

Sexualized Brains

Scientific Modeling of Emotional Intelligence from a Cultural Perspective

edited by Nicole C. Karafyllis and Gotlind Ulshöfer

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1 Introduction: Intelligent Emotions and Sexualized Brains—Discourses, Scientific Models, and Their Interdependencies

Nicole C. Karafyllis and Gotlind Ulshöfer

The last decade, despite its bad news, has also seen an unparalleled burst of scientific studies of emotion. Most dramatic are the glimpses of the brain at work, made possible by innovative methods such as new brain-imaging technologies. They have made visible for the first time in human history what has always been a source of deep mystery: exactly how this intricate mass of cells operates while we think and feel, imagine and dream. This flood of neurobiological data lets us understand more clearly than ever how the brain's centers for emotion move us to rage or tears, and how more ancient parts of the brain, which stir us to make war as well as love, are channeled for better or worse. This unprecedented clarity on the workings of emotions and their failings brings into focus some fresh remedies for our collective emotional crisis.

—Daniel Goleman, *Emotional Intelligence: Why It Can Matter More than IQ*, 1995, xi.

1.1 The Starting Point

In this book, leading scholars from both sides of the Atlantic focus on the new neurodisciplines, their sexual stereotyping and use of gender role clichés, and their underlying relations to the “hype” around Emotional Intelligence (EI). The latter was kicked off by Daniel Goleman's best-sellers on EI, which have appeared since the mid-1990s¹ and include his most recent publication, *Social Intelligence* (2006). His books belong to the category of pop science, as do Simon Baron-Cohen's *The Essential Difference: The Truth about the Male and Female Brain* (2003) and Louann Brizendine's *The Female Brain* (2006), to name just two of many.² This list may seem an incongruity at first sight. Though coming from different disciplinary backgrounds, these authors have jointly opened a discourse field on “sexualized brains,” which not only laypeople but also scientists—working on the interplay of emotion and intelligence—have inhabited. Emotions are crucial parts of manifold academic concepts such as personality, morality, social stigma, unconsciousness, intelligence, survival of the fittest, and many others. And, of course, emotions are part of nonacademic public and private life. With

regard to the distinction between public and private life, and academic and nonacademic concepts of emotional life, their boundaries became more porous than ever, particularly through the new brain research on emotions.

In contrast to previous studies on differences in brain weight and size, and in the symmetry of men's and women's brains, and different grades of interconnectivity between their brains' hemispheres, which are said to lead to different cognitive performances (Kimura 1999; see Schmitz 2006a for a critical overview), many of the present studies on sex differences in the human brain are inspired by the idea that individuals consist of brains which are *essentially* male/female. It is assumed that the sexualized brain's essence is different with regard to both thinking and feeling. In current emotions research of the neurosciences, the map of the human brain has a new earth at its center (no sun), around which many planets, metaphorically embodying scientific approaches, are orbiting: the *amygdala*. Particularly social (cognitive) neurosciences have been creating a new cosmic system around this small area of the brain, and they hope to one day finally understand "it all": emotions, sexuality, behaviors, attitudes, relationships, social norms, personal success, and more—in short, the human and the society (in singular). However, this new anthropology which is now on the horizon is still working with classical stereotypes. The female brain is said to be good at empathizing, while the male brain is adept at systemizing (Baron-Cohen 2004, 2ff). Even if this sounds like an old story to feminists, the rhetorics and entities recently have changed: It is not women and men, or their bodies and their brains, but female brains and male brains.

One major step in this direction was taken with the neuroscientific idea that emotions can be found in the brain. The colored representations of emotionally active areas, resulting from brain- and neuroimaging techniques, are, it seems, so persuasive that their character as representations (i.e., representing something which has been established in advance as an epistemic model, in order to serve a certain function) is fading away in public discourse. It is worth noting that models are always models *of* something and models *for* something. The same is true of image representations, particularly when they have been generated in scientific contexts (Köchy 2005).

The main model relevant for this new kind of emotion research is the "emotional system" of the brain which is modeled as a composition of brain areas, regions, and related structures of different order (see section 1.5). From an epistemological point of view, the newly defined emotional system overlaps with former concepts like "lymbic system" and "pain matrix." Neural processing of emotions engages diverse structures from the highest to the lowest levels of the neuraxis, and this processing is mediated by hormones and neurotransmitters. Areas like the hypothalamus and the septal area, regions like the orbitofrontal cortex, and related structures like the amygdala (an almond-shaped complex of related nuclei) and the nucleus accumbens belong to the emotional system, that is, they function—though not exclusively—for

emotionality. According to Tania Singer et al. (2004b, 2006), they also function for morality, understood in this specific context as a category in which ideas of (economic) fairness, empathy, and the desire for punishment of “cheaters” are involved. Both emotionality and morality are potentials (Hubig 2006), which have to be instantiated to generate emotions (or morals)—a fact that is disguised by using the term “system.” In pop science texts, the emotional system is often referred to as “the reptile mind,” as parts of it are considered primitive in connection with evolutionary biology. In the experiments presented by the Singer group and others, men and women show significant differences in the neural activities of their “reptile minds.” Again, female brains were found to be good empathizers (Singer et al. 2004a), but this time “women” were referred to explicitly. In the experimental setting of neuroimaging, where (presumably only heterosexual) couples were tested, results showed that women “experience”³ the physical pain of a loved one all but as their own, though only part of the pain matrix is involved (see figure 1.1; color plate 1). In the article, published in the journal *Science*, there is no indication of a reverse experimental design, that is, in this study the empathic capacity of men was apparently not tested:

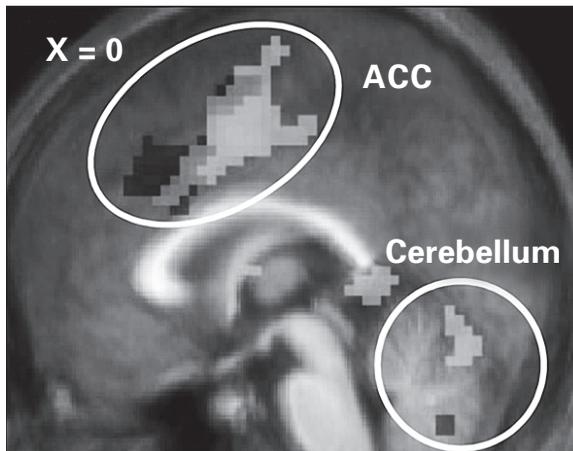


Figure 1.1

(color 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.)

We assessed brain activity in the female partner while painful stimulation was applied to her and her partner's right hand through an electrode. . . . The partner was seated next to the MRI scanner and the right hand of each subject was placed on a tilted board, allowing the female partner with help of a mirror system to see her and her partner's right hand. On a large screen situated behind the board, cues were presented in random order indicating whether she (self) or her partner (other) would get low (no pain condition) or high (pain condition) stimulation. We were especially interested in comparing pain-related brain activity . . . in the context of "self" and "other" (Singer et al. 2004a, 1158).

The boundary between the self and the other seems to be especially thin in women, reminding one of the old misogynous concept of the flexibility and assimilating abilities of women, rather than the rigidity of men (see, e.g., Weininger 1980). It might be that the motivation behind this kind of research is a desire to show the specificities of women's brains and, by the same token, to challenge the model of "the" brain because in terms of the history of science, it has usually been men's brains which have been scrutinized in the search for the ideal type of human brain (Hagner 2004); or the (questionable) aim might be to prove that women are—morally—the better humans, or mammals. However, what if good morals—an idea which Baron-Cohen (2004) also associates with the female brain—do not pay off in contemporary societies and market economies? As Singer et al. (2004a, 1157) put it, "Human survival depends on the ability to function effectively within a social context"—but what "human" and "survival" mean on the personal (rather than the species, population, and organism) level, or even what it means to "function effectively within a social context," remains obscure. As will emerge in due course, this special kind of research has a range of social, ethical, and socioeconomic implications related to exclusion, particularly concerning gender-related identities and the social division of labor.

The main arguments for "intelligent emotions" are supposed to be debated in the classical disciplines of psychology and biology, which have opposing theories of mind, cognition, and subjectivity, though, with regard to the soul (Greek *psyche*), contemporary biology has no theory of subjectivity at all. In the last decades, however, parts of biology and psychology have fused and established, for example, a *psychobiology* that focuses on hormones and neurotransmitters, a focus which is important for the emerging research fields of social neurosciences and pharmacogenetics (see, e.g., the findings of Hariri et al. 2002). Thus, when interpreting bio-psycho-scientific findings concerning the idea of the human, moreover the human person,⁴ these sciences are in need of the humanities and the cultural and social studies in order to come to terms with the ontological and metaphysical hypercodes accompanying scientific modeling.

Nevertheless, they rarely adopt the findings of the latter, but on the contrary export their basic anthropological assumptions, which are often rooted in modern versions of Darwinism as well as in technofuturism (not infrequently related to research on

humanoid robots and artificial intelligence in the cognitive sciences). Very often, emotions are important constituents of these assumptions, and they are reframed within special types of intelligence, as can be seen, for instance, in the recent book *Mating Intelligence* (Geher and Miller 2007), in which the authors, from the field of psychology, argue that there is something like a reproductive system in the mind. Of course, this system functions differently according to the different sexes, that is, only the two which are important for biology: men and women, identified by the well-established physical body capacities for biological reproduction. However, referring to the discourse field on EI, and by means of the associated techniques of brain- and neuroimaging (e.g., positron emission tomography and fMRI), which, together, allowed these new strategies for sexualizing the brain to emerge, scientists do not simply examine biological reproduction. They go much further, shaping the cultural understanding of what can be regarded as uniquely human, moreover uniquely female and male, in industrialized Western societies.

Claudia Wassmann argues that the brain became an icon as a normative instance especially in the years 1984–2002, due to several highly recognized TV programs on brain scans: “a gap has opened between the representation of brain imaging in the lay press and the properties brain scans acquired within the neurosciences. This gap has widened since the beginning of the new century” (Wassmann 2007, 153; see also Phelps and Thomas 2003). Within the same time period, the brain as icon has also become influential in the humanities and the social sciences. In all new disciplines which have emerged with the prefix “neuro” (e.g., neurosociology, neurophilosophy, neurotheology, neuroeconomics), the relationship between emotion and intelligence, the former topoi of the (potentially) irrational and the rational, are being (or already have been) reconfigured. According to neuroscientists (e.g., Damasio 1994, 2003), emotions now seem to have an original cognitive content and ensure rationality, at least in the brains of “normal” people. “Cognition,” in the cognitive sciences, has a meaning which is quite different from its typical understanding within philosophy (i.e., a conceptual and propositional structure). Rather, in the cognitive sciences, it is “used for any kind of mental operation or structure that can be studied in precise terms” (Lakoff and Johnson 1999, 11). In this view, a “cognitive unconscious” exists, which, moreover, opposes psychological traditions and their ontologies of soul and mind. In recent years, models and terms from the field of neurosciences and cognitive sciences have colonized the epistemic cultures (Knorr-Cetina 1999) of many other disciplines, in the process transforming some of their ideas about what is normal, what is human, and, not least, what determines a functioning society.

In the meantime, EI, related to research on personality, has become an important issue in the discussion of creating *elites* in the business world. It was Goleman (1995, 2006) himself who drew the connection between brain research and mental training for better human relationships; according to him, both are needed to make a “better”

society. This idea of improvement by both understanding and managing emotions can, described less dramatically and with less of a focus on the brain, also be found in, for example, the popular-science work of renowned psychologist Paul Ekman (2007). For Goleman, increasing the ability to understand and control emotions is seen as a crucial tool, especially for creating more effective organizations in a functioning society (“leadership”).⁵ At the popular level, “EI” has therefore become a buzzword in the discussion of behavioral issues in private, corporate, and public life. The compelling need for new solutions to many pressing problems, which Goleman describes as an “emotional crisis,” ensured vast sales of self-help literature and sizeable participation in EI coaching seminars. Most of these problems, like social deprivation, drug abuse, aggressive behavior, and mental depression, are, it seems, driven by the isolation and self-centeredness of the modern subject. Goleman’s answer to these problems is individual brain training and an emotional appeal for social commitment at various levels. In order to overcome the purported “emotional crisis,” he offers a sort of turnkey solution and (though also educated in sociology) ignores not only the sociological patterns of reflexion but also the broader philosophical conceptions of mind, self, and subjectivity (see, e.g., Davidson 1989, Ricœur 1992, Godfrey-Smith 1998, Metzinger 2004, Searle 2005). These omissions are, at least to some extent, due to the pop-scientific character of his books, and due to the influence of contemporary cognitive science on shaping both a theory of mind and the category of mind reading by means of the concepts of behavior and cognition (e.g., Johnson 1987, Lakoff and Johnson 1999, Clark 2003).

However, providing a detailed analysis of Goleman’s publications is neither our aim nor the reason behind this book. In fact it is the discourse field which the books on EI and related research fields have opened, that is, the assumed sex and gender differences—in the human brain and in the person’s mind—and the underlying assumptions of, for example, social rank, leadership, empathy, mind reading, and their implications, that have inspired this book.

1.2 The Goal: Toward a Cultural Philosophy of Science

We want to contribute methodologically to a transdisciplinary approach, understanding scientific concepts, images, and narratives as cultural constituents in a cultural philosophy of science still to be developed, accompanied by sociology, history of science, and other disciplines (Karafyllis 2006b). For the discipline of philosophy itself, the term could be read in both ways, that is, that the classical philosophy of science which was mainly centered on experiments and theories generated within the laboratory setting is being challenged to become more oriented toward the life world of people’s everyday experiences (Schütz and Luckmann 2003; see also Latour 1993) and that the subdiscipline of cultural philosophy is being encouraged to apply its

concepts and theories (e.g., media theories) not only to society as a systemic whole, or a specific culture in the narrower sense, but also to the special context of doing science and stimulating the development of new disciplines (e.g., Latour and Woolgar 1986, Knorr-Cetina 1999).

