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Quo Vadis Homo Economicus? References to Rationality/Emotionality in Neuroeconomic Discourses

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Abstract. Rational choice theory's propositions, that economic actors strictly follow an optimization calculus, denying any kind of influence from social action, has been challenged for years within economic discourse and economic sociology. Re-conceptualizations of the Homo Economicus acknowledge the emotional influence on individual decision making within social contexts. The interdisciplinary research field of neuroeconomics has become a strong reference point in scientific and more so within socio-economic-political discourse as part of the emerging neurocultural framing of today's neoliberal society. We analyse the recent formation of the Homo Neuroeconomicus with respect to the current dispute around concepts of separation and competition versus interaction of emotional and rational processing that should predict economic decision making. We outline the permanent gendered connotations of this knowledge production and their impact on the persistence of biologically grounded and separated processes of emotional or rational processing. With an in-depth analysis of a case study, i.e., the (neuro-) biological explanation for the financial crisis by the Frankfurter Zukunftsrat in 2009, we exemplify how biological explanations and references to separate processes of emotional or rational decision making are utilized to legitimize individual responsibility and failure. This neglects socio-structural contexts and symbolic inscriptions in the concept of the Homo Neuroeconomicus.

Keywords: economic decision making, neuroeconomics, rationality/emotionality, gender, socio-economic-political discourse.

1 Introduction

Over the last decade, there has been emotional hype about economic decision making in both academia and practice. With the global financial crisis erupting in September 2008 and throwing economies into a recession around the world, public

discourse about reasons have shed light on new facets of emotionality and rationality in economic decision making. While newspapers filled their front pages with stories about the greed of male bankers and managers, academic discussions circled around the role of biomarkers like testosterone, dopamine and neurobiological processes in (economic) decision making (e.g., Asher *et al.*, 2013; Eisenegger *et al.*, 2010; Eisenegger *et al.*, 2011; Mohr *et al.*, 2010; Sapienza *et al.*, 2009). In reference to the study of Coates and Herbert (2011) about the positive correlation between the testosterone level of Londoner traders and their willingness to accept economic risks, the argument was raised as to whether Lehman *Sisters* would also have boosted the same risky credit boom that eventually lead to the failure of financial institutions and the global economic crisis. In public discourse, the idea has become popular that financial markets could be controlled by keeping testosterone levels low on trading floors (see Vidal, 2012, for a critique on this construction). Also ‘defects’ in managers’ brains (or genes) have been associated with allegedly uncontrolled behaviour in financial markets; in 2009 a group of leading German politicians, scientists and philosophers, associated with the so-called “*Frankfurter Zukunftsamt – The Future Think Tank*” (<http://www.frankfurter-zukunftsamt.de/>), blamed the human genetic bias towards avarice and greed for the global financial crisis. In their statement “Thesenpapier des Frankfurter Zukunftsamtes”, they propose consideration of biological predispositions in recruiting decisions for leading positions (see section 3 discourse analysis later in this paper).

In the corresponding interdisciplinary field of neuroeconomics, research scholars try to integrate social, cognitive and emotional aspects into the economic (decision) theory (Camerer *et al.*, 2005, Glimcher *et al.*, 2008). By referring to neuroscientific research, behavioural economists have not only alleged that specific neural markers predict individual decision-making (e.g., Knoch *et al.*, 2008; Knoch *et al.*, 2010), but they have relocated the concept of the *Homo Economicus* into methodological individualism (biologically determined), ignoring the socio-structural context of economic decision-making. Neuroeconomics has again sparked the gendered discourse by suggesting the existence of neuronal differences between men and women in decision-making (e.g., Singer *et al.*, 2006).

These current re-conceptualizations of the *Homo Economicus* in both the public and scientific discourse call for a critical analysis of the findings and interpretations of neuroscientific research and its gendered ascriptions. First of all, the understandings of emotionality and rationality (the first being feminized and the latter being masculinized in a long history of research) are of crucial importance in framing the neuroeconomical knowledge production and its impacts in society. Secondly, the analysis can function as a case study to gain a deeper understanding of the in- and exclusions that may result from an undifferentiated adoption of neuroreferences into socio-economic-political discourses.

In this paper we analyse the consequences of the re-conceptualization of the *Homo Economicus* in terms of emotionality and rationality in neuroeconomics. We depart with an analysis of the “Models of Man” (in the Latin sense of ‘human’) in management and economic theories and show how they have changed over time. We then single out how neuroscientific research contributes to a biological explanation of (human) decision-making on the individual level. Finally, we show how these recent neuroeconomical conceptualizations of the *Homo Economicus* are reflected in the

normative discourse in our society by analysing the propositions of the *Frankfurter Zukunftsrat* triggered by the recent economic crisis. With this analysis we are able to reveal facets of how today's economic structures are legitimized with reference to neuroeconomics.

2 Conceptualization of the Homo Economicus

2.1 Homo Economicus: Connecting Rational and Socio-emotional Decision Making

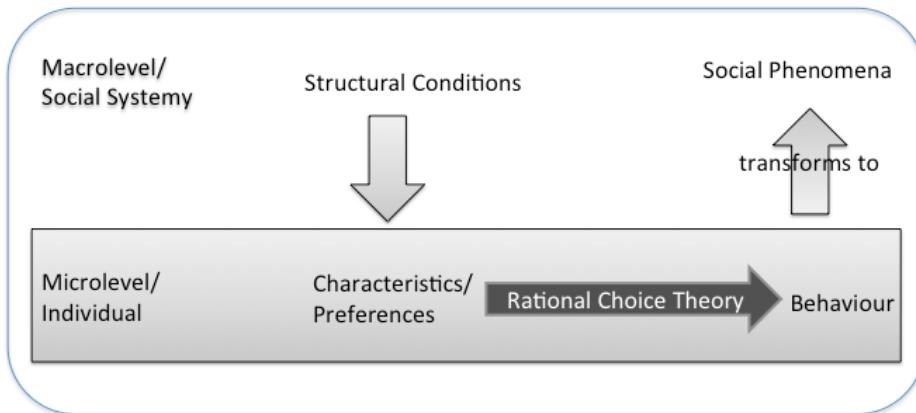
Rationality is a fundamental and widely used assumption about individual behaviour in decision making. In economic theory, ‘rationality’ is understood differently from its colloquial use for ‘sane’ or ‘reasonable’ behaviour, it is interpreted to mean utility maximizing behaviour that is – somewhat simplified – the tendency of individuals to prefer more rather than less of something that is of value for them. This notion of rationality has deeply influenced today’s neoliberal conception of economic actors and managers but has been applied also far beyond economic models (e.g., Becker, 1968 on Crime and Punishment).

