# 10 The Economic Brain: Neuroeconomics and "Post-Autistic Economics" through the Lens of Gender

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## 10.1 Neuroeconomics and Its Challenges

A new discipline has emerged which brings together neurobiology, economics, and psychology: neuroeconomics. Economists and neuroscientists cooperate in focusing on the effects of products and economic behaviors on the human brain and on the brain's activities during economic decision making. Economic theory and marketing are affected by this research, which takes into view especially the emotional aspects of decision making.

In Germany, for example, the boom in neuroeconomics started in 2001 with one of the first public presentations of a marketing study which used neuroscientific results conducted at the University of Magdeburg, Germany. Institutes of neuroeconomics have been established at universities worldwide. However, for-profit imaging institutes have also been founded—for example, in the United States there were more than 88 for-profit imaging marketing institutes in the year 2004 (Hüsing, Jäncke, and Tag 2006, 149f).

In this chapter I want to look at neuroeconomic research from a gender perspective and analyze what brain research is doing in the area of economics, and how this research interest is connected to a broader view of economy and society. I will interpret neuroeconomic research as a reaction of capitalism to the critique that capitalism lacks emotions—in the sense of Luc Boltanski and Ève Chiapello (2006), who assume in their study *Le nouvel Ésprit du Capitalisme* (The New Spirit of Capitalism; French original 1999) that this economic system responds to these critiques. I will also try to explain where I see the deficiencies and problems of neuroeconomics, concerning present-day Western economic systems. My focus will be on scientific research in neuroeconomics, which does not exclude neuromarketing (e.g., Zimmermann 2006), but I will not place marketing and its problematic sides in the center of my analysis.

My analysis will take into account the following challenges of the self-understanding of human beings which emerge through neuroeconomics. First, how does

neuroeconomics question the assumptions of economic theory with respect to its image of the model human being, *homo oeconomicus*, and the theory's individualistic methodology? This leads to a second point where the conventional "economic brain" is examined: The role of emotions has become a challenge for the economic rationality relevant in economic science (Priddat 2007, 215). What are the emotional aspects of economic decision making (e.g., Sanfey, Loewenstein, McClure, and Cohen 2006)? Third, neuroeconomics challenges the idea of power and influence over the self, especially in the field of neuromarketing: Can big companies—by knowing how the brain works emotionally—manipulate human behaviors? This is a fear expressed by Sandra Blakeslee in her article, "If Your Brain Has a 'Buy Button,' What Pushes It?" in *The New York Times* (October 19, 2004), referring to arguments from the U.S. nongovernmental organization Consumer Alert with respect to neuromarketing research. Fourth, neuroeconomics also challenges the self in the way it deals with society: Which underlying concepts of economy and society are used in neuroeconomics? What is the role of the individual from this perspective? Do individuals have to optimize themselves and adapt to the economic sphere? How are outstanding individuals, such as leaders, perceived? All four challenges are related to the question of how gender and sexual stereotyping influence the findings of neuroeconomics and vice versa.

## 10.2 The "Economic Brain" and Its Critiques

For mainstream economics, "the economic brain" has a clear characteristic: It is rational in the sense that the utility of the individual is maximized (Blaug 1993, 229ff), independent of any social influence. These assumptions are aggregated and labeled as *homo oeconomicus*, being central to the leading paradigm in economics, that is, neoclassical economics with its methodological individualism (Persky 1995). Economic rationality in general has been located in the human brain—and therefore we can also refer to *homo oeconomicus* as "the economic brain." In its traditional form, economic rationality is based on the idea of full information, which is processed in the brain to make rational decisions. *Homo oeconomicus* is a theoretical construct, enabling the "science" of economics to describe economic processes as processes of decision making which tend toward equilibrium. Emotions have not been considered important within economic theory. This might also be due to the fact that the bodily localization of emotions has been unclear for the last few centuries, and the finding of valid data concerning the influence of emotions and other factors on economic behavior has been difficult. "Since feelings were meant to predict behavior but could only be assessed from behavior, economists realized that, without direct measurement, feelings were useless intervening constructs" (Camerer, Loewenstein, and Prelec 2005, 10). Economists themselves are generally aware of the modeling character of their analyses, its underlying assumptions, and its deficits (Ulshöfer 2001, 75ff).

Nevertheless, there is a long tradition of criticizing *homo oeconomicus* as inadequate when making "real-life-decisions," leaving out important aspects like the sociality of human beings and emotions—as can be seen in sociology or when looking at the history of economics (Ulshöfer 2003, Rammel 2002). *Homo oeconomicus* has been characterized critically in many different ways—for example, as a "lust machine" as nineteenth century British economist Francis Ysidro Edgeworth called the model (Tietzel 1981, 117).

The focus of present-day critiques of the economic brain lies as well on the lack of emotions, the individualism, and the self-centeredness of this model. These critiques can be seen in "post-autistic economics" (PAE) and in most of feminist economics,[1] for example. At present, one of the most popular descriptions of *homo oeconomicus* is "autistic"[2]—taking up a description from the natural sciences to refer to a behavior, which is assumed similarly self-centered. Autists' lack of a "theory of mind," that is, "to make attributions about the mental states (desires, beliefs, intentions) of others" (Singer and Fehr 2005, 340), is brought into relation with the individualistic, nonrelationalist characteristic of a market participant in economic theory. Autism as a characteristic of and within the "science"[3] of economics has been exposed by the newly emerged *"post-autistic economics" movement,* and it is also used in neuroeconomics to describe those people who act in line with the individualism of the economic theory.

In 2000, economics students at the Sorbonne in France wrote a petition entitled *Autisme-Économie* (Dürmeier 2006, 14), calling for a more pluralistic economic theory. Their protest spread to universities in other countries, like the United Kingdom, Germany, and the United States, gaining support among renowned scholars like James Kenneth Galbraith (Galbraith 2001), and has reached an international audience with its online journal *Post-Autistic Economics Review.*[4] Besides the critique of methodological individualism in economics with its self-centeredness as well as the lack of social and cooperative characteristics in *homo oeconomicus* (Arbeitskreis Postautistische Ökonomik 2006, 29), their critique also referred to the uncontrolled use of mathematics, the lack of pluralism in the economic approach, the paucity of realism, and, at the pedagogical level, the need to teach more than the established skills (Fullbrook 2003, 13f). By labeling the well-known critique of economics "post-autistic," the French students managed to attach their demands to the ongoing dialogue on the role of emotions in capitalist societies. Hollywood films like *Rainman* (1986), for example, thematized the topic of individuals who are unable to get into a proper relation with other people by using an autist as the main character in the film, and so autism found its way into the public realm (see also Karafyllis, this volume, for details). This critique also stands in relation to standard critique of capitalism for nurturing egoism, exclusive self-interest, and self-centeredness (Boltanski and Chiapello 2006, 79ff).

Although feminist critique does not use the "label" autistic, there are similarities between PAE and feminist economics. In 1993, Marianne A. Ferber and Julie A. Nelson edited a "pathbreaking collection" (Jacobsen 2007, 21) of feminist critiques of economics called *Beyond Economic Man* (Ferber and Nelson 1993), in which the assumptions of neoclassical economics were also under attack. Paula England, for example, describes the characteristics of *homo oeconomicus* as expressing a "separative self" (England 1993, 37), that is, a self which is not emotionally connected to others, lacks empathy, and is autonomous. However, feminist analysis goes further than PAE by detecting the underlying gender bias in economic models and revealing them as "androcentric," that is, that the existing system of gender relations has been chosen because it is biased in favor of men's interests (England 1993, 37), which are often considered to be different from women's interests. This imbalance is especially clear in Gary S. Becker's "new home economics" (Becker 1991), where he applies the neoclassical model to the household. Here, market and family behavior are differentiated: "In the family, individuals (particularly men) are presumed to be altruistic. Thus, empathic emotional connections between individuals are emphasized in the family whereas they are denied in analyzing markets" (England 1993, 37). Becker refers to the paternal altruism of the "family head," traditionally the man, who takes financially responsibility for the family, in order to be able to go on with a single utility function for the family, without mentioning that the "head of the family" also traditionally controls the resources. With this assumption a gender bias is implicit. Although both forms of criticism are similar, gender issues are not a priority for the PAE movement—a fact criticized by feminists (Nelson 2001).

In a way, neuroeconomics can be seen as a reaction to these forms of criticism of economics, although no direct references are made to them. In neuroeconomics the role of emotions for economic decision making is researched, which also relativizes the *homo oeconomicus* concept. In some of the neuroeconomic studies, economic rational behavior is labeled "autistic" as well. However, it is never declaring itself as being radically critical of economics. Neuroeconomics can be seen in the tradition of adding new and other methodologies to economics. In this sense, "behavioral economics" can be understood as its forerunner.

For the last two decades, "behavioral economics" has been doing psychological and cognitive science research on economic behavior and its relation to economic topics such as finance, game theory, macroeconomics, and so forth (Camerer, Loewenstein, and Prelec 2005, 9). This way of taking up psychological and particularly cognitive insights into economic theory and of also using laboratory experiments in economics was acknowledged by the broader scientific community in 2002, when the Nobel Prize committee awarded the prize for economics to two scholars who have challenged neoclassical economics: Daniel Kahneman and Vernon Smith.[5] Although these

approaches are further developing economics (Ross 2005), in general, the neoclassical paradigm is still dominant in economics.

The transdisciplinary field of neuroeconomics also deals with the topic of emotions in economic decision making but challenges the "economic brain" in a different way: Instead of merely observing behavior, brain functions are measured in vivo while subjects are active with economic decision making. With brain- and neuroimaging technologies, emotions and feelings are thought to be empirically verifiable and can, therefore, also be taken consideration for economic decision making and economic theory, that is, for a "science" like economics (Gächter 2005, 2).

Since PAE as well as feminist economics do not put the brain at the center of its analysis or critique of economic theory, and since the focus of this chapter is on the "economic brain," it is neuroeconomics which will be analyzed here in depth in order to show the ways in which brain research stands in relation to economics and economy.

## 10.3 Flexible Capitalism, the Economic Brain, and Gender

In neuroeconomic research, biological, medical, economic, and business issues merge. This merging also has a problematic side: For research, functional magnetic resonance imaging (fMRI) scanners are needed, which are usually found in clinics. With the possibility of carrying out commercial studies, there is, on the one hand, the chance of financing these expensive instruments and apparatus. On the other hand, it is said that the effects of research done in this setting have to be evaluated very carefully (Steinmetzer and Müller 2007). The intermingling of business interests and scientific research is one of the critical points concerning this connection, as is, for example, referred to in the critical letter of Consumer Alert, that has been criticizing Emory University for allowing neuromarketing research on its campus.[6]

These networks between business corporations and universities can also be interpreted as part of flexible capitalism which Richard Sennett (1998, 2006) describes in his analysis. One characteristic of this kind of capitalism is "networks." The cooperation needed in neuromarketing can be understood as networking—with the effects that power is diffused. The two other characteristics of the underlying power system of flexible capitalism are an ongoing restructuring of organizations, institutions, and corporations. And this means also for production that it has to be more flexible and more specialized, so that there can be more innovations in shorter time periods (Sennett 1998). The organizational structures correspond with characteristics which are needed by human beings living in this era of flexible capitalism—as flexible employees who can easily adapt to changing situations (see also Baumeler, this volume) and who need to have a certain attitude in order to be able to survive. They should be short-term oriented, looking toward the future, neglecting past experiences, and

having their potential abilities and their development in mind rather than real achievements (Sennett 2006, 83ff). The ideal of a market with its individualized market participants with economic brains seems to have become reality.

