

A DIGITAL IMAGE OF THE CATEGORY OF THE PERSON / PET Scanning and Objective Self-Fashioning / Joseph Dumit

Probably one of the most important initiatives we have ever undertaken [at the National Institute for Neurological Communicative Diseases and Stroke] is our support for positron emission tomography (PET), an intriguing new research technique . . . With PET we will be able to examine what happens functionally, in the living human brain, when a person speaks, hears, sees, thinks. The potential payoffs from this technique are enormous.

—Donald B. Tower

We must learn to distinguish it [the body in which I live and experience, just as I live and experience it] from the objective body as set forth by physiology. This is not the body which is capable of being inhabited by a consciousness.

—Maurice Merleau-Ponty

MARCEL MAUSS AND OTHERS FOLLOWING HIM argued that the basic human unit, "the person," is a cultural category with different attributes—rationality, agency, participation, gender divisions, and so forth—for different cultures in different times and places (Mauss 1985; see also Carrithers, Collins, and Lukes 1985; Geertz 1973; Strathern 1988, 1992). For Mauss and his successors, ("the person" is a category stuffed into a physical body but independent of the body's physicality.) They argue as if each culture or historical period has its own category of the person. Other anthropologists have been more troubled by the findings of medicine and neuroscience. Victor Turner, for instance, once expressed great difficulty in keeping up with the latest findings:

This is because I am having to submit to question some of the axioms anthropologists . . . were taught to hallow. These axioms express the belief that all human behavior is the result of social conditioning. Clearly a very great deal of it is, but gradually it has been borne home to me that there are inherent resistances to conditioning. (Turner 1983:221)

Turner is describing how new facts from medicine and neuroscience disturb his notion of personhood and personal behavior. (What kinds of biological limitations are built into our brains—limitations on, for example, personality, sexuality, violence, mental illness—that might resist being changed by society?)

Facing these facts requires reimagining what kinds of persons humans are. How do we as anthropologists and other scholars understand our bodies?¹ How do we put together the facts of science and medicine that we read in the *New York Times* and receive from our doctors with the role of culture in our constitution? In anthropological terms, I am interested in how facts come to play a role in our everyday category of the person. MI

Medical anthropologists have long faced the relation between what Merleau-Ponty called our objective body and our lived body, or our person, with a variety of more subtle analyses. For clinical medical anthropology, oriented around the question of efficacy (the lived body (cultural) and the objective body (physiological) have initially different causes but mutually influence each other throughout development.) For example, physiological diseases are often inseparable from cultural variables like political violence, discrimination, housing conditions, poverty, and diet (Desjarlais 1995; Farmer 1992; Kleinman 1986; Kleinman and Good 1985; Rhodes 1991; Romanucci-Ross, Moerman, and Tancredi 1991). In spite of this flexibility, each culture is ultimately assigned its "body" that is lived and explained in relation to an objective body, which provides the touchstone of cross-cultural comparison and criticism. Change in the category of the person is not well attended to. Instead, categories are often explained as a reflection of changes in other spheres of society: economics, politics, colonization, and religion (see Carrithers, Collins, and Lukes 1985). crit

Other medical anthropologies, some sociologies of medicine, and the history of science and medicine take a different approach. Instead of viewing the experience of health and illness as variable, the "objective body" is understood to be culturally and historically contingent the object of a scientific and medical gaze that changes with the times and according to discipline, site, culture, and circumstance (Farquhar 1992; Manning and Fabrega 1973; Saunders 1989; Taussig 1992, 1993). These approaches regard the objective body as varying with the development (positive or negative) of technoscientific culture and examine how the historical-cultural category of the person (via politics, economics, etc.) influences the evaluation of the objective body (Canguilhem 1989; Foucault et al. 1988; Gilman 1988; Terry 1989). The objective body and the experienced body remain side by side, both variable, but analytically separate.²

Focusing on brain theories and brain images, this paper begins to explore the way that facts and categories of persons are produced, proved, contested, and lived—in other words, how they are at stake in social interactions. It treats the emergence and maintenance of categories of persons as a dialectical process involving expert-researchers, mediators (such as science writers, anthropologists, popular psychologists, and mass mediators), and laypersons.³ I am interested in the question, How do mutations in our categories of the person happen?

Given the unevenness of scientific knowledge and our dependence on its authority for self-knowledge, is it possible that local mutations in categories of persons take place daily, that they are contested within American cultures because they are lived and not just known? Building up a dynamic notion of the category of the person—objective self-fashioning—I first examine a best-selling account by a psychiatrist of how his patients learned to reconfigure their notions of core personalities through attending to how the drug Prozac altered their physiology. Next I turn to a popular movie in which a brain-imaging technol-

ogy, PET scanning, is used to decide whether or not a murderer is insane. Finally, I look to the operation of a small PET center where images of mental illness as located in brains, and therefore biological, are sought out by sufferers and their families. In each case I am concerned with understanding how the circulation of evidence—first-hand experiences, reports, newspaper articles, movies, interviews—helps to form and reform human possibilities and probabilities. Each of these examples proposes a biomedical answer to uncertainty and anxiety over human nature by evoking the citadel of scientific certainty. One question I would like to answer, but cannot, is what would constitute final certainty with regard to human nature. evi
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Living with the Facts: Prozac

In his recent nonfiction bestseller, *Listening to Prozac*, psychiatrist Peter Kramer begins with the following story. Kramer is visited by a patient, Sam, who suffers from a brooding depression following the death of his parents. Kramer first prescribes an antidepressant that does not seem to have an effect. He then proposes Prozac, which Sam agrees to try.