The origin of the term *Homo Economicus* dates back to Ingham’s “*A History of Political Economy*” in 1888 (Persky, 1995). Yet, O’Boyle found the use of the term *economicus* in 1847 and 1826 editions of Karl Rau’s *Grundsätze der Volkswirtschaftslehre* (O’Boyle, 2007). The notions of economic rationality and *Homo Economicus* belong to current social theories summarized in the rational choice paradigm. In this paradigm, human behaviour strictly follows an ahistorical abstract optimization calculus (Kappelhof, 2000) and denies any other kind of social action that is not instrumental for the pursuit of own well-being; individuals are seen to be motivated by the desires or goals that express their ‘preferences’. They calculate and predict costs and benefits of alternative courses of action and choose – consistent with their known individual preference order – the alternative that best realizes their own interests. In this paradigm, the *Homo Economicus* is the archetypical human being; an (economic) actor constructed as a materialist, rational and self-interested decision maker (Dixon, 2010).

The nomological core of rational choice theories is thus constituted in two fundamental assumptions. Firstly, it is based on methodological individualism, i.e. the assumption that complex social phenomena can be explained and predicted by reference to the wishes, beliefs or will of autonomous individuals and their actions (e.g., Kappelhof, 2000). Thus, the *Homo Economicus* embodies the (ontological) proposition that the individual is superior to social wholes (groups such as societies, communities, and organizations) (cf., Dixon, 2010). The concept emphasizes *absolute* self-determination, conceptualizing individuals as genuinely free agents solely responsible for the way they act. The second fundamental assumption is that individual decision making is only rational if it is consistent with the individual preference order following the microeconomic notion of utility maximization. The *Homo Economicus* will make choices that produce the optimal outcome, given that the decision maker has complete knowledge of consequences for alternative courses

of action and the ability to compute this information correctly. According to Dixon, this “perception of human nature is taken, in the Humean tradition [...], to be self-evidently universal, uniform, constant and predictable” (Dixon, 2010, p. 352).

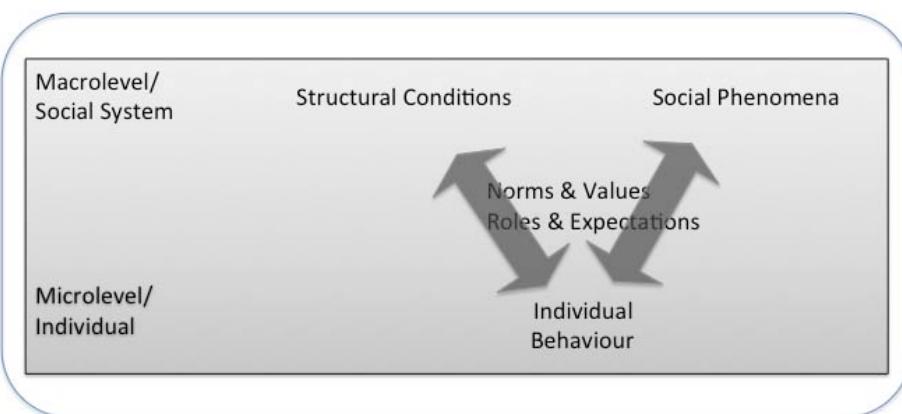
Figure 1: Methodological Individualism in the Rational Choice Paradigm



The *Homo Economicus* and the rational choice paradigm have been criticized – unsurprisingly – by many scholars of various disciplines. Within the discipline of economics, the criticism has led to adaptations of the concept, which Richard Thaler has summarized as a development “From *Homo Economicus* to *Homo Sapiens*” (Thaler, 2000, p. 134 ff.). The first major adaptation is that within the past 50 years, the *Homo Economicus* ‘has lost IQ’, i.e. with the introduction of the concept of *bounded rationality* (Simon, 1957, Simon, 1972), economists considered in their models, that human decision makers lack the relevant information to optimally resolve decision problems and the cognitive capacity to compute all relevant information. The most famous example is Daniel Kahneman’s and Amos Tversky’s ‘prospect theory’ that introduces psychological cognition into decision theory under uncertainty. They illustrate that most people will act irrationally, but lean toward loss aversion (Kahneman *et al*, 1979). This development has contributed to the establishment of the new (at that time) and interdisciplinary field of behavioural economics, in which scholars aimed to make economic models more ‘realistic’ (Mumby and Putnam, 1992). Furthermore, it has led to a distinction in economics between normative theories (rational choice theories, how individuals *should make* decisions) and descriptive theories (like the prospect theory, how individuals *actually make* decisions). Exactly these interdisciplinary connections of microeconomics and behavioural psychology brought a second major change in the concept of *Homo Economicus*; it has become more social and emotional by including social experiences such as trust, fairness, altruism and norms of reciprocity (e.g., Fehr and Gächter, 2000; Fehr and Gächter, 2002; Henrich *et al*, 2001; Nowak *et al*, 2000; Sigmund *et al*, 2002), but also emotions like envy (e.g., Kirchsteiger, 1994). With the help of controlled laboratory experiments, scholars test individual behaviour in classic economic games such as the Prisoners’ Dilemma Game, the Gift Exchange Game, or the famous Ultimatum Game. The latter game has been particularly useful in proving