However, for employees as well as for the elites and leaders in this setting, their abilities have become more important, since flexibility and change are the most relevant features in this economic world. Sennett makes this clear by referring to testing culture and what it tests: the "innate abilities" of human beings (Sennett 2006, 117). The employees need the potential abilities and not so much the "craftsmanship," as Sennett calls the deeper knowledge about something. This situation also has an influence on human beings on a more personal level: "Potential ability focuses only on the self. The statement 'you lack potential' is much more devastating than 'you messed up.' It makes a more fundamental claim about who you are" (Sennett 2006, 123).

In this setting, emotions are considered to be important and play two different roles. On the one hand, they can be seen as needed in order to improve one's situation in this context. Since abilities have become relevant, emotional abilities might be considered important now as well—for this interpretation of the situation we can name Daniel Goleman's idea of Emotional Intelligence (EI).

On the other hand, emotions play an important role in coping with the challenges this situation provides—thereby, three challenges can be distinguished. First, how can the individual handle unstable life situations (how to deal with uncertainties and risks)? The second question is how is one to survive in the situation and make the most out of it, as an individual, but still relate to others—be it in a business or in a personal context? How is one to maintain relationships when moving from one town or even one country to another is required by the job in short time periods? And the third challenge is how is one to learn to adapt to the social environment, also emotionally, and still find one's own way with respect to how to do things?

In Arlie Russell Hochschild's book *The Managed Heart* (1983), she analyzes the situation of "emotional labor" in the workplace. Her concept of "emotional labor" refers to paid work which requires adapting one's emotions and feelings to the working situation where a certain emotion is required (Hochschild 1983, 7). In the occupations of care which are often held by women, part of the professional education is learning to manage emotions (Colley 2003). However, emotional labor in society is not restricted to women; men are also part of this both societal and social demand (Soares 2003, 37). If a person does not have the demanded emotion in his or her repertoire of emotions, she or he obviously has to train it, that is, make it emerge or suppress it. In this way, the economic brain is challenged, economic rationality is no longer sufficient, and emotions seem to be required. Emotional labor in times of flexible capitalism is not restricted to service jobs (Zapf et al. 2000; Zapf and Holz 2006). Leaders are also required to refer to emotions—or does leadership mean using an economic brain? And what role do organizations play, especially if we see them as social contexts where

gender roles are inscribed (Acker 1990), so that gender, race, and class all play a role? Differences between the behavior which is accepted and how the pay for work and labor is determined run along the lines of sex, race, and class (e.g., Rhode 2003a, 2003b). There are parallel processes concerning gender and race groups, and exclusion mechanisms: In top positions, women and people of color, in European and U.S. contexts at least, are in a minority; they are assigned a lower social status and are subject to negative stereotypes in relation to important competencies for top positions (Parker and ogilvie 2003, 182). We can still see a gender and race gap concerning wages in the United States[7] as well as in Europe (European Commission 2007). Equal pay for equal work is not the rule. In the European Union, the gross wage per hour for women is between 63% and 90% of that of men, depending on the work area (Eurostat 2007). The wage gap is where gender discrimination is most obvious (see also the Introduction to this volume).[8] Affirmative action, which is positive discrimination for the benefit of those groups in society which have traditionally been discriminated against—for example, women, homosexuals/lesbians, persons of color, and so forth—was one strategy in the 1980s to improve their political, social, and economic situation. In the 1990s, "comparable worth" was a political strategy to ensure equal wages for men and women in their occupations in order to abolish sex-based differences. In her description of the development and implementation of "comparable worth," Joan Acker—a professor of sociology and member of its legislative task force—shows just how difficult it is to transform a system, because, among other reasons, the techniques used are also political (Acker 1989). This is something the Gender Equality approach of the European Union is emphasizing at present as well. Gender mainstreaming has become an important E.U. policy since the beginning of the 21st century, focusing on equal treatment and equal opportunities for women and men by legislative, mainstreaming, and political actions.[9] The details of the strengths and weaknesses of these concepts will not be discussed here, but the concepts show that important criteria for improvements of participation in leadership, for example, are the ways and principles for admission to these positions.

In the era of flexible capitalism, with the possibilities afforded by the neurosciences, the questions concerning how to get into top positions are put anew: Will there be brain scans in the future for detecting the perfect flexible employee, in addition to the traditional achievement and ability tests, and what about the influences and tests possibly to be developed by the neurosciences on the behaviors of consumers?

Before we come back to the relation of the economic brain, neuroeconomics, and leadership, a closer look is needed at how neuroeconomics deals with this situation in flexible capitalism. The brain has become a central subject in flexible capitalism because it stands for the stability and continuity of the individual and can also be seen as his or her "instrument" to adapt to uncertain situations. Neuroeconomics focuses on the brain and tries to reveal the emotional elements of economic decision

making. In order to be able to understand the underlying ideas concerning neuroeconomics, I will focus now on the research methods in this discipline.

## 10.4 Neuroeconomic Research

### 10.4.1 Introduction

In general, neuroeconomics researches the connection of brain activities with certain forms of economic behavior. Individual decision making could be considered, as well as social exchange, or behavior in relation to institutions such as markets; taken together, "the working hypothesis is that the brain has evolved different, but interdependent, adaptive mechanisms for each of these tasks involving experience, memory and perception" (Smith 2002, 550). With this broad description of a potential research field, Vernon Smith opens it up, but at present mostly economic decision making in the broadest sense (including marketing issues) is researched in neuroeconomics. The brain, and especially those areas in the brain which are considered to be emotion related, and which can be seen as being active during economic activities as well, are at the center of this research, which takes place in a laboratory.

The focus on economic "decision making"—which means having the choice between different options, generally framed as an investment or noninvestment of money, or, to describe it differently, as a decision about how to use the money provided in the game—can be seen as a reduction of economics and economic issues: Abstract tests or games, like the ultimate game,[10] are typically designed for one or two players with a certain task which is theorized to detect an "emotion," that is, activities in brain regions ascribed to emotional processes. In some of the experiments, a questionnaire is used after the scans to detect what the person says verbally in relation to the researched hypothesis (e.g., Singer et al. 2006). Blood is sometimes drawn before and after the games to detect hormonal reactions; thus, at least part of the body is taken into consideration (Zak, Borja, Matzner, and Kurzban 2005, e.g.). However, the focus lies primarily on the brain.

### 10.4.2 The Four Main Topics in Neuroeconomic Testing

Neuroeconomic experiments in general deal with four topics, although one experiment might deal with different topics at the same time. These topics can be seen on a broader level as generated within the framework of flexible capitalism—since the three basic questions mentioned above with respect to how individuals can cope with this economic situation is also relevant in them.

First, there are experiments which deal with central categories of economic theory like utility, preferences, and incentives, and the question of which role "emotions" or other nonrational elements, like, for example, attitudes, play in the tests which are oriented toward these concepts (Sanfey, Loewenstein, McClure, and Cohen 2006,

109f). A comparison is made between *homo oeconomicus* and "living people," also trying to understand basic elements in modern economic theories—like game theory (Camerer 2003). This implies a comparison of science and society (see the Introduction to this volume). As an example for a new understanding of a basic economic issue, research on the utility of money and the reactions of the brain to financial gains can be mentioned here. The reactions to the gains are found to take place in the reward center of the brain and elicit the same activation as other attractive things. This result stands in contrast to economic theory because here money is considered a medium, not as something which represents a direct reward. The idea underlying the study on money might have been to give "physiological evidence" for a feature in capitalism that money is a direct reward and with it to make economic theory more realistic.[11]

The second topic refers to the basic situation of human beings in flexible capitalism. The question is how to deal with uncertainties and ambiguities. The "economic brain," being a present-oriented utility maximizer, does not take time aspects into account in general. Therefore, decisions under this premise cannot give a clue how to handle these situations in real life. Neuroeconomic researchers bring the temporal aspects of decision making into view (e.g., Huettel et al. 2006). However, there is a long tradition in economics about the exposure to risk and uncertainty and economic decisions made in relation to them. In economics, exposure to risk and uncertainty has often been dealt with as a problem of probability calculation. In neuroeconomics, the question of how people make decisions in situations where there is risk (defined as "uncertainty with known probabilities") and ambiguity (defined as "uncertainty with unknown probabilities"; both Huettel et al. 2006, 765) is considered by testing the reactions of the brain in relation to decisions affecting the future.[12]

And third, human beings in individualized, flexible capitalism have the problem of how to keep up their social life, which communities they want to join, and what brings the communities together. Therefore, in neuroeconomics, researchers also look at "social" issues in experiments which deal with topics described by neuroeconomists as trust, altruism, cooperation, strong reciprocity, empathy, and fairness (e.g., Fehr and Fischbacher 2004). These behaviors, which are oriented toward other people, are of special interest for neuroeconomic research, because some of the behaviors, like altruism, for example (Ahlert and Kenning 2006, 38), are considered "abnormal" behaviors by economists and in the sphere of economics, since a behavior such as altruism does not fit with the "economic brain" and its utility-maximizing self-centered rationality.

On the other hand, seen from a societal point of view, as some neuroeconomists do, a number of these behaviors—like trust—are understood as being basic for the functioning of an economy (Zak 2004). One of the outstanding scientists dealing with trust is Paul J. Zak from Claremont, California. He also brings the social dimension of his research into view and emphasizes that trust is one of "the strongest predictors of

whether a country will successfully develop: poor countries are by-and-large low-trust countries. This occurs because low trust inhibits investment and thereby the creation of wealth" (Zak, Borja, Matzner, and Kurzban 2005, 360). Trustworthiness for him means "cooperating when someone places trust in us" (Zak 2007, 2). In this quote from Zak, we can see that in these experiments a transgression of the economic paradigm, that is, the *homo oeconomicus*, takes place and a broader view on society is taken into account.

Fourth, neuroeconomic experiments focus on learning and reward mechanisms, sometimes in relation to the regulation of social relationships and sometimes with regard to marketing issues (Erk et al. 2002, 2499).

These four research areas in neuroeconomics show the relation of this new discipline to flexible capitalism, and the urge to take up the topics of emotions and nonrational reactions in economic decision making. In this sense, neuroeconomics looks at the deficits of flexible capitalism. In order to see how neuroeconomics approaches these issues—and if they really refer to a change in the "economic brain" and lead to a change in economic theory, and perhaps even in economic policy, and thus, maybe, resolve deficits of economic theory as well as capitalism—we need to take a closer look at the experiments and their experimental designs.