In recent years, several outstanding books and articles leading in that direction have been published. Many of them refer to the theory modeling and integrating role of *metaphors* in science (e.g., Otis 1999, Keller 2002), while others explore the constitution of the assumed border between culture and science (Illouz 2008). Science can, on the one hand, be understood as a unique culture of its own and can be analyzed as opposing some sort of “other” culture, for example, culture of the life world. On the other hand, science itself consists of many subcultures and related disciplinary codes, many of them dealing with “the same” sort of problem, for example, EI. An example would be the disciplines of biology and psychology, partially fused and/or split into different divisions with various labels as, for instance, cognitive science, brain science, neuroscience, psychobiology, natural language processing, or even the science of artificial intelligence (AI; e.g., Minsky 2006). Looking closely at the models involved, one finds they do not in any way all deal with the same problem but with different ones. What makes them fuse is that they share metaphors and an overall sociopolitical background. For instance, when Goleman (2006) describes the interplay of neural-based and social emotions saying “we are wired to connect,” he is employing a technical metaphor familiar from the source domain of robotics. And many uses of “mind” in the target domains of neuro- and cognitive science are related to the source domains of philosophy and psychology. Metaphors are also used to cross the border between science and pop science. The cross-border trade of metaphors takes place as well between society and science, challenging the very idea of a border (on the philosophy of metaphor, see Ortony 1993, König 1994, Karafyllis 2006a; in relation to gender, see Brown 2005).

Furthermore, all these subcultures intermingle with the life worlds of different individuals and their different cultural settings and historical traditions of understanding emotions and intelligence. For instance, in Western democratic and liberal societies, at the moment, it seems to be politically incorrect to speak of existing elites, or, worse, *the elite* (see section 1.4).⁶ As historian Michael Hagner (this volume) points out, the term “elite brain” was first introduced in 1904 (in German: “Elitegehirn”) and has had a strong relation to racial oppression. At present, this term is not explicitly used in scientific discourse. Looking at the pop science market related to EI, neuroscience, and leadership, deeply involved in a “therapeutic culture” (see Illouz, this volume), one gets the idea that this silence could soon be over. To put it bluntly, the well-known metaphor “class brain” is not suspected of being politically incorrect, as long as the brain remains an object of the imagination rather than of material representation of human capacities. Once “brain” is used in the sense of

“essence,” and connected to functionally interpreted qualities and quantities, it will “make” classes, that is, social representations. The ascription of sex to brains, in this sense, will also influence the structuring of society, related to both qualities and quantities. A quality would be the brain’s capacity for empathy, which can then be interpreted, functionally, as relevant for service jobs or child care (see section 1.6). Moreover, it can be associated with both a quantity and a stereotype, for example, that female brains or women’s brains have “more” of this quality. On the other hand, researchers state that men’s blood has a higher level (quantity) of testosterone (quality), serving the evolutionary end of fighting against other male competitors to guarantee the survival of his genes (function) (see Sapolsky 1997, Baron-Cohen 2004, Brizendine 2006). Therefore it is not enough to stress—from a philosopher’s point of view—that brain- and neuro rhetorics imply naturalization, or biological determinism, which, moreover, are not necessarily the same thing. Neuro rhetorics imply much more than that. Thinking further, the book titles, like Baron-Cohen’s *The Essential Difference*, promising to analyze “the” essential difference between male and female brains contribute to the development of social classification; moreover, they bring a new sexual bias into social representations as will be shown in due course. Other than dealing with differences, in plural, they manifest the heteronomy of the two biological sexes of mammals, that is, heterosexuality. Perhaps the academic reluctance to imply such a broad range of consequences, triggered by the renewed sexualization of the brain, was one of the reasons why renowned psychologist and neuroendocrinologist Melissa Hines titled her recent book on sex differences *Brain Gender* (2004). She stresses that a relationship between a brain structure and a behavior does *not* confirm the argument that the behavior results from this structure (causality) or that the structure determines the behavior (determinism). Referring to the often-found deductions from the animal model to the human sphere (see Gruber, this volume), Hines’ advice is that scientists should be more reluctant to make such deductions. While accepting the importance of gonadal hormones for the phenotypic sex differences, including genital ambiguity, Hines nevertheless votes in favor of flexible gender identity for neuroscientific reasons, as the brain is a highly responsive organ, and because of its plasticity, it is always open to experiences.

Argued quite similarly at first glance, the decrease in neuroplasticity from childhood to adulthood is the main hypothesis of Bruce E. Wexler’s approach in *Brain and Culture* (2006), from which he draws some social implications, particularly related to migration and ethnicity (e.g., ethnic violence). The brain of an adult, according to Wexler, tries to piece the social environment together to fit the internal structure. Note that “the brain” *does* something, that is, it constructs its world. In contrast, a child’s brain shapes itself according to environmental features, which Wexler regards as one of the reasons why children of immigrants adapt more easily to a new culture, compared to their parents. By changing the cultural environment, each generation shapes the

brains of the next. In his approach, he merges intraindividual variability (i.e., variations within one person, especially occurring between childhood and adulthood) and interindividual variability (i.e., variations between both generations and cultures) of the human brain. Thus, Wexler votes for a cultural evolution of the brain—but it remains unclear how the term “culture” differs from “environment.” In many neuroscientific writings, “culture” is reduced to “social environment.” In Wexler’s concept, however, culture seems to be determined by the spatial patterns of geography. Apart from its reductionism, this is interesting because the metaphors of cartography (“map”) and navigation have been highly influential in brain research since the early modern period (Reddy 2001). Obviously, though, the mere focus on behaviors does not grasp the richness of symbols, narratives, and codes, which create cultural styles and are stored in cultural memories.

As language is able not only to cross disciplinary borders but also to overcome the somehow artificial border between science and society, it is worth thoroughly investigating this border and considering the market value of specific terms, for example, “emotional intelligence,” “male/female brain,” and “emotions.” Moreover this view can contribute to gender studies of science (e.g., Haraway 1985, 1989; Harding 1991; Schiebinger 1993; Meinel and Renneberg 1996; Rouse 1996; Kourany 2002; von Braun and Stephan 2005; Ebeling and Schmitz 2006; Konnertz, Haker, and Mieth 2006; Wahrig 2006; Dickenson 2007), where linkages between dominant socioeconomic and elitist structures related to science have been pointed out most intensely. The traditional approaches, looking at scientific instruments, experiments, techniques, and machines, will not be neglected but will be placed in a socioeconomic and cultural setting with certain norms and values in which theories and experiments only then make sense.

Consequently, we editors bring together academic fields which seem to have nothing in common at first sight (e.g., the socioeconomic debate on elites and the popularity of brain research), and at the same time we want to separate the rhetorical alliances of fields which seem to have much in common (e.g., research on personality, research on the brain, and research on “the self”; sexuality in the life sciences and gender discourse in the social sciences and humanities). Our aim is to reflect on a new intellectual area. *The area encompassed could be described as the emotional brain culture of individuals who rationalize their “self” while still believing in their unique personality.*

1.3 Step 1: Reflecting on the Emotional Intelligence Hype from a Gendered Perspective

A short glance at one of Goleman’s examples (1995, 44f; summarizing and interpreting findings of Berkeley psychologist Jack Block; Block 1995) for amendable emotionality

offers a first hint at the high relevance of gender, social, and philosophical studies in this field:

The high-IQ male is typified—no surprise—by a wide range of intellectual interests and abilities. He is ambitious and productive, predictable and dogged, and untroubled by concerns about himself. He also tends to be critical and condescending, fastidious and inhibited, uneasy with sexuality and sensual experience, unexpressive and detached, and emotionally bland and cold.

By contrast, men who are high in emotional intelligence are socially poised, outgoing and cheerful, not prone to fearfulness or worried rumination. They have a notable capacity for commitment to people or causes, for taking responsibility, and for having an ethical outlook; they are sympathetic and caring in their relationships. Their emotional life is rich but appropriate; they are comfortable with themselves, others, and the social universe they live in.

Purely high-IQ women have the expected intellectual confidence, are fluent in expressing their thoughts, value intellectual matters, and have a wide range of intellectual and aesthetic interests. They also tend to be introspective, prone to anxiety, rumination, and guilt, and hesitate to express their anger openly (though they do so indirectly).

Emotionally intelligent women, by contrast, tend to be assertive and express their feelings directly, and to feel positive about themselves; life holds meaning for them. Like the men, they are outgoing and gregarious, and express their feelings appropriately (rather than, say, in outbursts they later regret); they adapt well to stress. Their social poise lets them easily reach out to new people; they are comfortable enough with themselves to be playful, spontaneous, and open to sensual experience. Unlike the women purely high in IQ, they rarely feel anxious or guilty, or sink into rumination.

Goleman, here, makes two purifications on a vertical level (1. pure IQ types, in contrast to—less pure—EI types; 2. women/men). Instead of robust empirical data, he simply provides two reasons for the suggested dichotomies: First, women in general never seem to reach important business qualifications, for example, productivity and ambition. Second, they do not climb the highest step of EI, that is, they never reach “pure” EI. IQ-type women are depicted as intellectually confident (but only as far as they are expected to be), thoughtful, aesthetically oriented, and passive–aggressive, whereas high-IQ men, while being ambitious and productive, are on the whole unerotic. According to Goleman, emotionally intelligent women learn to control their assumed outbursts, are playful, and are highly functional in coping with stress (see section 1.6). Unlike their male counterparts, they still do not seem to fully recover from their feelings of guilt and anxiety, no matter how emotionally intelligent they are.

Whether or not this caricature, reminiscent of the classic nineteenth-century stereotype of the “male intellectual” and the “middle-class housewife” (see also Fraisse and Perrot 1995), is due to the biological sex or the social gender role—sometimes referred to as the nature–nurture divide—is not discussed in depth, perhaps because in the real world no clear-cut differentiation is possible. There is no such thing as an

isolated individual with an interior brain and an outer social environment (or “social universe”; see above); instead, there are social and cultural relations from the very beginning of existence. In any case, the ambiguity of these two possible explanations (with regard to the mind: internalist/externalist in a broad sense) gives the book the potential to critically reflect on imbalanced interpretations of why men and women think, feel, and act the way they are assumed to. Obviously, the sex matters for emotionality, meaning the potential of being “typically” emotional and having a life rich in sex-specific emotions. But how, and why? And does emotionality matter for the sex?

In the following passages, some crucial terms for the debates are clarified. According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO), “Sex describes the biological differences between men and women, which are universal and determined at birth” (UNESCO’s Gender Mainstreaming Implementation Framework [GMIF] 2002–2007, Annex 2, 17). Gender, on the other hand, refers to the roles and responsibilities assigned to men and women in families, societies, and cultures. Gender roles and expectations of how men and women typically behave (masculinity/femininity) are learned. They are not biologically predetermined nor permanently fixed. The concept of gender is a category of social analysis, which reveals the variations within and between cultures due to class, ethnicity, age, physical and mental disabilities, and more. Going beyond UNESCO’s GMIF, we now add *science* to this list.

Rather than physical disabilities that are obvious, neuroscientific—like genetic—research focuses on phenotypic abilities which are still hidden and often remain hidden. The brain’s *capacity* (e.g., to show effects when stimulated in a laboratory context) is not identical with a person’s *ability* (e.g., to feel, understand, or do something)—and this is something we would like to state as a basic differentiation for the entire book. Depending on how the brain is modeled as an epistemic object in relation to certain functions (see Godfrey-Smith 1998; on philosophy of functions, see Millikan 1984), a capacity can appear as an ability; moreover, it can also appear as a mental disability.

Evelyn Fox Keller (1995, 80) has pointed out that the relation of gender and science can be analyzed in a threefold sense: (1) *women in science/as scientists*, (2) *science of gender*, and (3) *gender in science*. Our book stresses the relation between (2) and (3), that is, the (not only) neuroscientific construction of sex-related differences, and the cultural idea of gender stereotypes within the formation of scientific terms, models, and theories. Strategy (3), gender in science, especially allows for questioning prominent perspectives on research fields and, thus, the related ideas and ideologies influencing the scientific modeling of categories (2) by means of specific terms used for description and explanation. Subsequently, when one looks closely at scientific descriptions, they reveal a priori normative assumptions and challenge the idea that

there is something like pure and objective knowledge, particularly regarding the science of gender. Related pop-scientific discourses essentially belong to the epistemologic level of gender in science, as many people (including peers from the humanities and social sciences, politicians, and other decision-makers, e.g., in science funding) inform themselves about recent scientific findings mainly through “easy to read” texts and by images which seem to show “obvious” differences. Both scientists and journalists writing pop science books thus play a mediating role in shaping science-related discourses, that is, here, regarding the neuroscientific findings on sex-related differences.

There are complementary approaches to critique, which this book will not explore in great depth. First, one could ask why Western societies in particular are so interested in finding gender (and other) differences, and why these differences are frequently inserted into a *binary structure*, for example, woman/man, black/white, and so forth. The movement endorsing “queer thinking” concerning gender issues turns to this question. Above all, this question was inspired by biological research on the causes of same sex sexuality, particularly male homosexuality—which has also given rise to previous neuroscientific research (LeVay 1991, Byrne and Parsons 1993; for a critique, see Hegarty and Pratto 2001).

Second, the methodological concepts, analyzable within the “science of gender” approach, offers many points which are also relevant for objections regarding the explanatory level of neuroscientific research (for details, see Schmitz 2006a). At this level of critique, one questions the methods of experimental design, measurement, mathematical calculation, and statistical interpretation (concerning, e.g., research on bilateral language representation in men’s and women’s brains; see Sommer et al. 2004) and the instruments and artifacts involved. Turning to the latter, the still questionable *comparability* of neuroimages, when resulting from different laboratories and different data processing by means of different visualization techniques and computer programs, challenges the idea that with respect to constructing sex differences by means of, for example, spatial orientation capacities, emotional capacities, and phonal processing capacities, the results could be aggregated for modeling “the” woman’s or “the” man’s brain. Thus, this approach attempts to defeat science with its own weapons, questioning whether sound science was produced. Third, analyzing the concepts of *visual culture* (Gombrich 2000), the shaping of what is actually seen and not seen in (neuro)images, is another highly relevant method for critique. For example, as in other in vivo representations of the interior body (most prominently, the human embryo), the black modeled background of most neuroimages suggests that the entity of attention (brain) exists context free, that is, has a life on its own.

Another interesting question to pose for art historians and media scientists would be “Is there an iconology of neuroimages?”—that is, do these images remind us of others already known (Boehm 1994; Bredekamp 1995, 2005; Reichle, Siegel, and

Spelten 2007). Speaking as laypeople, perhaps the fluorescent colors remind onlookers of a gloriole, related to religious iconology, or a map of unknown territory which can be marked as visited or even colonized. Otherwise, why would people from Western cultures understand the binary blue/pink color code in the artificially colored neuro-images as a signal for men/women (see figures 1.2 and 1.3; color plate 2, 3)? Neuro-images have also become part of the visual arts and have entered the contexts of biopolitics (DaCosta and Philip 2008),⁷ for example, in the work of Portuguese visual artist Marta de Menezes.⁸

Last but not least, all approaches critical of neuroscience harbor the notion that there is both an interindividual and an intraindividual variability concerning what people regard as being human.