social and emotional motifs of human decision makers. In this game, two players are offered a sum of money by the experimenter. The goal is to divide the money between them. While the first player (proposer) suggests how to divide the sum between the two players, the second player (responder) can either accept or reject this proposal. Both players only receive the money according to the proposal if the second player accepts the proposal. Otherwise both players receive nothing. The prediction of the game theory is that the rational decision maker will accept any offer of the proposer larger than zero. However, various experiments have shown that individuals consistently tend to reject unfair offers in order to punish unfair proposers (e.g., Henrich *et al*, 2001; Nowak *et al*, 2000). These results suggested that the rational decision maker framework required major revisions: 1. The notion of the self-interested, individual interest maximizing decision maker was expanded by socio-emotional motifs; 2. It had to be acknowledged that the development of ‘preferences’ is shaped by the economic and social interactions of everyday life (Henrich *et al*, 2001). Consequently, with these insights, the concept of the *Homo Economicus* being absolutely self-determined and genuinely free has been shattered.

Figure 2: *Homo Sociologicus* as an Interdependent Part of Society



In other disciplines, the criticism of the concept of the *Homo Economicus* and rational choice theories circled around similar problems. In the field of sociology, an alternative archetypical human being has been established: the *Homo Sociologicus*. The notion of the *Sociological Man* can be traced back to the German-British sociologist Ralph Dahrendorf (1968) who claims that individuals’ behaviour is driven by social norms. While the *Homo Economicus* is absolutely independent and unencumbered by any personal relation, the *Homo Sociologicus* is interdependent, a part of a society, and tries to fulfil socially pre-determined roles. By obeying the obligations of those roles and by learning the expectations of others, the *Homo Sociologicus* is able to become a part of society and build social relationships with others. The *Homo Sociologicus* is thus neither a purely self-interested nor perfectly rational human being, but instead driven by social forces that are beyond the individual’s control (cf., Ng *et al*, 2008, see also Dixon, 2010). Proponents of the new emerging field of economic sociology now propose that economic actions are

embedded within social relations, and humans' behaviour is deeply affected by their social relations (e.g., Granovetter, 1985). In a similar vein, Bandelj (2009, 2012) points out, that all economic encounters are influenced by emotional underpinnings that have consequences on economic outcomes.

In summary, there have been considerable attempts to enrich the concept of *Homo Economicus* with cognitive (bounded rationality, learning, etc.) and socio-emotional aspects (relationship, emotions, social norms) or even to reconcile the notions of *Homo Economicus* and of *Homo Sociologicus*: e.g., O'Boyle (2007) introduced the *Homo Socio-Economicus* in an attempt to bring the 200 year old concept into the "personalism of the twentieth century". Others, however, are strongly questioning the reconciliation of the two concepts (e.g., Dixon, 2010; Ng *et al*, 2008) suggesting that both notions are incommensurable, because they are built on completely different epistemological and ontological foundations.

2.2 Rationality and Emotionality in Neuroeconomics

With the acknowledgement of the importance of social embeddedness, emotions and empathy in economic decision making, a new research field has emerged in the last decade; neuroeconomics connects the fields of neuroscience, economics and cognitive psychology in order to research the neuronal basis of rational and emotional processing and to locate corresponding networks of brain activity in line with individual economic decision making. Previously, behavioural economics focused on the outcomes of (risk) behaviour and decision making, and solely the outcome could be taken to re-interpret the internal basics of these behaviours. Now, the neuroeconomics program, in contrast, aims to open the black box of the brain and explain economic behaviour not from its results but from its seemingly biological causes (cf., Camerer, 2010; Camerer *et al*, 2005; Kenning and Plassmann, 2005). Hence, it matches an important change in analytical perspectives: it aims a) to research the neuronal basics from which behaviour results, b) to visualize neuronal activity in line with decision making, and c) to predict the behavioural outcomes of the neuronal regulation.

One main focus in neuroeconomic research is the relationship between brain activation in the process of cognitive control (or rational aspects) and of emotional aspects during decision making. Schmitz (2012a, 2012b) has systematically analysed the first brain imaging studies that were conducted in the first half of the 2000, and which are referenced in many of the management discourses. In essence, these studies separate *conscious rational control* from *unconscious emotional regulation*, both allocated to distinct brain areas (e.g., Panksepp, 2003; Sanfey *et al*, 2003, Sanfey 2007). Alan Sanfey and colleagues, who were the first to analyse participants in an Ultimatum Game experiment with functional Magnetic Resonance Imaging (fMRI), presented images of brain activity in three particular brain regions of responders who rejected unfair offers: in the Dorsolateral Prefrontal Cortex (DLPFC), which the authors related to cognitive control; in the Anterior Insula and in the Anterior Cingulate Cortex (ACC), both part of the limbic lobe and related to emotional processing.

According to Sanfey, responders who rejected unfair offers tended to show greater insula activation than DLPFC activation, meaning that emotion against unfair

proposers ‘won’ out over economic (rational) reasoning that of some is better than nothing. In contrast, higher DLPFC activation was found when responders accepted unfair offers. The authors interpreted these results to be “consistent with the hypothesis that competition between these two regions influences behavior” (Sanfey *et al*, 2003, p. 1757). They further concluded: “*DLPFC activity remains relatively constant across unfair offers, perhaps reflecting the steady task representation of money maximization (less money is better than nothing), with anterior insula scaling monotonically to the degree of unfairness, reflecting the emotional response to the offer*” (Sanfey *et al*, 2003, p. 1757). In a later publication, Sanfey *et al* (2005) even introduced a *hierarchical separation* between the two regions, where emotional processing and behaviour is associated with the classification of unconsciousness whereas rational control is connected to conscious processes. In this vein, the system supports deliberation (rationality) as being ‘on top of/controlling’ the system that supports emotional processing. Sanfey’s group was aware of the implications of introducing a hierarchy: “*Perhaps the distinction with the greatest immediate ramifications for economic theories is between systems supporting emotion and those supporting deliberation, which closely parallels the distinction between automatic and controlled processes*” (Sanfey *et al*, 2005, p. 114). Rational control is positioned on top as a steady state, whereas the emotional regulation ‘from below’ only interferes in the cases of dealing with unfair situations.