### 10.4.3 Test Persons and the Laboratory

The test persons involved in neuroeconomic experiments are often students,[13] considered to be "healthy," and they are recruited for playing games or solving the tasks put to them by scientists. Both men's and women's behaviors and emotions are researched, but only some of the tests are gendered. In neuroeconomic experiment descriptions, sometimes there is the contra-intuitive usage of "normal" and "autistic" for the test person: The category "normal" is used for the test person as long as she or he does not behave according to economic theory; otherwise, he or she is labeled "autistic."

The autistic person seems to have the perfect "economic brain"—which is in this context pathologized. Camerer and colleagues give an example of a student test person who is astonished at the noneconomic behavior of counterplayers in an "ultimate game."[14] They comment, "Ironically, while the subject's reasoning matches exactly how conventional game theory approaches the game, it sounds *autistic,* because this subject is surprised and perplexed by how normal people behave" (Camerer, Loewenstein, and Prelec 2005, 47).[15] "Normality" is defined here in a very narrow sense—the "norm" is just the majority of the researched persons' behavior. The small number of participants— approximately 20 to 30 volunteers or fewer in the experiments (e.g., Huettel et al. 2006, 772; Moll et al. 2006, 15626)—is probably due to the costly experimental settings: The experiments are carried out with technologies like fMRI, positron emission tomography, and magnetoencephalography (Ahlert and Kenning 2006, 32).

The person who takes part in an experiment with fMRI is put inside the fMRI test tube and answers questions or reacts to a game while his or her brain is scanned, that is, the blood flow in a specific brain region is measured. The images of the brain which are made with this technique are representations of reconstructions, created by algorithms and special software for image data processing on the computer. Therefore, it is problematic to say that these images are images of the real brain, representing brain functions and how they are really structured (Schmitz 2003). Also, the placement of the test person inside the fMRI machine might influence his or her behavior and the possible outcome of the experiment.

In his article "Mind Games: What Neuroeconomics Tells Us about Money and the Brain," in the September 18, 2006, edition of *The New Yorker*, John Cassidy describes his experience in a scanner at New York University's Center for Brain Research, where a graduate student, Peter Sokol-Hessner, guided him to the laboratory and through the experiment: "After an hour inside the machine, I was more concerned about getting out than I was about making a few dollars. . . . 'That's the terrible thing about MRIs,' Sokol-Hessner conceded. 'You are in a long tube, and you might feel tired or claustrophobic. There's definitely other stuff going on in there besides the experiment. We have to be very careful about how we interpret the evidence.'" However, there are some experiments in situations which are close to real-life situations, and which use not fMRI, but, for example, psychophysiological characteristics like skin conductance, blood volume pulse, heart rate, electromyographical signals, respiration, and body temperature as described in Andrew Lo and Dmitry V. Repin's field study. Lo and Repin measured foreign exchange traders while they were trading and making contracts in a volatile market in their "natural environment without disrupting their workflow while simultaneously capturing real-time financial pricing data from which market events can be defined" (Lo and Repin 2002, 232). They found out that "rapid market movements provoked traders' sympathetic nervous system; this can be interpreted as emotional response" (Zak 2004, 1743). In the field experiment, in which society became a "natural environment" of the actor, the question was also raised about the relationship between rational economic decisions and emotions.

As for individuals in flexible capitalism, it is also in these experiments that their own histories and individual experiences (i.e., the unique person) are not what is important here. The focus in the experiments is on the reaction of the human being in his or her brain, which everybody has. In contrast to the therapeutic use of brain scans, where the individual image is of importance for the diagnosis, and for finding deviations from health norms, here neuroimaging is used to set up economic and societal norms.

How is the "test person" seen—is he or she an "object" or a "subject"? Participants in the experiments are called "subjects" or "volunteers" (e.g., McCabe 2003) rather than "objects." The labeling refers first to the fact that the experiment is not a mass

scanning, which is forced on the population, but a voluntary decision to participate in the experiment. It also alludes to the point that participants in the experiments might only be part of a certain group in society, for example, students. Second, by using "subjects," the idea might still resonate that human beings are the participants, that is, persons with their own individual history and experience. On the other hand, the boundary between subject and object is vague here, because while subjective processes are experienced by the person, neuroscientists look for a causality-related effect in the brain which can be generalized and thus made objective. Therefore, the neuroimage resulting from a scan should allow scientists to make inferences about abstract generalities of human economic behavior. In this sense, "objectification"[16] (Nussbaum 1999b, 218) takes place here through fungibility: Although the persons tested are subjects, the experiments turn them into objects because their brains are seen as interchangeable. It is not their individuality which is observed and focused on, but the common reaction of all volunteers in the test. The search for the localization of emotions in the brain by scanning and by testing also implies, in a way, a "standardization" of reaction patterns a priori and a posteriori. By taking the majority of the neural activations' region, size, and intensity as the "norm," this kind of behavior comes to be seen as the standard for human beings in this situation. Due to the small number of test persons in the experiments as well as the special laboratory setting, these standardized conclusions about humans are difficult to evaluate.

### 10.4.4 Two Experiments: Detecting Emotions and Sexualizing Brains in Neuroeconomics and Neuromarketing

In this chapter I will focus on two experiments: one on empathy in neuroeconomics and the other on reward related to neuromarketing. In these experiments, the transgression of *homo oeconomicus* is most obvious because they deal with aspects which lie outside of the traditional economic rationality paradigm, and they also thematize differences between brains of men and women directly as well as indirectly.

The empathy experiment which will be described here was undertaken by the research group of Tania Singer and was published in *Nature* in 2006 (Singer et al. 2006). Empathy is understood in a neuroeconomic sense as enabling one "to share the emotion, pain and sensation of others" (Singer et al. 2006, 466). The study researched empathy reactions in the brains of men and women in relation to the fairness of others.

This kind of experiment is interesting for the field of economics for two reasons. First, it seems to reveal that the behavior in decision-making situations influences our perception of the person on an emotional, noncognitive level. This understanding contrasts with the assumptions of *homo oeconomicus*. Second, this experiment is an example of how a game—like the prisoner's dilemma game (PDG)—which is also used in economic theory becomes part of a test of empathy. The prisoner's dilemma game

involves two players. The rules are that each one can choose to either defect or cooperate. When both defect, they will lose (lose money, lose the opportunity to go free, or lose the opportunity to be assigned some other fate, depending on how the game is structured); if both cooperate, they will both win; if one defects and the other cooperates, the defector wins more. Adding *homo oeconomicus* into this situation, the only rational answer to the PDG is the defection of both. On the other hand, people frequently cooperate in real-life situations. In the context of neuroscientific experiments, the PDG is often employed in order to thematize the willingness of the test persons to cooperate.

Here, the game has been used in the first part of the experiment with 16 men and 16 women as test persons and four actors, two men and two women. The aim at this stage of the experiment was to induce liking or disliking of players. The game was set up so that a sequentially iterated PDG was played. The "first player can trust a second player by sending 10 starting points (subsequently converted to money) to the other player knowing that each point sent will be tripled. The second player (confederate) then reciprocates by sending an amount between 0 and 10 points back, which is also tripled" (Singer et al. 2006, 468). The professional actors were the scientists' "confederates." Based upon previous findings, the researchers expected that the test persons would like fair players and dislike unfair ones.

The second step in the experiment was the scanning of participants in the fMRI in order to look for responses in the brains of the test persons to determine whether having seen the liked or disliked person in the game receiving a pain stimulus elicited different responses in the brains, that is, empathy for pain.

The third step was filling out questionnaires, that is, giving a rating on a standard empathy scale "to rate the intensity of the low and high stimulation, their liking for the two confederates, and their desire for revenge on the two confederates" (Singer et al. 2006, 468).

Focusing on the second step again, there were two important findings: Just seeing the pain produced in the other player elicited the pain-sensitive activation networks in the brain, but these brain regions reacted differently according to whether the recipient of the painful stimulation was a fair player or an unfair player. In the experiment, the results were differentiated along the lines of sex: Women's reactions to the pain inflicted on fair and unfair players were nearly the same. In men, the results were different: "the knowledge that an unfair player was in receipt of pain elicited no increase in empathic activity in FI [fronto-insular cortex]" (Singer et al. 2006, 467; see also figure 1.2, this volume), that is, part of the pain center. The second point is that seeing pain inflicted on unfair players is not the only difference between men's and women's brain activities. Men also have an increased activation in the left ventral striatum/nucleus accumbens (NA) (see figures 1.3a and 1.3b, this volume). The NA and the orbitofrontal cortex were correlated in the experiment with the desire for

revenge (see figure 1.3d, this volume) since in the after-scan questionnaires, men showed a stronger desire for revenge than did women, so that this correlation was acknowledged, too. Although the questionnaire data showed that women said that they also felt a desire for revenge (lower than men; see figure 1.3c, this volume), their NA showed no further activity. Image results and questionnaire results for women thus were contradictory.

The focus of the study's interpretation lay on the men and their higher NA activity. The men's increased activity in the image suggested a correlation with the results of the questionnaire. Since there was no such correlation on the side of the researched women, their lower desire for revenge was not of further interest for the paper. The reactions of the men were generalized and brought into relation with theories of social preferences that "people value the gains of others positively if they are perceived to behave fairly, but value others' gains negatively if they behave unfairly. This pattern of preferences implies that people like cooperating with fair opponents but also like punishing unfair opponents" (Singer et al. 2006, 467f). The authors realize the generalization which lies in this interpretation by expressing a need for further research on the different emotional evaluation of men and women, but the sexually biased interpretation goes further and becomes even gendered: Singer et al.'s conclusions rely on a certain understanding of how women usually behave.

Here, the authors offer two possible interpretations: While admitting that their research design might be biased, they refer to stereotypes about female behavior, since the pain induced was physical pain. Their idea is that this might have influenced the desire for revenge in women. They wonder if, with a psychological or financial threat, women might have answered differently. Women are here associated with the "emotional" and the "nonviolent." Another interpretation explores the relation with the structure of society. This can be viewed as an example of how neuroscientific research is not free from ideas of society which can have an influence on the way we perceive not only *homo oeconomicus* or our individual behaviors but also society: "Alternatively, these findings could indicate a predominant role for males in the maintenance of justice and punishment of norm violation in human societies" (Singer et al. 2006, 468). What conclusions can be drawn from this statement? The friendliest one would be that this is not an emancipatory statement but a sexist one. One can assume that the norms of society are derived from biology. Political life and public life seem to be determined by biological differences.

Another research area in the field of economics and business is marketing, where emotions are already in the focus (Kenning et al. 2005, 57). In order to improve advertising and sales, neuroscientific methods are used to make the emotional effects of advertisement observable and measurable.

In a study carried out in a clinical setting at the University Clinic Ulm, Germany, in cooperation with the Daimler Chrysler Research Center Berlin, the focus was on

the effects sports cars have on the brain reward regions. The assumption was that sports cars, as "cultural objects," signal "high social rank, social dominance and wealth, and can be regarded as the human equivalent to the peacock's tail" (Erk et al. 2002, 2500).

Twelve men were questioned about their car preferences. While they were being shown photographs of cars from different categories, their brain activity was measured. The results of the brain scans showed that the reward circuitry was more active when seeing sports cars than when seeing other types of cars. In order to explain this reaction, these results were compared to the higher activation of the reward center of heterosexual males when looking at attractive female faces—with the underlying idea that these faces "can be regarded as a potentially rewarding stimulus, that is, the initiation of a social interaction" (Erk et al. 2002, 2501).