The change, when it came, was remarkable: Sam not only recovered from his depression, he declared himself "better than well." He felt unencumbered, more vitally alive, less pessimistic. Now he could complete projects in one draft, whereas before he had sketched and sketched again. His memory was more reliable, his concentration keener. Every aspect of his work went more smoothly. He appeared more poised, more thoughtful, less distracted . . . Though he enjoyed sex as much as ever, he no longer had any interest in pornography. He experienced this change as a loss. The style he had nurtured and defended for years now seemed not a part of him but an illness. What he had touted as independence of spirit was a biological tic. In particular, Sam was convinced that his interest in pornography had been mere physiological obsessiveness . . . This one aspect of his recovery was disconcerting, because the medication redefined what was essential and what was contingent about his own personality—and the drug agreed with his wife when she was being critical. Sam was under the influence of medication in more ways than one: he had allowed Prozac not only to cure the episode of depression but also to tell him how he was constituted . . . Though I had never taken psychotherapeutic medication, I, too, seemed to be under its influence. (Kramer 1993:xi)

Sam becomes more alert, attentive, happy, adjusted, and "successful" than ever before in his life. Observing this, Kramer realizes that both he and his patient now understand the "real Sam" to be the one that Prozac revealed, and the "former Sam" to be a biological sickness. Sam and Kramer have "listened to Prozac" rather than to Sam's previous three decades of life. Because Prozac is a biologic drug, Sam must in some sense have been cured by it, freed at last from his strange psychophysiological disease and able to be his true self—and his true self becomes something that is perhaps revealed only with Prozac.⁴ I want to note the account of Sam taking Prozac and then behaving differently (and

better) as a "fact-in-the-world," a reminder that facts don't just pop into our consciousness. Facts have to find us; we have to hear of them or read them, and we have to incorporate them as facts.

Sam's story is not just an anecdote but an apparently objective account made as part of a psychiatric case history. We only know this "fact" about Sam through the story told by Peter Kramer, MD. I almost want to name this "fact" a "factoid" to call attention to the specific ways that we *learn* the fact, that we attend to all of the cultural aspects of our learning: the objective voice, the authorship of a psychiatrist, doctor, scientist, book-writer, the way in which Kramer's discussion of his own disconcertedness and surprise allows us to share these feelings as part of the novelty of this fact.⁵ This story is a challenge for us. We deny it or fit it into our categories of persons. These are ways in which the story makes sense to us, seems possible, even as it shifts our notions of what is possible. We are the sorts of people who take facts seriously. But *how* do we take them so? How do we incorporate them into ourselves, especially ones that shape who we are but that we ourselves are not equipped to properly verify?

Facts typically imply relationships between things that are not bound to time and space and culture; they simply are. But facts are not untethered. They are facts-in-the-world. One task is to understand (how the meanings of facts change) how we are never simply handed facts but are continually faced with facts-in-the-world and continually judge their status and relative worth for ourselves. Facts are bits of mastery in expert culture. Expert culture is about being extremely knowledgeable about a very few things. We each know very little about most things, and in their entirety the facts are beyond reach. The very category of the person, it seems, has become parceled out among expert discourses. All facts contain, imply, or exclude categories of persons. Calling the case of Sam a fact-in-the-world is an attempt to mnemonically maintain the perspective that a particular category of the person is at stake in the "fact," and that this fact has traveled.

We must ask ourselves, however, why this Prozac story can be so compelling, and why we might consider it authoritative. One objection to Kramer's description might be that Sam *experienced* a new self, and it was so compelling that he simply adopted it as his true self. Kramer and Sam's friends followed suit because they too experienced a different Sam. But this does not account for my feelings and others' upon hearing about Sam. In discussing this case I have been struck by a double response. On the one hand there is a desire to have it not be true, to deny the fact of the transformation and assert a less mutable category of the person. On the other hand is a desire to know more about the story, to begin to play with the fact of Prozac changing personalities and call into question one's own category of the person. My sense is that the fact exploits the incompleteness of our categories of persons, that there is much that is either unaccounted for or contradictorily accounted for in our categories, and that each fact provides material "good to think with," in Lévi-Strauss's (1963:89) memorable coinage.⁶

What makes *Listening to Prozac* fascinating reading is that Kramer is well aware of the middle-class American cultural boundedness of his understanding of Sam's self, and he is both frightened and eager to work with it. He goes on to

consider more borderline cases, for instance, a woman who has been "spacey and flaky" all her life. When on Prozac, she becomes a faster and more articulate speaker. A businessperson on Prozac becomes less sensitive to the possible problems in proposals and therefore more risk-taking and successful. These examples raise the dilemma of what Kramer calls "cosmetic psychopharmacology," people who are taking Prozac in order to become better than their "normal" selves (1983:244-49). At stake in these stories are categories of persons: flakiness and eloquence, risk-taking ability and self-deprecation, as neurochemical on/off switches. These in turn alter how we feel about the drugs qua controlled substances: "Once these medicines have colored our view of how the self is constituted, our understanding of related ethical issues inevitably will be affected" (249).

Kramer's work illustrates how, at least in the US, expert scientific and medical facts play a key role in how we experience our selves, our bodies, and others. In other words, there appear to be many objective bodies that we inhabit consciously, in part through adjusting our categories of persons to account for compelling facts. Of course this is not a one-way imposition of science upon laypersons. Scientific facts affect us, but we are not, as Roger Cooter (1984) has pointed out, passive laypersons. We participate in the instantiation and legitimation of facts. In the next sections I will consider our role as social scientists in the business of producing and maintaining facts.

Mediating Facts

The years passed. I continued to treat ritual essentially as a cultural system. Meanwhile exciting new findings were coming from genetics, ethology, and neurology, particularly the neurobiology of the brain. I found myself asking a stream of questions more or less along the following lines. Can we enlarge our understanding of the ritual process by relating it to some of these findings?
—Victor Turner

We, as scholars and laypersons, are involved in the midst of science and in the midst of facts; our persons are built into them. Every fact involves asserting a particular view of human nature. Scholars have studied the use of facts in abortion debates (Hartouni 1991; Pechesky 1987; Strathern 1992) and in research on purported biologic differences between homosexual and heterosexual individuals (Bayer 1981; LeVay 1993; Terry 1989) and between races and sexes (Fausto-Sterling 1985; Gould 1981; Lawrence 1982; Stepan and Gilman 1993). In Stanley Fish's terms, "disagreements are not settled by the facts, but are the means by which the facts are settled" (1980:338).⁷

