

Does social neuroscience facilitate an autistic understanding of prosocial behaviour?

1. Introduction

“Oh my God, he stabbed me! Please help me! Please help me!” were presumably the last words of Kitty Genovese before she died in a horrific crime with numerous passive witnesses (Gansberg 1964). On March 13, 1964, 21-years old Kitty Genovese was returning home from work 03:15 am in the morning. Having parked her car, she was attacked by a 29 old man Winston Moseley, who stabbed her two times in the back. When Kitty screamed for help, to no avail, Moseley fled. Later, he returned in his car and found the wounded woman in the hallway of an apartment building. Moseley stabbed Kitty again and killed her, before raping her. During these two episodes, about 38 people witnessed parts of the crime, but no one rushed to help the dying woman, and only few called the police. While later studies indicate that the number was exaggerated, and probably few, if any, were aware that they were witnessing a homicide (many thought it was a brawl or a quarrel between two drunken lovers) (Manning; Levine; Collins 2007). The murder of Kitty Genovese (Wispe 1981, p. 208) nonetheless caught the attention of medias, psychologists and social scientists. Particularly one type of behaviour was puzzling: bystanders’ passive reactions when witnessing a crime (Knickerbocker 2003), later known as the ‘bystander effect’. With psychologists and sociologists realising the need to examine human nature and the significance of helping other people (Wispe 1981), prosociality originated in psychology in the 1970s focussing on voluntary actions that benefit other people or society as a whole, such as helping, sharing, donating, co-operating and volunteering (Wispe 1972; Latane & Darley 1970; Macaulay & Berkowit 1970; Bar-Tal 1976; Mussen & Eisenberg-Berg 1977; Eisenberg 1982). The interest in doing research on prosociality has later caught on in different branches of neuroscience. Especially, social neuroscience has had a significant role - examining neural mechanisms of prosocial behaviour like empathy (Sambo, et al. 2010; Singer & Lamm, 2009; Singer, et al. 2004). The focus of this explanation model is to quantitatively measure and visualize the neural structures that is thought to activate prosocial behaviours like empathy (as an object among other objects) by relating one level of organisation; the social to the neural level (Berntson et al. 2012). Social neuroscience thereby seeks to give ‘hard science’ answers to questions

about human behaviour. The explanation models of neuroscience have become so popular that there even is talk about a Neuro Revolution. (Slaby 2010, p. 398). Studies show that neuroscientific information is perceived by the public to provide good explanations of human behaviour because people find them intuitively satisfying, regardless of whether they are relevant for the explanation (Weisberg et al. 2008). The successful development of social neuroscience related to prosocial behaviour calls for a thorough philosophical analysis.

In this respect, various philosophers and sociologists have tried to explain why some scientific disciplines from a societal perspective, besides scientific merits, are more successful than others (Timmermans & Berg 2003; Taylor 1985a). Canadian philosopher Charles Taylor has argued, the modern is dominated by a '*paradigm of clarity and objectivity*' that gives objective sciences moulded after the natural science model and mathematical calculus (like neuro physiological theories, theories of economy and social science) profound credibility as these explanatory models offer a luring sense of security, and the belief that we (at least in theory) can control and manipulate the world we live in (Taylor 1985a). However, following Taylor, such theories ignores that humans are defined by self-understandings that depends on subject referring properties, and therefore often ends up with an unreflective and rigid description of human behaviour (Taylor 1985b). In this light, various philosophers and neuroscientists in cognitive science have criticised the enterprise of neuroscience. A central meta-critique implied in this position is, that neuroscience provides reductionist explanations of human behaviour (Bennett & Hacker 2003; Bickle 2003) that are alien to how we understand our own actions as human beings. Contrary, to this critical position, prominent sociologists like Nikolas Rose suggest that the psychological space of Descartes' mind-body problem, between body and behaviour, is flattened out in neuroscience. This creates a somatic individual and a new perspective of a neurochemical self (2001, p. 3).

This paper looks at these discussions in relation to social neuroscience studies on prosocial behaviour. How does the development in social neuroscience studies on prosocial behaviour affect our understanding of prosocial behaviour, and is there a new way to explain these two seemingly conflicting views? Is it from a philosophical perspective possible to give a general account of social neuroscience studies on prosocial behaviour in light of the discussion of reductionism and societal interactions with neuroscience?

With a hermeneutic starting point in the philosophy of science, the purpose of this paper is to examine, whether social neuroscience's epistemological ideas and use of neuro imaging technologies, methodologies and experimental designs on a more general level resonate a modern thought and cultures paradigm of clarity and objectivity as presented by Taylor? (1985a; 1985b). In doing this, I

argue, that while social neuroscience in the eyes of the public seem to produce a securing picture of clarity and objectivity; it is in fact a normative and murky enterprise.

The paper thus uses Taylor's conceptual framework, and explores and evaluates the ongoing discussions and accusations of social neuroscience being reductionist, and inadequate to explain normal human behaviour (Bennett & Hacker 2003). This is contrasted with Rose's thesis of the neurochemical self. Where prosocial behaviour previous was mapped onto a psychological level, it is argued that biological psychiatry of neuroscience maps out empathy in our body - the human brain - in a new neurochemical self that is very different from the way our modern society's culture traditionally understands self-concepts and human behaviour in a psychological dimension, and does not coordinate or interact with these traditional understandings.

I suggest this reductive explanation model creates an 'autistic' understanding of prosocial behaviour that challenges Taylor's hermeneutic self, and puts our common self-understandings in a limbo. This explains some of the critique of neuroscience structures reducing the psychological dimension of human behaviour as a difference in perspectives and lack of coordination between levels. Through Taylor's framework the article suggest an ontology with multiple levels.

While, autism in general terms traditionally is defined as a mental disorder that makes people unable to communicate properly, or to form relationships (Bullon 2007, p. 85), autistic in this article's context means that neuroscientists' methodological focus on structural details excludes the experience dependent properties of the prosocial behaviours they examine – and any coordination with our ordinary understanding of these and human behaviour in general.

Sorting out the nuts and bolts of this development, this paper makes an important contribution to future discussions of philosophy and social neuroscience studies on prosocial behaviour in cognitive science. Showing that social neuroscience when describing possible causes of prosocial behaviour still has a lot of interpretation work to do in the translation of the language of neuroscience to laypersons understanding of human behaviour and psychology, when they promote and inform the public about prosocial behaviour. But, first, we begin with the birth of prosociality.

