible in several of the essays, in which social and material environment are taken into account. An example is Godelinde Gertrude Perk’s article on what the effects of particular material culture could be on cognition, by studying the similarities between needlework and knitting compared to the writing of Julian of Norwich. Perk’s findings suggest that medieval brains, engaged in these practices, actually functioned differently from modern brains. Equally, in one of the most precise and persuasive contributions, Victoria Blud looks at E4 cognition, and unequivocally demonstrates the usefulness of certain modern models in the study of the medieval period. E4 cognition holds that the brain is not the sole centre of cognition, but that the body and

external data also affect it. Blud particularly focuses on extended cognition in the medieval period and on confession as an extended cognitive process.

Several other strategies taken by the contributors are clustered in the sections entitled 'Questions of Method' and various groups of different types of case studies. These are separated into Case Studies focussing on: 'Histories of Neuroscience, Psychology and Mental Illness'; 'Reading Texts and Minds' (of which Blud and Perk are part); and 'Case Studies: Approaching Art and Artefacts'. The section 'Questions of Method' presents some discussions about methods by which various modern theories on the mind can be compared or applied to medieval ones.

This is what José Filipe Silva endeavours in his essay, 'How Modular are Medieval Cognitive Theories?' in which he compares a contemporary theory on the modularity of the mind to medieval faculty psychology (focussing on encapsulation of faculty and domain specificity). Medieval faculty psychology here is primarily studied in an Aristotelian scheme through Avicenna and the contemporary modularity theory of Jerry Fodor. This direct comparison confirms a considerable similarity between the two theories, giving us some insight into the dominant ways of thinking about the brain in both periods. Nonetheless, the selection of Fodor's theory of mind as a 'contemporary' theory raises some questions. Silva selects him because his model became the standard in modularity of mind theory and because of his place in the tradition of faculty psychology, yet it was formulated in the early 1980s, after which our knowledge of the brain changed markedly, and it is now generally considered to be a flawed representation of the brain.

This first article of the volume leads me to what is perhaps the most important question in this endeavour. How recent and accurate do our contemporary sources on cognitive sciences need to be? Neuroscience, psychological theories and diagnoses are frequently subject to change (see for example the frequent updates of the DSM) is this an unsteady anchor to hold on to when we search for explanations of behaviour in the past?

Instead of primarily considering a 'contemporary' or modern theory on the mind, Ralph W. Hood Jr's paper centres around William James' Common Core principle, particularly in relation to medieval mysticism. Hood suggests that modern science can contribute much more to our understanding of medieval Christianity if researchers also expand their fields of study to become more interdisciplinary and/or engage in dialogue with the humanities.

Correspondingly, in a thought-provoking article, Daniel Lord Smail argues further in favour of the combination of history and neuroscience as he focuses on environment and epigenetics. Smail's paper is primarily centred on the neurological appearance of stress and the correlations it has with historical occurrences of violence. He explains that, 'although we cannot 'see' stress hormones in the historical record, we can plausibly infer the presence of stress in situations involving violence, humiliation and poverty. Stress is interesting as a historical subject because it allows us to write a human history framed in the context of an ongoing dialectic between the stress-response system on the one hand and human institutions, practices and patterns of behaviour on the other' (p.85). True though this may be, this statement sets the tone for his essay, in which the cause-and-effect relationship between stress and violence remains somewhat oblique.

The case studies sections may feel like the most comfortable territory in this edition to readers with a background in the humanities. Cognitive approaches here are embedded in solid analysis of primary sources. Juliana Dresvina's paper in particular allows for an important and well-argued leap into the psychological study of attachment theory, applied to personal relationships and relations to God of figures such as Julian of Norwich and Margery Kempe. This essay illuminates with a fascinating study how a relatively modern psychological concept can be seen to function in a very different way and context, whilst remaining intimately close to the original source material. Another comparison between psychological theories from different periods is made in Wendy J. Turner's essay, where she argues that 'medieval constructions of mental health categories run parallel to ideas about

mental health today' (p. 97). A structured comparison gives insight into this concept of 'parallel diagnosing', in which symptoms are compared using selected 'neutral' terminology-Turner looks at causes and symptoms, primarily in a legal context. She shows the difficulty of interpreting the meaning of certain descriptions, while demonstrating that concepts of mental illness, which are similar to ours, existed in the medieval period. Antonina Harbus takes us through the early medieval mind in Old English poetry, where she takes a surprising new angle and looks at emotional experience triggered in a modern reader, rather than a medieval one. This interesting piece questions whether readers of such poetry are affected by this type of narrative in the same way, over time.