The fundamental separation of brain areas for cognitive and emotional processing, however, is partly owed to the predominant method of fMRI computation. In neuroimaging, the relevant task-dependent activity is to be extracted from an overall brain noise with contrast analyses: e.g., with a computation of task-baseline activity, task1-task2 activity, or men-women activity, and vice versa. This computation results in a reduction of data, as all activities that are activated under both conditions are subtracted from the observation. Consequently, the resulting brain image covers the connections between activated areas. This procedure highlights *separated and apparently isolated locations*. From a connectionist perspective in neuroscience, however, it is the connectivity between brain networks that reflects their complex function. In addressing this point, Elisabeth Wilson states, “*individual units have no representational status as such; it is the overall pattern of activity across the network in total that reflects ‘thinking’*” (Wilson, 1998, p. 156). As a consequence, the separation of DLPFC and Insula/ACC activation, as in Sanfey’s study, is a result of a contrast analysis in image procedure. Scholars in neuroscience do not yet know how strong these areas interact.

Consequently, the newer concepts of neuroeconomics followed the shift that we have already outlined for economic discourse to an acknowledgement of emotional processing versus a concept of pure rationality in decision making. There was, however, an important differentiation; emotions and cognitive control are not supposed to interact mutually, but emotions are framed as necessary counterparts to rationality. The three notions of *separated brain areas* to regulate cognitive control and emotional regulation, both *competing* with each other and *ordered hierarchically*, remain a strong foundation in neuroeconomics (Camerer *et al*, 2005; Camerer *et al*, 2010; Frith and Singer 2009, Ochsner and Gross, 2012; Schüll and Zaloom, 2011).

Other studies, however, highlight a more prominent (not merely regulatory) function of emotions (e.g., Gutnik *et al*, 2006, Viviani, 2014), and outline the mutual

interactions and individual differences in the cognitive-emotional system (e.g., Dolcos *et al.*, 2011). Recent debates reference the integrative concepts of emotions and cognition in all of the thinking, behaviour and related brain networks (Damasio, 1994; Damasio, 1999; LeDoux 1996), and question whether brain regions can be conceptualized as either 'emotional' or 'cognitive' (Pessoa, 2008; Pessoa, 2010). They criticize the hierarchical notion of a dual system of cognitive control over emotional regulation (Viviani, 2014). Moreover, the cognitive-emotional separation in line with the ascription of cognitive control to consciousness and of emotional regulation to unconsciousness has been challenged by affect studies that differentiate clearly between unconscious affect and conscious emotions (for an overview, see Gregg and Seigworth, 2010).

Economic (decision) models already differentiate between mood, an unconscious state of an individual, and conscious emotions, attributable to a specific stimulus (e.g., Griessmair and Koeszegi 2009). Several theories have been proposed to explain the role of affect in (joint) decision making: the Affect Infusion Model (Forgas, 1995; Forgas, 1997), focusing on how mood affects one's ability to process information; the Appraisal Theory of Emotions (Lerner and Keltner, 2000; Lerner and Keltner, 2001), which proposes that individuals are extracting emotions from the evaluations (appraisals) of events that cause specific (individual) reactions; the Feelings-as-Information Theory (Schwarz, 2012) which explains that a good mood influences target evaluation positively whereas a negative mood does the opposite; and Hatfield, Cacioppo and Rapson (1993) propose the notion of emotional contagion, defined as the unconscious and automatic mimicking of other's fleeting expressions of emotion in social encounters.

Accordingly, there is a strong call for further analysis of the debatable separation of rationality, emotionality and affect already within neuroeconomics. Nevertheless, Schüll and Zaloom have outlined how the "*dual-systems brain model prevails when it comes to justifying policy measures that intervene at the internal level*" (Schüll and Zaloom, 2011, p. 530). We will take up these references made to the separation and ordering of rationality over emotionality in economic discourse, but first we aim to outline the impacts of gendered connotations on the manifestation of the emotional versus the rational binary.

2.3 Genderings in (Neuro)economics

The traditional Cartesian cut between rationality and emotionality is deeply gendered in signifying rationality with masculinity and emotionality with femininity. This gendering in economics, already shown by Mumby and Putnam (1992), has turned out as a strong line of continuation in neuroeconomic debates (Ulshöfer, 2008). Valuing rational control over emotional regulations, in line within the neuroeconomic discourse, raises the question as to whether it introduces new constraints and re-genderings.

We would like to exemplify the need for a critical stance with one study published by Tanja Singer and her colleagues in 2006 in which they explicitly address the question of whether men and women show different neuroactivities during social interactions (Singer *et al.*, 2006). They suggest that fairness and co-operative behaviour, in general, strengthens empathic binding (Singer and Lamm, 2009).

However, according to these authors, men more often tended to cut social relations to unfair partners, whereas women tended to react more empathetically and in an altruistic manner, irrelevant to the fairness or unfairness of their partners. The Singer group used the Ultimatum Game with a variation from the original format; fMRI scans were taken while the participants (16 women and 16 men) watched how a previously fair or unfair player was treated with a painful electroshock. Both gender groups showed activity in those areas that are classified as processing empathic reactions (again Insula, ACC) when fair counter players were punished. But, as Singer *et al.* (2006) presented in the brain images of their experiment, only females mirrored empathy during punishment of unfair players, whereas males elicited no increase in empathic activity against this form of punishment. In contrast, men reported stronger feelings of revenge, which was reflected in higher activation of their Nucleus Accumbens (NA), a region that is associated with the processing of reward. Yet again, contrast analysis methods, i.e. subtracting brain activation in the condition “no pain” from “pain”, place strong emphasis on the differences in brain images between tested subjects while the overlaps and commonalities may remain covered. The brain images can give no evidence as to whether men did not show any empathetic activation at all during the punishment of unfair players. Furthermore, Schmitz (2012b) outlined in an in-depth analysis of this study, that during the post-experimental questionnaire not only men but also women reported feelings of revenge. It is worth mentioning that the differences between men and women have been visually exaggerated by presenting only the upper part of the scale (while the lower parts pertaining to the similarities were not included in the presentation of the findings).