Research on emotions is deeply influenced by cultural norms and sexual stereotypes, and—not to be forgotten—by gender role types (Butler 2004). By relating gender in science and science of gender, we emphasize the ambivalent epistemic fields and levels of autonomy and control in which emotions are analyzed.

From a sociological point of view, not only are emotions related to the microlevel (the individual and the family) but they are also relevant at the mesolevel (corporations, institutions) and the macrolevel, where questions of social patterns and social systems crop up. We may ask, with a kind of Durkheimian approach, what these levels have to do with each other when self-help concepts like EI and research fields like social neuroscience emerge. This broad perspective may seem discouraging from an analytical point of view; however, we are interested in more than asking if EI really is a useful construct. Rather, we are interested in the cultural and scientific climate that produces scientific concepts of self-enhancement which are then disseminated to laypeople. Everyone wants to be “above average,” and the fetish object brain will trigger related enhancement strategies, just as the fetish object body⁹ did in years past.¹⁰

1.4 Step 2: Analyzing Reconfigurations of “the Self” in the Light of Elites

1.4.1 Society and Science

Before one can attribute emotions to someone or something, there has to be an entity which can have these emotions, that is, a self. The ontological question of where one self starts and ends, that is, how the boundaries of the self and the other are defined, is thus of critical importance. For instance, when EI is discussed as promoting leadership, one has to ask which entity is supposed to be more emotionally intelligent—the leading CEO, the sum of employees, the individual person, the person’s brain? EI as a concept touches on both social and scientific ontologies, and, when it refers to the category of sex, also ontologies of nature. Ontologies always lend basic structures to

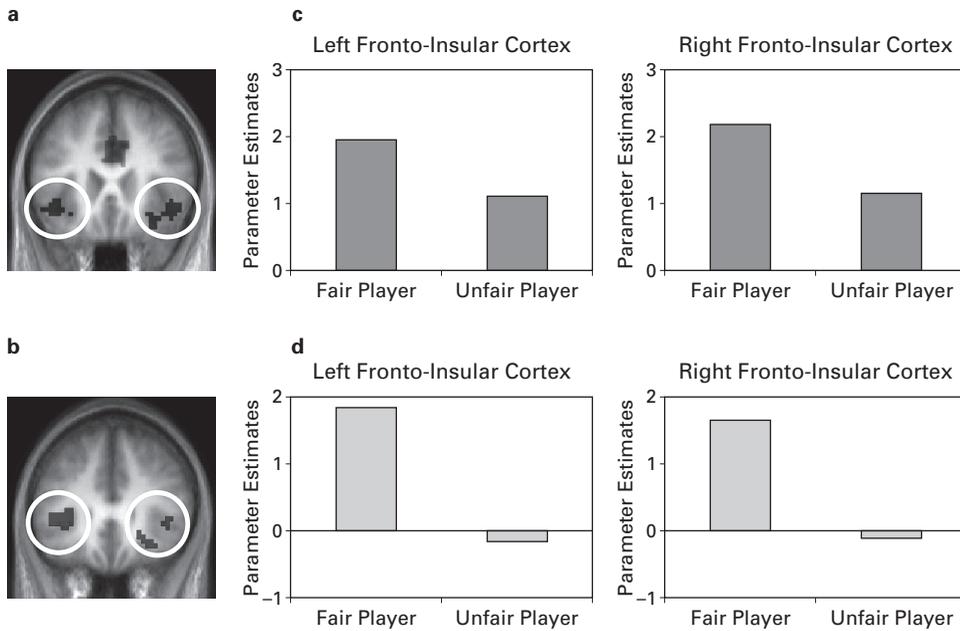


Figure 1.2

(color 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.)

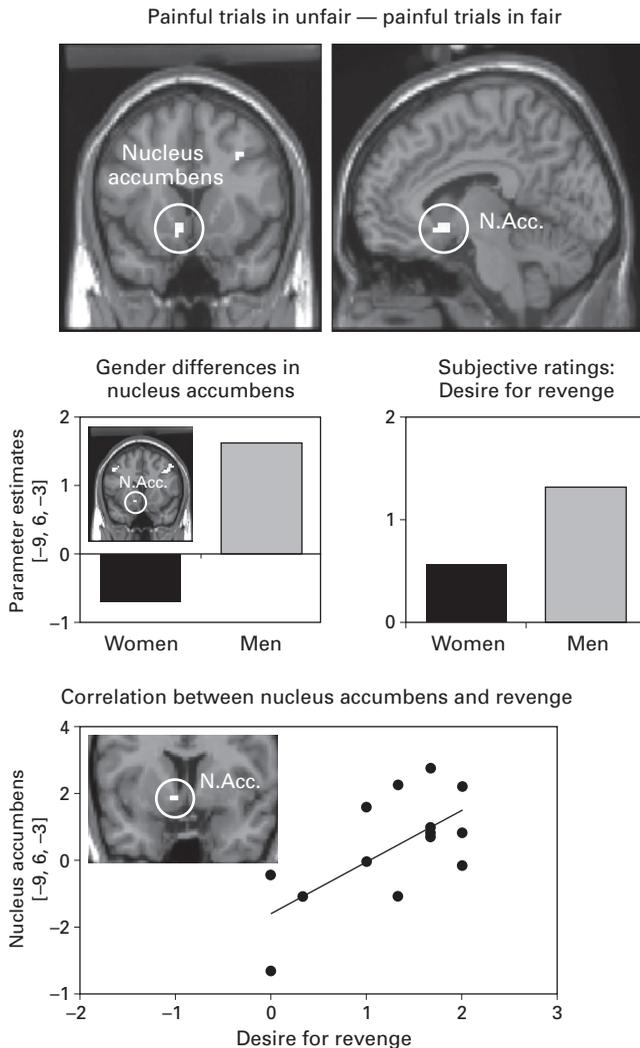


Figure 1.3

(color 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.)

the world and its entities existing in time and space. They constitute a sort of architecture—of society, of science, of human life, of biological life, of nature. This structure is often interpreted hierarchically and contains—metaphorically speaking—a basement, several floors, and a top floor.

In sociology, the top floor is often characterized as the “elite.” However, this top floor has different apartments, since there is not only “one” elite but many, in different parts of society and in different parts of the global world. C. Wright Mills, in *The Power Elite* (1956), showed the close interdependencies of the elites in the different fields of economics, politics, and the military in the United States and contrasted their power with the disinterested “mass society.” Although he claimed that the power elite is represented by men, he is typical of a large group of elite theorists because he neglected to do a gender analysis of the issue. Another open question for elite theorists is the relation of EI and the creation of elites. Moreover, feminist research in general is critical of elite theories because it tends to view itself as part of a liberation movement advocating an egalitarian society (Dackweiler 2007).¹¹

With sociologist Suzanne Keller (1963)—in 1968 the first woman in the history of Princeton University to be granted a tenured professorship—we can differentiate between *strategic elites* who are important for society, because their decisions influence many of its members across different contexts, and elites who are only formative for special contexts, like beauty queens. Stardom regularly functions as a channel of upward mobility for individuals with low incomes. Similarly, Goleman’s concept of EI in general nourishes the hope of becoming a star performer through individual brain training (see, e.g., Stein and Book 2000; Bradberry and Greaves 2005).

Strictly speaking, EI is a concept that serves strategic elites (“leaders”), particularly in the business world. According to recent data, women are still not adequately represented among strategic elites. This is a global phenomenon. One of the most important elite areas, the economy,¹² can be taken as an example. Research on the top 200 companies worldwide in 2004 showed that women comprise only 10.4% of the boards of these companies. Breaking this figure down into percentages by country, 17.5% of board members in U.S.-based firms are women, in Germany the figure is 10.3%, and the lowest percentage is found in Italy with 1.8%.¹³ In addition to these facts, which form part of gender research on women’s employment rates, there also exists a global “gender pay gap.” The gender pay gap represents the relative difference between the average hourly pay for men and women before taxation. According to the latest figures from the European Commission’s experts groups (2006, 2007), across the E.U. economy women continue to earn an average of 15% less than men. This figure has barely changed within the last decade, although the European Union tried to implement policy strategies for change, as this figure, so to say, insults the self-image of a democratic society. Asking why this figure has remained so stable, one of the experts’ judgments is that women have lower wages not only

due to unequal pay for equal work but also due to the different scales of evaluation of women's competencies in the labor market, particularly concerning jobs dominated by women rather than by men, though based on the same qualification levels deriving from school or college (e.g., the payment of nannies compared to car mechanics). Here, jobs considered "emotional labor" (see section 1.6) are addressed in particular. Statistics show that the pay gap grows significantly with age, education, and years of service. In the European Union, women with third-level education face a gender pay gap of up to 30%. Not surprisingly, the highest pay gap is found in the financial and business sector—that is, the sectors which are inspired most by the idea of emotionally intelligent leadership and individual brain training for increasing emotional quotient (EQ).

A differentiated perspective on elites helps to critically analyze where cultural concepts of science, sex, and gender influence elitist structures within society. Membership in "the elite" stands in close relation to having a position of strategic, financial, or some other form of power—as described in functional elite theory (e.g., Dreitzel 1962). There are, however, family structures where women are present as part of "the elite," as Tomke Böhnisch (1999) analyzes in her research on wives of members of the economic elites in German-speaking countries. Böhnisch shows that, although these women do not hold positions of power themselves, their self-images clearly consist of being "the female part" of an elite (Böhnisch 2003, 186). Wives can share their husbands' high social rank, though without sharing their husbands' power. Böhnisch also shows that this mind-set creates a social distance with respect to women who define themselves as "career women" to maintain or develop their social status—or simply because they have to earn money.

We can now try to connect the neuroscientific finding that there are two sexually stereotyped forms of an "extreme brain," as put forward by Simon Baron-Cohen (2003), with the idea that a person's brain condition is essentially relevant for gaining a top position. Assuming there is something like a male elite brain, making up a new functional elite, the wife's adoption of the elitist aura of her husband will become more difficult, because the woman has a brain of her own. Moreover, she is responsible for her own brain training and enhancement—or, if there is a corresponding concept of an elite female brain, specific functions have to be envisioned, according to which a woman can belong to a female elite.

One of the main criteria for analyzing elites is the access to and the recruiting of elites. Keller sees the primary recruiting principle for strategic elites as showing target-oriented capacities and corresponding achievements, whereas family and origin play only a secondary role. Is the recruitment of elites—at least theoretically—open to everybody who is adequately qualified? If yes, then elites also seem to be an acceptable construct for building a democratic society (Dahrendorf 1992). Merit and reward become central entry requirements for elites, and they are closely connected

to education. Successfully completing an educational program is the basis upon which a meritocracy is built. However, there are three limits to the meritocracy.

One limit lies in the link between the socioeconomic power of individuals, their families, and access to education. In the United States, the book *The Price of Admission* (2006) by Daniel Golden, a *Wall Street Journal* deputy bureau chief and 2004 Pulitzer Prize winner, once again raised the issue of admission practices to Ivy League institutions of higher education. Golden reports that college admission offices are not only looking for high achievers in selecting their incoming students but also give preference to privileged wealthy candidates—a practice he criticizes. Therefore, although Ivy League schools try to convey the image that they are meritocratic institutions, Golden's analysis shows that this image is pretence.¹⁴

A second limit of meritocracy lies in the link between gender stereotypes and positions of leadership. The average school and university marks of many girls and young women (Macha 2004, 27) show that “girls out-perform boys,” as E.U. Commissioner Vladimir Špidla recently declared in a press release (European Union, Brussels, no. IP/07/1115, released July 18, 2007). Given the additional fact that (in the European Union) more women enter the labor market with a university degree than do men, it is amazing (in the words of Špidla: “absurd”) that these achievements are not adequately accounted for in elite recruitment in top positions—be it in the economic, political, scientific, or cultural sector. While the methods of measuring intelligence, in general, seem to need further development, the existing EI testing methods reveal that women score higher in the abilities which are often called “the soft factors” of leadership (see MacCann et al., this volume). These findings could transform the overall idea of leadership, while keeping in mind the open question of whether soft factors matter once you are a leader or in advance, in order to become one. However, it is mainly the sex differences which are measured here, not the gender differences. And it is mostly personality which is scrutinized for “soft factors,” rather than emotions themselves. Unless there is a testing method which refers not only to sex but to gender roles, too, it will remain unclear how emotional styles (“female” and “male” and various mixtures of the two) influence the test results ascribing a certain level of EI to a person. This approach would also touch on the question of equal opportunities for lesbian and gay persons in the (business) world.

Obviously, there is no way for science to avoid typifying behaviors, reactions, and styles. This is due to systematic reasons: deciding which methods applied to which models (referring to theories and hypotheses) produce robust results and are, thus, agreed to produce scientific findings in a true sense. This decision also touches on the question of what can be regarded as knowledge, and its other, for example, nonknowledge and its various forms (Ravetz 1990, Beck 1999, Wehling 2006, Schiemann 2007). Scientific findings and the produced knowledge are reckoned universal, that is, the

findings have to be reproducible and applicable within all laboratories working with the same standards. For science, the construction of distinct categories, abstract models, and artificial environments is a must. The problem we address here is that the universality claimed by science should be sufficiently valid for real life outside the laboratory, that is, for living practice (in the sense of the Greek *praxis*). On the other hand, outside the realm of pop science, it is possible for science to refrain from stereotyping and to explicitly stress that the findings refer to types and not to individual human beings (and this difference, after all, is mentioned in the final section of Baron-Cohen 2004).

Gender equality—understood as ensuring equal opportunities and living conditions for realizing full human rights for women and for men—obviously has not been achieved yet.

A third reason why there are limits to meritocracy lies in the link between *habitus* and elite positions. In taking up Pierre Bourdieu (1979/1984), we also argue that the *habitus* and its sovereignty are important elements for recruiting elites (see Illouz, this volume, for details), and it also plays a role in access to elite positions (Hartmann 2002). With *habitus* we understand the embodied social and economic conditions of an individual. However, although the *habitus* is embodied, it is, of course, socially constructed (Bourdieu and Wacquant 2006, 160). The idea of elite brains and their both innate and essential capacities, expressed as functionally interpreted abilities by means of the body (see also Pfeifer and Bongard 2006), would challenge this position. With regard to the theories of brain science, neither the *habitus* nor performativity is relevant. Embodiment would then mean, as in embodied robotics and AI research, that a body is the medium (here used in the sense of a mere “carrier”) of functional expressions, which are internally controlled and externally decoded by a central processing unit.