Who takes facts up? Who does not? How are they produced and distributed? These are critical anthropological questions in another sense as well. New facts-in-the-world, for instance, literally make Turner reconsider his notions of personhood. Turner goes on to examine, find fault with, and then propose his own theories of how brain topographies might make sense of cultural rituals. Like Kramer and Sam, Turner listens to the facts propounded by neuroscience and physiology and wonders how to refigure what he knows so as to make sense with them. His response, quoted above, is instructive. Accepting the importance

of these facts about the brain, he discovered that they could not account for the fundamentally important concepts of religion and play. Rather than using this insight to discount the value of these studies built on flawed and deficient theories of human nature, he instead reworked them into his own theories of the brain that could account for religion and play. I suggest that these neuroscientific facts compel such reworking because they provide authoritative starting points along with combinatory possibilities. Like Lévi-Strauss's totem animals and Turkle's computers, they are good and solid and fun to think with, lively facts with provocative connotations.⁸

Turner's implications regarding neuroscience are twofold. First, he makes it clear that merely to ignore contemporary neuroscience is to risk building an outdated (wrong) neuroscience into our categories of the person.⁹ Second, he makes it clear that anthropology has a lot to contribute to neuroscience, especially with regard to human specificity (how we are different from animals) and human differences (cultural differences among humans). Of course, anthropology already does this. Konner's *Tangled Wing* (1983), for example, one of the more forceful and eloquent defenses of sociobiology, depends upon cultural anthropological facts to substantiate the relative determinism of human nature by biology.

Other studies have concerned themselves with popular categories of persons that are taken up into scientific theories as they are developed. Evelyn Fox Keller's studies of gendered and capitalist subjects built into biology, and Sahlins' examination of sociobiology's roots in possessive individualism, are excellent examples (Keller 1985, 1992; Sahlins 1976a). Feminist studies of science have concentrated on gender bias in scientific practice as well as patriarchal presuppositions in good science (Bleier 1986; Haraway 1989, 1991a; Harding 1987, 1991; Longino 1990; Martin 1987). Cultural studies of science and technology have been especially active in tracing the profound role the media have played in shaping the development of scientific facts (Hartouni 1991; Martin 1987; Pechesky 1987; Treichler 1991). And historians and sociological studies of science have traced the political orientations of scientific and technological research (Shapin 1979b; Shapin and Schaffer 1985).¹⁰ If categories of persons are built into facts, and facts are mutually borrowed between disciplines such as anthropology and neuroscience, human nature at least at this level is quite dynamic and dialogic.

Objective Self-Fashioning

Given the explosive rate at which the fields of molecular genetics and neurobiology are expanding, it is inevitable that the perception of our own nature, in the field of sex as in all attributes of our physical and mental lives, will be increasingly dominated by concepts derived from the biological sciences.

—S. A. LeVay

Within this broad sketch of three symbiotic actors—experts, laypersons, and mediators—each drawing upon and reconfiguring the presuppositions of the others, I am going to concentrate my attention on the aspect I call objective self-fashioning.¹¹ The objective self is an active category of the person that is devel-

oped through references to expert knowledge and invoked through facts. The objective self is also an embodied theory of human nature, both scientific and popular. Objective self-fashioning calls attention to the equivocal site of this production of new objective knowledge of the self. (From one perspective, science produces facts that define who our selves are objectively, which we then accept. From another perspective, our selves are fashioned by us out of the facts available to us through the media, and these categories of persons are in turn the cultural basis from which new theories of human nature are constructed.)

Kramer provides an excellent illustration of this by relating how both he and his patients incorporate the fact that Prozac makes some people "better." Out of this fact Sam fashions a new objectively true self and a new history (of a self that was defective until Prozac), while Kramer goes on to experiment with Prozac and draw upon other human and animal facts to propose a new set of theories of human nature, packaged for a popular audience and read by psychiatrists and other neuroscientists.¹²

Objective self-fashioning is thus an acknowledgment of local mutations in categories of persons highlighting the active and continual process of self-definition and self-participation in that process. Objective self-fashioning is how we take facts about ourselves—about our bodies, minds, capacities, traits, states, limitations, propensities, etc.—that we have read, heard, or otherwise encountered in the world, and incorporate them into our lives.¹³ As anthropologists and other scholars we are, like Turner, most often in the mediator role, casting theories of objective selves out of our own categories of the person.

These cases point to two interrelated meanings of objective self-fashioning: (1) How we came to understand ourselves as subject to the scientific, medical, and technical discourses of objectivity and (2) How these discourses choose "us" as their object of study. The difference between the two meanings is a matter of point of view. On the one hand these cases point to the ways in which we fashion our selves—person, body, brain, and mind—out of ready-made objective types, and therefore subject ourselves to the disciplines of science and technology, expertise and machines. This kind of self encounters objectivity in the form of resistance; who we are is a product of discourse networks and technologies over which we have little control (Kittler 1985). On the other hand the practices of science, technology, and medicine fashion selves as objective facts through scientific experimentation, subject selection, and medical taxonomic exercises. This latter case emphasizes social and disciplinary production of selves, while the former emphasizes cultural presuppositions built into concepts and practices.

Attending to the categories of the person built into facts and attending to facts-in-the-world as facts enables us to see more clearly how medical and scientific claims, along with our own, are as much about dividing persons as they are about describing them. Here, along with Emily Martin, I believe we should also "acknowledge the varieties of ways in which experience resists science and medicine" (Martin 1987). More specifically, the question of objective self-fashioning raises the issue of creativity with regard to facts. Rayno Rapp, for instance, has followed the different ways in which people incorporate the possibilities and results of amniocentesis into their lives—for one mother, the fact of

evidence

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a genetic defect means a decision to abort, while for another it means preparing to take proper care of a challenging baby (Rapp 1990, 1993). Martin and Rapp are both calling for a reader-response analysis of our relation to science, medicine, and other facts of life.¹⁴

PET Scanning in Courts and at the Movies

With PET imaging, we can begin to explore the degree to which biological and social factors affect brain chemistry. Perhaps one day we will speak of an individual's brain chemotype as well as his or her genotype and phenotype.

—Henry N. Wagner, Jr., and Linda E. Ketchum

I am concerned with objective self-fashioning as a result of my work in the field of positron emission tomography (PET) scanning, a brain-imaging technique that promises to provide images of the living brain in action as it thinks, worries, adds, gets sad, and goes mad. I have been examining what might be called, following Stone (1992), the "virtual community" of PET scans—the heterogeneous community of people who interact with these scans and each other. In addition to fieldwork among those who work with the injection and imaging of radiopharmaceuticals, I have interviewed graduate students, imaging technologists, and PET researchers. I have also followed how PET scans have appeared on TV, in newspapers, and in Hollywood movies. In particular, my attention has been drawn to the use of PET scans as authoritative facts in claims about how the world and people objectively are—that is, what attributes and properties our objective bodies have, and what this means for the rest of our persons: our lived bodies, subjective souls, and/or our selves (see, for example, Begley 1991).