2. The history of prosociality

The earliest works on prosocial behaviour were before 1960 (Hartshore et al. 1929; Murphy 1937). However, social scientists first really began to use the term prosociality in the 1970's (Latane & Darley 1970; Macaulay & Berkowitz 1970; Bar-Tal 1976; Mussen & Eisenberg-Berg 1976) as a reaction to prior studies' focus on aggressive behaviour due to increased stories about violence and crime (Bar-Tal 1976, p. 4). Lauren Wispe, thus, coined the phrase prosociality in 1972, as an antonym to antisocial behaviour

in her study “*Positive forms of social behavior*”. Prosociality represented ‘positive’ aspects of social behaviour such as: altruism, helping, trust and tolerance as opposed to ‘negative’ aspects of social behaviour, for example: aggression, egoism, competition and lying etc., described as anti-social behaviour (p. 203). There even is a journal that focuses on prosociality *Journal of Social Issues* (Eisenberg 1982, p. 3), and prosociality is a concept still in the making. Altruism and altruistic psychosocial factors, like empathy, are connected with prosocial behaviour as key elements, but not the same. Where altruism refers to helping others without regards to benefits, a prosocial act refers to actions that benefit others. An action can, thus, be prosocial, but not altruistic, if the motive, for example, is egoistic (Eisenberg et al. 2007). Today, prosociality has evolved into a variety of branches such as social psychology, behavioural genetics, development psychology, personality theory, industrial and organizational psychology, neuroeconomics and social neuroscience (Penner et al. 2005, p. 14.21). As this paper will show, especially social neuroscience has had immense influence on the current development of prosociality.

In the following section, it is suggested that social neuroscience's use of experimental design and statistic analyses (Sambo, et al. 2010; Singer & Lamm, 2009; Singer, et al. 2004) echoes a modern thought and cultures paradigm of objectivity and clarity, expressed in a natural science model of objectivity and the prestige of mathematical calculus (Taylor 1985b). It is further argued, that the social element of social neuroscience (prosocial behaviours) is transformed to an independent static object with unchangeable causal properties that ignores that human behaviour change and might influence theory.

3. Studies on prosociality resonate a modern paradigm of clarity and objectivity

Traditionally a branch of biology, neuroscience is now an interdisciplinary discipline with collaborations between, chemistry, computer science, engineering, linguistics mathematics, medicine together with physics, psychology and philosophy. With a massive and generally positive public interest in brain research (Racine et al. 2010), sub disciplines like social neuroscience appeared in the early 1990s and has since evolved in an impressive enterprise that examines how biological systems put social behaviour into practiceⁱ. Using biological concepts and methods, social neuroscience informs and refines social theories of social and human behaviours, often focussing on prosocial behaviours like empathy, care and cooperation (Decety & Cacioppo 2011, p. 3, 5). These advancing technologies have made it possible to study social and emotional stimuli more directly by tracking brain activity, especially those stimuli that are activated when we care for other people’s wellbeing, like sympathy for pain (Lamm et al. 2011). As Nikolas Rose points out in *The Politics of Life Itself*, biological psychiatry constitutes not only

what counts as an explanation, it constitutes what there is to explain (2007, p. 192). But, though studies show evidence for a connection between empathy and prosociality, an empirical demonstration of a link between empathy and prosocial behaviour has still not been proven (Singer & Lamm 2009). While, it is indicated that the way social neuroscience (often unconsciously), shapes the content of the concept's 'social' term, is part of social neuroscience's success that brings with it a whole new understanding of the human self and behaviour. As we proceed, it should become clear, this is also its Achilles heel.

3.1 Charles Taylor – Man as a self-interpreting animal

One way to elucidate this in a contrastive fashion is Charles Taylor's (1985a) famous hermeneutic description of man as a self-interpreting animal with strong and weak evaluations in *Self-interpreting animals*. Here Taylor puts his philosophical anthropology in continuation of Heidegger's *Daseinanalytiks* (1953). The self relates to itself, and is always interpreting itself. But, even though the self relates to itself in a reflective way, it never seems to be able to get behind the understanding and objectify it. As humans' our feelings are always confronted with some subjective (sensations) of what it means to be human, and what is qualitatively important to us. Taylor states that our feelings always are connected to certain articulations. These interpretations are not optional, but an essential part of being human. Our self- and mis-understandings form what we feel. It is in this way, that man is a self-interpreting animal that always relates reflective and interpreting to his/her self and life (2007, p. 134). If we put prosocial behaviour into Taylor's conceptual context, an adequate understanding of emotions like empathy would therefore demand a hermeneutic interpretation. According to Taylor, this field of interpretations pose a huge challenge when describing human behaviour in behavioural sciences that collide with a modern '*paradigm of clarity and objectivity*' (1985a, p. 45).

3.2 The paradigm of clarity and objectivity

Taylor, thus, describes one of the reasons for the success of sciences moulded after the natural science model and mathematical calculations as modern thought and cultures '*paradigm of clarity and objectivity*'. To paraphrase Taylor, the paradigm demands that we think clearly and objectively about something in order to reach a truth about an object among other objects. In line with social neuroscience, thinking objectively is here conceived as abstaining from associating or describing properties to the object that are subjective. Taylor calls these experience-dependent properties (1985a, p. 45-46). There, thus, is a