The second point (sexual stereotypes as a barrier to elite positions) and third point (the *habitus* as a limit) are interlinked because these “fine differences” concerning the *habitus* are also of importance for success or failure in entering elite ranks and surviving in elite surroundings. Women and men have, own, and use different forms of capital. Differentiating between economic, social, cultural, and symbolic capital, Bourdieu emphasizes that these different types of capital influence each other: Economic capital and the right economic assets, for instance, ease the acquisition of cultural capital (Bourdieu 1979/1984, 189), as we have seen in the example of Ivy League schools. Even if women are endowed with equal economic capital, other types of capital which could make all the difference might still be lacking.

For instance, the cliché that girls and women are not interested in technology and its artifacts (Baron-Cohen 2004, e.g., 92), seen as a proof of the “femaleness” of their brains, is based on other than economic forms of capital. Australian “technofeminist” Judy Wajcman (2004) points out that nowadays there is much more gender equity in

the use of technologies (PCs, mobile phones, etc.) than in decades and centuries past (of course, in reference to other artifacts). Nevertheless, she argues, at the design stage women still rarely enter engineering and information technology contexts, and once they have entered, they are less encouraged to continue than their male counterparts (see also Leicht-Scholten 2007). In contrast, and excluding the private sector, a recent study on German researchers' access to holding a professorship (i.e., for the German context: reaching the associate professor level) revealed that professors of engineering and computer science, a male domain, encouraged their few woman students and PhD candidates much more than did colleagues from language and cultural studies (where more than half of all graduate students are women), the humanities, and medicine (Löther 2006). The study's results show that the technology departments lost significantly fewer women during the qualification process, though women comprised only about 12% of the students.

When we understand Goleman's EI concept as a way of acquiring capital in Bourdieu's sense, it is still the failure to combine his approach with a social theory that makes it problematic. EI cannot be understood as a way of overcoming the limits of meritocracy because this approach to refiguring and improving oneself—as a man or a woman, with male or female behavior—leaves the question open as to how capacities, abilities, and functions are defined and who defines them. Meritocratic structures are always in a state of flux. Taking into account that members of elites are recruited not only due to their achievements but also because of a special habitus—which is different in the various areas of society (for the scientists, cf. Beaufaÿs 2007)—the notion of “elites” is also a social construct which must be evaluated and questioned from a gender perspective, especially in the wake of new neuroscientific findings concerning the “essential difference” between men and women, and being male and female.

1.4.2 Science and Society

In this book, the authors focus on some of the structures which underlie elite concepts and touch on feminist issues without explicitly identifying themselves as feminists. Research on “the” brain, particularly on “the female” and “the male” brain, will probably help to both create new elites and strengthen existing elites. At the moment, an expanding literature (e.g., Angier 2000, Brizendine 2006) which contributes to *feminalism*—trying to solve the “mysteries” of the woman's body and sexuality by means of “hard” bioscience, that is, neuroscience and genetics—ignores many ideas that are important in *feminism*, for example, considering the social construction of science and the fight for social and economic equality. Here, brain research is particularly engaged in “pleasure studies,” for example, finding essential differences between female and male orgasms, sexual arousal, and the activation of the brain's reward center after orgasms and faked (female) orgasms, often combined with hormone

research.¹⁵ This faked orgasm is particularly important in brain research for methodological reasons. Comparing the brain images resulting during/after a faked orgasm and during/after “real” pleasure allows scientists to determine what—in a theoretical view—makes the “real” difference. The research field of sexual arousal and the brain, focusing on the various kinds of “sexual dysfunctions,” is undoubtedly related to our book’s focus, as there seem to be sexual elites as well: sexually omnipotent and easy to arouse, unaffected by any kind of stress resulting from the workplace or private life. However, the authors of this book will not explicitly discuss this topic.

Obviously, new questions concerning elitist thinking arise, starting with the following: How could definitions of elites change when they are related to brain functions, as Goleman and Baron-Cohen envision? Historically, especially in the nineteenth and twentieth centuries, there has been research on the topography of the brains of geniuses (see Hagner 2004; Hagner, this volume). Who can be regarded as a *genius* depends on a historically fluid understanding of “elite” and “idiocy” as the following example might elucidate.

The French pioneer of intelligence testing, Alfred Binet, introduced his classical paper “New Methods for the Diagnosis of the Intellectual Level of Subnormals”¹⁶ (French original 1905, coauthored with Théodore Simon, transl. 1916) as follows:

Before explaining these methods let us recall exactly the conditions of the problem which we are attempting to solve. Our purpose is to be able to measure the intellectual capacity of a child who is brought to us in order to know whether he is normal or retarded. We should[,] therefore, study his condition at the time and that only. We have nothing to do either with his past history or with his future; consequently we shall neglect his etiology, and we shall make no attempt to distinguish between acquired and congenital idiocy; for a stronger reason we shall set aside all consideration of pathological anatomy which might explain his intellectual deficiency. So much for his past. As to that which concerns his future, we shall exercise the same abstinence; we do not attempt to establish or prepare a prognosis and we leave unanswered the question of whether this retardation is curable, or even improvable. We shall limit ourselves to ascertaining the truth in regard to his present mental state.

Binet writes quite precisely about the limits of his investigation and, though from today’s point of view the text might give another impression, his motivation was first and foremost pedagogical. In his article, Binet rejects the concept of “idiocy,” borrowed from “alienists” (an archaic term for one who treats mental illness, particularly a physician specializing in legal aspects of psychiatry, from the French *aliené*, meaning insane), as in the alienists’ concept regarding children with a “rebellious disposition,” that is, children who were called “moral imbeciles” at that time fall into this category. Binet reminds instructors not to treat children “whose character is not sympathetic with their own” as pathological cases. For this reason, he also feels the urge to remove the aura of idiocy and pathologization from those with an “inferior intelligence” (this is the term he suggests). Of course, his new testing approach implied a comparison

with what is “general intelligence” (*g*), that is, what is normal (on the different acceptance of statistical methods at that time, see Hacking 2005). Besides its content, Binet’s article is also noteworthy for the nearly vanished style of academic prose, which reveals the intellectual’s awareness of social problems, for example, with regard to the societal “aptitude” of the different intelligences, which might be involved in his approach from the very beginning: “Some have a good auditory or musical memory, and a whole repertoire of songs; others have mechanical ability. If all were carefully examined, many examples of these partial aptitudes would probably be found.” As a consequence, his method of testing intelligence(s) included tactile and other non-verbal abilities, which, moreover, shows deep insight into the phenomenal ontology of the senses.

And there is another suggestion, concerning Binet’s test, which would also be relevant for the present neurosciences and their image runs with follow-up questionnaires, even if the volunteer is an adult: “Rapidity is necessary for this sort of examination. It is impossible to prolong it beyond twenty minutes without fatiguing the subject.”

Binet rejected physiological and craniometrical research on inferior intelligences (on Binet, see also Hacking 1998, 97–99). Nowadays, neurobiological and neuropsychological research ascribes certain physiological events in the brain to certain kinds of intelligences, attitudes, and behaviors.

For instance, in an interesting study entitled “The Good, the Bad, and the Ugly: An fMRI Investigation of the Functional Anatomical Correlates of Stigma,” Anne C. Krendl and her colleagues (Krendl et al. 2006) analyzed how feelings of disgust toward socially stigmatized groups are represented in neuroimages with reference to the brain’s capacity for controlling this disgust. We have explicitly chosen this study to exemplify how transformations of models and terms from both sociology and the social world take place in the laboratory of the social cognitive neurosciences, as its experimental design is very thoughtfully conceived. Although these researchers are particularly sensitive to the underlying biases of social neurosciences and are aware of the impact of these biases on society, the study shows how difficult it is, methodologically, to keep to one’s own normative premises.

The general hypothesis of this study is that control and disgust refer to two separate neural systems. The amygdala, the “organ” of emotions, is involved in the areas responsible for “feeling” disgust. The scientists were interested in both modeling and understanding how the process of social categorization takes place. Twenty-eight students, all right-handers, were recruited from Dartmouth College (in New Hampshire); three had to be excluded from the experiments because of “excessive movement” during imaging (and another three because of problems with data acquisition). “Excessive” here means more than 2 mm. The implicit architecture of the experimental design, for example, regarding the level of students’ familiarity with the stigma type, which we will not discuss here, was quite challenging.

Photographs of persons who self-reported having any one of a group of specific attributes—*being obese, extensively face-pierced, transsexual, generally unattractive*—were selected and shown to students (both men and women) at random. The students were supposed to rank the intensity of their feelings of disgust for each face in the photos on a special disgust scale. Previously, a scale for general attractiveness (“likeability”) had been developed for every single volunteer, based on individual evaluative ratings of photographs with “control faces,” in order to compare the brain condition for each individual when looking at photographs of “normal” people with the condition which developed while looking at the photos of the stigmatized individuals. *That* these people are generally stigmatized was the scientists’ decision (i.e., it was their categorization), even if Krendl et al. claimed that the chosen stigma categories are “widely acknowledged” (Krendl et al. 2006, 7). Their assessment was accompanied by the decision to take the photographs from social platforms of self-defined groups, such as Web pages of piercing artists or a dating Web site for overweight people. This means that they selected photographs of people who identified themselves as obese, pierced, transsexual, or unattractive, which does not necessarily mean that they view themselves as socially stigmatized.

In general, for social neuroscience the problem arises that if you want to measure the process of stigmatization (i.e., a categorization) in the brain, you must define a priori what stigma (i.e., a category) is and in which brain area(s) it might show up, for example, in the area responsible for feeling disgust. The neuroscientific approach is similar to scrutinizing whether, in the neuroimaging, a woman’s brain proves to be empathic or not (see Singer et al. 2004a), except for the important fact that the category “woman” seems to be both *self-evident* and *normal*. Therefore, she becomes the volunteer and not the stigmatized.

Put in philosophical terms, in the study of Krendl et al., *acceptability* was modeled neuroscientifically, and the category of “stereotype,” on which, according to Krendl et al., social stigma is based, was considered as given. Here, already, the terms used are important for modeling knowledge, as the experimental use of “stereotype” provides a reference to previous neuroimaging studies on stigmatization of race (to which Krendl et al. refer). This is what Ian Hacking—referring to Nicholas Jardine—called “calibration” of instruments within scientific developments (Hacking 1998, 98), that is, that every new method introduced for measurement has to be calibrated against the old one, including the evaluation of how adequate the old one was. In psychological terminology, the concept “calibration of instruments” (e.g., clocks) is known as validation (of tests and questionnaires, i.e., constructs), which leads to other problems. Obviously, there is no awareness among some scientists within the social neurosciences of the need to calibrate their instruments, meaning *social concepts* like stigma and stereotype, with sociology or philosophy. We argue that concepts like stereotype can be *instruments* in social cognitive neuroscience. They make it possible

to technically generate hypotheses in the context of cognition and emotion, and these concepts differ from the concepts which result from the experiment. It is important to notice that this transformation differs from metaphorical use and the science/society cross-border trade of metaphors. How can concepts be instruments? Because within the experiment, their real meaning seems to be irrelevant. Instead, they just lend the experiment their linguistic skeleton, purified of metaphorical and social meanings and implications, for the purpose of social cognitive science. A cultural and social concept, like stereotype, which is binary coded can be an extremely useful instrument, because it can be combined with attributes which are also binary coded.

There is a clearly established cultural stereotype of black and white, likewise of man and woman. Concerning the “old” and still intensively used instrument, that is, the stereotype black/white applied in stigmatization studies of race, the concept of stereotype somehow made sense (this is not to suggest, however, that it made sense in all of the studies in which it was employed). However, a stereotypic structure is not obvious in fat/slim, extensively pierced/not at all or not extensively pierced, unattractive/attractive. They relate to aesthetic categories, which are highly heterogeneous. There is no objective beauty, moreover, which is not related to a type, and even the idea of ugliness does not contradict the idea of attraction. All chosen types involve *continua* and are not discrete attributes. Of course, black/white also involves continua of color, but color *can be more easily stereotyped* (see Berger 1999), for example, by scientists’ choice of photographs, than attractiveness. And what is the binary other of transsexual? Not transsexual? Heterosexual? Same sex sexual? Taking a closer look, it appears that this study focuses not on stereotypes but on normality and its opposite, the construction of abnormality. This is a slight but nevertheless important difference. And it makes all the difference regarding the question of who shapes this normality—science or society, the scientist with her abstract categories or the individual within her life world of personal experiences?

During the experimental process, and by means of several abstractions and generalizations, predefined attributes of individuals’ faces on photographs were converted into properties of members of social groups. On the other hand, the idea of a social group emerged because one single attribute was seen as principal and thus made the essence of this social group. The social world was remodeled. Within the laboratory context, the individuals in the photographs became “targets” of social stigma, whereas the members of the indicated social groups became “bearers” of social stigma. The volunteers in the laboratory became “perceivers” of social stigma, and the photographs themselves “stimulus materials.” This setup is not an exception but the normal approach and terminology for social cognitive neuroscience.

According to Krendl and her colleagues, the disgust inspired by obesity is much more controlled within the students’ brains than disgust toward transsexuality, that is, seeing a photograph of a transsexual feels more disgusting than seeing a photograph

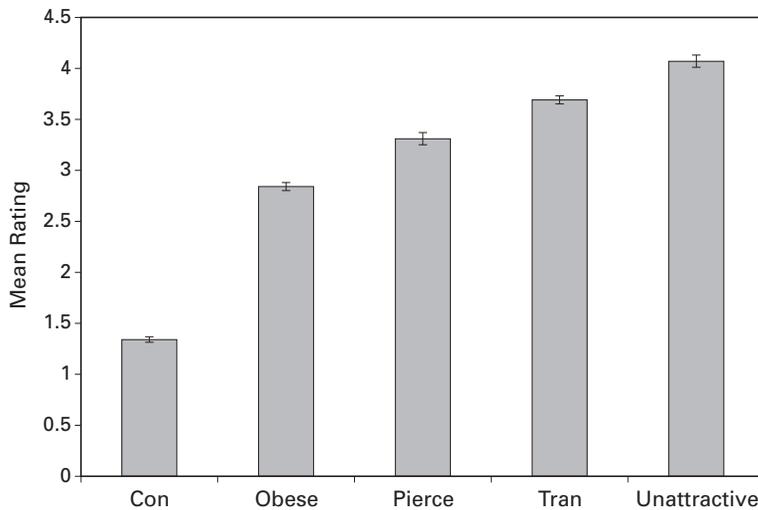


Figure 1.4

(color 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.)

of an overweight person. The most disgusting of all is to perceive general unattractiveness (see figures 1.4 and 1.5; color plates 4, 5).