The PET scan, produced in university research laboratories, is one of the iconic centerpieces of the 1990s' "Decade of the Brain."¹⁵ This recent technology produces images of living brain and body functions through the use of radioactive tracers.¹⁶ Unlike CT (computed tomography) and MR (magnetic resonance), which provide images of the tissue and structure of the brain, PET produces high-resolution, functional images of blood flow and glucose consumption within the brain. Producing PET images is an extremely capital- and expert-labor-intensive process. PET requires an infrastructure—including interdisciplinary personnel, a cyclotron, a nuclear chemistry lab, high-speed computers, and a scanner—that costs upwards of six million dollars to install and one to two million dollars a year to operate. Government fears of high-cost medicine have contributed to the fact that PET did not enter regular clinical medicine as CT and MRI did, but has remained an experimental science into the 1990s (Dumit 1995).

After an experiment is designed and representative subjects selected, a small cyclotron is used to produce radioactive isotopes.¹⁷ These isotopes are short-lived, with half-lives that range from two minutes to two hours. They are immediately "tagged" or attached onto other chemicals to form radio-labeled substances, or radiopharmaceuticals. Fluorine-18, for instance, can be tagged onto glucose, and Oxygen-15 can be tagged onto water. The radiopharmaceuticals thus formed either mimic or are analogs of substances regularly circulating through the brain.

The next step is to set up the experiment, inject the human subject with the radiopharmaceutical, and place him or her in the scanner. While the subject carries out some task (such as looking at words) or attempts to maintain some state (such as rest or anxiety), his or her brain is assumed to be using energy differentially in those regions involved in that activity or state. Scans can be taken quickly for a "picture" of blood flow during a thirty-second period, or they are taken after forty minutes for a "picture" of the glucose utilization up to the scan.

The scanner depends on the physics and biophysics of positron emission. As the radiopharmaceutical decays in the brain, it emits positrons that travel a short distance, run into an electron, and burst into two photons or gamma rays that fly off at almost 180 degrees. The scanner consists of a ring of detectors connected to a computing system that reacts when two detectors are hit by gamma rays at about the same time. The computer then assumes that there was a positron along the line between the two detectors.

After collecting hundreds of thousands of data points, the computer attempts mathematically to reconstruct the approximate spatial density of the radiopharmaceutical, a process involving many assumptions about brain biochemistry and metabolism. The result is a simultaneously simple (in the sense of transparent) and complex image of a human brain at work. In addition to appearing in popular magazines and newspapers, these images are increasingly being used in court cases to argue for incompetency and insanity as well as neurotoxic damage and head trauma (see, for example, Stipp 1992).

To begin considering the role these images can play in our own lives, I would like to present an example of PET as depicted in a popular film about schizophrenia, violence, and insanity. The following is my own transcription of part of the final four minutes of a 1989 movie, *Rampage*, directed by William Friedkin. I believe it represents the first use of PET in a Hollywood movie. At this point in the script, Charles Reese has committed six grisly murders and is about to be found guilty of them by a jury.

In a courtroom.

Defense attorney: [whispering to his client, Charles Reese] We still have a shot to save your life. We can still show the jury that you weren't responsible.

Cut to the Judge's chamber.

Defense attorney: Your honor, I'm going to request that a PET scan be performed as part of a defense to show the jury that he is mentally ill, during the penalty phase.

Prosecutor: A PET scan purports to show only a patient's brain chemistry at a certain moment of time. In this case it is after the crime is committed.

Judge: A PET scan is a form of medical imaging which is used in the diagnosis of epilepsy, some Alzheimer's, as well as mental deficiency. Depriving Mr. Reese of putting this in front of the jury . . .

Prosecutor: [interrupting] It's only another gadget to hide Mr. Reese's responsibility.

Judge: [pausing, contemplating] Well, we're going to err on the side of caution. I'm going to order the test. We'll let the jury evaluate it. Nobody knows what it will show.

Cut to medical laboratory. Charles Reese is put in the PET scanner. A computer-generated rotating skull is shown, peeled back to reveal a rotating brain in red, then green.

Two scans come up side by side. One is labeled "Normal Control," the other "Reese, John." The scans look significantly different.

Medical Doctor: [pointing to Reese's scan] These are abnormal patterns, without a doubt.

Defense Attorney: What does that tell you?

Medical Doctor: Well, this yellow-green area here is consistent with schizophrenia. What you are seeing is a computer-enhanced image of the chemistry of the brain. And what it shows is a picture of madness.

Cut to the courtroom again.

Jury Foreman: Your honor, based on the new scientific evidence, we, the jury, find that the defendant should go to a state mental hospital.

At the end of the movie, text: "Charles Reese has served four years in a state mental facility. He has had one hearing to determine his eligibility for release. His next hearing is in four months."

In the microcosm of this movie, a convicted brutal murderer is not put into prison but is treated as a mentally diseased subject who may be released in the near future. The sole element presented to account for the jury's decision is a PET scan.¹⁸ The words of the doctor—"This is his brain . . . These areas are definitely abnormal . . . consistent with schizophrenia . . . a picture of madness"—concatenate a history of struggle and controversy within the medical and legal communities regarding a host of relationships: PET scan to brain, brain to schizophrenia, schizophrenia to insanity. In the movie, the PET scan stands as the fact, the linchpin referent, which holds the chain of connections together, convincing a jury that an abnormal brain scan is an abnormal brain is an abnormal person who does not bear responsibility for murder.