After the test in the scanner, the test persons went through an interview, which was in part quantitative, about "preferences and indifferences concerning cars in general and their individual criteria for the evaluation of a car" (Erk et al. 2002, 2500).

In this experiment a typical connection is made between men, cars, and attractive female faces. The assumption is that men might need some signal of social status or wealth to become attractive to others. Although this is not directly addressed in the study, by referring to "the peacock's tail," the underlying idea is that the purpose of acquiring this attraction is to impress women. The researchers mentioned in another article that the "tail thus fulfils no meaningful function except for signaling that its owner is obviously strong enough to be able to invest energy in such a superfluent structure . . . peacocks that are able to produce the most fancy and ornamental tails are 'fitter' in the Darwinian sense. . . . In human societies, it is known that the demonstration of wealth and superfluity is also a strong signal for social dominance" (Walter, Abler, Ciaramidaro, and Erk 2005, 370). Following the line that underlying the image of the peacock's tail lies a description of the relation of men and women, I will interpret the relationship between men and women modeled here as being that the woman seems to be able to choose the attractive man, who needs some social status symbols in order to make himself attractive. But at the same time, the point is that the man still remains in the dominant position, having power and wealth, and seems to need the woman as another attribute of these categories.

The problems concerning neuromarketing do not at present stem only from the possibility that the techniques of brain research might be misused and people directly manipulated by a neuro-based marketing campaign (Ziegenfuss 2005). These fears might be justifiable, but more in the long term, since, at present, the research on the brain cannot provide clear explanations about how the brain really works. Of utmost importance currently is the question of which images of society and individuals are promoted by neuroeconomics and neuromarketing. The underlying evolutionary concept of the survival of the fittest seems to leave out those who are not able to

compete in the market. No research on social interaction is carried out on those who are on the fringes of society. The aim seems to be to control and improve oneself—in order to join the group of the "fittest."

### 10.4.5 Gender and Emotions in Neuroeconomic Research

Taken together, what we have seen concerning the test settings as well as the experiments in neuroscience, and taking into consideration the two experiments described above, paradigmatically, there is only a rudimentary sensitivity to the sex of the test persons in neuroeconomics. Although the descriptions of the experiments refer to the sex of the test persons, and the findings are also sometimes described in relation to the sexes, there seems to be no or little reflection about the way in which the behavior of men and women as test persons might be influenced by their cultural or historical context as well as their gender roles. Sexual stereotypes, for example, that women are considered more empathetic, might have played a role in research setups. There also seems to be no reflection about the question of what constitutes a "female brain" and a "male brain." Neither transsexuals nor homosexuals/lesbians apparently play a role in the experiments. This reductionist view of society and its groups corresponds to the relatively small number of test persons in each experiment and the problematic that the conclusions are often generalized. The gender problematic of flexible capitalism is not explicitly referred to here. On the contrary, sexual stereotypes and traditional gender roles are written ahead in the structures of these experiments (see also Vidal and Benoit-Browaeys 2005).

Second, the experimenters want to show that "emotions" play a role in economics. This is done, for example, by referring to empathy as the way to "share the emotion, pain and sensation of others" (Singer et al. 2006, 466). It is not clear, however, how the relation of emotions and sensations as well as something like empathy is understood. On the level of basic research, the "status of emotions" in the brain and its relation to deliberation is not clear. In an article on neuroeconomics, Alan G. Sanfey and his coauthors argue the "greatest immediate ramifications for economic theories is between systems supporting emotion and those supporting deliberation, which closely parallels the distinction between automatic and controlled processes" (Sanfey, Loewenstein, McClure, and Cohen 2006, 112).

Some experiments show that empathetic response is automatic and that the brain regions activated are also observed when an unknown person shows pain reactions, but there are different individual empathetic abilities (Singer and Fehr 2005, 339ff). In the latest research, for example, Tania Singer and Frederique de Vignemont have questioned the assumption that "individuals automatically share the emotions of others when exposed to their emotions" (Vignemont and Singer 2006, 435), proposing instead that there are "several modulatory factors that might influence empathic brain responses" (Vignemont and Singer 2006, 435).

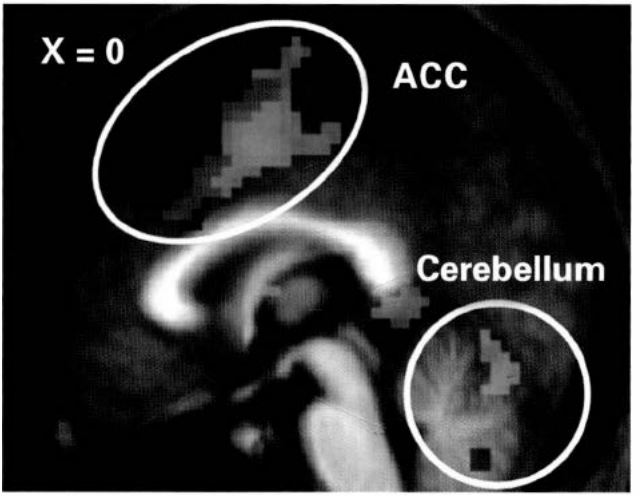



**Plate 1**

Pain-related activation associated with either experiencing pain in oneself or observing one's partner feeling pain: activation in anterior cingulate cortex and cerebellum. Areas in green represent significant activation ($p < .001$) for the contrast (pain–no pain) in the "self" condition and areas in red for the contrast (pain–no pain) in the "other" condition. The results are superimposed on a mean T1-weighted structural scan of the 16 subjects. Activations are shown on sagittal slides. (Source: Singer, Seymour, O'Doherty, Kaube, Dolan, and Frith. 2004. "Empathy for Pain Involves the Affective but Not Sensory Components of Pain." *Science* 303, no. 5661: 1157–1162, 1158; reprinted by permission from the American Association for the Advancement of Science: *Science*, © 2004.)

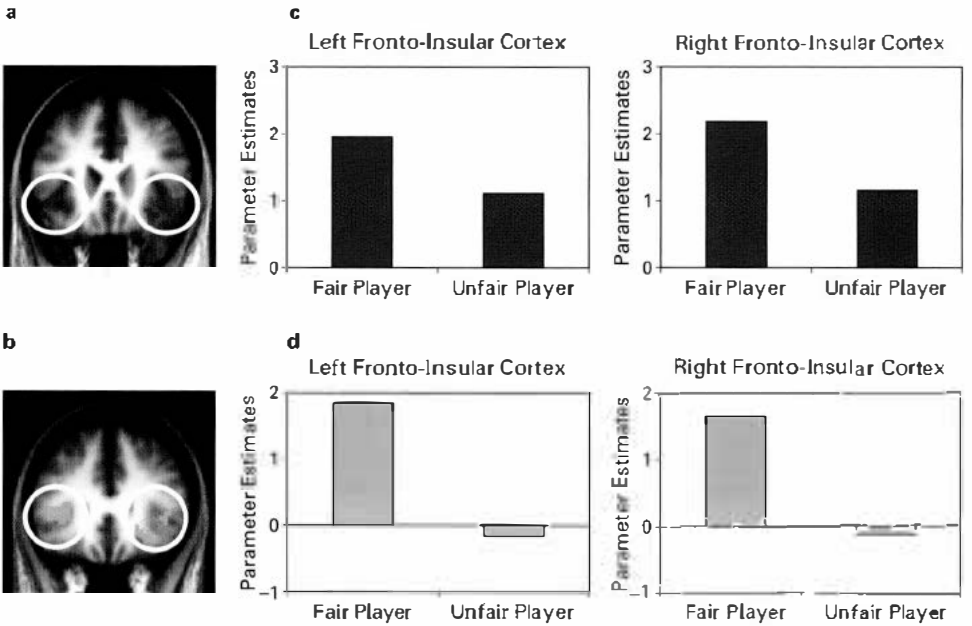



**Plate 2**

Pain-sensitive activation networks to the sight of fair and unfair players in pain. (a, b) Conjunction analysis between the contrasts pain–no pain in the context of self and the fair condition at $p < .001$ for women (pink; a) and men (blue; b). Increased pain-related activation (asterisk indicates whole-brain corrected) for women in ACC* [9, 18, 27], left fronto-insular cortex* [−42, 15, −3], right fronto-insular cortex* [30, 18, −18], left second somatosensory area (SII)* [−60, −30, 18], right SII* [63, −30, 24], and brainstem* [3, −18, −18]; for men in left fronto-insular cortex* [−33, 33, 3], right fronto-insular cortex [42, 33, 3], and brainstem [3, −33, −30]. (c, d) Average activation (parameter estimates) in peak voxels of left and right fronto-insular cortex for the painful–nonpainful trials in fair and unfair conditions for women (pink; c) and men (blue; d). (Source: Singer, Seymour, O'Doherty, Stephan, Dolan, and Frith. 2006. "Empathic Neural Responses Are Modulated by the Perceived Fairness of Others." *Nature* 439: 466–469, 468; reprinted by permission from Macmillan Publishers Ltd.: *Nature*, © 2006.)

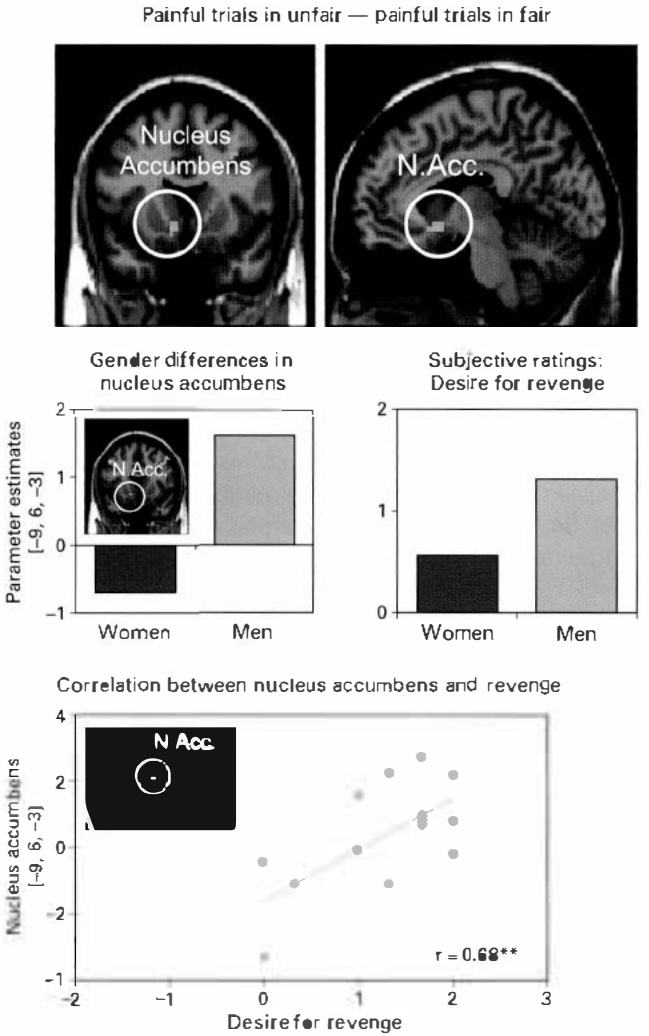



**Plate 3**

Gender differences in brain activity in nucleus accumbens (N. Acc.) specific to the perception of an unfair compared to fair player in pain. (a) Increased activity ($p < .005$) in nucleus accumbens [-9, 15, -9] for painful trials in the unfair/fair condition for men but not for women. (b) Average activation (parameter estimates) for women (pink) and men (blue) in left nucleus accumbens [-9, 15, -9] when testing for gender differences. (c) Men (blue) compared to women (pink) indicate stronger feelings of desire for revenge, $t(30) = 2.40$, $p < .05$, measured on a scale ranging from –2 ("not at all") to +2 ("very much"). (d) Correlation ($r = .68$, $p < .05$) of parameter estimates at peak of nucleus accumbens activation [-9, 6, -3] for the (pain in unfair–pain in fair) contrast in men with expressed desire for revenge in men. There was no correlation for women. (Source: Singer, Seymour, O'Doherty, Stephan, Dolan, and Frith. 2006. "Empathic Neural Responses Are Modulated by the Perceived Fairness of Others." *Nature* 439: 466–469, 469; reprinted by permission from Macmillan Publishers Ltd.: *Nature*, © 2006.)