distinction between primary and secondary properties, where the last are ‘unscientific’ in the sense that they are subjective, and therefore incompatible with the *'paradigm of clarity and objectivity'* (ibid. p. 45-46). As we move on, it should become clear that social neuroscience's explanations of behaviour also are shaped by a *'paradigm of clarity and objectivity'* similar to a natural science ideal. An ideal that in the public brings with it the prestige of a science that appears to provide theoretical truth. According to Taylor, this prestigious objective outlook has resulted in reductive explanation models of human actions and experiences in physiological, materialistic and chemical terms (1985a, p. 47). This is most notable in the dominance of the natural science ideal of objectivity and mathematical thinking and other forms of formal calculus in the development of modern Western society and sciences like social sciences (and psychology) (Taylor 1985b). We find support for this claim in *Trust In Numbers*, where Theodore M. Porter argues that use of controlled clinical trials and medical statistics became the standard for medical evaluation of therapies. While, I think, the motives are multiple and complex, a key reason was, according to Porter, the march of medical statistics in the twentieth century. This redefined fields like medicine, psychology, agriculture, ecology, economics, sociology and biological and social disciplines, and provided a democratic openness and a public quantified demonstration of results (1995, p. 203-204). In this line, statistical analyses are an integrated element in social neuroscience studies. Arguments based on formal calculus appear convincing in our Western culture, says Taylor. It shows in the undeserved dominance theories; based on the natural science ideal and formal calculus, have in social science (1985b). In this respect, Weisberg et al. (2008), argue that neuroscience is very popular in the public eye. Their study shows that explanations of psychological phenomena's that include neuroscientific explanations bring with them much prestige, and are viewed as more satisfying by non-experts. These explanation models give people the impression of providing a good explanation of human behaviour, even if the neuroscientific information is irrelevant to the explanation. Similar, Prozac was not successful because it was more effective than other drugs, but as a smart drug, it purported to give a targeted treatment on a single neurotransmitter system without all the side-effects of older anti-depressants like benzodiazepines. Providing a sense of strategically control (Rose 2001, p. 5-6). In this light, Taylor's *'paradigm of clarity and objectivity'* is consistent with public support for neuroscientific research (Racine 2010). In accordance with this *paradigm*, the prestige of ‘objectifying’ sciences and their quantification/(objectification) of human behaviours (wherein we can categorize social neuroscience studies) seems to be the closest we get a paradigm of ‘objective’ knowledge about human behaviours like empathy (1985b). Whether the success of social neuroscience today is undeserved is more questionable, and not a discussion I want to go into in this article.

While, I have tried to show that experimental social neuroscience studies on prosociality echo a *'paradigm of clarity and objectivity'*, I think, the picture and the consequences still are somewhat vague. However, as we proceed, and examine how theories of social neuroscience interact, or does not interact, with man and change our self-understandings, my suggestions ought to become clear. This will enable us to understand the critique of reductionism from a new perspective. Next, we therefore examine how neuroscience's explanation model influences our understanding of prosocial behaviour in connection to the *'paradigm of clarity and objectivity'*, using Taylor and Bennett & Hacker's outline on neuroscience. With Taylor's outline on 'brute data', it is argued that social neuroscience ignores experience-dependent properties like shame, meanings and intentions because they would break with the *'paradigm of clarity and objectivity'*. While there might be some elements of redundancy in their arguments, together they make a strong case for the importance experience-dependent properties play in our (psychological) understanding of human action and behaviour, and why 'objectivistic' approaches in sciences of man like social neuroscience struggle with these properties. In this respect, I show that our ordinary understanding of normal human behaviour is non-reductive, in the sense that we understand an agent's action through interpreting factors like purpose, intentions and norms. Bennett & Hacker argue it seems inconceivable that we could get a deeper understanding of such events by referring to neural brain activity. However, I suggest that in cases of pathological or abnormal behaviour, social neuroscience purport to provide an objective account of possible mental disorders with a scientific approach that paradoxical also are a result of a variety of negotiations. I argue that social neuroscience in this way unconsciously defines prosocial behaviour as the norm, the normal, by referring to its antonym, antisocial and pathological behaviour. This is done with an objectivistic approach whose use of 'brute data' so far has been inconceivable with our ordinary understanding of how actions and feelings are defined by personal judgements and perceptions. Introducing Nikolas Rose's definition of a neurochemical self, attempts are made to nuance the discussion, by suggesting a difference of perspectives. In relation to pro-social behaviour, I examine how neuroscience's quantitative description of neural brain activity, according to Rose, creates a new neurochemical self that operates in the body – the human brain - and guided by a *'paradigm of clarity and objectivity'*, rewrites human experiences (psychological phenomena) to intersubjective (scientific) 'brute data' (neuroscientific phenomena), and - according to this paper - challenges Taylor's hermeneutic thesis *'human beings are self-interpreting animals'* with self-understandings (1985a, p. 45). However, contrary to Taylor's account, some scientists suggest that we are beginning to understand the social through the biological in cases, where the social can be translated to neural activation. I argue that in spite of the prestige of social neuroscience and the neurochemical self, in our culture we still do not understand

ourselves, our moods, feelings and intentions through a neurobiological language, but through a psychological self-interpretive self like that of Taylor's. Introducing an autism metaphor, I explicate this and show that the neurochemical self seems to provide an autistic understanding of prosocial behaviour. To clarify the difference of perspectives and levels, we introduce philosopher Erich Klawonn's (1942-2011) fierce defence of dualism.

4. Brute data of psychology and neuroscience ignores experience-dependent properties

Following Taylor, scientific attempts to describe man with a background in an objectivistic orientation have entailed a reductive explanation model of human actions, behaviours and feelings (1985a, p. 47). In *Peaceful Coexistence In Psychology*, Taylor exemplifies the paradigm with the term 'brute data' (ibid). Following this objectivistic perspective, science should only use univocal and intersubjective data. Any potential observer should be able to use 'brute data' without making any subjective interpretation or judgement of it. Physical parameters are ideal as 'brute data' because they are easy to identify. A hypothesis can then be settled by observing how an interpretation-free object interacts in an experimental situation. This makes it possible to reach a collective agreement among scientist, giving science an, "...*impressive show of objectivity...*" (1985a, p. 117). Although Taylor's outline is from 1971, and therefore outdated in terms of how neuroscience has evolved since then, his notion of 'brute data' is still highly relevant as it touches upon the dilemmas of describing human behaviour adequately in an objective account without using experience-dependent properties, or, what we could call, the psychological dimension of man. Technologies like Functional Magnetic Resonance Imaging (MRI) and Electroencephalography (EEG) are therefore used to make observations more accurate and detailed in social neuroscience by quantitatively measuring and visualizing perceived empathy, as an example, for pain through brain activity (Lamm et al. 2011). Instead of hermeneutic approaches, like the Freudian interpretation of the patient's voice and biography, brain imaging shows differences in regions of the 'normal' brain from the 'schizophrenic' brain, and provide a new objectivity (Rose 2007, p. 9). However, as Matusall points out (2012, p. 62), we need to be aware that technologies like MRI neuro imaging not are neutral representations of the brain, but results of sociotechnological relations: "*the constraints of hard- and software, historical developments and negotiations between developers and applicants of the technology.*" The 'objective' perspective of prosocial behaviour seems radical different than our self-understandings and ordinary way of understanding and talking about behaviour. In this light, to paraphrase Taylor, there are two aspects of our ordinary accounts of human behaviour, which neurophysiological explanations struggle with. First, because human behaviour is teleological it describes our behaviour in terms of purpose, bent and desires. Second, it is also intentional as our

behaviour is understood by the meaning things have for a subject, his/her self and the environment - herein reside experience-dependent properties like shame. We are normally content with these forms of explanations as they resonate behaviour to, how a 'normal' person acts in our society. However, these ordinary accounts of human behaviour vary in different cultures and milieus, which makes it hard to use them unambiguously and intersubjectively in a neurophysiological explanation model (1985a, p. 165, 167).