Interestingly, Lamm, Decety and Singer (2011) themselves questioned these gender differences in a more recent meta-analysis on empathic brain activation. Based on a null-result concerning gender, they argued against difference results in earlier studies (Derntl *et al.*, 2010; Singer *et al.*, 2006), referring to them as possible false positives. Additionally, the predictability of brain activity differences on self-reported differences (with females stating higher on emotional scales) remains unsolved (Michalska *et al.*, 2013). Finally, the Singer group recently strengthened the learnability and even the training of emotional regulation based on brain plasticity independent of gender (Klimecki *et al.*, 2013; Leiberg *et al.*, 2011).

Nevertheless, binary gendered concepts of females’ empathic versus males’ rational or – in the case of emotional references – revenge and risk-oriented regulation of behaviour and decision making influence recent work in neuroeconomics, ranging from bio-determinist (e.g., Moore *et al.*, 2014) to hormonal significations (e.g., Coates and Herbert, 2008; Eisenegger *et al.*, 2010; Eisenegger *et al.*, 2011; Sapienza *et al.*, 2009). Particularly, testosterone is held responsible for men’s uncontrolled risk behaviour. On another level, Bernhardt *et al.* (2013) tested individual differences in empathic responding and their correlations with brain activity using only female participants. The authors legitimized their decision to take only females under examination in referencing Singer’s *et al.* (2006) ‘evidence’ of gender differences in social emotions on the behavioural and neural level.

To date, only at first glance it seems that the extension of the emotionally upgraded *Homo Economicus* has the potential to overcome a long history of masculinized rationality contrasted to feminized emotionality (cf., Hagner, 2008). Despite the lack

of generalizable gender effects, the notion of their significance remains more or less manifest and implores further *re*-search for gender differences. In addition to the difficulty of transferring findings from experimental laboratory gaming to complex real world settings, neuroeconomic findings possess the danger of legitimizing gender roles and positions in society. Two instances that could exemplify this are: When females' empathic versus males' revenge orientation "*could indicate a predominant role for males in the maintenance of justice and punishment of norm violation in human societies*" (Singer *et al.*, 2006, p. 468); When responsibility for the financial risk is referenced to the testosterone of 'Lehman Brothers' instead of 'Lehman Sisters' (Vidal, 2012). Conclusions like these require further in-depth analyses of how neuroeconomic conceptualizations of decision making are reflected in the normative discourse in our society and how they shape concurrent economic structures and institutions.

3 Analysis of Public Discourses Referencing Neuroeconomics

In this section we analyse references drawn to neuroeconomics today in public discourse, i.e. public debates, newspapers and media coverage of economic and political experts. We are interested in how these references frame the economic-political discussions. We first ground the neuroeconomics discourse within the current framework of neurocultures (cf., Littlefield and Johnson, 2012; Maasen and Sutter, 2007), and then analyse the references made to neurologic and genetic arguments in economic-political discourses. Furthermore, we question whether gender aspects gain particular meaning implicitly or explicitly within these discourses, and which implications these references have on gender equality issues.

3.1 Neuroeconomics as a Part of Current Neurocultures

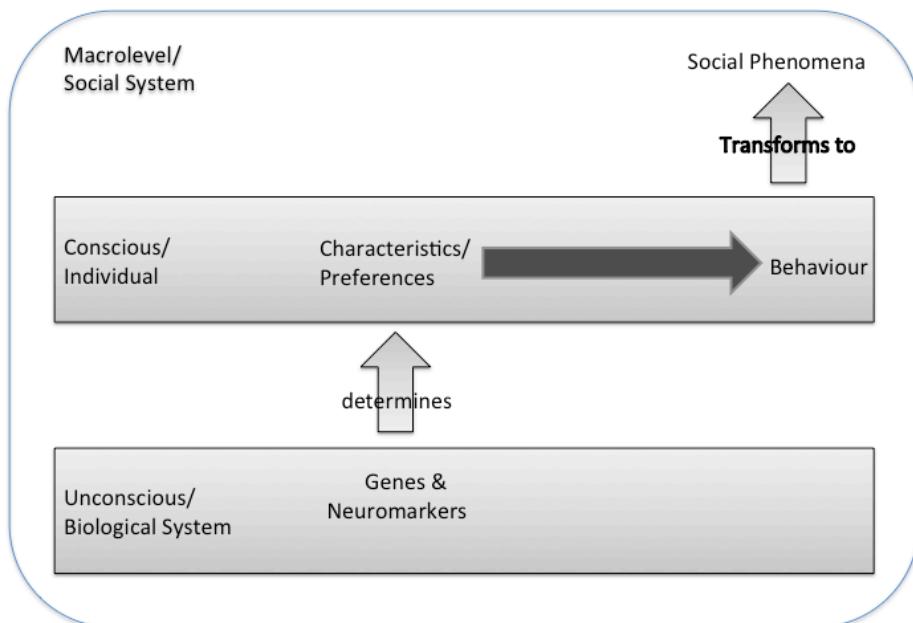
The neurosciences and the cognitive sciences today are deeply interwoven with the norms and values that are related to the so called *cerebral subject*, an anthropological figure of the human according to which the self is constituted by its brain (Ortego and Vidal, 2007; Vidal, 2009). Behaviour and thinking amalgamate with the biology of the brain and the cerebral subject emerges as the central category of defining the self, socio-cultural processes and even future visions of the human. The notion of the *modern neurodeterminism* (Schmitz, 2012a) seeks to fully explain and predict all current behaviourisms, thinking, action, rationality and emotionality from the materiality and functions of brains. This form of determinism is detached from the question of whether the structures and functions of the brain are innate or formed by experiences, to which the concept of brain plasticity refers. The main issue is not that the brain's structure or function itself is biologically determined and unchangeable. Instead, modern neurodeterminism states that the brain features and processes of neuronal activation at a particular point in time determine all the individual's behavioural properties at that time. Currently, brain research is described as the discipline that is able to explain and predict complex phenomena of subjects' thinking

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and acting on the basis of neuroscientific empirical research with the help of its neurotechnical methods. Because of the embeddedness in neuroscientific research and its technological applications, Schmitz (2012a) suggested the term ‘bio-techno-social cerebral subject’ to keep these differentiated and interacting notions in mind.