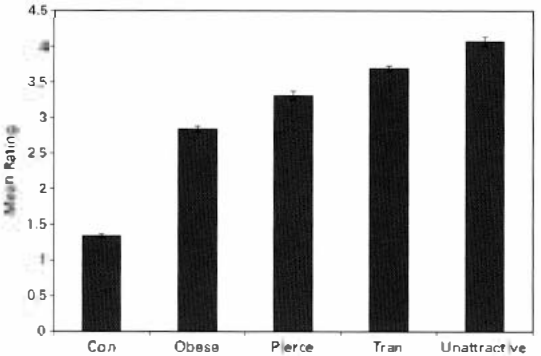



**Plate 4**

Mean disgust ratings: post hoc individual ratings, reverse scored such that 1 = "not at all disgusting," 5 = "very disgusting." Con, control; Tran, transsexual. (Source: Krendl, Macrae, Kelly, Fugelsang, and Heatherton. 2006. "The Good, the Bad, and the Ugly: An fMRI Investigation of the Functional Anatomic Correlates of Stigma." *Social Neuroscience* 1, no. 1: 5–15, 9; reprinted by permission from the publisher Taylor & Francis Ltd., http://informaworld.com: *Social Neuroscience*, © 2006.)

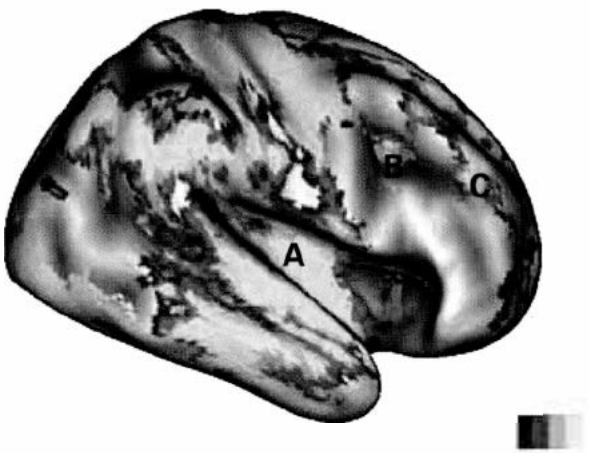



**Plate 5**

Parametric modulation of disgust ratings: analysis conducted with individual disgust ratings modeled linearly as a covariate of interest. An inflated voxel-by-voxel cortical rendering of the right hemisphere with a minimum threshold set at T = 3.53 and maximum set at T = 7 for $p < .001$ uncorrected (Van Essen, Drury, Dickson, Harwell, Hanlon, and Anderson 2001). Region of interest analyses extracted activity in the right inferior frontal gyrus (A; BA 45: 53, 24, 18), right medial frontal gyrus (B; BA 9: 50, 8, 36), and anterior cingulate gyrus (C; BA 32: –9, 22, 35) activity. (Source: Krendl, Macrae, Kelly, Fugelsang, and Heatherton. 2006. "The Good, the Bad, and the Ugly: An fMRI Investigation of the Functional Anatomic Correlates of Stigma." *Social Neuroscience* 1, no. 1: 5–15, 10; reprinted by permission from the publisher Taylor & Francis Ltd., http://informaworld.com: *Social Neuroscience*, © 2006.)

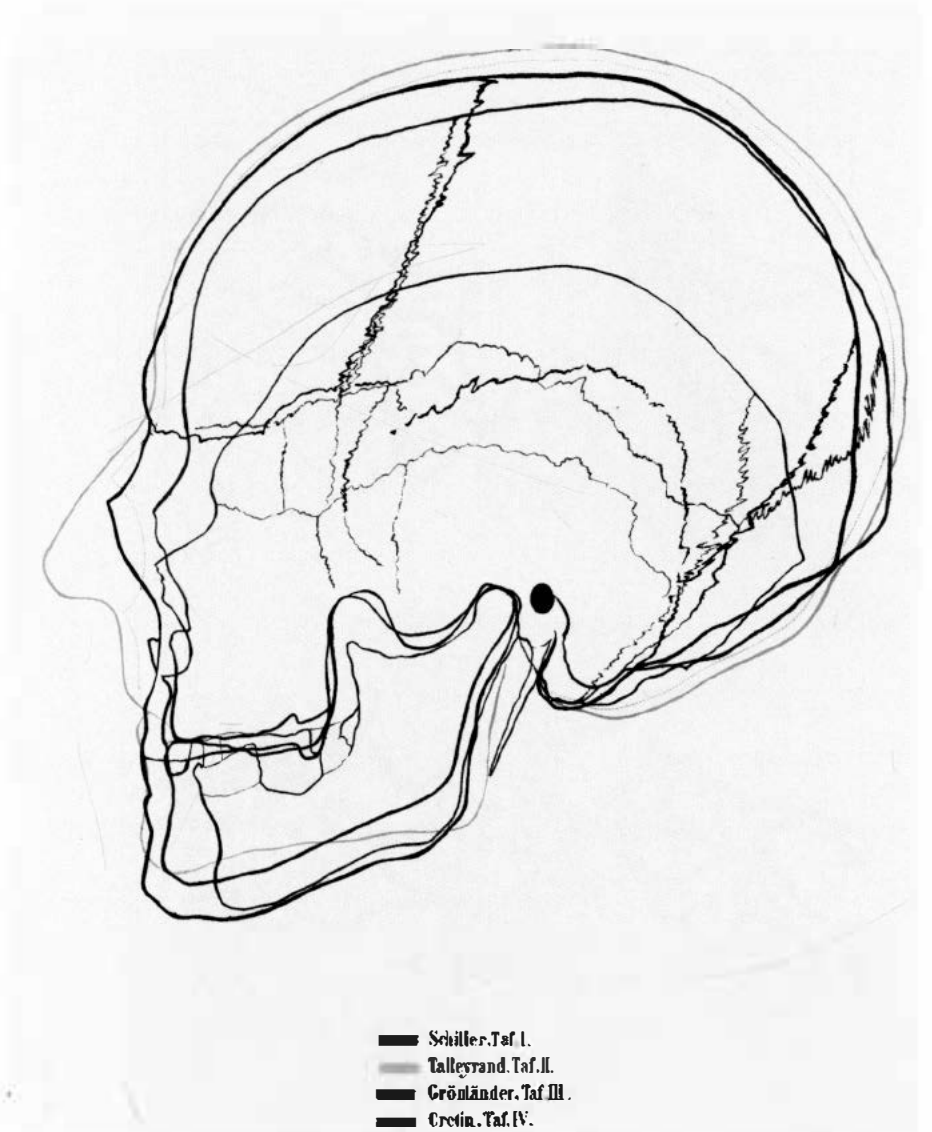
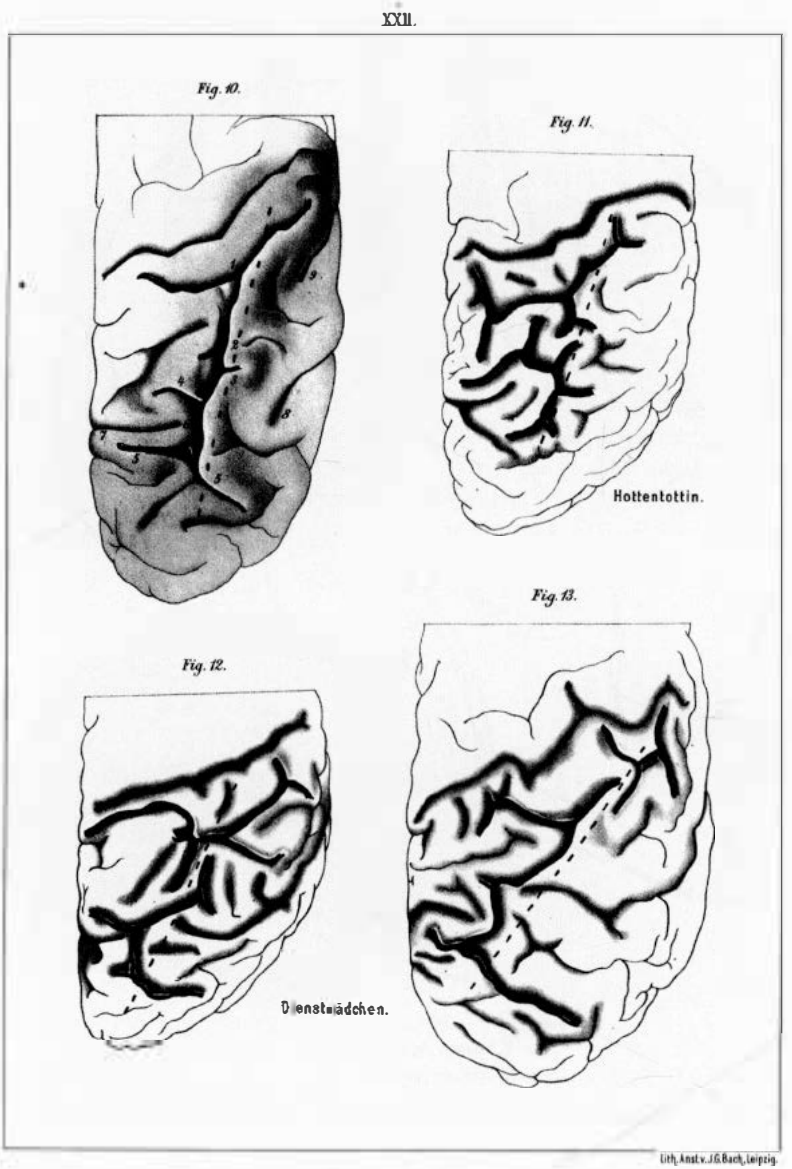