4.1 Experience-dependent properties and the story of the Good Samaritan

While, we might think that the experience-dependent properties/emotions of Taylor (1985b p. 57) only fare with self-concerned emotions like shame they can also arise in situations, where we not are concerned with the self but for the wellbeing of another person. From Taylor's perspective, the parable of the Good Samaritan is about feeling an obligation to help, not because we could somehow benefit from acting prosocial, or be 'for' being 'social' (that is, prosocial as some sort of extra dimension of life), but because we feel a call to help the person lying in front of us. While, reasons for actions here are subject referring or experience-dependent, they are not egoistic. While, we might be struck by self-regarding emotions: 'this will make me look good', following Taylor's reasoning, our real motivation to help is not a prosocial desire (in any strategic sense) to help this person, who has fallen of her bicycle. We may even not feel a desire to help, but wish to do something else, and leave the wounded person as the priests choose to do in the parable. However, oftentimes we realize that these egoistic reasons are ill timed as this is not some sort of game, but the needs of another person that matters, and who is dependent on us. We feel this obligation as a sensible/rational and moral being (Rose 2013, p. 146), and realise that this obligation is ours, and we have to rise to the occasion (Taylor 2007). According to Taylor, there thus is an inevitable moral dimension connected with subjectivity, where we seem destined to be moral animals. From an Aristotelian viewpoint, Taylor thinks that an essential part of being human is having orientations towards the good life. In this process, our feelings help us realise what the good life is (1985a, p. 65).

4.2 Explanations of reasoned actions are non-reductive

Let us revise one of Taylor's examples (1985a, p. 120), and try to elaborate the characteristics neuroscience struggles with in light of reductionism. By reductionist, I mean: the belief that human behaviour can be explained by reference to interactions of nerve cells and molecules. In our ordinary

understanding of human conduct, we identify an action by knowing the purpose it aims to achieve. Mostly this identification is straightforward. A girl asks you, if she can turn on the light in a dim room. You see the girl flip the light switch, and naturally, in agreement with her question, reasons that she wants to turn on the light, because the room is dim. According to Bennett & Hacker's critical outline in *Philosophical Foundations Of Neuroscience* (2003) this type of explanation is non-reductive, in that it refers to various factors and presupposes our knowledge of social practices and conventions, such as turning on the light. Following Bennett & Hacker's reasoning, it would be meaningless to think that we could come to a deeper and more adequate explanation of, why she turned on the light by adding a reductive neural explanation model measuring brain activity. Neural patterns in brain activity have no logical consequences to what we psychologically believe of something. According to Bennett & Hacker, a neural configuration cannot show the truth of a proposition to be right or wrong (ibid. p. 361-362). If we want to get a deeper understanding of what is going on, we have to ask the girl, why she turned on the light? The explanation will need to provide her reasons for turning on the light. These explanations refer to multitudes of familiar, but complex moral, social and legal conventions (Bennett & Hacker 2003). Quite unexpectedly, she tells, she is unable to relax before the switch is in alignment with the other switches on the wall. With the new explanation of purpose, we need to make a new description of the act. Here knowing the purpose of the action is crucial if we want to get an adequate understanding of the situation (Taylor 1985a). Taylor therefore reasons, that we often need to understand the intention of an agent in order to know the actions. With the girl, we might question her reasoning and try to explain the irrationality of her actions. We might come to an agreement, where we are able to somehow understand how important, albeit illogical, the position of the light switch is and we might not. In the last case, we are stranded on different judgements, and we cannot seek other criteria's than those of an interpretive dispute. So, while there still are criteria's they rely on our insight into certain matters and our judgment of the situation. Following this outline, we cannot step out of this domain of interpretations (Taylor 1985a, p. 121). In continuation, Bennett & Hacker argue, we do not explain human behaviour by referring to neurons, but by referring to situational context and asking for reasons and judging the validity of these in light of the situation. These reasons may refer to a variety of human goods that lead to actions or refer to context related social or cultural norms that permit or forbid certain forms of behaviour for certain kinds of people: "*No amount of neuroscience can explain why Henry VII could not divorce Catherine of Aragon without papal permission*" (p. 364). However, Bennett & Hacker acknowledge that in special cases, where abnormal behaviour comes to force we can seek to understand behaviour by measuring brain activity, which would give a descriptive explanation in terms of offering evidence for a possible mental disorder.

Actually, it turns out the girl has obsessive-compulsive disorder (OCD). Indications of OCD can be measured using magnetic resonance imaging (MRI) (Milad & Rauch 2012), which provide a visual and quantified explanation of brain activity for possible neural indications for why she is unable to relax before the switch is in alignment with the other switches (Taylor 1985a, p. 119, 123). However, in order to know what Kitty is doing, when she screams for help, we need to know what it means to be a human being and to feel fear, and how it can come about. Through neuroscience, we can learn a lot about abnormal neural activity in Moseley's brain, should he have a mental disorder. Neuroscience explains such behaviour through neurotransmitters in the brain that cause an anomaly in moods or conduct (Rose 2001, p. 4). Neuroscience is quite remarkable at describing pathological behaviour and how we psychological can be prone and responsible for temperaments (Bennett & Hacker, p 366). However, in order to understand why Moseley did what he did on a personal level, he would have to go through therapy, and a psychologist would have to learn about his life story, upbringing, etc. And we might examine how mental diseases alienate people (Erdner et al. 2005). Besides Moseley's possible mental disorder, a neuroscientific reductive neural explanation of brain activity does not improve forms of explanation in the domain of human social, moral and legal life, should we follow Bennett & Hacker's reasoning (p. 363, 366). Yet, as French philosopher and physician Georges Canguilhem has shown in *The Normal and the Pathological*, we often define the normal and learn to understand the normal by referring to the pathological and abnormal (1991, p. 138). From this perspective it seems reasonable that prosocial behaviour often is understood in connection to antisocial behaviour, and the development of for example new drugs like SSRI's for pathological behaviour such as different anxiety disorders: Social Anxiety Disorders, Panic Disorder, Generalized Anxiety Disorder etc., and the marketing strategies that fare with the development. Thus, SSRI drugs seek to emulate pro-social behaviours such as empathy, kindness and happiness that in a prescriptive manner are being defined by its opposite, anti-social behaviours.