These notions of modern neurodeterminism underline the discursive development of current neurocultures, which is the reference to the ‘neuro’ within a large scope of disciplines, also from outside the neurosciences (e.g., Pickersgill and von Keulen, 2011). The aforementioned analyses have shown that neuroeconomics highlight individualized explanations for all forms of decision making and follow a paradigmatic change that embeds neuroeconomics within the framework of modern neurobiological determinism, i.e. the possibility to explain – primarily on the level of the individual – behaviour and decision making from biological materiality to full extent.

Figure 3: *Homo Neuroeconomicus* as Biologically Determined



With the debates concerning the financial crisis and emotionally affected decision making, this discourse has currently been re-addressed to the macro-level of societal structures, e.g. positively in terms of ‘emotional capital’ (Goleman 1996) and negatively, concerning the greed debates (Neckel, 2011). The greed debates, in particular, refer to neuroeconomics aiming to solve the question of empathy and co-operative decision making in economic-political contexts (e.g., Fehr and Camerer, 2007; Quervain *et al.*, 2004). It seems that scholars are about to establish a new notion: the *Homo Neuroeconomicus* framed as an archetypical human being whose agency is restricted not by social structures but by biology (see Figure 3).

3.2 Analyses of Neuro-referencing in Economic-political Discourse

In the following section, we deconstruct the seven propositions from the members of the *Frankfurter Zukunftsrat* (2009) which were issued after their meeting on June 3, 2009 at the University of Bonn (translated and abbreviated by the authors, the German version could be accessed until 2014 at the Presseportal.de¹):

Proposition 1: The reward system of the human brain dominates human behaviour in economic decisions.

Neuroscience, in combination with economics, has established the new scientific field of ‘neuroeconomics’. Recent studies in this emerging field demonstrate that because of the specifics of the human brain, the ideal ‘rational homo economicus’ would be a rare occurrence. . The reason for this being the so-called “reward system” of the brain, which can dominate human behaviour, especially economically- and socially-relevant behaviour.

Proposition 2: Humans react towards short-term gains or the prospect of money as they would to cocaine.

The reward system, which is located in the centre of the brain and also utilizes parts of the frontal lobe, is of particular significance since the anterior parts of the human brain are enlarged. The reward system reacts to short-term gains, prospects of money, gambling and chocolate, but also to controlled-substances like cocaine.

Proposition 3: Greedy financial behaviour is relentless and addicting, due to genetics.

The reward system of the human brain does not show any sign of habituation. Animal experiments show that “fatigue” in the reward system cannot be expected, even in primates. Consequently, the reward system is a relentless system, positioned at the top of the hierarchy in decision making processes. (...) The reward system is responsible for the satisfaction drawn from gains, whereby short-term gains tend to be most rewarding. (...) This activation [of the reward system] can be addicting. Together with the facts that there is no exhausting the reward system, the possibility of addiction exists, and money is a simulator of the reward system, the possibility of greedy financial behaviour is well within realm of reason for many people.

Proposition 4: Greedy financial behaviour is genetically pre-determined.

There is diversity in reactions of the human reward system. One reason for this is the so-called polymorphisms of the gene that builds the receptor for the transmitter dopamine. (...) If this gene is changed, the receptor does not function properly anymore, and the human reward system cannot be activated as easily. Persons with

¹ <http://www.presseportal.de/showbin.htm?id=123666&type=document&action=download&atname=thesenpapier.pdf>

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these genetic changes are less prone to gamble and probably also less prone to exhibit greed in financial behaviour.

Proposition 5: Altruistic punishment is uneconomic behaviour.

The reward system is also responsible for “altruistic punishment”, which is uneconomic behaviour. (...) The Ultimatum Game demonstrates that in many situations humans do not behave in a strict economic sense. This [altruistic punishment] is an enormous evolutionary benefit, as it becomes apparent by this game, and it facilitates “fair” behaviour between humans, thus optimizing social behaviour.

Proposition 6: To resolve the financial crisis, the central role of the reward system has to be considered.

Because of the central role of the reward system in human behaviour, both economic “errors in judgement”, as well as the evolution of positive behaviour in social interaction can be explained. It becomes clear, however, that the brain systems make rational economic behaviour difficult. The central mechanisms of the brain systems have to be considered for the development of governmental regulations.

Proposition 7: Leading (economic and political) positions should be filled without “genetic” financial greed.

In the near future, it will be necessary to have a better understanding of the role of brain systems in social and economic behaviour, and for decision processes and institutions to maintain a frame of reference in regard to neuroeconomics. This holds for human resource management policies (incentives) but also for the formulation of laws and state-run programs, like consumer protection.

The discourse analysis of these seven propositions reveals several problematic assumptions. Five of the major problems are discussed here:

(1) From the outset, the members of the *Frankfurter Zukunftsrat* claim that the rational *Homo Economicus* is the ‘ideal’; an ideal that in reality could never occur. Given the broad criticism on this concept from various scholarly disciplines, it is surprising to find such a strong and blunt commitment to a selfish, profit maximizing, asocial Model of Man.