We can explore Krendl et al.’s study a bit further, with regard to the methodology and epistemology of social neuroscience. They assert that their study is, first, inspired by the awareness that social neuroscience studies on social categorization and stigmatization have predominantly dealt with race differences (see Phelps and Thomas 2003 for a critical overview). Second, their study represents a critique of previous studies of social stigma which had resulted in the concept that theoretically controllable stigmas (such as obesity) lead to more negative feelings in the receiver than uncontrollable stigmas (e.g., blindness). Again, in philosophical terms Krendl et al. tried to reject the idea that *blame* and *guilt*, which have been lurking behind the concept of controllability, are involved in stigmatization. This complex field of guilt and visible stigma, which was analyzed in the laboratory, imported a specific Christian tradition into the scientific modeling. The differentiation between controllable stigma and that which is “given” has a long religious history, distinguishing a stigmatized person from others on the basis of a bodily wound (Goffman 1963, Harrison 1996, Menke and Vinkenly 2004, Fessler 2007). Having biblical origin, stigmata in the Catholic tradition refer to

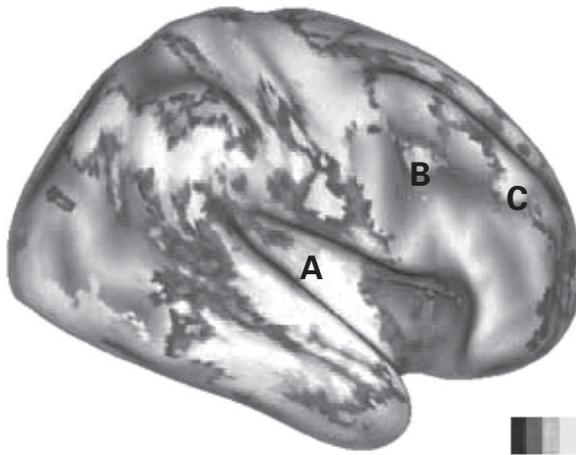


Figure 1.5

(color 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.)

marks on the body which resemble the wounds Jesus received while hanging on the cross—like wounds on the feet and hands. In religious tradition, stigmata are not a sign of guilt but show a cosuffering with Jesus Christ and the capability of bearing the sins of others.¹⁷

According to Krendl et al., they chose the attributes of obesity and transsexuality because these attributes are ambiguous, whereas piercings are clearly controllable, and unattractiveness is determined by genetics and is thus uncontrollable. The category of "control" is used variously in the social neurosciences: first, regarding personal and social behavior; second, regarding the control of emotions and emotional areas inside the brain by other, more "intelligent" areas (mainly the prefrontal cortex); and, third, regarding the social response (of groups) and emotional response (of individuals) to the perceived behavior of others.

Something else that is typical of social neurosciences is the lost differentiation between bias that is unintentional and bias that is unconscious. Bias is an issue in the

use of questionnaires, where the volunteers are supposed to answer questions such as “Do you like this person?” after being shown a photograph of a possibly stigmatized person. This procedure is always done after the image has been shown. Whereas intentional bias results from volunteers who purposely give wrong answers, unintentional bias is due to the fact that—because of social norms—some people do not want to admit that they dislike the person or that they have prejudices. The difference is not easy to detect, though it is possible to do so employing conventional methods from behavioral and social psychology, for example, by measuring startle reflexes (see Phelps and Thomas 2003). This type of unintentionality is amenable to consciousness.

Another concept of unintentional bias is now entering the arena of testing culture, and this is where cognitive neuroscience of emotions comes into play: the *unconscious bias*. Unconscious feelings are not amenable to consciousness.¹⁸ Rather, they are labeled “automatic” (Krendl et al. 2006), giving shape and form to an old vision of cybernetics (Wiener 1961; for a cultural perspective related to the development of electroencephalography, see Borck 2005): the control of behavior as an instance for locating an identity between animal and machine. The automatic feeling of disgust is labeled as “automatic evaluation.”

In other words, a scientific target of social neuroscience is to unveil political correctness rhetoric, or other forms of learned control, and to determine whether the evaluation given in the questionnaire (behavioral data) contradicts the neuroimages (fMRI data) or confirms them. These two different measurement methods are newly referred to as “explicit measures” (questionnaires) and “implicit measures” (neuroimages), thereby tacitly abolishing or at least reducing the implicit measurement methods referring to unintentional bias from psychology (see also Phelps and Thomas 2003, 756). Unconsciousness wins over unintentionality. In the end, this issue is about the definition of truth and which science holds the greatest claim to defining it. And since emotions still seem to evidence the innocent nature of the uncivilized animal in us, which cannot lie, the neuroimages are thought to represent the “original” and true feeling of the reptile mind. It’s a jungle out there, in the brain. Of course, the wildlife of the amygdala can be tamed by the civilized brain areas responsible for evaluation and emotional learning. As a consequence, social norms seem to be inscribed in the brain, somehow governing its cruel “nature.”

Not surprisingly, in the discussion section of their paper Krendl et al. offer the opinion that “Over the course of evolution, the avoidance of those possessing stigma may have been adaptive” (Krendl et al. 2006, 12).

We, the editors and authors of this book, after having investigated so many neuroscientific studies on emotions, and, sometimes, as in the case of the study of Krendl et al., having been impressed by the fine architecture of the hypothesis and experimental design, have always been inspired with a deep sense of disappointment at the appearance of the repeatedly recurring sentence, “Over the course of evolution X may

have been adaptive.” As neuroscience is rooted in biology, and biology in Darwinism, this phrase seems to be unavoidable. It is like the final scene in a Western movie: Regardless of the story, the cowboys are on their horses, riding into the sunset; their work is now done.

We, however, continue with more questions. In nearly all of the neuroimaging studies we investigated which came from outside the clinical context (of explicit diagnosis and therapy), the volunteers were recruited from university campuses. With reference to social categories, then, do students’ brains mirror societies’ brains—or rather “the brain” of society?

Do social norms light up in the brain? What does this idea suggest for the creation and recruitment of elites? Will the elites of the present adapt to certain brain functions, or will new elites inhabit the top floors in the future, for example, the high-functional autists (90% of whom are men) as Simon Baron-Cohen (2004) envisions? Have new research programs already been developed within clinical contexts, for example, concerning diagnoses of sexual and social dysfunctions, which resist the classical approaches of medical therapy or surgery? Does it matter that the technology for neuroimaging already exists, and that financial investments have to pay off, that is, that as many people as possible should be brain scanned? To what degree would brain-centered elites change society and society’s ideas of pathology? Looking at the current status of science and technology, it will not be possible to answer all these questions in this book. For the present, it should be enough to simply put them on the agenda.

Elites form a part of a “corporate self,” for example, a company, a university, a nation, or a global economy. They have power and hold leading functions. Therefore, they also shape the self-image of the corporate self (corporate identity) and act as its representatives. The primary aim might be to gain money and influence for the corporation, its individual members, and their families. Over and above the issue of power and status, it is the task of modern elites to represent and take social responsibility for society as a whole. It was Daniel Goleman, after all, who tried to stress social responsibility in his EI concept.

1.5 Step 3: Making the Sciences of “the Self” Emotional

In the following passages, we will see that the limits of “the self” differ according to the experts’ theoretical backgrounds, especially when the spheres of rationality and emotionality intermingle. For some reason, the sphere of rationality is easier to handle, academically, than its emotional counterpart. Every discipline uses different methods, media, and techniques for mediating between these spheres, for example, photographs and questionnaires in psychology, videotapes and neuroimages in neurobiology, symbols and ideas in the humanities and social sciences. In social cognitive

(neuro)science and developmental cognitive science, these different methods and techniques are being merged. What they all have in common is that they are motivated by the desire to clarify, intellectually, what emotions are, what they reveal, how they do it, and what end they serve. Accordingly, we find ontological problems (What are emotions?), methodological problems (How can emotions be made accessible?), epistemological problems (What purpose, or even end, do emotions serve?), and, finally, a normative problem: How can emotions be functionalized, and should we do that? All these questions relate to different levels of “the self,” starting with the level of the individual human person, with respect to his or her brain. Emotions today have a physical place *in* the brain, as, for example, prominent neuroscientist Antonio Damasio argues, and we all seem to be emotional people who think *by* feeling (see also Wassmann 2007, 160).

In this book, we are not going to answer the question of what emotions are. Commonly, these five basic emotions are considered to form the core understanding of emotion: anger, anxiety, sadness, disgust, and happiness. Surprise is also often listed. Let us take a short look at the complexity of the field. The sciences search for the physiological basis and evolutionary function of emotions, based both on the anthropological category of “the human being” and on the biological category of “the human organism.” Propositions on “human nature” are nowadays valid for all individuals who are acknowledged to fall into the biological category of *Homo sapiens*. A well-known example of a both physiological and evolutionary explanation for emotions is the hormone adrenalin, which causes high pulse rates and most often aggressive behavior. Both are useful in dangerous situations where combat might be necessary. Sex-related hormones like testosterone and estrogen also are said to serve evolutionary functions which guarantee the survival of the species. Biological explanations in general refer to the organism, the population, and the species (i.e., to models) and not to the individual human being, that is, neither to “personhood” nor to personality. The category sex stands somehow crosswise to the category of the species *Homo sapiens*, as it divides the species’ population into two different types of human beings (man and woman), nevertheless serving one common aim: survival, that is, producing the next generation. Many scientists who shape the discourse field of biological sex differences and brain research (of emotions), that is, Robert M. Sapolsky (1997), Louann Brizendine (2006), and Melissa Hines (2004), use an endocrinological approach to the research field by analyzing the internal processing and the functions of the gonadal hormones (for a feminist perspective on the gonadal hormone concept, see, e.g., Fausto-Sterling 2000, Ebeling 2006; for a cultural history of gonadal hormones and anti-aging therapies, see Stoff 2004). Moreover, fMRI studies on hormone-related neural activities of nonhuman primates before mating (see Ferris et al. 2004) inspired neuroscientific research for finding also a human “mating intelligence” (Geher and Miller 2007). Emotions then aid reproduction via—philosophically speaking: the

medium of—hormones. By the same token, emotions have been used in recent neuroeconomics (see Ulshöfer, this volume), though there the hormones as mediators are only of marginal interest. For neuroeconomists, the emotions represented “in” the brain, which are said to be relevant for rational decisions, are methodologically (economic theory) and practically (consumer behavior) important. They seem to complete the model human being, the *Homo oeconomicus*. Looking closely at the theoretical architecture of modern biology and economics, it becomes obvious that both disciplines share common ground regarding efficiency, functionality, and reproduction of their systems’ entities. Both interpret nature with economic and technological models of regulation and control. The essential difference, in the true sense of “essential,” is that biological entities necessarily have to be alive to be efficient, functional, and reproductive, and that their functionality shows *ex post*. Taking this argument further, living beings need to grow and develop to *become* efficient, functional, and reproductive (i.e., when grown-up), and recent research findings on the brain’s plasticity show that only a brain which has already learned develops further potentials of plasticity, enabling it to learn more. This implies that, for characterizing living beings, it is not sufficient to only *behave* in a functional way. Even robots can do that (Haraway 1997), and in the history of science animals have also often been described as functioning like automatic systems (e.g., Wiener 1961; Rosenblueth, Wiener, and Biegelow 1943).

In contrast, human beings have to internalize the goals of their lives (and life’s boundaries, above all, mortality) and the means to reach them in such a way that the resulting behavior makes sense to themselves and others. Therefore, it is not enough to have an “internal model” of consciousness (Holland and Goodman 2003). On the other hand, internalizing is a process in which both causes and reasons are involved, and reasons still remain in the sphere of subjectivity. Living subjects are not static but continue to reflect on their agency within a sociopolitical ontology (Marcoulatos 2003, Cole 2005). This will continue, even if brain research tries to model the category of personal experience, which is crucial for uncovering reasons which account for a subject’s decision in terms of objectively measurable, intraindividual changes of neuronal networks (plasticity). However, the individual’s modal space, provided by neuroplasticity, is, at the same time, described as limited by a fixed architecture which is both species-related and sex-related.

From an epistemological point of view, the emotional behavior one shows is not necessarily identical with the emotion one has.¹⁹ This is a crucial problem for the sciences which try to make the subjective feeling accessible to objective reasoning. Neuroimaging is the main methodology for this, and its limitations and impact are currently being debated (see Hüsing, Jäncke, and Tag 2006). Moreover, the process of having and showing emotions (“way of feeling,” “mood”²⁰) differs from the content of the specific emotion felt (“the feeling” or “sentiment”). The distinction works in a

way that is analogous to “thinking” and “thought.” The single incident which causes a fast sensation is another relevant category, because in the laboratory fast results are of high value. For example, when you burn your hand with boiling water, you will feel the sensation of pain immediately and connect it to the incident. First of all, a sensation like this differs from long-term feelings which can last for a lifetime, for example, guilt or shame. Second, this incident is felt as experience and comprises a lived biography. You will never do it again.

In contemporary neuroscience laboratories, a majority of studies are devoted to representations of pain. Due to methodical constraints, related to experimental design, this is the case even when the real research interest seems to focus on empathy (note: Greek *pathos* means suffering). Results from several studies have shown that fear, conflict, and (what neuroscientists call) “social pain” lead to the activation of a common alarm system in the brain, which is localized in the anterior cingulate cortex (ACC; a part of the limbic system; see, e.g., Panksepp 2003, Eisenberger, Lieberman, and Williams 2003). These different kinds of pain share the same representation of pain within neuroimaging. If we have given the impression thus far that pain is an emotion, let us correct it. Pain is not an emotion. It remains a sensation and is simply an indicator of an emotion or a feeling, which is richer in content and which must be interpreted based on the particular context in which it occurs. By means of neuroimaging, the hypothesis is put forward that humans may experience the same kind of feeling during their several modes of perceiving the world, even if the feelings have different causes and effects and are related to different senses and sensations. This misunderstanding is due to generalization and abstraction. However, the concept of perception (rather than cognition) seems to be underestimated in current cognitive neuroscience.