Taylor accepts that, we might be able to make reductive explanations of feelings on a neurophysiological level. Thus, Taylor in *Self-interpreting animals* from 1977 (1985a) acknowledges that it in principle would be possible to describe causal reasons in a human that feels fear through computers and sensors that register patterns of recognition and facts about feeling fear. However, following Taylor, we would possess a structural analogy to fear, herein the recognition of 'meaning' and escape, but we would lack the specific qualitative description of that particular feeling of fear connected to a subject's consciousness as these would be considered concomitant phenomenon's. While, the model seems to work in connection to a physical threat, it does not work with something like shame. Remembering the aspects a neurophysiological explanation model struggles with, this is because the

data in psychology (or our ordinary understandings of human behaviour) is of a unique kind. Psychology uses phenomena's like feelings and actions that are characterized by the thoughts, images and intentions of those subjects that produces these phenomena's. Taylor calls some of these subject-referring properties. It is emotions like shame, integrity and dignity, which are neither strictly objective nor just subjective because they rely on, what Taylor calls, certain import-ascriptions. So in an objective explanation model, experience-dependent emotions like shame cannot be generalized, since shame is dependent of particular cultures *imports*, which is a context related evaluation of how a situation is (ibid. p. 51-53, 55). What is important for a person in one culture may not have the same meaning in another culture. Furthermore, shame is not always a rational feeling; it can be quite irrational and have an illogical presence. In this regard, language is decisive as it articulates our feelings and thereby our sense of related imports, and thus changes the feeling (Taylor 1985a, p. 70-71). Even though, I rationally know that I should not be ashamed of my 'terrible' dialect - the shame is still real, as it collides with how I wish to present myself. That is because the import-recognition of a shameful condition is related to a subject, me, for whom it has significance. Furthermore, an acceptance of experience-dependent properties like shame in experimental psychology and neurophysiological explanation models would break the paradigm of objectivity. While actions and feelings thus, following Taylor's point of view, to a certain extent are defined by experience-dependent judgements, perceptions and emotions, where some (like shame) are irreducible to judgements about 'brute data' (1985a, p. 122), social neuroscience on the other hand, offer reductive explanations on a more basic level that in cases of abnormal neural brain activity (like OCD) provide indications for why some people tend to act in a certain way. Following Taylor's view it seems subject-referring properties like shame does not fit into an objective worldview as they describe properties that relate to the meaning things have for people, which an objective model (like neuroscience) does not acknowledge. However, as we shall see, elaborating on Taylor's outline, disagreements might be a question of different perspectives, and different levels.

4.3 The neurochemical self defines prosocial behaviour

We have just learned social neuroscience's understanding of man and human behaviour is radical different from the interpretive perspective of Taylor's hermeneutic self, because social neuroscience relies on 'brute data' in the shape of neurochemicals and neurones. As Nikolas Rose (2007, p. 188) points out, where human behaviour previous was mapped out on a psychological level (like Freud's psychoanalysis or a more general account, man as self-interpreting), they are now mapped out on the human body – the brain. With neuroscience, we therefore need to understand behaviour in a whole

new register, where we have become neurochemical selves, says Rose (2007, p. 188). Rose argues this new enterprise brings new norms of behaviour that operates on another level than the psychological dimension. Instead, of using language and interpretation, social neuroscience's descriptive approach seeks the social through observation and measurement of synapses and neurotransmitters (Matusall 2012, p. 4). According to Matusall (2012, p. 67), this constitutes a conceptual shift in how we understand human behaviour and relations to the social and the biological. Now it is possible to understand the social in the biological as long as the social can be translated into neural activation. To paraphrase Matusall, how aspects of the social world influence behaviour and biology have little interest in social neuroscience as they are thought as being insignificant to the basic development, structures and processes of the brain and human behaviour (Matusall 2012, p. 4). What seems to be of interest is, how we can explain the role environments and experiences play in anti-social behaviour through impacts in the brain (Rose 2007, p. 220).

Taylor accepts different levels of explanations that use languages with a different logic than the teleological and intentional explanations of our ordinary life. However, he argues, while the logic of the two languages - between our ordinary explanation of actions and a neurophysiological explanation is very different - it, nonetheless, does not preclude making a reduction from one theory to another. Although, a neurophysiological account would not have concepts like 'want' or 'shame', it could have "*connecting propositions such as 'the state Px is the state of the CNS which corresponds to what we call "wanting peanuts"'*" (1985a p. 173). Because human beings are physical objects, they have to comply with the laws of physics and chemistry. If any kind of reductionism is true, then higher levels of explanations like psychological or sociological should be explainable on lower neurophysiological levels in terms of physics and chemistry. Although, a neuroscientific explanation would be a more basic theory on a neural level, it ideally should be able to fill in the gaps in our ordinary explanations of human actions (the social level) by motive. While, Taylor (ibid. pp. 167, 174, 181) sees such theories as potential rival theories, Bennett & Hacker argue that neuroscientific explanations not are in competition or conflict with explanations of normal behaviour guided by intentions, goals and purposes, because it is impossible to reduce such explanations to a neuroscientific account (p. 366). Nonetheless, Taylor argues, the mechanistic explanations of a neurophysiological account needs to be restricted so it coordinates with our everyday account - in order to 'save the phenomena'. Even so, it would most likely often upset our ordinary perceptions, but in a way so it still supports, "*the logic of our ordinary language of feeling, action and desire*" (1985a p.174). In other words, while a neuroscientific explanation of prosocial behaviour might differ radically from our ordinary account of behaviour, following Taylor, it would somehow have to resonate in general with the logic of our everyday experience of the subject of study,

and our ordinary language of feelings, actions and desires. Berntson et al. (2012, p. 70-71) calls this calibrative reductionism, and present social neuroscience as an example of a method that tries to map out behaviour across multiple levels - but (in correspondence with the '*paradigm of objectivity and clarity*') with the reservation that subject-referring properties/emotions are left out. However, while Taylor seems to make our ordinary understanding of human behaviour a first priority, whereto neuroscience should coordinate their descriptions so as to 'save the phenomena', Berntson et al. give no priority to one level over another. Hence, the ideal goal of social neuroscience as an interdisciplinary science would be to calibrate knowledge and theories with other levels - and produce multilevel and interdisciplinary understandings of phenomena's. Ideally, this calibration among levels would be a reciprocal multilevel configuration. As an example, Berntson et al. mention a study on amphetamine, where the drugs effect on primate behaviour was examined. It was first when the primate's position in the social hierarchy was included that a pattern was formed. Showing primates that were high in the social hierarchy would become more dominant with amphetamine, while primates that were low in the social hierarchy would become more submissive in their behaviour.