A somewhat different type of case study is found in the final cluster of the volume, 'Approaching Art and Artefacts'. This section holds two articles about material culture, the first of which, by Nadia Pawelchak, explores neuroscientific responses-particularly using mirror neurons-to 14th century artwork. Although she takes a bold approach in this demonstration of cognitive-medieval methodology, Pawelchak also advises caution and discusses various techniques for applying neuroscientific data in the field of art history. Jeff Rider considers the effects of spoons and whorls on cognitive processes in the past, and looks especially at processes stimulated by physical engagement with artefacts. The informal and informative journey Rider takes us on in this last contribution of the volume is a delightful and unusual final case study.

These case studies show us how a particular comparison can be made between contemporary science and an element of medieval studies, whilst still prioritising textual or material analysis from original medieval sources. Despite the warnings expressed in the introduction with regards to the projection of neuroscience on medieval subjects, it appears that some risk needs to be taken in order to make progress in this new field of study. I previously questioned whether fast-paced research and changeable contemporary information from the field of cognitive sciences can perhaps be somewhat unstable when applied to the field of humanities. This volume contains some dated stereotypes on endocrine and nervous systems, which are then applied to the medieval period. Examples are a section about the hormone testosterone as an instigating factor in the history of violence (p.90) and outdated symptoms of mental illness (p.106). These descriptions have once been part of the cognitive sciences and while it is logical that some traces may survive, it may be hard to untangle them once they have been applied to medieval studies. One is also concerned about the risk of over-diagnosing, e.g. various kinds of mental illness are applied to situations of male violence (p.108). Although this analysis is based on primary sources, perhaps social context and inequality are factors to be considered as well. It may not be possible to create enduring studies using the ever-changing data from cognitive sciences, but awareness and acknowledgement of this can still make them valuable contributions to the field of medieval studies.

The selection of essays overall contains an impressive, broad scope of significant topics, which creates new perspectives, not only on specific elements in the field of medieval studies, but also on the methodologies applied. John Onians' afterword contains a positive and stimulating analysis of the papers in this volume and his diverting response to Rampley's critical take on neuro-humanities gives us an indication of the ongoing conversations it provokes on the study of (and insight into) the medieval mind. Throughout the reading experience of this edition, the reader is given a clear sense of the necessity of the publication and the avenues it presents for future research. The edition succeeds in making mental states in the past more tangible, concrete and quantitative, though it occasionally risks moving in the direction of 'neuro-mania' by some overly enthusiastic applications of cognitive science to the medieval brain. Are humanities scholars (even with state-of-the-art neuro-scientific tools) really the right people to ask questions about hard-wired and soft-wired brains, epigenetic anthropology and medical diagnoses?

From a medievalist perspective, the overriding question we are left with is this: does finding modern cognitive explanations help us to understand medieval society and the medieval mind

better? The volume leads the reader to the conclusion that it does and is persuasive that many of the approaches used are both valid and useful. It brings with it however a sense of anticipation of the debate upon whether techniques which combine cognitive science and medieval studies are fully consolable and satisfactory. The range of medieval sources and voices are at risk of becoming somewhat overpowered by the administration of modern cognitive knowledge. It occasionally leaves us with a sense that the people from this period are not our sources but our patients, whose own thoughts on their mental world and wellbeing are thereby neglected. We see that usually only the most extreme cases of mental illness are documented and portrayed with a specific agenda; by concentrating mostly on the medical side of this, we risk forgetting the context.

The combination of cognitive sciences and medieval studies is in many ways still underdeveloped and it will take time and experimentation to find out which methods are most successful. Juliana Dresvina says it best when she states, 'here we specialise in probing, not proving' (p.135). This volume is a very impressive example of such probing. There is much left to discover about medieval minds, and *Cognitive Sciences and Medieval Studies* has opened a wealth of methodological routes to follow. I do not doubt that scholars working in this field will be inspired by the works in this volume.