Therefore, emotions are a primary category of phenomenology, as they depend on the senses through which humans perceive and experience the world (see Karafyllis, this volume). Focusing on emotions in brains, that is, on looking “inside” the human head, we tend to forget that the primary organ of sensual perception is the skin, demarcating the boundary of what is “inside” and “outside” the body. Since the early 1990s, the pioneers of pervasive computing have tried to technically blur the skin’s boundaries or, so to say, enhance the skin’s capacities for perceiving the outside and inside world (including people’s emotions) with intelligent clothes. The idea is to construct a sheath with optimized sensor components (see Baumeler, this volume). This research field is interesting, when reflecting on emotion research, because on the popular level it developed mostly without explicit reference to neuroscientific discourses, though it was nevertheless trying to control emotions from the very beginning.

In phenomenology, the perceptual contact with the world is prior to consciousness and cognition (Husserl 1922/2002). Emotions constitute the subjective spatiality and

temporality of the body which only one single person owns and feels as being her own, the so-called *le corps propre* in the terminology of Maurice Merleau-Ponty (in German: *Leib*, which is different from *Körper*, i.e., the physical body; see Merleau-Ponty 1966). Moreover, in phenomenology sensually felt emotions (“feelings”) are the media for creating an intersubjective relation for constituting the life world and are not causes, means, or ends (Schmitz 2007).²¹ In a process view, they are regarded as personal drives which are not ends in themselves.

It is worth debating how far this media character of emotions is actually transformed in order to make emotions target-oriented means. In other words, the techniques for shaping emotions with regard to cognitive content imply normative assumptions at different levels of description and explanation.

In the humanities, there is a consensus that emotions can be reduced neither to desires nor to reasons and that they are essential to human life. Emotions somehow connect the sphere of sensitivity²² and the sphere of what is going to make sense, and they are sometimes seen as dispositions. In his famous article “What Is an Emotion?,” William James wrote “that the emotional brain-processes not only resemble the ordinary sensorial brain-processes, but in very truth are nothing but such processes variously combined” (James 1884, 188). He argues that “bodily disturbances” directly follow the perception (e.g., of something perceived as dangerous). The idea of disturbances refers back to the etymology of the word “emotion.” They are the manifestations of emotions, from which then the feeling arises which is the emotion. James strongly disagrees with the opinion that it is the mental perception of some fact which “excites the mental affection called the emotion, and that this latter state of mind gives rise to the bodily expression” (James 1884, 189f). In short, James argues that there is no purified “mind-stuff,” but bodily symptoms which necessarily belong to emotions and which are expressed quite consistently from an evolutionary perspective (e.g., by the contraction of the brow).

Antonio R. Damasio (1999) distinguished between emotions, defined as the body states caused by somatic markers, and feelings, which he defines as the conscious perception of emotional body states. To cut a long philosophical story short, this view refers to an interior map of representation and second-order representations which undergo further re-representations within the brain. In a simplified form, this idea was already put forward by Aristotle, who (in *De anima* 412b 5–9) used the metaphor of a wax plate situated within the human soul, enabling the soul to form concrete impressions while perception was being inspired by fantasy. It was a metaphor, though, and it was related to the cognition of a higher than empirical knowledge. In Aristotle’s (and later Hegel’s)²³ view, emotions were only alogical during childhood because they remained in the sphere of the lower appetites (related to the vegetative soul inside the human body), that is, what we call “drives” today (Freud 1991). However, they always contained the potential to be persuaded by rationality. During

education, the child was taught to exercise self-control and to let emotions serve virtues for the sake of the human good (see Fortenbaugh 2002; Nussbaum 2001/2003; Elster 1999, 52–75). In the grown-up, the habituated and cultivated emotions enabled the individual to act properly even before reflecting on the consequences of the act, for example, in situations of war. In antiquity, emotions were related to both ethical and political theory, that is, they were practical and, if applied right, proof of prudence (Luckner 2005). With its appeal to social responsibility, one may well understand Goleman's concept of EI as a watered-down version of Aristotelian thought, adapted to modern times. Aristotle's list of emotions was long, compared to contemporary ones, ranging from mildness, love, and benevolence to contempt, shame, pity, selfishness, emulation, anger, and fear. This enumeration reveals that for Aristotle emotions concerned both the individual and family level (involving friendship; Greek *oikos*) and the community (Greek *koinonia*) and city (Greek *polis*) level, that is, emotions were always political (Sokolon 2006). It is noteworthy that Aristotle differentiated between emotion and emotional response (in relation to someone), a much richer version of the twentieth century category of behavior. There was, however, no special concept related to subjectivity such as consciousness, which would have allowed him to separate emotions from feelings.

The general dialectical structure of emotions, that is, possessing the potential to be both rational and irrational, and being situated between physical dependence and autonomy, has continued through the centuries. Influences from different cultural, religious, and political contexts reformulated the ontological architectures in which emotions were situated—above all, the potential of the human being to be actively good or bad.

One major question still debatable within present ontological architectures is whether the body or the mind is primary for having emotions. James, in contrast to Damasio, voted for the body. What for James was an emotion is, so to say, a feeling for Damasio. Damasio's idea of somatic markers in the brain is strongly inspired by neuroimaging, blurring the distinction between cause and representation. As a consequence, the mind, though immaterial, seems to be embodied a priori.

In the last decades, emotions have lost their primacy in the mind and in the body. In the past, they were responsible for the unmediated responses of human beings, while simultaneously representing authenticity and personality. In contemporary thought, they serve the intellect in different ways.²⁴ A well-known service function is named motivation. As a result, a feeling (a mental representation of an emotion) is not just a feeling; it can be right or wrong, it can be enhanced by mental training, and it can be provoked. The problem, similar to that with evolutionary theory, is that it is only clear afterwards which emotion would have been "right" to feel and express. The different disciplines involved in demarcating the line between rational and irrational choices "to feel something" lack a unifying fundament of rationality (Karafyllis

and Schmidt 2002) due to the unclear ontological and epistemological status of emotion and of world. Emotions interact with cultural values, and the transformation of emotions by media cultures (see Fahlenbrach and Bartsch, this volume) configures culture-dependent emotional styles (see Reddy, this volume). On the other hand, there might be some invariant human facial expressions across cultures—a question Charles Darwin was already deeply interested in (Darwin 1872/1998) before it gave rise to a psychological research field, nowadays prominently represented by Paul Ekman (2006). This unclear status of emotions between nature and culture is but one reason why research on emotions has recently become prominent both in the sciences and humanities.²⁵

When sociologists Gillian Bendelow and Simon J. Williams (1997) wrote more than a decade ago that Western intellectuals had neglected the study of emotions because they thought in dualisms like mind/body and nature/culture (on the latter, see Ortner 1972), they might not have imagined the outcome of today's research: a strong interest in emotions while researchers still cling to dualisms, even if the latter nowadays are more difficult to identify. Two of these dualisms which are sometimes difficult to detect in current neuroscientific writings are mind/brain and brain/body. When you subtract "brain," the old mind/body problem emerges again. It is obvious that, depending on what is to be explained or justified, the brain is modeled as belonging either to the sphere of the body or to the sphere of the mind. The commonly used term "embodiment" (Lakoff and Johnson 1999) makes understanding exactly what is embodied where, how, and why even more complex. Another dualism is emotion/intelligence, or emotion/rational decision, and these dualisms all seem to have been merged into a monistic structure within some psycho-bio concepts of EI and social neurosciences.

However, in the academic world of psychology, EI's definition as a psychological construct is still in a state of flux, and there is disagreement about how EI is to be measured (EQ) and applied (Geher 2005, Murphy 2006). In the 1990s, psychologists John ("Jack") D. Mayer and Peter Salovey revisited and reconceptualized EI (Salovey and Mayer 1990, 1997). The idea of fusing emotions with intelligence is by no means new, and one of its forerunners is the concept of "social intelligence" (see Bechtoldt, this volume). In addition to concepts of multiple intelligences (as put forward by, e.g., Howard Gardner), the claim that there is an EI serving the "real," that is, rational intelligence, yields two hierarchical, heteronormative forms of intelligence which can easily be affiliated with the heteronormativity of biological sex—even if this connection was never intended by its originators.

From a cultural point of view, the brain has now replaced the heart, which until the early modern period had been "the" organ of emotions, while the blood was their carrier (once thought to produce different temperaments). The biologically interpreted ontic nature of the human being (i.e., in the neuroscientific context: the brain and

its neural activity) seems to work toward useful ends, when viewed from a metalevel, but, in so doing, this approach to humans neglects the individual, practical, and social level of useful meanings. Humans, rather than the brain, take action. Moreover, the classic philosophical questions concerning the mind/body problem and intentionality (e.g., How can I think “myself”? Is there a free will?) are still unanswered and will probably never be fully answered.²⁶ Maybe it belongs to being human to live with unanswerable questions. Nevertheless, the stories of an overall *neuromythology* (Fuchs 2006/2007), imagined by brains which have attained the status of meta-subjects in modern—mostly Western—societies, linger on. Individual brains, we argue, have a status that falls between subjects and objects in contemporary science. They are hybrids (Latour 1993), or biofacts (Karafyllis 2007a, 2008e), and neither resist naturalization (objectivation) nor personification (subjectivation) (see Latour 2004, 47). As epistemic things, which are also said to be alive, they allow scientists and others to forget that the concept of life they represent is exclusively neurobiological, and that “alive” is reduced to a mere attribute.

Brain research, in general, operates on three epistemic levels. On the macrolevel, it offers functional descriptions and explanations of conceptualized areas, such as the cerebral cortex and the amygdala. The mesolevel deals with larger cell units and tissues, while the microlevel elucidates the processes of single cells and molecules. Most advances in the neurosciences are made at the macro- and microlevel, the latter having a strong affiliation with genomics and proteomics research programs. The general direction of related research is top-down, not bottom-up. Looking at the microlevel, you can find genes for expressing hormones that might be relevant for certain reactions, but you cannot find a gene for an emotion or emotionality in general. Processes on the mediating mesolevel are still rarely understood. In neuroscientific studies of emotion at the macrolevel, there is currently a strong focus on making the functions of the ACC visible by neuroimaging. The ACC seems to be involved in reward-based learning and emotional affects.

At the microlevel, a special class of cells occurs in the ACC regions of humans, whales, and great apes, the so-called *spindle neurons* (the Von Economo neurons; see Nimchinsky et al. 1999, Allman et al. 2002), which could be responsible for intelligence and emotion (in general) and adaptive responses to changing environments. They were already described in the nineteenth century but recently have been found to occur only in the most intelligent mammals. Strictly speaking, this view challenges the idea that the ACC forms part of a primitive region (see section 1.1). Spindle neurons seem to arrange the transit of signals exchanged between the cortex and distant parts of the brain. In people with “autistic” disorders (pervasive developmental disorders), the spindle neurons are suspected of having developed abnormally.

Up to now, the category of neurons called spindle neurons has primarily been described anatomically. In contrast, the second prominent category of neurons

important for the field of EI has been described physiologically and thus has gained greater significance in epistemic contexts within the neuroscience of emotions (particularly related to empathy): the *mirror neurons*. In the 1990s, the research group around Giacomo Rizzolatti discovered that observing the action of others and imitating the same action activates a common neuronal network. They called this neuronal system the *mirror neuron system* (Gallese et al. 1996, Rizzolatti and Craighero 2004) and defined mirror neurons as a special type of visuomotor neurons. Empathy research at the macrolevel is, at present, intensely involved in mirror neuron research at the microlevel.

These explanations all sound very rich in presuppositions. It seems that when neuroscientific findings are exported to other explanatory contexts, they lose their theoretical backgrounds. On the other hand, the disciplines importing the neuroscientific propositions gain the aura of a scientific fundament, in the narrow, empirical sense of the word "scientific." The new neurodisciplines in the humanities, such as neurophilosophy, -sociology, -theology, and -economics reinforce the reductionist approaches to the complex world of everyday life and living practice. They more or less accept the basic assumptions transported with the neurobiological interpretations of the empirical data and artificially evoked effects and provoked phenomena (resulting from stimulation and context isolation) which result from experiments in the worlds of the laboratory and thus transform the ontological and normative theory backgrounds especially in the humanities and social sciences.

What is also forgotten, then, is that any biological interpretation always operates with historical assumptions about the development of life on earth, due to evolutionary thinking. Because of this, our objective is to provide the historians of science and culture with a platform side by side with the biologists and psychologists in order to narrate different stories about how the results of different studies of the emotions and intelligences were constructed. As is well-known in the history of philosophy, the humanities themselves have carried sexualized, sometimes misogynous concepts of human nature (e.g., concerning temper and character, from Aristotle in ancient times to Otto Weininger in modern times)²⁷ throughout the centuries. As science is part of the culture in which it develops, recent scientific models of male/female brains and behaviors necessarily are influenced by these cultural settings. At least for Greek antiquity, the existence of something in between, that is, hermaphrodites, was certain, moreover admirable, and the existence of intersexes and transsexual persons (see Nye, this volume) remains a challenge for brain and behavioral research today.

Moreover, psychology, with part of its theoretical background of subjectivity rooted in psychoanalysis, is one of the disciplines which has been put under great pressure by the neurodisciplines. When subjectivity is not reduced to mere personal behavior, psychology emphasizes the philosophically important point that individual identity

is determined more by its temporal (biographical) than by its spatial (localized) constitution. Neurobiology still focuses primarily on the spatial dimension of the central organ brain, its areas, and regions (“neuroarchitecture”), although there have been recent efforts at historicizing localized dysfunctional emotions as “temporal injuries,” especially in trauma research. Related to these findings is the distinction between primary (innate) emotions and secondary emotions, which are attached individually to specific objects and events. The terms “function” and “dysfunction,” nevertheless, refer to biological and economic ends which seem to be fixed in a state of cultural vacuum.

1.6 Step 4: Analyzing the Equity and Equality of Emotions, as Well as the Impact of Brain Research

At first sight, emotions might seem to be a resource which everybody has plenty of—something that is obviously not true for intelligence, as has been demonstrated in the elaborate testing culture around the IQ.²⁸ When we look closer at the intertwined concepts in the sciences, this veil of equity and equality of emotions is a very thin one, with the old stereotypes and social stratifications still visible underneath.²⁹ Because of strong competition in the job market, a high value is set on scientific proofs of special qualifications for doing the right job (and doing the job right). Emotions are nowadays also interesting as additional qualifications for intelligent abilities, helping to fill out a person’s rational capabilities and to acquire new ones. Only if a person is conscious of her abilities can these qualities be communicated and offered as capabilities. Women seem to have plenty of potential for “good” emotions in private life (e.g., empathy), while men may have potentially useful emotions for the workplace, connected with aggressiveness, competitiveness, self-assertiveness, and so forth.