While, Taylor states that it most likely would be impossible to capture the essence of experience-dependent properties like shame, we should aim to coordinate a neurophysiological account with these properties. He seems to think that neurophysiological theories (neuroscience) should be able to make these distinctions by including more levels. Following Taylor's line of thought, methods in social neuroscience (MRI, EEG) would therefore: "*have to be rich enough to mark the major distinctions of all the varied cultures. (...) For a neurophysiological short-cut which by-passed cultural differences would make nonsense of a great part of the descriptions men use to speak of themselves*" (1985a, p. 178). An adequate neuroscience would presumably struggle - but should quite paradoxical try - to include the 'unscientific' description of feelings like empathy (our language of emotions), intentional and teleological concepts, and thereby the description of man's psychological dimension when informing science about human behaviour (Taylor 2007, p. 119-120), and thus interfere with the '*paradigm of objectivity and clarity*'. According to Taylor, such a theory would not be reductive and rich enough to explain people's self-understandings and able to indicate the key distinctions of the varied human cultures (p. 178). Hence, Taylor (2007, p. 123) maintains, there are truths about the subjective sphere, which cannot be reduced to an objective ontology without including the psychological dimension. We could try to explain behaviour by measuring serotonin levels in our brains, and refer to them as possible causes of prosocial behaviour. However, from Taylor's outlook, we would need to incorporate the major distinctions of our culture and self-understandings, otherwise social neuroscience would run the risk of providing a rigid explanation of behaviour that puts our common self-understandings (herein empathy understood as

and experience dependent emotion) in a limbo, because the explanation does not relate to the situation in a meaningful way, neither does it coordinate between levels, nor does it explain reasons for acting. So, while both Taylor and Berntson et al. reason that multiple levels are possible, and we get the most adequate understanding of behaviour if these levels interact and there is coordination between them, Taylor argues, we ideally should strive after a non-reductive neurophysiological explanation that includes experience-dependent properties. Instead, Berntson et al. (2012) excludes these descriptions. However, as Berntson et al. suggests, social neuroscience's mapping out prosocial behaviour also creates a potential alienating gap of non-understanding, if there is lack of coordination between the different levels of the explanation models of social neuroscience and our ordinary self-understanding of behaviour.

To better understand the complexity - the two self's and their different ways of understanding human behaviour - consider a map analogy. We can illustrate social neuroscience's mapping out the human brain with mapping a new road in a road-building project, where the land surveyor, using GPS, measures the road with fixed points that afterwards is printed out on paper. Just by looking at the paper, the land surveyor knows that this is "*Road-building project A3*". To a layperson it is just lots of dots that makes no sense. Moving on, we add the fixed points to a landscape map. Now the layperson is able to see the dots in a larger context, and may suggest, the map illustrates some sort of building project. Then the land surveyor has the architect connect the fixed points with lines and lets him/her add descriptions. The layperson now reasons that this must be a drawing of a road-building project. However, it is first when the layperson sees the road project illustrated in a 3-D drawing (or on a picture) that s/he gets a real understanding of what it all is about. But, even then, the layperson's understanding is not deep like that of the land surveyor. Similar, we live in a society, where a psychological understanding has evolved as a natural part of our culture, and where a neurochemical self appear as a new way of understanding man (Rose 2013, p. 221) that seems alien to our ordinary psychological way of understanding of human behaviour. Using a Taylorian terminology, we could call these maps of self-understandings. In alignment with the '*paradigm of clarity and objectivity*', this neurochemical self offers a sense of control based on objective scientific knowledge, and thereby the impression that we can somehow readjust ourselves through chemicals when we are mentally out of balance in order to become the "real me". This real self is both "natural" and (in alignment with a natural science ideal) "produced". From the neurochemical perspective the biological is a new way of understanding the social. However, Rose argues, while it is possible for people to understand their behaviour and feelings through a neurobiological language, a psychological dimension still remains a fundamental way of understanding ourselves (Rose 2013, p. 212). This confirms our suggestions that

social neuroscience creates new self-understandings, which also provides explanations of behaviour that seem far from explanations of our ordinary life, because the psychological dimensions are excluded. Using Taylor's conceptual framework, a disanalogy emerges. Human behaviour is not an inanimate object and always changing. We do not understand man and prosocial behaviour by looking at the brain, like we understand the road by looking at the drawings. While the road-building map has to remain the same in order to describe the road adequately, the map of human behaviour is ever evolving - as our selves are continuously evolving. Roughly, we can say, where social neuroscience looks at the structure of human behaviour, they do not look at the content of these behaviours (such as judgment of reasons for behaviour through strong evaluations), and are therefore not good at describing normal behaviour. Like a person with autism, social neuroscience examines something (in this case pro- & anti-social behaviour) to the smallest detail - its very finest structures, but from a hermeneutic perspective, social neuroscientists' do not really provide (coordinate) an essential meaningful understanding of what it feels like to be empathic and act prosocial, because shaped by the prestigious '*paradigm of clarity and objectivity*' they leave out the distinctive subject referring properties of prosocial behaviour, such as feelings and reasons for helping other people, which is what makes us understand behaviour as human beings.

To elaborate the challenge of making reduction from one level to another lets us look at Eric Klawonn's defence of dualism. The purpose is not to go into a discussion about materialism vs. dualism; neither do I wish to defend dualism. However, I think, his description beautifully pictures how a hermeneutic self like that of Taylor's and the intrinsic nature of mental thoughts (and their distinctive experience-dependent emotions) differ compared to measuring and observing mental thoughts as psychical entities via brain activities in the biological neural network of the neurochemical self.