Not one of these connections, however, is settled in the scientific and medical community, in the legal community, or in my own mind.¹⁹ Medical anthropologist Horacio Fabrega discusses the reluctance of Anglo-American society to accept a theory of illness-caused deviance. He suggests that this is primarily due to a need to have the will be socially or rationally motivated: "In essence, mental illness as a defense of homicide requires a suspension of our attribution of personhood if the latter is equated with willful symbolic behavior" (Fabrega 1989:592). Although I think that this argument makes sense in general when comparing societies, I am interested in the ways in which the attributes of personhood in the US are continually contested using batteries of facts. *Rampage* is an intervention into the facts of PET and the facts of life, presenting as it does a definition of PET, a set of presumptions about imaging and mental illness, and a possible scenario of PET's use in a court. Watching the movie, one confronts these facts of PET and is drawn into the virtual community of its images.²⁰

What is the status of these "facts" proclaimed via Hollywood? Are they true? These questions trip me up as I watch a world of biotechnopower where technology judges who is responsible/sane/rational and who is not. This is a "view of the world that might be different from my current one" (Martin 1985:195). Like Emily Martin, I often find myself stumbling "over accepting [these] scientific medical statements as truth" (1985:10). But Hollywood re-frames the question of truth, calling for an examination of the ways in which new facts, worlds, and persons are produced, distributed, and incorporated. For example, *Rampage* mediates between experts who presumably provided the details of PET, brains, and schizophrenia, and us lay viewers.

Though some might want to claim that there is a set of accepted medical truths, the purpose of this paper is to work with a notion of uneven flows of knowledge and contradictory versions of acceptability and legitimacy. We don't know how much we don't know about medical truths. Hollywood movies, along with best-selling novels written by physicians and our own doctors' advice, help to shape our notions of "accepted medical knowledge" and thus help shape our categories of the person. As part of my ethnography I follow this shaping process, examining how facts travel in the world, but also how they never travel alone. Instead they are packaged in the form of stories, explanations, and experiences, as authorized or unauthorized accounts, and they necessarily include definitions of human nature. Faced with novel facts, we may indeed stumble over accepting them.



When I have shown the movie clip from *Rampage* and pictures of PET scans during talks, some people with social constructionist tendencies and some with strong feelings about the social or psychodynamic nature of schizophrenia have been upset over the biosocial totalitarian implications of this apparently seamless presentation of clear difference between "them" and "us." I want first to note that despite constant work on PET and schizophrenia over the last twenty years, there is still much disagreement over whether PET is ready yet for clinical work with mental illness. In addition, over 90 percent of the PET community furiously opposes the use of PET for the insanity defense (Moyberg 1992; Rojas-Burke 1993). In spite of this unreliability for regular clinical work, in some places PET has nevertheless been heavily supported, including financially, by mental illness activists, that is, organized families of people with mental illness. Here another set of contests emerges. Should researchers look for biological correlates of schizophrenia, and how should such correlates be interpreted? What do the facts mean? Surprisingly, the meaning of these facts does not emerge solely from the research community; the whole virtual community must be examined.

In order to examine this story I have to back up forty years to the beginning of the "biological revolution" in psychiatry. During the 1950s and through the early 1960s, new pharmacological agents—drugs such as thiorazine (chlorpromazine), lithium, and valium, which helped reduce symptoms in mental patients—were discovered and allowed many patients to live at home for the first time (e.g., Andreassen 1984, 1989). In the 1960s and 1970s, however, mental illness treatment critics organized to reform institutionalization practices. These critics created an uneasy alliance with psychotherapeutic psychiatrists who were invested in talking cures, and together they campaigned heavily for the

notion that schizophrenia and the affective disorders were psychogenic. These "antipsychiatrists" argued that mental illness was socially constructed and therefore in need of social cures, not drugs (Laing 1967; Szasz 1970).²¹ Their argument drew in part on the fact that there were no known biological mechanisms for mental illness. Perhaps, the antipsychiatric camp argued, drugs only affected the symptoms, not the cause.²²

In the late 1970s and 1980s the increasing availability of new diagnostic techniques such as computed tomography (CT) scanning and PET scanning changed this perspective. These techniques offered different ways of examining living brains (Pardes and Pincus 1985). The medical imaging advantage was measured in two ways. First, it allowed correlation between brains and diagnosis among living humans, thus permitting anew the equation of "brain = illness." Second, medical imaging promised to provide early warnings of the onset of mental illness, one of the largest problems in its treatment and prevention.

PET in particular was hailed as significant because it promised to provide functional images of the brain in action. Early on, it was realized that many head injuries, strokes, and epilepsies leave the structure of the brain relatively unchanged but show up with different degrees of clarity on PET scans. In biological psychiatry, such proof of pathology was talked about as a Holy Grail. One biological psychiatrist, for instance, began a review of PET with the statement, "In the 1970s, the antipsychiatry movement almost had us (Szasz 1970), but now we have proof" (Kuhar 1989). For this subdiscipline, eager to demonstrate the physiology of mental illness, images of brain differences between mentally ill patients and non-mentally ill controls were facts that implied that a full biological explanation of mental disease was only a matter of time.²³ This technique thus functioned as a promise that mental illness was not "in the head" but in the brain.

Patients, Victims: On Seeing Oneself in a Brain Mirror

I find a tremendous interest in PET scanning everywhere I go. I do a lot of public speaking, and I find that people are very interested in this. And they are always appreciative of the first ten minutes where I go through how positrons decay into gamma rays and the coincidence detections. They follow this, they understand it, they have a concept of how the whole thing works, and they are terribly fascinated with the whole idea. People are tremendously interested in the brain. You know, almost everybody thinks they are going to get Alzheimer's disease. If for no other reason, they want to know what is going on.
—Richard Haier

To illustrate the ongoing negotiation of personhood and illness and call attention to the wider virtual community of objective self-fashioning around PET, I turn now to one site of my fieldwork, the Brain Imaging Center at the University of California at Irvine (UCI). This center was unlike most PET centers in two important respects. First, it was located in a psychiatry department, not in a chemistry, nuclear medicine, or radiology department. Second, for a PET center, it was extremely underfunded. Other major PET centers have received either Department of Energy or National Institutes of Health program grants to support

the multimillion-dollar costs of laboratories in nuclear medicine or radiology. UCI's program was started in a psychiatry department and purchased its scanner and then its cyclotron with bank loans. Monthly payments were dependent upon an external fee schedule that dampened free operation. In the words of one researcher,

YY: We were sort of a shoestring operation. I think we were sort of an upstart in some sense, because other places that have PET centers are much better endowed than we were. We were sort of the scrappy, come-from-behind, shoestring budget kind of guys. And we did things on a budget that is probably one-tenth of the budget that Hopkins or UCLA has for their PET centers. They are very well endowed and they support their PET centers in a maximum way. I think that we have a much more sort of guerrilla-type operation. We are unconventional in that we did so many things on our own, but I think we were fairly productive. We've done a fair amount of work even though we are on a shoestring budget, relative to a lot of other facilities.