Social neuroscience engages in research on job qualifications, as does research on EI within work and organization psychology. To cite but one example, neurobiologist Tania Singer and her colleagues tested which of the men’s and women’s brain areas lit up during fMRI scans while the test persons were watching physical pain stimulations to the hands of four complicit professional actors, that is, “confederates,” some of whom had cheated in a game symbolically dealing with money—related to economic models of “altruistic punishment” and social preferences (Singer et al. 2006). The so-called primitive brain areas for reward lit up in the 16 men examined but not in the 16 women (see figure 1.2) when seeing the unfair “confederate” receiving a pain stimulus. Instead, women’s “empathy centers” glowed.³⁰ After undergoing scanning, the volunteers were given questionnaires, asking, among other things, about the volunteers’ empathy and desire for punishing the confederates for their unfairness. Astonishingly, women wrote that they did *feel* a desire for punishment, though this

feeling did not show up in the neuroimages, in contrast to men (see figure 1.3; see also Ulshöfer, this volume, for further descriptions of this experiment). Interpreting these results, Tania Singer said in an interview with *The New York Times* (see below) that men “expressed more desire for revenge and seemed to feel satisfaction when unfair people were given what they perceived as deserved physical punishment.” Her interpretation of the male reaction, which does not seem to be very sociable, is as follows: “This type of behavior has probably been crucial in the evolution of society as the majority of people in a group are motivated to punish those who cheat on the rest.” Even though she states that there is more research to be done, she does not hesitate to make a recommendation which goes far beyond the biological setting: “This investigation would seem to indicate there is a predominant role for men in maintaining justice and issuing punishment” (all citations quoted in *The New York Times*, January 19, 2006, in the article “When bad people are punished, men smile (but women don’t)” by E. Rosenthal).³¹ Putting aside the ambiguous relation between perceiving and feeling something, and the desire for something and the actual emotion, as both systemic problems of the neurosciences, at this point let us ask some rhetorical questions. For instance, are male lawyers and policemen right for the job? How about men’s lower ability to communicate the reasons for issuing their punishment (women in general show higher communication skills in experiments; see, e.g., Kimura 1999)? Or has the Stone Age become the new utopia for science, replacing the popular science fiction visions for assessment? Why not look at the present societies, for a change?

Seen through the eyes of a neurobiologist, individual cheating is obviously not useful for the so-called evolution of society, which is outlined in the quotations above according to models of population biology, moreover without hierarchical stratifications. This view challenges some of the approaches to EI, where various ways of individual cheating (on the rest), for example, pretending, can be a sign of EI and of being qualified for leadership.

Let’s return to the question of who is right for which job. What is “right” is narrowly and functionally interpreted in the quotations above, and the definition of functionality moreover differs according to sex and dominant socioeconomic structures. Back in 1983, Arlie R. Hochschild analyzed, in her classic book *The Managed Heart*, the “emotional labor” typically reserved for the service sector. It is mostly women (and also a high percentage of gay men) who work in this field that is likely to be associated with neither elite thinking nor high wages. They seem to be “naturally” qualified, although they might culturally have adopted management techniques in handling their emotions depending on the social context, that is, what Paul Ekman calls “display rules” (Ekman 2007, 4). According to Nicky James (1989, 15), emotional labor is “the work involved in dealing with other people’s feelings, a core component of which is the regulation of emotions.” We editors do not know if there are studies in which the EQ of flight attendants, nurses, or wait persons has been tested. However,

the jobs offered in service, caring, and child care depend on professional “warm hearts” (Bernard 1981, 215). Will they depend on “warm brains” in the near future, or on female brains, or can these, because of the glowing empathy centers shown in neuroimages, even be regarded as the same? When Goleman (see section 1.3) typified the pure female EQ type with the attribute of easy stress coping, he might have been thinking of the cultural reality that it is primarily women who actually are working in jobs of emotional labor,³² connected with a special kind of stress (Persaud 2004).

In contrast to the neuroscientific Tania Singer group, psychologist Paul Ekman explicitly stated that during his research on facial expressions of emotions (e.g., Ekman, Friesen, and Ellsworth 1972), trying to determine whether they are innate or not, he searched for a culture which was still living in the Stone Age (Ekman 2007, 3f). Before changing his hypothesis, he showed photographs of white Caucasians with facial expressions of distinct emotions to U.S. Americans, Brazilians, Japanese, and others to observe their nonverbal behavior, especially their facial expressions, but wrote, “All the people I . . . have studied might have learned the meaning of Western facial expressions by watching Charlie Chaplin and John Wayne on the movie screen and television tube” (Ekman 2007, 4). This statement reveals why the questions put forward in this volume belong together: the different media (photographs, videotapes, professional actors, mirrors, etc.) used in experiments, popular culture (including media culture), and science are influential in shaping an emotion.

Among the five basic emotions, the semantic fields and indicators (e.g., pain) related to anger and anxiety have been examined most intensely in the neurosciences, compared to happiness, for example, as these emotions inspire the strongest reactions and responses. Referring to long-lasting feelings, guilt is one of the prominent candidates for research in psychology. However, empathy and love are currently receiving much scrutiny, though it is debatable whether this is for better or worse. Undoubtedly, gender and sexual stereotypes will continue to influence models and explanations of emotions.

1.7 Science and Emancipation—A Conflicted Relation

As we saw previously, sexual stereotyping has already had an impact on both the context of discovery and the context of justification of cognitive neuroscience. This means the normative dimension does not arise in the—“later”—context of application, where specific technologies and policies are developed, but already in the early stages. Even prior to theory development, the metaphors, models, and symbols play a key role in consolidating a new research field (Keller 2002). Certain technologies for representing a functional nature and a functioning “society,” like neuroimaging, also shape new ways of intervening and canalize the development of both new tools and hypotheses. A cultural philosophy of science has to be sensitive to these early stages

of a science (or its subdivisions) in progress, such as social cognitive science and the model of an “extreme male brain” (Baron-Cohen 2004).

In the philosophy of science, the question has arisen many times since the beginning of the twentieth century of whether there are possible alternatives to a value-laden science. A philosophy of science which takes the cultural dimension of science seriously has to put the implicit normative assumptions of science in relation to the values of the specific culture in which science is situated and in which its research problems and hypotheses are generated. This would also elucidate science’s explanatory limits. Many feminists want more, however, and vote for a science that should not primarily serve explanation, but emancipation, as Noretta Koertge (2003) critically points out. A serious challenge to this idea of an emancipatory science would be, first, the restriction of a science that contributes to concepts like sex, class, and race,³³ and, second, the imperative to actively include emancipatory elements into science. This conventional enumeration of sex, class, and race, which is often found to generally address oppressed groups, is misleading. While the biological attributions of sex and race are more or less innate and, in general, not open for change, a person is born into a specific class, but it is a political and societal decision how rigid social strata are and if (and how) a certain status can be overcome. Even if sex, class, and race together have typically comprised a category of the disadvantaged, referring to social cognitive science they are not at the same ontological level. To be more precise, in a political ontology these categories may be identical, but in a “natural” ontology (thinking, e.g., of Aristotle’s philosophy of nature, or the ontology of the senses, that is, that olfactory and tactile senses give rise to sensations “closer” than the visual sense) they are not—at least insofar as the properties of “class” are not regarded as hereditary, and as the class structure and morphology are not reduced to mere hierarchy. Binet (1905/1916) had already mentioned that the socially privileged might object to intelligence testing, as it might result in prohibitions against perpetuating privileges which seemed to be guaranteed by bloodline.

Note that when we speak of “nature” as a philosophical term for self-reflection, we are not addressing the category that has been established by anthropologists and biologists (Konner 2002), based on Darwinian thinking (Darwin 1859; Darwin 1874; on Social Darwinism, see Young 1973, 1990, Bannister 1979); the same should also be taken into consideration when we speak of “culture.” This differentiation is important to stress because sex and race have been well-established and explicit categories of biological research for centuries, while class and gender framed these categories (class has been inscribed particularly in biological systematics).³⁴ This scientific tradition is still apparent in the fact that the majority of social cognitive neuroscience studies, when exploring the perception of group differences, dwells on either race or sex differences, whereas class and gender are thought to belong to the political sphere and not to science. The reason is quite simple: class and gender are not considered to

be entities of natural selection but rather their result. They resist serious biological scrutiny. However, they have made their way into structures of various anthropological and biological concepts (Janich and Weingarten 1999).

Sex is a concept which is primarily employed in the research dimension of *science of gender*; class generally refers to *gender in science* (see section 1.3); with regard to race, no differentiation is possible, as races or cultures which are defined as inferior are often labeled “female” (e.g., regarding Western intellectual history about the division orient/occident). Race differences, like sex differences, have also been a topic of interest for neuroimaging (e.g., Lieberman et al. 2005), related to the neuroscience research of social stigma (particularly: same-race-face vs. other-race-face recognition by means of amygdala activity; for a psychologists’ critique of this research area, see Phelps and Thomas 2003). Lieberman et al.’s study (2005) rejects findings from other studies, which had found race differences in the race recognition of others. This study reveals that the processes happening, while either saying “African-American” to volunteers or showing a photograph of an African-American to them, are controlled differently by the brain. Emotional responses to words are more amenable to learning. This finding would seem to stress the importance of political correctness (PC) in the written and spoken word. At the moment, the question of whether PC is useful or not seems to be one of the important political contexts for social cognitive neuroscience, and thus its experimental designs frequently mirror political opinions. However, the real problem might not be the concept of PC itself, but rather the growing impression that PC is mere rhetoric without any real belief in the underlying ideas of justice, thus revealing a *Menschenbild* which is pessimistic by heart.

Racism, like sexism, is making its way back into scientific journals. For instance, in the paper entitled *Race, brain size, and IQ: The case for consilience* (Rushton 2003), author J. Philippe Rushton, professor of psychology at the University of Western Ontario (Canada) and editorial-board member of the international journal *Intelligence*, compares brain sizes between races and tells the age-old story that the average size of African-Americans’ brains are smaller than those of Caucasians, and he therefore concludes that the latter have higher cognitive abilities, which have recently been exceeded by the Mongolian type (see also Rushton 2000). It implies the idea of a “national intelligence” (Cattell 1937, Cattell 1971; see also Dobzhansky and Montagu 1947) which plays a part in global competition, obviously focused on China at the moment (on Rushton’s racist research, see, e.g., the critiques of Cernovsky 1995, Lieberman 2001). Since he used MRI to support some of his findings, Rushton managed to place the paper in the journal *Behavioral and Brain Sciences*. The equation, smaller brain = lower intelligence, has often been applied to womens’ brains, as well, and sometimes still is (see Hagner, this volume; Schmitz 2006a). The recently revived questions, in the field of behavior and population genetics, about whether *g* is heritable, and what has happened to human intelligence for the better since the Black Man left

sub-Saharan Africa, allows neo-eugenics, for example, Beyondism and Jensenism (Jensen 1998), to emerge, moreover supported with economic data from “successful” economies, their racial profile, and the average IQs of races (Lynn 2006; see also Turner and Glass 1976). If fast breeding of high-priority human genes and behaviors is a potential goal for science, and for the society in which science is embedded, then women will have to be modeled as highly reproductive and available (for a social history perspective, see Schwartz 2006).³⁵ Thinking of genetics and neuroscience as “hard sciences”—as materialized if-then conditionals of pure causality, without having a cultural and social background in which they emerge, are applied, and make sense—makes it easier to say, “Just look at the data! The differences speak for themselves!” Perhaps a look at the last 200 years of related anthropological research would clarify the outcomes to which all-encompassing strategies in science can lead, how they arise, and how they can trigger various ways of oppressing or even eliminating “minorities” (Dobzhansky 1966, Stocking 1968, Chorover 1980, Tucker 1994, Stanton 1982, Stepan 1982, Stümke 1989, Harris 2001, Lieberman 2001, Jellonnek and Lautmann 2002, Tucker 2002, zur Nieden 2005a, 2005b, Weiler 2006). Alfred Binet’s original idea of preventing discrimination (against individual children in school) through intelligence testing has been turned to the opposite purpose, though there are exceptions. When testing is done for reasons other than supporting the individual, that is, to help the individual achieve her or his own goals, such testing is better not done. After all, there should remain something like a property right to one’s own “cognitive” unconscious. However, testing culture of humans, applied to humans, has traveled a long way down the slippery slope.

For both scientists and ethicists, it is important to understand how scientific modeling in advance sets normative benchmarks, which cannot be later erased by ethical evaluation if they are later detected at all. The previously mentioned case in which emotional processes in the brain were either labeled “automatic evaluation” or defined as “natural” stereotypes in the brain a priori, and where people were defined as stigmatized without asking for their self-understanding, is but one example.

As philosopher of science Ian Hacking (1998, 99) puts it:

Binet’s great innovation, the testing of intelligence, made sense only against a background of shared judgments about intelligence, and it had to agree with them by and large, and also to explain when it disagreed. Who shared the judgments? Those who matter, namely, the educators, other civil servants, and Binet’s peers in the middle classes of society. Despite the sometimes unattractive features of the history of intelligence testing, there was seldom a deep problem about calibration. This was because, at any time, there was a body of agreed judgments and discriminations of intelligence to which the IQ tests were calibrated.

Psychological research on intelligence, referring to educational backgrounds, necessarily focuses on class differences. “Class” in a political ontology has a structure parallel

to the category of “gender,” as the social gender role of many “women” can still be regarded as a disadvantage (e.g., from an economic or legal point of view). The role, however, is not a disadvantage in and of itself—as long as it is not biologicalized with the aim of transforming women into a *body of society* and making this altered role a reality in society (e.g., Tiger and Fowler 2007). The success of this will depend on how desperate the leading elites’ desire is to become the *brain of society*.

