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## BOOK REVIEW - RECENSION DE LIVRE

KELLY A. JOYCE, *Magnetic Appeal: MRI and the Myth of Transparency*. Ithaca, NY: Cornell University Press, 2008, viii + 198 p., index.

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*Magnetic Appeal* is an enjoyable and thoroughly researched book about magnetic resonance imaging (MRI), a technology reputed to be the most sophisticated diagnostic imaging tool available to contemporary medicine. In the popular imagination MRI appears to take pictures of internal anatomy. Nevertheless, as Kelly Joyce shows, this seemingly magical accomplishment is a complex social achievement that depends upon cultural, material, and economic factors.

Though a sociologist, Joyce also identifies herself as a science and technology studies (STS) scholar. Exemplifying a particular STS style, Joyce follows her object – MRI – through the range of settings that have given it form. Over seven years, she interviewed the physicists and chemists who created MRI, conducted ethnographic studies of MRI units in clinics and hospitals, attended MRI related conferences, and analyzed cultural representations of MRI. The book will certainly appeal to sociologists interested in science, medicine, and processes of biomedicalization. However, given its breadth, it will also appeal to sociologists in a variety of subspecialties. Sociologists of work will be interested in Joyce's analysis of the hierarchies and assembly-line production found in MRI clinics. Political economists will appreciate Joyce's description of the relationship between the biomedical industry and the astounding growth in MRI use. Cultural sociologists will recognize the narrative and semiotic techniques that Joyce uses to reveal the diverse meanings of MRI. Despite the range of topics covered, Joyce's central accomplishment is to show how MRI has become a central figure in the production of biomedical knowledge.

In the tradition of Bruno Latour and Donna Haraway, Joyce argues that the machine has come to act as an agent in itself, possessing superhuman powers of diagnosis and cure. Everyday and professional language portrays the machine, rather than its user, as an agent capable of finding and revealing disease. The most important effect of treating the MRI as an agent is to render objective the knowledge produced through MRI. MRI's claim to objectivity is buttressed by its association with visual knowledge. Indeed, Joyce's central argument is that MRI participates in, and produces, what she calls the "visual turn" in Western culture. A process central to the

construction of reality in modernity and postmodernity, the visual turn elevates visibility and transparency to the realm of uncontested truth. In opposition to this valorization of the visual, Joyce claims that MRI “images do not *reveal* the inner body, but instead *produce* the inner body” (48). Here is where we find the most useful contributions of Joyce’s study. She argues that MRI is successful because of its appeal to visuality, but then shows that the visuality of MRI is tremendously unstable. The truth telling capacity of MRI, and its product, a picture of the inner body, is an ongoing accomplishment that depends upon making invisible the techniques of its own production.

Contrary to the popular view, MRI does not use a lens, or any analogous instrument to take pictures of the body. Instead, the production of the image depends upon a translation from numbers to images. As a nuclear technology, the science of MRI dates to the physicist Wolfgang Pauli’s work in the 1920s on nuclear spin and magnetic fields. Though in its early applications, physicists used MRI to mathematically describe the movement of nuclei, when MRI finally came under the control of radiologists, the machine was used to produce visual images. Indeed, by the 1980s MRI machines had built into them the mathematical formulas required to transform numbers into pictures, thereby making the pictorial imagery provided by MRI appear automatic and natural – a mere snapshot of the insides.

But even with these procedures black-boxed, the meaning of the images is not automatic or transparent. In chapter three Joyce describes a number of the interpretive problems faced by MRI technicians and radiologists. Images never come out picture-perfect. Radiologists must be able to distinguish visual anomalies produced by the machine from actual indications of illness and disease. The term “cross talk” refers to white dots created when technicians place sections of the body being measured too close to one another. The terms “old friends” and “unidentified bright objects” refer to parts of the image that radiologists can’t explain but nevertheless know are not relevant to the diagnosis at hand. Radiological expertise, then, depends upon recognizing when a visual artifact is indicative of disease, and when it is irrelevant. These distinctions aren’t given by the image, but depend upon a tacit knowledge of the entire process of image production. Joyce’s description of the processes that go into the production and interpretation of the image demonstrate two important points. First, even though the MRI gains its authority through an appeal to visuality, the final images are social constructions that depend upon decisions about how to represent and convey the inner body. Second, in revealing the mechanisms behind the production of images, Joyce returns to radiologists and technicians the expertise that is part and parcel of their work. The MRI depends as much upon the social practices of its users as the users depend upon the superhuman capacities of the MRI.

Despite Joyce’s efforts to ground MRI in social practices, she ultimately treats it as a machine that is out of control. MRI has become a social problem. For Joyce, out of control means a few things. For one, its status as truth-telling machine drives the desire for the production and use of MRI images. This is connected to political economic processes. Particularly in the United States, MRI generates income for the producers of the machines (GE, Hitachi, Phillips, Siemens, Toshiba) and for the clinics that own machines. Insurance companies pay on a fee-for-service basis between 400 and 1000 dollars per image. As a result of the profit incentive MRI diagnoses are called upon when there is no clear need. This not only raises the expense of health care, but also places pressure on technicians and radiologists to put as many bodies through the machine

as possible. This compromises the ethic of care and compassion valued by most medical professionals. Further, the obsessive use of MRI undercuts other forms of medical knowledge. One of the most interesting discussions comes in the conclusion when Joyce considers alternative modalities of biomedical knowledge. What kind of medical knowledges could we produce if we departed from the visual and relied upon the sense of smell, or touch, or hearing? The best medical system, she suggests, would rely upon knowledges from all sensory modalities.

What more could a reader ask of Joyce? Despite the examination of a variety of users and sites, one kind of user is conspicuously absent: the patients who are inserted into the machines. We get a sense of what they might add to the story when Joyce refers to physicians' experiences of their own encounters with MRI: "You are really enclosed. It's noisy. Buzzing and things. Growling" (83). Despite knowledge of the processes behind the production of the image, the physician is overwhelmed by the machine. This contributes to MRI's status as an agent-in-itself. How much more interesting, and powerful, these descriptions would be if they came from patients encountering the machines for the first time?

It's also important to note that Joyce's study focused on MRI use in the United States. How does Joyce's study translate into the Canadian context? According to a Canadian Institute of Health Research Report (*Medical Imaging in Canada, 2007*), at six scanners/million of the population Canada falls below the median of OECD countries (well above the median, the US has 26 scanners/million). It is well-known that there is constant pressure on Canadian governments to increase access and shorten MRI wait times. At present, in Canada, MRI clinics are one of the medical services permitted to operate as fully private clinics (18% of MRI machines are in private stand-alone clinics). Given the expense of MRI, it is tempting to further expand private MRI use. The fear, of course, is that this system allows for queue jumping, and gives rise to conflicts of interest in which physicians make referral decisions on the basis of economic gain rather than patient need. Indeed, here we see the political economic problems outlined by Joyce in embryonic form: a system of diagnosis driven to expand for economic rather than health reasons.

On this, Joyce's book makes an important point. Canadians, just as much as Americans, are constituted through the visual turn. MRI appeals to Canadians because it promises an outstanding form of truth. Joyce's point is that despite this appeal, MRI doesn't make a big difference in quality of health care. In most cases MRI only confirms what other kinds of diagnoses already indicate. In fact, in one of Joyce's two references to Canada, she points out that even though MRI is used less frequently in Canada than the US, Canada ranks higher in overall health indicators. Given the cost of MRI to the medical system, and the threat it poses to equitable, publicly funded health care, Canadians would be well-advised to consider Joyce's book before insisting on the expansion of MRI, either privately or publicly.

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