This PET center operated from such a precarious financial position that its researchers spent much time doing local community outreach. They found a ready alliance with the mental illness community in Orange County, especially with families who had schizophrenia among their children. As Haier details below, the psychodynamic approach, while supporting the social nature of schizophrenia, often localized this causation into the family and specifically in the mother.

RH: The Lockhardts contributed \$250,000 to help pay for our scanner . . . By that time, the scanner had arrived and we were making pictures, they had schizophrenia in their family, and they were very interested in it. And they knew our emphasis was going to be on schizophrenia. We always approach it that in the long run, the main help will come through research. Probably not for people who currently have it, but because there is a genetic component, there are still the grandchildren to worry about. And families find this compelling. Remember, even in the late '80s, the public was just coming out of the idea of the schizophrenic mother, that schizophrenia was somehow induced because the mother was doing something wrong. Virtually every set of parents that we talk to now, when schizophrenics are now in their twenties and their thirties, almost every parent has had the experience of going to a psychologist early on and getting the idea that somehow they were at fault. So it is all in their memory. And the idea that it is biological has caught on real fast over the last five or eight years. Family groups have organized around this to support biological research, and imaging is obviously at the heart of that. So it is kind of a natural sequence of events.

Supporting PET research became a means for these families to empower their participation within science, stay informed, and come to understand their role as accountable to, but not responsible for, the fact of familial schizophrenia. Along with the National Alliance for the Mentally Ill (NAMI), these families

advocated a biological redefinition of mental illness and actively helped to produce facts about the nature of personhood and mental illness (OTA 1992). Objective self-fashioning is here a strategy without which such research might not get done.

Within the daily practice of clinical psychiatry, these brain-imaging techniques have also helped sufferers deal with the fact of mental illness symptoms. The following excerpt is from an interview with Dr. Joseph Wu, a psychiatrist at UCI.

JD: Do you show the patients their PET scans?

JW: Oh yes. We try and show them the PET scans, and then some of these patients will refer them out to people. I have a part-time private practice with some of them, and they may like to continue with me.

JD: Does it help them overcome part of the stigma of mental illness?

JW: I think so. I think that definitely. One of the intrinsic messages is that the depression isn't something to be ashamed of; it is an illness which needs to be understood. And it is not something that is their fault.

I think that there is a destigmatization that occurs with the biological emphasis. It is a fine line, because there are some arenas of personal responsibility that people can and should assume for their feelings. But I think it is a very narrow and tricky balance. It is important not to think that it is all biology; that can lead to a certain eschewing of what is appropriate for one's own role in understanding one's emotions. On the other hand, I think that people can go overboard, and say, "Gee, I'm entirely at fault for how I feel." [It is important] to try and understand one's role in helping to monitor one's emotions without being unnecessarily harshly judgmental of oneself.

The reconfiguration of mental illness as biological through the use of PET scans becomes part of a personal reconfiguration of one's own category of person. A strict division between the biological self and the personal self is not at issue here. Rather, the relations between the two selves are redistributed so that, (although the patient must continue to experience the illness and live with it, she or he no longer has to identify with it.) The diseased brain, in this case, becomes a part of a biological body that is experienced phenomenologically but is not the bearer of personhood. Rather, (the patient who looks at his or her PET brain scan is an innocent sufferer rationally seeking help.²⁴)

Other researchers who have also shown patients their scans have agreed that, especially in cases of neurological and mental diseases, which are often accompanied with self-disgust or a sense of failure, both the scan and the process help legitimate the problem. They make it something that can at least be explored.²⁵ These patients (and their families) want schizophrenia and depression to be medicalized, to have a single cause or explanation, even if there is no solution or cure for them.

Anthropologists of medicine have long explored this kind of effect as a crucial aspect of every health care system. Jean Jackson discusses the failure of culture to come to grips with chronic pain (Jackson 1994; see also Good et al. 1992).

The tension Jackson describes involves mental versus physical pain. Chronic pain sufferers seek out, even hope for, positive test results, even cancer, because then there would be something to point to and work on to solve the problem. Regarding depression, Dr. Wu concurred with this interpretation when I asked him about the history of psychiatry.

JD: Dr. Wu, Nancy Andreasen has written about the biological revolution in psychiatry.²⁶ You were in medical school during this time. Did you also get the other side of psychiatry?

JW: Oh, very much so. I would say that most of the psychiatrists in this department are still analytically, dynamically focused. I would say that biologically oriented psychiatrists still make up a minority of the faculty. Maybe 30 to 40 percent, as opposed to the psychodynamically oriented people [who] are 50 to 60 percent.

JD: Do both of these sides come into play in your work?

JW: Somewhat. For me, when I do a study of depression, there is a part of me, a whole human dimension, that really tugs at my heart. Part of me feels moved by the pain of the patient that we work with. I am also moved by the courage and the willingness that many of these people have to participate in this study, even with the depth of their emotional pain and anguish. I think we try to offer to them the gratification that comes with knowing that they are contributing to the fund of knowledge that will eventually help to, we hope, eliminate depression or mitigate it. And that is something that many of these people find appealing, because there may be some greater purpose to their suffering. It is a way of reconnecting in some sense with the broader community. It is a way of making a personal meaning out of the emotional pain that they suffer from. For me, I see the whole biological aspect as not being contradictory or mutually exclusive from the psychodynamic aspect. I really see it as complementary and synergistic with the dynamic aspect. There are some people that see it as either/or. I see it more as a both/and type of proposition.

PET research into mental illness has thus become an area of study worthy of community support and patient contribution. The both/and approach to psychiatry, popularized by writers like Peter Kramer (1993), involves realizing that the brain can be altered by the social environment and by genetic development and drugs. The kindling theory, for instance, suggests that repeated abuse during childhood can build up depressed reactions until the depression is neurologically self-sustaining (Post and Ballenger 1984, cited in Kramer 1993: 110-18, 334). The brain becomes "rewired" as if the person had been born that way. In the same vein, both psychodynamic talk therapy and psychopharmaceutical drug treatment can change brain chemistry and rewire the brain toward freedom from depression. Note that the brain remains the bearer of mental illness, but has now become an intersection for social and biological influences.