**Plate 6**

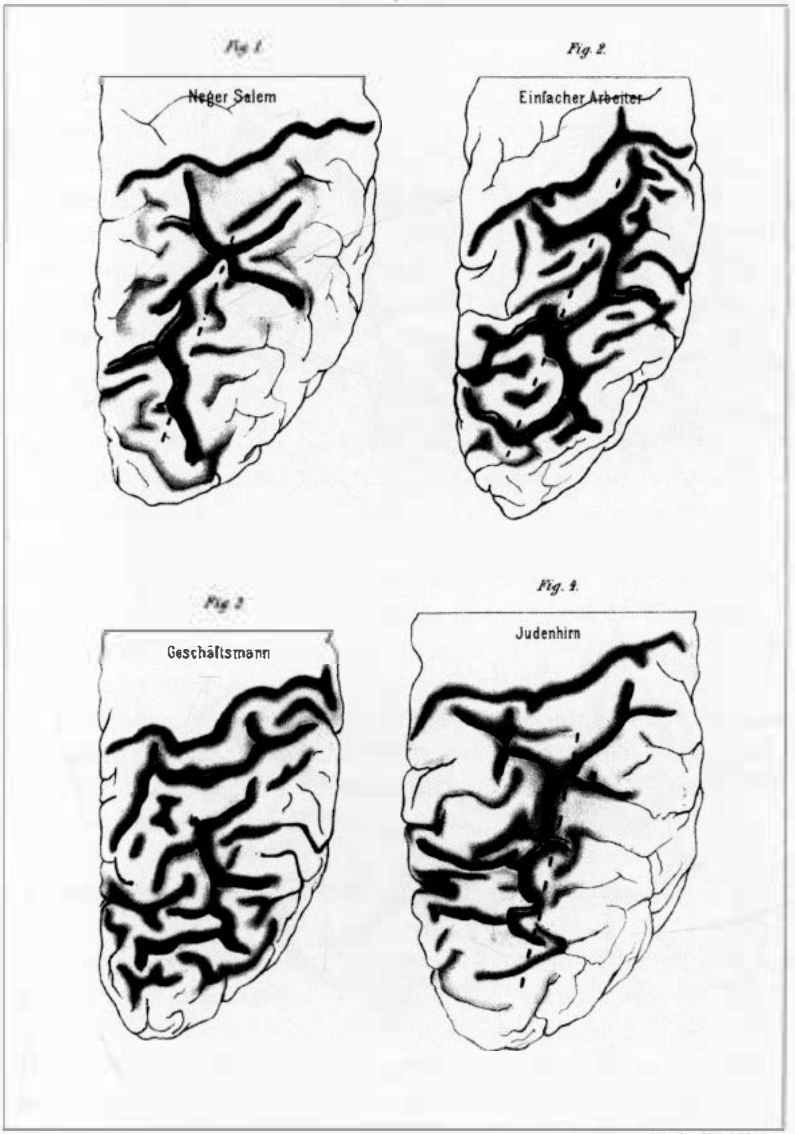
Carl Gustav Carus, facsimile drawing of four skulls. (Source: Carus, *Atlas der Cranioscopie oder Abbildungen der Schaedel- und Antlitzformen beruehmter oder sonst merkwürdiger Personen.* 1843–1845, table IX.)




Hirne von Frauen.

**Plate 7**

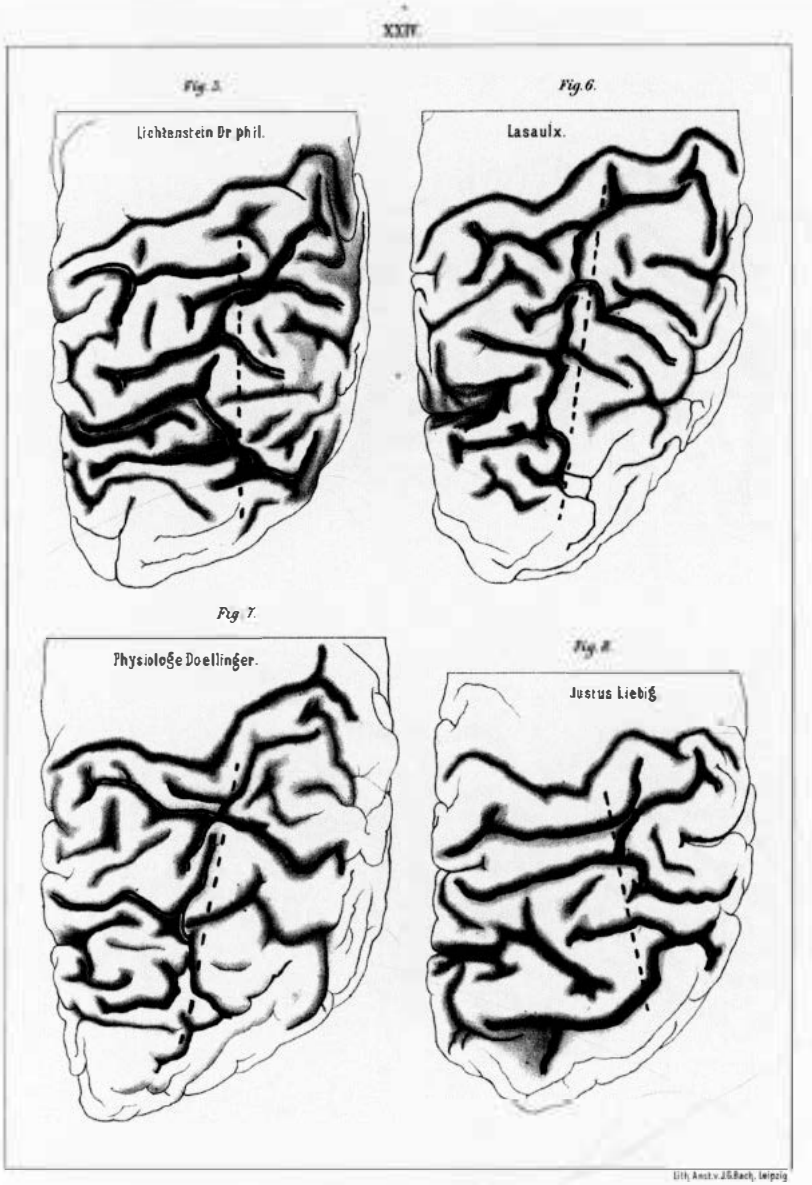
Nikolaus Rüdinger, brains of women. Hottentottin, Hottentot woman; Dienstmädchen, handmaiden (Source: Rüdinger. Ein Beitrag zur Anatomie der Affenspalte und der internen Interparietalfurche beim Menschen nach Race, Geschlecht und Individualität. In *Beiträge zur Anatomie und Embryologie als Festgabe Jacob Henle zum 4. April 1882 dargebracht von seinen Schülern*. 186–198. 1882, table XXII.)




Hirne von Männern.

**Plate 8**

Nikolaus Rüdinger, brains of men. Neger Salem, Negro Salem; Einfacher Arbeiter, unskilled worker; Geschäftsmann, business man; Judenhirn, brain of Jew. (Source: Rüdinger. Ein Beitrag zur Anatomie der Affenspalte und der internen Interparietalfurche beim Menschen nach Race, Geschlecht und Individualität. In *Beiträge zur Anatomie und Embryologie als Festgabe Jacob Henle zum 4. April 1882 dargebracht von seinen Schülern*. 186–198. 1882, table XXIII.)




Hirne von Gelehrten.

## Plate 9

Nikolaus Rüdinger, brains of scholars. (Source: Rüdinger. Ein Beitrag zur Anatomie der Affenspalte und der internen Interparietalfurche beim Menschen nach Race, Geschlecht und Individualität. In *Beiträge zur Anatomie und Embryologie als Festgabe Jacob Henle zum 4. April 1882 dargebracht von seinen Schülern.* 186–198. 1882, table XXIV.)

As can be seen from these different interpretations, neuroeconomics is still a new research area, and there are many different possibilities for interpreting research findings. However, sometimes research possibilities are declared which lead to a direct explanation, for example, in Camerer et al.'s statement that via neurosciences "direct measurement of thoughts and feelings [are made] possible for the first time" (Camerer, Loewenstein, and Prelec 2005, 53). This diffusion makes the status of emotions in neuroeconomic findings and their relevance for economic theory problematic. On the one hand, neuroeconomics has taken up issues like emotions and noncognitive activations in the brain—and with them it goes beyond the model of *homo oeconomicus*. On the other hand, no real differentiation is made concerning the role of emotions in economic issues.

This gap also has to do with a functionalist understanding of emotions. The functionalist idea is that having a certain mental state is an output and a reaction to a certain input (on the concept of function in social science, see Radcliff-Browne 1952). However, as we can see in the empathy example as well as the reward example, even if certain input (cut/pictures) stands in relation with pain or empathy and reward, the question is whether the quality and the experience of the emotions can really be shown in these settings (the *qualia* problem, e.g., Searle 1992; see also the Introduction to this volume). In these examples, in order to detect the "quality" of the emotions, questionnaires are needed. But then, as Tania Singer's research shows, for example, the feeling of desire for revenge, expressed by women, is not extensively referred to in the interpretation of the experiments. And by calculation, they become "statistical" qualities. This narrow view on the relation of economic problems and emotions can become problematic when applied to "real-life situations" like leadership.

## 10.5 Neuroeconomics, Leadership, and Elites

Neuroeconomics has not yet explicitly focused on leadership.[17] This lack of research might be due to a functionalist understanding of economic decision making, which is not sufficient in order to deal with leadership problems. Leadership, that is, being in charge of others in a group, institution, or company, can be described as dealing with the decisions concerning the group or the organization, referring to each member of the group (most often the subordinate employee) as well as convincing stakeholders of the organization. The problems in these settings might be too complex and refer to elements which cannot be easily measured with brain scans.

Although neuroeconomics itself does not refer to leadership, there are two approaches which are inspired by neuroscientific findings and which relate to leadership issues. One is Daniel Goleman's *Primal Leadership* approach, coauthored with Richard Boyatzis and Annie McKee (Goleman, Boyatzis, and McKee 2002), which refers to his EI concept and applies it in leadership contexts. The other approach is Simon Baron-Cohen's

(2004) systemizing leadership style (see Karafyllis, this volume). In both approaches, emotions play a role, one in their presence, the other one in their absence.

In Goleman et al.'s approach, the improvement of the individual leader in his or her emotional skills is central. The authors present a concept of leadership which they call "primal leadership," and they argue that "the fundamental task of leaders . . . is to prime good feeling in those they lead. That occurs when a leader creates *resonance*—a reservoir of positivity that frees the best in people. . . . Primal leadership demands we bring emotional intelligence to bear" (Goleman, Boyatzis, and McKee 2002, ix). The relation between leaders and their employees is defined by means of emotions. For the leader, key aspects concerning EI are self-awareness, self-management, social awareness, and relationship management. Although Goleman and his coauthors refer to the neurosciences in order to present "scientific" arguments for the importance of EI (Goleman, Boyatzis, and McKee 2002, 103), it is from the field of psychology that the concept of EI in Goleman's sense has been heavily criticized for not providing scientific empirical proof (see also MacCann et al., this volume) about how leadership effectiveness can be successfully measured by EI (Antonakis 2004). In this sense, EI including brain science is understood as pop science.