So how should science serve emancipation? On the one hand, one may ask if such a political enervation of science would still be science and if scientists could then still function as a “small, powerful, well-educated group” (Koertge 2003, 229), that is, as an elite. Koertge is right to argue that prolonged debates would emerge about which types of hypotheses are actually politically progressive. She concludes, “We should make every attempt to keep politics and religion out of the laboratory.” But what if they are already in the laboratory from the very beginning? Currently, there is a strong public and scientific interest in finding the neurobiological basis of religious feelings and spiritual phenomena, giving rise to a neurotheology (Goleman 1997b, Dalai Lama 1999, Newberg and Lee 2005). On the other hand, then, we have to answer the question of whether science in general can be “neutral” to political and economic developments. As the history of science (e.g., concerning military research and eugenics) has shown, and some of the contributors to this book also show, it obviously cannot. The laboratory world is not simply an isolated world of its own, though with regard to hypotheses and findings as mere sentences (propositions) within a theoretical framework of deductionism and empiricism it may appear to be one (Köchy and Schiemann 2006). It is doubtful whether an attempt at ideological purification would be feasible at all and, moreover, whether it would even be useful. Furthermore, one could ask how the border between the laboratory and society is constituted in a vision of a purely explanatory science. Nowadays, a culture of testing, therapy, and enhancement pervades many industrialized societies, which means that society itself functions as an extended laboratory (Krohn 2007; see also Cunningham and Williams 1992). Thus, philosophy of science has to engage with political philosophy and sociology because science itself engages with society and politics. It has always done so, as philosophers and sociologists can learn from historians of science. Therefore, there is a need not only for a philosophy of applied sciences but also for an applied philosophy of science. The laboratory, as a detached sphere of value-free experimenting geniuses which disseminates pure knowledge into a society, is a myth. Another myth is that in capitalistic societies, where huge amounts of money are invested in the funding of science by governments and companies, the two-phase approach of science—first, “undisturbed”/“pure” science, and, then, ethical evaluation—will lead to better science in the normative sense (Düwell 2004). If ethicists really were given a veto right with regard to the context of the application of scientific findings, the possibility would then exist that some investments might turn out to be a waste of time and money. The pop science

book market already adjusted to this mere possibility of ethical limits, as, for example, media activist John Brockman recently has been asking scientists, “What is your dangerous idea?” (Brockman 2006; see also Brockman 1996, 2004a). A waste of time and money is unlikely to happen due to economic rationality which, thus far, has been put forward to justify attempts to make scientific progress (and vice versa). In the long run, citizens and consumers will decide which scientific findings, technologies, and products are culturally relevant and lasting. And, last but not least, these decisions will depend on emotions and what sense they make in real life—not just in the jungle inside the brain.

1.8 Outlook

Science as such necessarily remains based on empirical data collection, solid analysis of the data, and theoretical scrutiny. In fact, the openness of this process as well as the accessibility to it has to be guaranteed, in order to observe and review this process from the very beginning. Consequently, we neither suggest that EI-related science is wrong, or even “bad” in general, nor do we claim that there is no such thing as sex-related differences in human beings. The problem seems to be the narrow construction of normality and functionality which is supposed to correspond to two unique sexes and one type of sexuality (heterosexuality), and that this one type is thought to be constitutive for any functioning society in general (see also Richardson 2000).

There are good reasons to support research on sex differences. Some feminist activists, for example, argue for a more “sexualized” medicine and an epistemology related to the female body, as many illnesses and maladies—heart attacks, for instance—appear in men and women with different symptoms. When medicine uses only the male body as a boundary object for diagnosis and therapy research, the health care of women is endangered, as illustrated by recent figures showing that fewer women recover from acute heart attacks because of incorrect and/or late treatment. What we can learn from the experts in this book is that gender research in the neurosciences is still in its infancy. It remains to be seen whether feminists—and others—will find good reasons for fighting for a female (and male) brain.

Finally, why not ask for the scientist’s self-understanding, which is reflexively related to the self-image of science? When Koertge (2003, 232) criticizes Helen Longino’s idea of a “feminist scientist” (1990) who is responsive to the ideals of a political community, she expresses doubts about whether science can simultaneously be made both more objective and more humane. Here we would like to add that science is practiced by human persons who must have motivation from outside the laboratory to find out “something” in order to explain it (and do something good) to “someone.” This humanist interpretation of scientists and their ethos is not restricted to the scientist’s sex. Ensuring gender perspectives in science will not “naturally” be guaranteed by recruiting more women scientists³⁶ but by employing people who are interested in

scientifically acknowledging the pluralism of modern societies. With regard to neuro- and cognitive science as “hard science,” “big science,” and pop science, small scientific solutions and limited explanations currently do not seem to be *en vogue*. On the contrary, holisms of mind, brain, gender, and world might soon go out of fashion.

If science is understood in an elitist and thereby exclusionary way, and scientists are forced to choose between either “the true” or “the good,” science will lose its relevance for cultural progress. There is no such thing as scientific progress without the assumption of cultural progress, whatever both mean in detail. For modern societies, the emancipatory element is fundamental as is the possibility to critically reflect upon it. This is but one of the reasons why the sciences and the humanities depend on each other.

1.9 Summary

To sum up: The modern cartography of the human brain describes areas which are said to perform thinking and feeling functions. By virtue of this topography, a neurobiology, a neurophilosophy, and even a neuroeconomics can be developed. In the context of these scientific and philosophical developments, questions of gender and sex become matters of critical importance: To what extent are specific types of intelligence—EI, for instance—restricted to female or, alternatively, male behavior or performance, or the biological sex? In contrast, to what extent do cultural and biological attributions of sex and gender define the topography both of the human brain and of society? Raising the question of gendering in relation to the neurosciences also enables us to ask, are specific forms of intelligence or performance socially and economically privileged? In terms of EI, are all brains equal, or are some more equal than others? Did and do we have “elite brains”? Can you train yourself to become “at least” emotionally intelligent, if not “really” intelligent? If some of the questions are answered with a “Yes,” what are the consequences? Behind the social acknowledgment of elites one can find masterminds—and how masterminds are defined.

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Notes

1. Goleman’s first book on EI (Goleman 1995) was translated into 30 languages—for example, German translation *Emotionale Intelligenz* (1996), Dutch translation *Emotionele intelligentie* (1996), Italian translation *Intelligenza emotiva* (1996, transl. Isabella Blum), French translation *Intelligence*

émotionnelle (1999, transl. Thierry Piélat), Spanish translation *La inteligencia emocional* (1999, transl. Elsa Mateo), and a Japanese translation that appeared in 1998. Whereas in German and Dutch the acronym EI is used as it is in English, it is referred to as IE in the French, Italian, and Spanish literature.

2. Earlier examples of related books are Moir and Jessel (1992), Sapolsky (1997), Geary (1998), Kimura (1999), and Blum (2007, 1st ed. 1997). In this book, we focus only on those authors of both scientific and pop-scientific volumes who had an education in science or are still science practitioners, for example, Simon Baron-Cohen, Louann Brizendine, Paul Ekman, Robert M. Sapolsky, Doreen Kimura, and Daniel Goleman, though the last has spent the past 25 years of his life working as a science journalist, editor, and coach. For example, science writer and Pulitzer Prize Winner Deborah Blum's *Sex on the Brain* will just be listed to mark the discourse field but not considered here for a thorough investigation. We also do not touch on the issue of how sexual arousal is represented in the brain, although there is a close relation between functional magnetic resonance imaging (fMRI) of nonhuman primates—for example, marmosets, which showed neural activity in different brain regions (including those relevant for “decision making”) after olfactory hormonal stimulation (see Ferris et al. 2004)—and the claim for a sexualized human brain (Brizendine 2006) and a human mating intelligence (Geher and Miller 2007).

3. In contrast to the study's authors, we would suggest “perceive” here.

4. “Human being” and “person” cannot be used interchangeably in the context of our book. As is known from philosophy, it is debatable what exactly makes a human being a person, for example, his or her biographical consciousness of temporality, forming an individual identity. This problem particularly emerges in bioethics—for instance, concerning the question about whether newborn babies, great apes, or coma patients are—already or still—persons or not.

5. “Outstanding leaders' emotional competencies make up 85% to 100% of the competencies crucial for success” (Goleman 1998, 187).

6. In Germany, there was a huge political debate in 2006 concerning whether politicians are allowed to use the word “Unterschicht” (literally translated: “understratum,” meaning underclass) for addressing the less economically successful. The Friedrich Ebert Foundation therefore suggested the word “Prekariat.” On the other hand, there seems to be no problem in emphasizing the special status of an elite university.

7. Both bioartists and bioscientists increasingly take part in “sci-art” programs, which are funded by the U.K. Wellcome Trust, among others. As Jens Hauser (2008) puts it: “One of the questions we may ask is whether artists engaging with biotechnologies can still choose the appropriate context for their action, or if they fulfill context's expectation of *usefulness* that can become a slippery terrain.”

8. We thank Jens Hauser for this information. On endogenous design in BioArt, see, for example, Karafyllis 2008c.

9. Enhancement strategies concerning the body range from fitness training to cosmetic surgery, as well as pharmaceutical and biomedical treatments to achieve a perfect body.

10. One cannot only think of recent research in deep brain stimulation, which is trying to enhance the capacities both of remembering and of forgetting certain incidents. Recent approaches to neuroeconomics must also be kept in mind (see Ulshöfer, this volume).

11. For a broader view on the relation of feminism and liberalism, see Nussbaum (1999a) and Fraise (1993; 2007).

12. We do not want to get into a discussion of the role of the economic elite area here (cf., e.g., Münkler 2006) and whether it is *the* leading elite; it is, in any case, one of the leading elites.

13. Quoted in the national report of the German Federal Government (2006) on women in leading positions in the economy: Die Bundesregierung. 2006. *2. Bilanz Chancengleichheit: Frauen in Führungspositionen*. <http://www.bmfsfj.de/kategorien/Forschungsnetz/forschungsberichte,did=69162.html> (accessed May 4, 2007), 11.

14. In a national study on elites in Germany, Ursula Hoffmann-Lange argues that the social background exerts only an indirect influence on access and recruiting with regard to the chances of getting a good education (Hoffmann-Lange 1992, 129ff).

15. For the research field of sexual arousal, see, for example, Heath (1972), Park et al. (2001), Hackbert and Heimann (2002), Holstege et al. (2003), Holstege and Georgiadis (2004), Canli and Gabrieli (2004), Komisaruk et al. (2004), Maravilla and Yang (2007).

16. In the French original it is *anormaux*.

17. The use of the Greek word *stigma* derives from the Bible, where the sentence in Paul's letter to the Galatians reads: "I bear on my body the marks (τὰ στίγματα) of Jesus" (Gal. 6, 17). The idea of stigmatized persons developed in medieval times; the first extensively documented case (1224) was Francis of Assisi, Italy (Yarom 1992). The first stigmatized woman is thought to be Christina von Stommeln (who died in 1312) of Jülich, Germany, who had the wounds of the crucified Jesus on her body (Harrison 1996). From then on, the number of persons purportedly bearing stigmata increased.

18. Brain research, especially when related to cognitive science research (see LeDoux and Hirst 1986), now seems to offer a "more scientific" alternative to "understanding" the true rationality of emotions: the *cognitive unconscious* (Lakoff and Johnson 1999, 9–15).

19. In philosophy, this difference is referred to as the "*qualia* problem."

20. During World War II, Otto Friedrich Bollnow wrote the basic work on the essence of moods (Bollnow 1995), in which—strongly influenced by the philosophy of Martin Heidegger—he characterizes moods as preliminary to emotions and feelings. Moods thus are essential to human existence, making an individual self-aware and inhibiting or facilitating certain emotions.

21. This view includes sexuality, which Merleau-Ponty views as "sexual drama," rooted in the very dialectic of existence: autonomy and dependence (Merleau-Ponty 1962, 153f).

22. Historian of science Adelheid Voskuhl (2005) points out how sensitivity and (French) *sensibilité* as one of the leitmotifs since the late eighteenth century were constructed by the interplay

of music, machine (music playing female androids), and literature. See also Barker-Benfield (1992), with a focus on sensibility.

23. Hegel (1830/1970, § 396).

24. This idea goes back to Aristotle's theory of intellect (Nussbaum 2001/2003).

25. See DeSousa (1987), Stocker and Hegeman (1996), Hatzimoysis (2003), Prinz (2006), to name just a few. For an overview of research fields focusing on emotions in psychology, see Lewis, Haviland-Jones, and Barrett (2008). For the relation of emotions and sociology, see Bendelow and Williams (1997). For a recent philosophical approach to emotions, see Kochinka (2004).

26. For a historical analysis of how the "I" became materialized in the brain research of the nineteenth and twentieth centuries, see Breidbach (1997).

27. On Greek antiquity, see Föllinger (1996); on Otto Weininger's influential main work *Geschlecht und Charakter* (translation: *Sex and Character*), see Harrowitz and Hyams (1995), and for a broader perspective, especially on the relation of sex and sexuality, see Nye (1999).

28. Nathan Brody presents a useful overview of the problems of scientifically understanding "general intelligence" ("g") and mentions score differences in intelligence tests related to race and class. Gender differences are not examined. Brody argues that the influence of race and class is overestimated, writing that "tests are sometimes disliked by privileged parents because they serve as a barrier to the perpetuation of social privilege" (Brody 2006, 174). Ironically, he supports his argument with Francis Galton's book *Hereditary Genius* (1869), in which Galton argues for a genetic explanation "because he noted that many men of genius had modest family backgrounds" (Brody 2006, 173). Galton is known to be one of the fathers of eugenic science.

29. This can be seen in Brizendine (2006).

30. As mentioned above, in earlier experiments, Singer et al. (2004a) observed that the bilateral anterior insula, the rostral ACC, the brainstem, and the cerebellum were activated when subjects experienced pain but also when they saw (in a mirror) that a loved one was experiencing pain (see figure 1.1).

31. In the scientific publication (Singer et al. 2006, 469) the conclusion is this: "It is possible that our experimental design favoured men because the modality of punishment was related to physical threat, as opposed to psychological or financial threat. Alternatively, those findings could indicate a predominant role for males in the maintenance of justice and punishment of norm violation in human societies."

32. Emotional labor means professional labor in which the regulation of emotions plays a crucial part, whereas emotional work means the same structural element in private life.

33. Koertge (2003, 227) presents the example of psychologist Paul Ekman, who reports that when he began to study facial expressions, which are supposed to be invariant in different cultures and can be identified as related to identical human emotions, Margaret Mead and Gregory

Bateson advised him against this study. They feared that any sort of biological explanation of emotions would encourage eugenic thinking. A source indicating that Ekman asked them for advice before studying this field can be found in Ekman (2007, 2).

34. Sociobiological research is an important exception.

35. In the communist countries after Lysenkoism, the idea of testing intelligences was rejected, though not exclusively. For further readings see Eysenck (1982) and Davis (1983), particularly on Eastern Germany (former German Democratic Republic), see Friedrich (1981), Schulze (1986), and Hagemann (1988).

36. On the contrary, women's access to science is important with regard to the different opportunities offered them in society.