Dr. Wu's "both/and" approach to psychodynamic and biological explanations of mental illness arises, I suspect, from taking patients' perspectives into his account.²⁷ Patients are able to participate in social and medical reform by

participating in research that might produce facts implying a category of person who suffers from a physiological rather than a psychological disturbance.

If we see that responsibility and causations are part of our categories of persons, this example demonstrates the flexibility and contestability of these categories. Patients and activists are actively getting together to support and promote research on the shared biological nature of mental illness because of their desire to see the results and their hope for cures. Paul Rabinow has called this grouping on the basis of biological commonality "biosociality" (Rabinow 1992). (A key point to remember here is that the facts of biology around which these groups are organizing are not necessarily fully decided within the scientific community.) Yet they provide the means for social action, justifications for support of certain kinds of research, and arguments for a biological understanding of mental illness. The facts enable the groups to further promote a category of the objective person that does not, in their view, prejudge them and condemn them to blame and guilt. This involves understanding the many very different ways facts (science, technology, nature) and experience (subjectivity, personality, culture) are constantly shaping and tripping over each other. These people are working creatively to refigure responsibility for mental illness, in this case to biology, in an attempt to gain control over this part of their world.

The challenge here isn't just to the social construction of mental illness. This is not a simple story of the gradual emergence of the right view of depression, schizophrenia, and PET scanning. Biological psychiatry, for instance, often leads to deinstitutionalization, which burdens lower-income communities more than upper-income ones. But this story is not one of victims and blame. By tracing facts-in-the-world throughout the virtual community of PET images, I hope that responsibility for these situations might be multiplied—that accountability might adhere to experts, mediators, and laypersons alike for their participation in objective self-fashioning.

Cyborg: Machines My Eyes and Ears

My present research with PET scanning is concerned with investigating chemical reactions constantly taking place inside the human brain, and how these reactions affect how we think, feel and act . . . how they affect whether we are afraid, violent or destructive . . . Perhaps we will be able to learn enough about the brain chemistry of fear, violence and destructiveness to save ourselves from the problems of interpersonal violence and war.

—Henry N. Wagner

When PET researcher Henry Wagner (1986: 253) says that "in PET, we now have a new set of eyes that permits us to examine the chemistry of the human mind," he is pointing to a particular kind of humanoid: a cyborg whose experience of vision includes the physiology of the brain as witnessed through PET scanning. Kramer and Sam listen to Prozac to hear Sam's true self speak. Some of us may shudder at the alienation implied in selves mediated by radiotracers, new pharmaceuticals, and multimillion-dollar bioscience. Others may breathe a sigh of relief at not being blamed for personally constructing schizophrenic children, at finally being respected as having wonderful children who happen to have a vis-

ible and therefore real/brain dysfunction. Still others may wonder when and how they will be classed as normal or abnormal, or if the binary categorization will finally prevail.

In conclusion, I have tried to point out some of the ways in which contemporary biomedical and scientific practices are culturally situated. These practices are participating in ongoing negotiations not just of specific brain-behavior-mind links but also of the nature of human nature and the significance of human differences. I have tried to show both the complexity of the process of producing contemporary neuroscientific facts and images as well as the numerous ways in which practical considerations often build in assumptions about human nature with undesirable and socially unequal consequences. My purpose is not to point a finger at any particular sets of people or techniques. I think it is necessary to recognize the social and cognitive benefits of these practices for many, many people. Rather, I am seeking to find a language to talk about multiple accountabilities between the diverse communities engaged with PET.

The challenges of how to understand the continuing and increasing presence of biotechnopower require close attention not only to the multiple uses and arenas of facts-in-the-world but also to their deployment within discourses of objectivity and to the ways that they have built-in, presupposed notions of human nature. The point is that science and medicine turn out to be our business on a daily basis. We are involved in them, they involve us, and they draw upon the ways in which we configure the person. My hunch is that this process will reveal much about the multiple circuits of theory transfer from laypersons to experts and back again to laypersons via all kinds of mediators—movies, magazines, personal physicians, and anthropologists. These circuits of fact distribution and presupposition are worth understanding if we want to play a critical role in our own understanding of our selves.

Notes

1. I'd like to acknowledge the comments from the SAR Advanced Seminar on Cyborg Anthropology, and especially the critiques of Wendy Belcher, Bruce Grant, John Hartigan, David Hess, Lorraine Kenney, Kim Fortun, Anjie Rosgo, Gail Sansbury, and Sylvia Sensiper.
2. "The body is not the object of study but the subject of culture" (Csordas 1990). Culture entails science for us; therefore our bodies have to take science into account.
3. The etymology of "loyperson" extends beyond its recent application to a non-scientist to any form of nonexpert. Its original use for noncleric hints at the search for truth, certainty, and redemption through expertise (Barzun 1964). In interdisciplinary neuroscience, for example, each researcher is usually expert in only part of an experiment and an informed layperson with regard to the rest. Complete interpretation of the results are therefore continually deferred to "other experts." See Ademuwagun (1979) for anthropological discussions of lay knowledge.
4. There are other perspectives on Prozac as well (Breggin 1994; Elfenbein 1995; Norden 1995; Wurtzel 1994).
5. I use "factoid" in the CNN sense of an apparently nonscientific, even pseudo-scientific claim. In a *New York Times Magazine* article, William Safire (1993) describes

many current definitions of "factoid." He eventually declares that though he prefers another definition, CNN's popular media power and its constant use of the term means that CNN's notion of it will in the end prevail.

6. "When one says in connection with totemism that certain animal species are chosen not because they are 'good to eat' but because they are 'good to think', one is no doubt disclosing an important truth. But it must not lead one to neglect the questions that then follow: why are some species 'better to think' than others; why is one pair of oppositions chosen over all the other possible pairs offered by nature; who thinks these pairs, when and how?" (Castoriadis 1984: 19). See also Turkle (1984).

7. Fish, cited in Rabinow (1986: 255). Science and technology studies researchers have a tradition of examining the contested production and stabilization of facts-in-the-world. See the work of Harry Collins (1985) on replication as well as David Hess's article in this book.