4.4 Klawonn: thoughts are strictly private

According to Klawonn (1991), we can locate our dreams in the brain through neurons, while the dream, itself, exists in another perspective. The same goes for thoughts and feelings like empathy.

Let me clarify this through a thought experiment. If we put a man in an MRI scanner with the instruction to look at another person who is subjected to pain (Singer et al. 2004), while he looks at a screen that monitors his brain activity, he most likely could state a thought of feeling empathy for the person suffering as being located certain places in the brain, marked with bright colourful areas. However, he would also know the neurophysiological representation on the screen as very different from his own empathic thought. As Roepstorff's study indicates in this kind of cases (2007), just by looking at the colourful brain image, an experienced neuroscientist with no prior information about

what the participant is thinking can presumably interpret the brain activity in what is called the pain matrix: "*the secondary somatosensory cortex (SII), insular regions, the anterior cingulate cortex (ACC), the movement-related areas such as the cerebellum and supplementary motor areas and, less robustly, the thalamus and the primary somatosensory cortex (SI)*", which could indicate that this man presumably is in a possible vicarious response towards another person, like feeling empathy for pain (Singer et al. 2004, p. 1158). But, the scientist will not know what the specific thought is about, the quality or *qualia* of the thought. The thought will be what, Klawonn describes as, "*strictly private*", (ibid. My translation, p. 7). While the physical reality, thus, in general is accessible for everyone the feeling of, for example, pain is never intersubjectively accessible, Klawonn reason. While, we thus can talk about pain as being a particular place in our body, we are not able to physically force our way into the thought: "*The feeling of pain is not "in" the tooth, and the mind is not "in" the head in the same way as the coffee is in the cup. The dentist's drill can expose an inflamed nerve, but the dentist has no access to the pain itself*" (ibid. p. 8). In the same way, with reference to Zahavi & Roepstorff's interesting article *Faces and ascriptions: Mapping measures of the self* (2011, p. 142, 147), they point out that the self has evolved into simplified versions in neuroscience. More theoretical and conceptual versions of the self, such as its structures, function and nature has vanished or been ignored. Indeed, the notion of a self with a subjective consciousness is to some neuroscientists just an illusion created by the brain (Rose 2013, p. 200). However, putting Zahavi & Roepstorff's outline into perspective with Klawonn's description, we could also argue that the 'empathic self' is not in the brain as the coffee is in the cup. Hence, we might measure brain activity that indicates empathic behaviour, but following Klawonn's account, the scientists' have no access to empathy itself.

5. Discussion

To summarize, there thus seems to be two perspectives of the self with different self-understandings that operate on different levels and inform in different ways, and from a Taylorian perspective does not coordinate or interact with each other - as they until now have left out our ordinary life's interpretive self-understandings and their subject-referring properties/emotions. However, social scientists' perceives these as unscientific properties, and shows that in the case of primates it is possible to coordinate inter-subjectively by including the social hierarchy. This creates a void space between these understandings - where no transcending understandings reside. Where the hermeneutic self relates to the mind and our situated self-understandings (the girl's reasoning and interpretation) in a psychological dimension, the neurochemical self relates to the somatic – the body (the girl's brain activity and observation) (Rose 2001, p 3). Where the first describes how we feel and understand our selves in our

ordinary lived life with all its extraordinary experiences - the last accuses the first of being an illusion, providing another explanation that following Bennett & Hacker up till now seem far from how we understand normal human behaviour. A good way of illustrating this is using the autism analogy metaphor. Like the amygdala in patients with autism, according to studies, seems to be relative detached from the mechanisms that generate conscious feelings responses (Decety & Cacioppo 2011, p. 200), in a similar manner social neuroscience's account of prosocial behaviours like empathy from a Taylorian perspective does not coordinate their accounts with our ordinary understanding of behaviour in a way where we can relate the two, as they exclude experience-dependent properties/emotions, making "*nonsense of a great part of the descriptions men use to speak of themselves*" (1985a, p. 178). Thus, social neuroscience provides an autistic understanding of behaviour that is very different from our ordinary language and understanding of human behaviour. While carrying with it the prestigious mark of scientific objectivity, social neuroscience from a hermeneutic perspective, like that of Taylor's, brings with it an autistic understanding of behaviour (Singer et al. 2004) that actually undermines our ordinary practical understanding of these matters because it detaches itself from what it examines, and reduces human behaviour to an observable object, a neurochemical self, after a natural science model that tries to leave out human self-understandings – herein meanings, intentions. In other words, what motivates people for being empathic, what reasons they have for helping?

They forget that prosocial actions often is motivated by feelings, or to use Hume's phrase "reason is a slave of the passions". Reason alone cannot motivate our will to act prosocial, but is also dependent of our passions. Our moral distinctions are derived from our moral sentiments: feelings of approval disapproval etc. Providing reasons to act prosocial.

Researchers within prosociality with their detailed knowledge, thus, fail to achieve a proper understanding of - what many think to be the essence of prosociality - empathy, because the dominating methodologies of social neuroscience studies on prosocial behaviour epistemologically doesn't recognize the qualitative aspects of what it is examining; empathic behaviours. The paradox of this development is, it carries with it a tendency to bring about: 'the more we know the lesser we understand', as it unravels new knowledge leave out an (ontological) ordinary humanistic understanding, because it so far have been unable to bridge the neuroscientific level with the psychological level, as the hermeneutic interpretation work of self-understandings has been left out as unscientific. As with Hume's critique of Kant ethics of duty, social neuroscience lacks the fundamental understanding of the reasons why people act prosocial. That is, understanding the experience depended properties that motivates people to act prosocial as it leaves out the passions that motivates people to

act prosocial, making the reasons for doing so a 'Kantian duty' ignoring the diverse underlying motivating feelings that makes us reason and act in reasonable ways.