(2) The propositions are based on preconceptions that the authors fail to explicitly address. At hand stands a biological determinism with broad implications. For instance, based on the assumption that there is a ‘reward system’ in the brain, individual satisfaction is explained to be significantly dependent on this system. This biological determinism and reductionism becomes clearly visible in Proposition 2. It claims that *humans* react, in a particular way, while in the explanation following the proposition the claim is that rather the *reward system* reacts in a certain way. This contraction, i.e. the human *is* the brain is unfounded and misleading. Even if the claim would hold that the so-called ‘reward system’ reacts on particular stimuli in specific ways, human decision making is a complex cognitive process including various brain processes that cannot be reduced to simple stimulus-response behaviour. Another example of a misleading contraction can be found in claim and explanation of Proposition 1: “the reward system can dominate human behaviour” (explanation) is

not the same as “the reward system dominates human behaviour” (claim). Here, a possibility turns into a fact within one single proposition.

(3) Individuals, allegedly, can become addicted to the activity of the reward system, and financial behaviour is set side by side with drug abuse, as the combination of Propositions 2 and 3 imply. Furthermore, the members of the *Frankfurter Zukunftsrat* claim that the reward system varies individually and that certain polymorphisms (genetic modifications) inhibit or raise its activity – which results more or less in “financial greed”. Consequently, ‘financial greed’ (a term that is not defined within the propositions) is explained to be based on the genes of individuals. The authors fail to give precise references for these claims and occasionally refer to unreferenced animal studies in their argumentation for an addictive reward system.

(4) The reward system is held responsible for ‘altruistic punishment’ which is a facet of revenge for unsocial behaviour (see Proposition 5). In congruence with Proposition 1, the authors denote altruistic behaviour to be uneconomical, i.e. irrational. Thus, they juxtapose intended rational economic behaviour (may be bad?) with uncontrolled social/emotional behaviour (may be good?).

(5) It is claimed that people with “financial greed” should not have leading positions. Propositions 6 and 7 draw the line from the biologically signified, symbolic level to the explanation of individual behaviour and responsibility at the structural/societal level. They conclude that people with ‘financial greed’ should not be considered for leading positions. Neuroeconomics should deliver – as suggested – the basis for these decisions. Does this finally legitimize gene and brain testing in recruiting decisions?

In summary, this biologism and its crude mixing of genetism and neurodeterminism reveals two consequences. Firstly, the propositions above remove responsibility for positive and negative (economic) behaviour from the subject and attribute it to genetics. Secondly, any political, economic or societal influence is ignored. We want to point here to the *individualisation* of bearing the blame, particularly with regard to the financial crises and its structural conditions. The discourse clearly shows that with this new *Homo Neuroeconomicus*, there is a backlash towards methodological individualism. Social phenomena are explained with the behaviours of individual decision makers who are – in contrast to the conceptualization of the *Homo Economicus* – not free in their formation of preferences but instead genetically determined.

Given the controversial content of the propositions, we also analysed the public reception of the propositions in newspapers, magazines and news-websites (see media article, reference list) that referenced the press release of the *Frankfurter Zukunftsrat*. Most of these articles were released in June 2009, shortly after the propositions had been published, with half of them more or less simply repeating the *Frankfurter Zukunftsrat*'s press release. A few added some additional information or ridiculed the propositions (in terms of columns/comments). Virtually all of the articles referred to Propositions 2 and 4 (“as to cocaine”, “greedy behaviour is genetically determined”), whereas Proposition 5 (altruistic punishment) was only mentioned once. Some of the headlines or articles integrated the term “also” (for example: “financial greed also is genetically determined”), although the propositions of the *Frankfurter Zukunftsrat* did not present this kind of relativism. Only three articles criticised the propositions.

Interestingly, the public discourse on the theses only lasted for a short time. Articles after June 2009 are scarce, e.g. a year later a journalist wrote a critical piece on how greed affects the financial crises, but only summarized the propositions and particularly reflected briefly on the claim that people with “financial greed” should not have leading positions. On another level, in June 2009 some blogs or comments on blogs also referred to the propositions (see list of blogs in reference list). The language is striking as they all ridiculed the propositions and often used defamatory language (for example: “bullshit”). The critical blogs also stressed the main argument of reductive individualization and highlighted that only biologically determined individuals had been held responsible for the financial crises, whereas societal influences of capitalism have not been discussed.

One article from this range of media and blogs is particularly noteworthy since the author researched the scientific sources mentioned in the propositions. Journalist Thomas Wagner (2009) criticises the biological determinism of the propositions and calls the discussion concerning greedy behaviour a manoeuvre that distracts from the systemic social causes, and hinders the development of possibilities for solving the financial crisis. Wagner vigorously disagreed with the propositions and states that genetic tests for recruiting would be an elementary infringement of human rights. Wagner reports information from one member of the *Frankfurter Zukunftsamt*, Christian Elger, Professor for Economics and Neuroscience at the University of Bonn, that the propositions were based on the article *Genetic Determinants of Financial Risk Taking* (Kuhnen and Chiao, 2009). In reviewing this scientific publication, however, Wagner shows that the researchers interpreted their result very differently from the members of the *Frankfurter Zukunftsamt*: “While the effects that we document here are suggestive of a causal relationship between individuals’ genotype and risk preferences, our data do not allow for causality to be firmly established.” Additionally, nothing is stated about how variants in the two investigated genes (for example carriers of one gene but not the other) may impact financial risk taking. This may be of great importance as the chance of being a carrier of either one of the two genes investigated is very high².

In summary, the discourse around the propositions of the *Frankfurter Zukunftsamt* focused on individual ‘financial greed’ and its biological cause. It neglected any explanations associated with societal influence. Although this particular case is not discussed anymore today, ‘financial greed’ remains a topic of discourse when it comes to the financial crises.³ Additionally, neuroeconomic results are taken for granted and are only rarely questioned⁴. Even in the few previously mentioned

² Interestingly, Christian Elger admitted that he had not seen the final published propositions beforehand, but judged the media reaction to the propositions as exaggerated. However, Prof. Elger neither sent “his” original propositions to Wagner nor did he answer our request regarding the references of the *Frankfurter Zukunftsamt*.