The other approach also refers to neuroscientific findings but has "autistic" brains, which are declared as the "perfect male brains," at its center. With respect to relating his "extreme male brain theory" to leadership, Baron-Cohen (2004, 126) shows that although he is referring to neuroscience as well, his ideal leader is completely different. For him, a leader is a good systemizer who knows how to control situations and does not empathize too much with subordinates. So, Goleman as well as Baron-Cohen refer to neuroscientific findings as proof for their ideas but arrive at different results. This difference has to do with the norms and images which are attributed to leaders and which are different in economic contexts and in those of the neurosciences.

To describe different kinds of leadership is a task of sociology or psychology, to evaluate them normatively, an ethical task. The sociologist Max Weber differentiates between three types of authority (*Herrschaft*). Alongside tradition and rational authority, he puts charisma (Weber 1956, chapter III, § 10). This differentiation resonates within some of the theories of leadership of the last decades. In the 1980s, leadership was constructed as a model in opposition to management. Managers were seen as lacking vision for the future. Bernhard Bass, building on the approach of James G. Burns, emphasizes a theory of leadership based on the charismatic and visionary leader (Antonakis, Cianciolo, and Sternberg 2004, 9): *transformational leadership* has at its center a strong identification with the leader and a vision which is shared; raising "one another to higher levels of motivation and morality" (Burns 1978, 20). *Transactional leadership* is differentiated from this approach: it "creates the leader–employee relationship on the basis of the contingent positive and negative reinforcement in a sense of the exchange theory" (Kroeger and Tartler 2002, 126).

Bass developed a test on which facets of transformational and transactional leadership, as well as nonleadership behavior and outcomes like satisfaction, effectiveness, and extra effort, were measured using a set of questions on 45 items concerning how subjects evaluate their own leadership style, their own reactions, and the reactions of others to their own behavior (Bass and Avolio 2000). This Multifactor Leadership Questionnaire (MLQ), based on Bernard Bass and Bruce Avolio's Full Range Leadership Model, is one of the most often used tools in the measurement of transformational leadership (Heintz 2006, i). Although within the context of flexible capitalism, the achievements are not so much tested on the MLQ, the test is at least not only based on an evaluation of the subordinate leader by a superior but takes different aspects of leadership into account as well. On the other hand, only a certain set of leadership styles are tested, and an MLQ evaluation identifies which of these leadership styles best describes the individual being tested. Therefore not the individuality of the leadership style is appreciated but a certain standardization of leadership styles is developed. The ideal seems to be an emotionally open-minded, democratically oriented person who is sympathetic and comfortable with his or her surroundings. Bass and Avolio suggest that female leaders tend toward the transformational leadership style (Bass and Avolio 1997). However, different studies on the evaluation of men and women in leading positions questioned with the MLQ have yielded differing results. Sometimes the leadership style of men and women (e.g., Australian bank managers) is rated equally by subordinates (Carless 1998). Other studies show differences in the evaluation of female and male leadership styles by subordinates.[18]

The idea in flexible capitalism is that self-improvement strategies like EI or the orientation provided by an MLQ-type measure suggests to leaders, as well as to employees, that it is possible, by their own energy, to improve their position in society's hierarchies (see also Bandura 2003). As can be seen from the MLQ evaluations, the leadership styles of women are perceived differently and probably are also different. However, the measurements of abilities are often problematic since they not only interfere with the employee's personality but seem also to refer to patterns and stereotypes of how men and women are perceived and often do not take into account the organizational structures of the workplace.

In a study on female design engineers, Joyce K. Fletcher shows that although organizations may propose an emotional and relational behavioral style for their leaders, the reality is different: This kind of behavior is not recognized when decisions are made concerning rewards and promotions because it contrasts with powerful behavior (Fletcher 1999). Often the definition of a power position is already "contaminated" with gendered connotations (Powell, Butterfield, and Parent 2002), which excludes women (Bourdieu 2005b (1998), 110ff), as well as other persons who do not fit into these concepts.

Since women are generally associated with caring roles and more "communal strategies" (for an historical overview see Allen 2005), in contrast to men who are associated with more aggressive behaviors and more "agentic strategies," it might be that women are not seen as being capable of ensuring success in leadership positions—as role congruity theory explains (Eagly and Karau 2002). These expectations concerning women and men have become injunctive norms, so that women or men who break out of these roles might get into trouble.

The above-mentioned tests, as well as neuroeconomic research on empathy, for example, fit into this setting: The individual's abilities to react and empathize with others are tested—and generalized from a gender perspective as well, while ignoring that sexual stereotypes are social constructs (Konnertz, Haker, and Mieth 2006). The individual who has to optimize himself or herself, in order to fit into an unstable society, can be seen as the underlying societal construct in neuroeconomics as well as in EI and modern leadership theories.

What are the effects of brain scans in relation to the development of the understanding of leadership? One could imagine that a brain scan of, for example, empathy, could also be used for testing and thereby the simplistic biologistic image of empathy would be brought into the realm of leadership qualification. And would the use of brain scanning then change leadership styles or change the composition of leadership groups? Leaders can be seen as elites. However, not all members of elite classes are transformational leaders who are responsible for a certain group of people and have vision. In elite groups, as well as nonelite groups, leaders seem to have the task of giving advice and meaning to the actions of others. They seem to have this power because they can give meaning to what is important for the society, the organization, or the group that they are leading. These definitions exclude others not only from leadership but also from joining the elites, which is something that could also change if brain scans were made available to a broader public, since the myth that neuroimaging provides more "objective" data than are obtained using other measures would also be brought into play.

However, up to now, in general, the U.S. power elite, for example, has not become as diversified, with respect to ethnicity, gender, race, and sexual orientation, as expected, although there are members of "minority" groups who have made themselves acceptable to the establishment as Richard L. Zweigenhaft and William Domhoff (2006) show in their analysis of American power elites, which follows in the tradition of C. Wright Mills (Mills 1956). The same effect is seen in the European Union (see, e.g., Imbusch and Rucht 2007).

Will this closure of elites change due to brain research? In the past, elite brains have been detected a posteriori (see Hagner, this volume), but could the idea come up that "brain elites" can also be detected a priori via brain scans? And would this be a desirable perspective? Answers to these questions depend on the metalevel and which

anthropological premises are taken up (Gräb-Schmidt 2002) and which answer is given to the question of what constitutes a human being. On a more practical level, answers also depend on which role is attributed to the "fetish" brain and on how findings in neuroscience make their way into public realm and are converted into "general knowledge."

## 10.6 The Pop-Scientific Side of Neuroeconomics

As the foregoing sections have shown, neuroeconomics takes place in a certain form of capitalism, being influenced by its economic and political system. But what about the other way around? How does neuroeconomics influence society? This broad research question cannot be taken up here in its entirety, but I will focus on an article which can be seen as idealtypic. Often neuroeconomic findings make their way to a broader public, in a pop-scientific way, through articles in newspapers and magazines. "Pop-scientific" means that scientific findings are simplified and also interpreted for a broader audience. The images produced through neuroimaging also have their own quality and fascination, which might lie in the way that an image from inside the body is presented with a certain coloring—which helps popularize the neuroscientific findings (Groß and Müller 2006).

Let us look at an article which can be seen as an example of presenting neuroscientific findings to a broader public. In "Taxes a Pleasure? Check the Brain Scan," John Tierney, in *The New York Times* from June 19, 2007, reports the neuroscientific finding that human pleasure centers in the brain respond to doing good not only for ourselves but also for others and interprets this finding. Tierney himself takes on a bemused distance—and is also skeptical about the validity of the generalizations of the research—which is based on a neuroeconomic study done at the University of Oregon in which researchers measured 19 female students' brain reactions to decisions which were modeled as simulations of donations of money and paying taxes, voluntarily or involuntarily.

At one level, the article can be interpreted as showing that neuroeconomics also tries to deal with open questions in capitalism. Here the topic—already announced by the heading of the article—is taxes. The underlying question is: Why should individuals pay taxes? Paying taxes implies that private money has to be given to the state and therein to the "public," and this also means giving up control over it. The idea of taxes is that "public goods" like streets or military activities can be financed and a kind of redistribution of wealth takes place as well. For a hard-core *homo oeconomicus*, this last point in particular is not acceptable. Seen from the neuroeconomic perspective of this research which the articles describes, paying taxes is not a question of responsibility for the common good or a question of an ethical norm or even an economic question but rather a question of physiology: What is going on in the brain

when paying taxes—or when a simulation of paying taxes is conducted? And I can formulate it also in this way: In this article the reason given to explain why paying taxes is a positive act is that it elicits activation of the reward center. On another level, an implicit political statement in favor of a libertarian society might be found in the statement of one of the researchers who conducted the study: Although the researcher admits that the proof might be vague, he sees a slight tendency toward more activity in the brain areas when making donations than when paying taxes. The way the experiment was structured, as well as the kind of interpretations given by the researchers, provides hints that neuroeconomics also influences society by dealing with issues of economic policy, and therefore I will have a closer look at which concepts of economics and economy and even biology can be found at the base of neuroeconomic studies.

## 10.7 Underlying Concepts of Economy, Economics, and Biology in Neuroeconomics

The research focus of some neuroeconomic studies on altruism and trust hints at one of the basic questions concerning an economic system: How is it possible to get an individualized market society to inspire united action? The old question of the relation between individual and community or society is addressed here, that is, sociality (Deuser 2004, Bedford-Strohm 1999, Parsons 1977).

An element which is seen as important in different economic theories is trust (e.g., for a libertarian approach, see Fukuyama 1995). Neuroeconomist Paul J. Zak focuses on trust in his research and often takes up trust games, where trust is understood in a monetary sense, and the individual is the DM (decision maker): "The consensus in the literature is that the transfer from DM 1 to DM 2 is a (costly) signal of trust" (Zak 2007, 23). In these games the point is to show that human beings trust one another in economic situations as well. In one of his descriptions of an experiment, Zak concludes with his vision for society: "At the national level, trust can be raised by emphasizing the importance of education, reducing inequalities, and promoting freedom and democracy. National institutions that allow and encourage individuals to achieve their goals directly promote trust and therefore the creation of wealth. . . . Friendships, confidence, empathy, mercy, love and faith all follow from trust and are likely mediated by oxytocin. As social scientists apply these findings to institutional design, not only will productivity be raised, but so will happiness" (Zak 2007, 32). First, this statement, with its allusion to an increase in happiness and its image of individuals building a society based on trust, resonates with Adam Smith's description of the "invisible hand," which leads to the happiness of everybody, in his *Theory of Moral Sentiments* (Smith 1759, part IV, chapter I). Zak refers to the need for education and reduction of inequality and combines it with the importance of freedom and democracy in relation to national institutions. Here, a market economic model

informs neuroeconomics—it still refers to the need for institutions and the reduction of inequality. Second, in contrast to Smith, the ordering of society is not mediated by an "invisible hand" but by a hormone: oxytocin (OT). This hormone simultaneously acts as a neurotransmitter in the brain and is related to the body of women. In one of his studies, Zak refers to sex differences and concludes that women who were ovulating "were less trustworthy than other subjects" due to their higher progesterone level which inhibits OT uptake (Zak 2004, 1745). In the above-mentioned quote on society, OT leads people to engage in interpersonal relationships, that is, sociality is based in this view on a body-interior biological medium. Interpreting his findings, Zak writes that it is "nature" which has "designed" human beings to cooperate. A close theoretical and practical linkage between biology and economics can be seen in this approach. In Zak's view—quoting Thorstein Veblen—"'economics, properly understood, is simply a branch of biology'" (Zak 2004, 1746).