8. See also Fischer (1990), Harrington (1992), and Star (1989, 1992) for analyses of the "brain" as a particularly inspiring object to think with.

9. Other disciplines also make use of this conceit. De Lauretis (1984), for example, uses the then contemporary neuroscience of vision to point out flaws in previous theories of the specular gaze in the cinema. This argument actually takes up where previous neuroscientific studies of vision left off regarding the persistence of vision phenomenon (de Lauretis and Heath 1980).

10. See also Fujimura (1988), Gerson and Star (1986), and Griesemer and Wimsatt (1989) for careful sociological attention to the framing of scientific questions within a conceptual environment.

11. With an acknowledgment to Stephen Greenblatt (1980).

12. My attention was first drawn to Kramer's book when a psychiatrist I was interviewing referred to it as something he had spent a lot of time thinking about.

13. On incorporations see Casper (1993) and Farquhar (1992) and also the magnum collection *Incorporations* (Crary and Kwinter 1992) and the much more modest *Cartographies* (Diprose and Ferrell 1991). The work of Douglas (1966), Douglas and Wildavsky (1982), and Ong (1987) has built the groundwork for this kind of approach.

14. Particular inspirations for me are Cheng (1993), Long (1985), and Radway (1984), who each examine the ways in which different groups of readers incorporate texts (science fiction, reading group selections, romance novels) into their lives creatively and powerfully.

15. Ordered by Congress and signed by President George Bush in 1989. See *Decade of the Brain: Answers through Scientific Research* (National Advisory Neurological and Communicative Disorders and Stroke Council, 1989). The full declaration and a summary of previous and promised projects including a national database of brain research can be found in *Mapping the Brain and Its Functions* (Pechura 1991), sponsored by the Institute of Medicine. The cover of the book features four PET scans with labels reading, "Seeing Words," "Hearing Words," "Reading Words," "Generating Words."

16. This paper emphasizes PET as a brain research technique and not as a clinical or whole-body diagnostic technique. For many researchers and clinicians, the latter concept of PET is the only meaningful one. PET is used to image the spread of cancer in the body, to localize focal epilepsy for surgery, to characterize heart conditions, and for many other uses, both in the brain and in almost all other organs.

17. The following description is provided as a guide to the process of PET scanning. A more developed and explanatory description is provided in Dumit (1995).

18. It should be noted that *Rampage* (Wood 1985), the book upon which the movie is based, does not mention PET scanning at all. It also has no pictures.

19. There is quite a lot of research on mental illness and violence. The legal category in the US is "dangerousness" (o danger to self or others can be grounds for in-

voluntary commitment). Mestrovic and Cook (1986) and Monahan and Shah (1989) provide histories and evolutions of the dangerousness standard. Many researchers have argued that mental illness is actually not predictive of violence (Monahan 1988; Mulvey and Lidz 1984; Pollack 1990).

20. Movies and other media are often the direct route for new sciences like PET to enter the courtroom. Consider for instance the case of Barry Wayne McNamara, who killed his parents, his sister, and his niece in 1985. When this case was brought to trial McNamara's attorney, Santa Barbara deputy public defender Michael McGrath, thought his client was not sane and sought proof beyond psychiatrists diagnosing schizophrenia: "We know there was a trend in the law which is hostile to psychiatrists in the courtrooms. . . . what we needed was objective evidence." McGrath learned of PET scanning through a PBS television series, "The Brain," and contacted Monte Buchsbaum at UC-Irvine's Brain Imaging Center. Buchsbaum reports that McNamara received a life sentence and not the death penalty "partly, perhaps, because of the ameliorating circumstances of a brain which was not entirely normal" (Black 1989).

21. There is ample documentation concerning abuse of drugs and electroshock therapy in many state mental institutions during this period. See also Lovell and Scheper-Hughes (1986) for an overview of this history of deinstitutionalization in the US and in Italy.

22. In the anthropology of medicine, much work has attended to the cultural construction of illness, especially mental illness. Kleinman's notion of Explanatory Models (EMs), for example, has been useful in helping to understand the many ways in which illness can be defined, explained causally, treated clinically, and respected socially. Further work has extended this to look at the cultural construction of the body in relation to EMs (Scheper-Hughes and Lack 1993). Gaines (1985) begins a serious critique of prevailing approaches to relativity by showing that the concept of the person underlies and crosscuts the very boundaries of our thoughts on the world:

Kleinman et al. (1978) and Kleinman (1980b) have found that patients have cognitive models of their illness episodes; they refer to these models as 'Explanatory Models' (EMs). They recognize that not only do patients have EMs, but so do healers. What I will suggest here is that EMs are in part reflections of larger cultural conceptions; in particular conceptions of the person. I suggest that the key conception of person *organizes* cultural knowledge which gives rise to the EM of patient and healer. That is, a non-medically focused notion, that of person, lies behind and organizes patients' and healers' thinking about sickness episodes. Put another way, we may say that a cultural or folk theory underlies and gives shape to cultural knowledge and direction to cultural thinking about sickness. (Gaines 1985: 230-31)

23. See, for instance, Frackowiak (1986: 33): "Much optimism has been generated in those who feel that the only reason organic bases for the various psychiatric syndromes have not been elucidated has been the lack of a suitable investigative tool . . . It is probable that PET is the investigative technique of choice for research of such hypotheses in man."

24. The psychiatrist in this instance is using the PET scan to "therapeutically exploit" the patient as well. That is, by helping the patient to see mental illness as a physiological phenomenon, physiological intervention is also facilitated. See Good et al. (1994) and Mattingly (1994).

25. One researcher noted during our conversation that he should list this feeling of validation as a confounder in future PET studies of depressed patients.

26. "These advances [in PET and SPECT] have dramatically changed the training of psychiatrists, as well as their clinical practice and their research. They now see neuroscience as their primary basic science, modification of brain chemistry and metabolism as one of their primary modes of treatment, and the brain as the organ that they are treating. (Good psychiatrists also recognize that they are treating people, and that sensitive counseling and psychotherapy are also a fundamental part of their specialty)" (Andreasen 1992:842). See also Andreasen (1989).

27. There has also been much controlled research on the usefulness of combining psychodynamic treatment (psychotherapies) with drugs (pharmacotherapies) (DiMascio et al. 1979; Elkin et al. 1985; Pardes and Pincus 1985).