³ For example, the political and media discourse around the Hypo Alpe Adria in Austria repeatedly refers to greedy behaviour. In a recent parliamentary extraordinary meeting Matthias Strolz (from the NEOS party) said that the bank was a “tragic product of vast greed for power and money”.

⁴ One blog even states that maybe the *Frankfurter Zukunftsamt* believed a parody to be true: in it, the authors of the parody claimed to have studied the genes of politicians. They didn’t find

articles/blogs no one referred to critical issues concerning the scientific methods, i.e. the constructive processes and biases within brain scan production and computation. The power of neuroscientific studies must not be underestimated and research about the ways they affect politics is crucial.

4 Conclusions: The Homo Neuroeconomicus in Neoliberal Society

The hype about emotions in management discourses and neuroeconomic research has been received somewhat positively because emotionality seems to value apparently ‘female’ capacities in both the economic field and in some feminist discourses. Both areas have integrated emotions into the concept of the *Homo Economicus* and thus have opened up new perspectives to questions on former reductionist and androcentric models of the pure rational economic male (cf., Ulshöfer, 2008). However, the *Homo Economicus* also experiences several forms of re-re-conceptualizations on the symbolic, individual and structural level that call for further critical reflection.

On a symbolic level, coming from the classical notion of the purely rational *Homo Economicus* armed with free will and agency, the *Homo Sociologicus* has been re-conceptualized as a human being whose behaviour is contingent and emotionally bounded (maybe for good reason). Neuroeconomics concurrently re-re-conceptualizes a new Model of Man in which the *Neuroeconomicus* seems to be determined by biology (independent of its plastic or evolutionary becoming), but in any case not to be determined by social structures (as in the concept of the *Homo Sociologicus*) as we show with our deconstruction of the propositions of the *Frankfurter Zukunftsrat*.

On the individual level, the *Homo Neuroeconomicus* with separated rational and emotional capacities seems to fit well into neoliberal concepts of personalized self-responsibility that address the flexible employee in a modern meritocracy (Boltanski and Chiapello, 2005). Illouz (2008) has outlined how the concept of emotional intelligence combines notions of emotional competence (as a personal constant) with professional competence (in the sense of Bourdieu’s emotional capital, 1976) forming a new ideal of a habitus for managers. However, gender analysis points to deeply gendered inscriptions of a masculinized rationality and a feminized emotionality, particularly concerning concepts of new leadership based upon neuroscientific references (cf., Sieben, 2007) or theories of emotional capital and the demands for optimizing emotional self-management and rationalizing one’s emotions (cf., Illouz, 2008). The separation of conscious rational control from unconscious emotional regulation, as being legitimated with the ‘newest facts’ of neuroeconomics, uncovers a contradiction in the discourse; on one hand, the responsible self should use the emotional capital consciously, while on the other hand, the same emotions are framed as an automatic, unconscious reaction. Although neuroscientific research under analysis continues to debate the question of how separated or connected, how hierarchical or equally valued, how consciously or unconsciously emotions and rationality are intertwined, the discrepancy may be kept alive to address the rational

a particular “politician gene”, but certain genes that could lead to gambling addiction or the aspiration for money and power.

actor, and more precisely a neurobiologically framed “*essential capacity for rationality*” to uphold the “*governability within a liberal framework*” (Schüll and Zaloom, 2011, p. 532).

On the structural level, the connection of the neoliberal framework with neurocultures (cf., Maasen and Sutter 2007) underlines the concept of the individualized *Homo Neuroeconomicus* neglecting all intervening factors of social and cultural provenience in decision-making. The consequences of economic behaviour are re-attributed to individuals instead of attributing them to social institutions and economic-political discourses. Even more, the *Homo Neuroeconomicus* is determined biologically and therefore not accountable for ‘wrong’ decisions. Finally, all these re-re-conceptualizations of Models of Man (sic!) are deeply gendered. The signification of feminized emotionality/sociality and masculinized rationality, unfortunately, has not been deconstructed. The neurobiologically gendered brain is referenced to legitimize access to labour markets, powerful positions and access to economic resources. Neurofeminism, a term introduced by Robin Bluhm and colleagues, seeks answers to the question of who gains the power upon decisions about in- and exclusions from these new forms of biologized citizenship (Bluhm *et al.*, 2012). It develops more gender adequate approaches in research (Schmitz and Höppner, 2014) and uses a bio-cultural perspective to account for the inseparable entanglements between the development of biological matter and social influences and spheres (Schmitz, 2014). The critical examination of brain imaging research, of its methodology, findings and interpretations, does not incur the denial of its contributions to economic discourses. However, we see a need to seriously analyse the knowledge production within these scientific fields for gaps and distortions in order to improve awareness for the conceptual and methodical constraints and to discuss the implications of scientific knowledge production and its distribution within society.

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Appendix: Biographies of Authors

Sigrid Schmitz is Professor for Gender Studies and is currently Senior Lecturer at the Faculty of Social Sciences at the University of Vienna. Her research and teaching covers approaches in Gender & Science Technology Studies with particular focus in brain sciences and contemporary neurocultures, body discourses in neo-liberal society, and feminist epistemologies.

Sabine T. Koeszegi is Full Professor of Labor Science and Organization and Head of the Institute of Management Science and Academic Director of the MBA Program Entrepreneurship & Innovation at the Vienna University of Technology. Her research interests are management of conflict and diversity in organizations, workplace bullying, negotiation support and computer-mediated communication, and flexible work arrangements.

Bettina Enzenhofer studied Gender Studies and Communication Science. Currently she is working at the Medical University of Vienna/Gender Mainstreaming Office. Her research interests are feminist science studies, queer theory, intersexuality and gender medicine.

Christine Harrer has been studying in the Middle European Interdisciplinary Master Programme in Cognitive Science at the University of Vienna since 2013. Before this, she studied Medical and Pharmaceutical Biotechnology at the IMC FH Krems, where she investigated Glioblastoma Multiforme and received the Bachelor of Science in Engineering.

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