Let us have a closer look at the connection between biology, economics, and economy which can be found in neuroeconomics. There seems to be an ongoing struggle about which of the sciences is more influential in interpreting the results of neuroscientific research and which paradigms are challenged in the related sciences.

Without question, the main focus lies on economics and neuroscience, which is considered part of biology. Although neuroeconomics sees itself as a transdisciplinary approach of neurobiology, economics, and psychology, the last of these seems to be pushed to the margin because media, like tests and questionnaires, are taken from this discipline, but only to cross-check the scanned results or to make behavioral assumptions. Psychologists' research questions are hardly taken into consideration.

Economics is challenged by the neurosciences, since the "rationality" concept of *homo oeconomicus* is questioned, though for scientists like Colin Camerer, doing research in neuroeconomics, the reverse is also true. He proclaims that neuroscience "is shot through with familiar economic language," and suggests that an "economic model of the brain" could help to develop an overall theory of the brain and explain how it allocates resources.

Paul Glimcher draws the conclusion that economic theory can overcome the Cartesian model of mind and body, rephrased in modern terms as brain and behavior, with a cognitive model which is economics based (Glimcher 2003). Findings in scientific contexts are interpreted in an economic sense, and in this way the impression is created that economics and biology merge. For Glimcher, for example, decision-making processes are "holistic" and are present in other mammals as well. He and colleagues carried out experiments with monkeys, in which, for example, thirsty monkeys were trained via a visual stimulus to expect different amounts of juice in relation to eye-movement targets. The monkeys adapted their behavior to the setting so that they could maximize their payoffs. The firing rate of the neurons was close to

the rewards the monkeys got. Glimcher interpreted their findings and those of other studies to suggest that the primates' brains acted as if monkeys were rational agents, maximizing their utility: "The final stages of decision making seem to reflect something very much like a utility calculation" (Glimcher, Dorris, and Bayer 2005, 31).

Is economic rational behavior then something biological? For Glimcher, economics is not a "pure" social science. Like the sociobiologist Edward O. Wilson (Wilson 1978), he thinks that economics and biology both address a single subject and will merge soon. This close relation between economics and biology has a long tradition in economics, and they have exerted influence on each other.[19] In neuroeconomics as well, reference is often made to evolution to explain the relevance of findings (e.g., Moll et al. 2006, 15626). From evolution theory, with its characteristics of variations, selection, and survival of the fittest, it is the idea of selection, re-envisioned as choice, which is considered important in economics (Haferkamp and Smelser 1992). "Ultimately, economics is a biological science. It is the study of how humans choose. That choice is inescapably a biological process. Truly understanding how and why humans make the choices that they do will undoubtedly require a neuroeconomic science" (Glimcher, Dorris, and Bayer 2005, 31).

Perhaps due to the underlying evolutionary framework, with its focus on selection and choice, neuroeconomics also makes choice and decision making its primary interest. It is the reformulated selection process of evolution. However, in order to be able to make the two sciences of biology and economics merge, the rational foundation of *homo oeconomicus* is questioned and emotions or something, which is "inscribed into the brain," is researched. So when neuroeconomics takes up questions of insecurity and freedom, it refers to self-optimization in order to improve selection processes within a society that is interpreted as nature. This also includes having underlying specific sexual stereotypes of men and women, with women being the ones who nurture and guarantee reproduction, and men the ones responsible for defense and law.

## 10.8 Final Thoughts

The foregoing analysis argues that neuroeconomics challenges the "economic brain" by taking into consideration the impact of emotions on economic decision making. However, neuroeconomics still has little influence on economic theory, perhaps because the findings are too recent—or are there other reasons?

Let us speculate, how might "the economic brain" develop from a neuroeconomic point of view? Will economic theory be completely transformed? In contrast to "post-autistic" and feminist economics, neuroeconomics is still bound to its underlying concepts of economy and biology, both of which are at present referring to the concept of evolution. At least for the moment, this common underlying reference frame makes neuroeconomics compatible with economics as well as with flexible

capitalism. It is through neuroeconomics that economics and the economy respond to the criticism that in these areas emotions are not taken seriously. Neuroeconomics tries to make emotions "visible" and measurable, and the next step would be to integrate emotions into an economic paradigm. In this sense, neuroeconomics fits to economics.

In my opinion, the mélange of economics and biology in neuroeconomics is becoming problematic, especially when referring to evolutionary explanations for economic and social relations and societal issues, for then the border of Social Darwinistic concepts is easily transgressed. From a gender perspective this is especially problematic due to the different tasks of the sexes traditionally assumed by evolutionary theories (Miller 1993). In the discussion concerning access to leadership positions, for example, the question of how to handle personnel evaluations is also a political question. Should it be by merit or ability (Young 1990), the criteria which determine the access to leadership positions should be evaluated critically in relation to their underlying gender biases and discussed not only under a paradigm of competition but also of quality and of democratic structures (Huber 1996, 299f).

Even if one does not share this normative position, it is at least—when considering neuroeconomics—important to be aware of the anthropological premises, to realize the underlying reference frame, and to see that the results of neuroeconomics are often quite open to interpretation. The interpretation of these results is at first a task of the scientists. In order to maintain standards of good science (Fausto-Sterling 1994), greater sensitivity to sex and gender implications of the research results is needed. However, there are also other aspects concerning the interpretation of research results to be considered, especially when realizing how close economics, neuroscience, and business work together in neuroeconomics. The influence on research, which runs over the finances, is to be taken into consideration in order to thematize its underlying power relations.

This leads to the point that we also have to become aware of how neuroeconomic results are used in the scientific community as well as in the realm of the general public. What kind of knowledge is communicated here—and what kind of explanatory value is it thought to have? Neuroeconomic research gives, at present, interesting hints as to which brain regions are active during decision making in abstract decision-making models. However, the functionalist explanations of neuroeconomics are not adequate to understanding economics in general and to solving economic problems within society and between societies, particularly not from a gender perspective.

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## Notes

1. Feminist economics is not monolithic. Research has also been done on economics and gender which remains within the economic paradigm (Jacobsen 2007). In this chapter "feminist economics" refers to the more foundational critique of economic theory.

2. For a critical analysis of the difference between autism and economics, see Devine (2002). The use of "autism" in the economic context is not considered to be discriminating against autists.

3. Uskali Mäki recommends differentiating between "the ontological convictions of an economist and the ontological presuppositions of an economic theory" (Mäki 2002, 6).

4. http://www.paecon.net (accessed January 7, 2007).

5. In his basic studies together with the late Amos Tversky, Kahneman developed *prospect theory*, demonstrating that human behavior in decision making under uncertainty does not always correspond to economic theory but is influenced, for example, by the frame given to a choice. They also showed that human beings focus more closely on relative gains and losses than on changes in their overall welfare (Rick and Loewenstein 2007).

6. www.commercialalert.org/issues/culture/neuromarketing/commercial-alert-asks-feds-to-investigate-neuromarketing-research-at-emory-university (accessed June 8, 2007).

7. See, for example, http://www.census.gov/prod/2005pubs/p60-229-pdf (accessed July 25, 2007).

8. This discrimination can even be seen in the description of the wage gap: It is analyzed from the perspective of men—and it is often not analyzed in relation to the complexity of the underlying social injustices (Kreimer 2006, 163).

9. http://ec.europa.eu/employment_social/gender_equality/index_en.html (accessed July 25, 2007).

10. In this game a fixed sum of money has to be divided between two persons. The proposer makes an offer about the division of the sum to the other person, who can accept or reject it. If rejected, none of the players gets any money; if accepted, the offer is taken.

11. The twentieth century libertarian economist Ludwig von Mises, for example, supposed that money is not seen as having utility in and of itself, but only indirectly (Mises 1981, HP 15). With neuroscientific findings, some "evidence" is assumed for a connection between money and "hemodynamic acitivations overlapping those seen previously in response to tactile stimuli, and euphoria-inducing drugs" (Breiter et al. 2001, 627).

12. In the study by Huettel et al. (Huettel et al. 2006), the researchers show that "different attitudes toward perceived risk and ambiguity in decision-making situations may reflect a basic distinction in brain function," as *Science Daily* reported in March 2006 (http://sciencedaily.com/releases/2006/03/060303113346.htm, accessed July 20, 2007).

13. Colin Camerer describes the participants in experiments for behavioral game theory, for example, as "college students playing a couple of hours for modest financial stakes" (Camerer 2003, 4).

14. For a description of the "ultimate game," see endnote 10. In general, the actions of most proposers are economically nonrational, because they offer nearly half (40% to 50%) of the money, somehow anticipating the observed fact that offers of less than 20% are rejected by nearly half of the responders.

15. Autists are stereotyped here, because there are studies which show that adult autists also cooperate in strategic games—although there are behavioral differences in real-life situations between autists and nonautists (Hill and Sally 2003, 50ff).

16. For Martha Nussbaum "objectification" has seven notions: instrumentality, denial of autonomy, inertness, fungibility, violability, ownership, denial of subjectivity, but not all have to appear together. Fungability is defined as "The objectifier treats the object as interchangeable (a) with other objects of the same type and/ or (b) with objects of other types (Nussbaum 1999b, 218). Note that Axel Honneth (2005) emphasizes that the tradition of "objectification" goes back to Georg Lukács and Karl Marx, but in this tradition, "Verdinglichung" is called "reification."

17. Although there are conferences on "neuroleadership" where neuroscientific findings are applied to leadership questions, this is done more on a "practical level" than on a scientific or scholarly basis; see, for example, http://neuroleadershipsummit2007.blogspot.com/ (accessed July 7, 2007). On neuromanagement see Senn (2004).

18. At a police academy, police students at the beginning of their training evaluated female and male leaders differently, but at the end of the education leaders of both sexes were evaluated about the same. http://www.aic.gov.au/conferences/policewomen2/Panopoulos.pdf (accessed July 27, 2007).

19. British economist Adam Smith, as a central figure in the development of modern economics, influenced Charles Darwin in his "theory" on the origin of species, which is now known as evolution theory (Gould 1982, 66). And in his work *Principles of Economics* (1890) British economist Alfred Marshall referred to biology as "the mecca" of the economist, emphasizing the importance of biology and evolution theory for economics (Hodgson 1993; see also Ghiselin 1974). The economist and social philosopher Friedrich August von Hayek also intensively worked on theoretical psychology (Hayek 1976) and developed a cultural evolution theory. There are a variety of different ways in which economics has incorporated evolutionary theory (e.g., Dopfer 2005, Faber and Proops 1997, Maynard-Smith 1982).