6. Conclusion

As I have tried to show, social neuroscience constitutes a new neurochemical self that provides neuroscientific explanations that operate on a different level than our ordinary account of human behaviour. Social neuroscience have so far only to some extent tried to coordinate their accounts on prosocial behaviour inter-subjectively with the psychological dimension. While, calibrative reductionism in the future might be potential promising in explaining behaviour, using Taylor's conceptual framework of Western societies and sciences governed by the '*paradigm of clarity and objectivity*', epistemological I have tried to show that many social neuroscience studies from a psychological perspective bring about a reductionist explanatory model and conception of human behaviour that provides, what I described as an autistic understanding of human behaviour because it constitutes a new observational neurochemical self that, like an autistic person, omits the experience dependent properties of the behaviours it studies, and ignores that these always are constituted and transformed by human self-understandings as experienced and interpreted feelings. However, with Nikolas Rose's notion of a neurochemical self this also seems to be a result of different perspectives. Where human behaviour previous was described on a psychological level (like Freud's psychoanalysis, or that of Taylor's self-understandings), they are now mapped out on the human body – the brain. Nonetheless, as Rose reasons, we still understand ourselves as human beings through a psychological dimension. In this light, social neuroscientists have to develop theories - that epistemological rely less on an autistic understanding of human behaviour - and, to use Taylor's framework (1985b), become more 'clairvoyant' and 'self-conscious' about practice and the underlying norms (of objectivity and clarity) that guide it.

According to Taylor, such an account would have to rely on an ontology with different levels.

However, it may be argued that social neuroscience already is conscious about practice. It is just another way of thinking about practice, where we are beginning to understand the social through the biological. It is the era of the neurochemical self - a new way of thinking - a new way of being conscious - a whole new epistemological map of understanding human behaviour that in time might change our ordinary self-understanding of human- and prosocial behaviour. However, from a hermeneutic (that is the psychological) perspective the enterprise of social neuroscience, thus, presents a (re) description of prosocial behaviours, like empathy, that lacks the hermeneutic work of

interpretation and realm of understanding, constituting a more observational and less-reflective self-consciousness of its practice. According to Taylor, an adequate neuropsychology would be non-reductive, in that intentional and teleological concepts would not be reducible to a more basic level. Enabling it to contain human interpretive self-understandings while social neuroscience operates in an observational bodily dimension of structural descriptions. While, such a theory, according to Taylor, should be able to make the cultural distinctions there is no solid evidence that this has happened. The self-understandings, that relate social neuroscience to how we live, act and feel as human beings, are missing. In this respect, social neuroscience's impressive enterprise still seems to have much interpretation work to do, if they are to inform theories of prosocial behaviour across disciplines in a fruitful way.

While, viewpoints differ on human behaviours and how we should understand them epistemologically; most of us feel ill at ease when we read the story about Kitty Genovese. As human beings, we empathise and can in some way relate to the terrible situation of fearing for your life. Most of us, thus, realize the importance of feelings like empathy, and we somehow share this understanding. We realize the importance of feeling a commitment to help when we see another human being suffer, and we hope, that we rise to the occasion, like Taylor's account on the Parable of the Good Samaritan, and that we don't rationalise ourselves out of the situation like the priests did. We hope this, not because helping would benefit us should we end up in a similar situation, but because we naturally feel a call, an obligation to help another human being. At least, this is what Taylor's philosophy tells us. The story of Kitty Genovese is another story. It is about not rising to the occasion, rationalising everything according to one's own good, and taking the same road as the priests.

It is about not understanding behaviours as something, which we feel towards other people. In this respect the story of Kitty Genovese illustrates the paradoxical challenges that social neuroscience faces in the limelight of its seemingly perennial success. It doesn't seem to understand behaviours on the level as something we feel, and thus seem alienated towards reasons for acting prosocial, because the enterprise has alienated its reasoning from the feelings and moral distinctions that motivate these actions empirically.

While, we might be able to give a detailed account on stimuli and brain activity (and neuro imaging certainly will carry a lot of prestige in the public), it still does not relate to our life or society in a meaningful way, because stimuli does not give us an adequate description and deeper understanding of the psychological aspect – feelings like empathy and the importance of intention – and the qualitative meaning these behaviours have for us as human beings. Why, we from an ethical perspective should be

pro-social instead of 'just' social. In this respect, theories such as Taylor's provide a promising account on, how we may understand prosocial behaviour as human interpreted behaviour that is self-reflective rather than strategic. Following Taylor, we all know that helping other beings is an obligation that cannot rest on animals, rocks or anti-social humans like Moseley, but only beings that have and experience subjective emotions with certain import-ascriptions that guides our moral compass. And, while we might be able to measure, whether feelings are of an empathic character, we can presumably never access the thoughts unique qualities, as they remain strictly private.

References

- Atran, Scott; Navarro, Arcadi; Ochsner, Kevin; Tobena, Adolf; Vilarroya, Oscar. 2009. *Values, Empathy, and Fairness across Social Barriers*. New York: Blackwell Publishing.
- Bar-Tal, Daniel. 1976. *Prosocial Behavior – theory and research*. New York: Hemisphere Publishing Corporation.
- Bennett, M. R.; Hacker, P. M. S. 2003. *Philosophical Foundations of Neuroscience*. Oxford: Blackwell Publishing.
- Berntson, Gary G.; Norman, Greg J.; Hawkey, Louise C.; Cacioppo, John T. 2012. Multivel analyse s and calibrative reductionism. *Interface Focus* 2, 65-73.
- Bickle, J. 2003. *Philosophy and neuroscience: A ruthlessly reductive account*. Dordrecht: Kluwer Academic Publishing.
- Bullon, Stephen. 2007. *Longman Exams Dictionary*. Halow: Pearson Education Limited.
- Canguilhem, Georges. 1991. *The Normal and the Pathological*, trans. Carolyn R. Fawcett & Robert S. Cohen. New York: Zone Books.
- Copleston, Frederick. 2003. *A History of Philosophy – Utilitarianism to early analytic philosophy*. London: Continuum.
- Decety, Jean; Cacioppo, John T. 2011. *The Oxford Handbook of Social Neuroscience*. New York: Oxford University Press.
- Eisenberg, Nancy ed. 1982. *The Development of Prosocial Behavior*. London: Academic Press.
- Eisenberg, Nancy; Fabes, Richard A. & Spinrad, Tracy L. 2007. *Prosocial Development*, chapter from "Handbook of Child Psychology". Wiley Online Library.
- Erdner, Annette; Magnusson, Annabella; Nyström, Maria; Lützen, Kim. 2005. Social and existential alienation experienced by people with long-term mental illness. *Scand J Caring Sci*, 19; 373-380.

- Gansberg, Martin. 1964, March 27. Thirty-Eight Who Saw Murder Didn't Call the Police. *The New York Times*.
- Hartshorne, H; May, M. A. & Maller, J. B. 1929. *Studies in the nature of character (Vol. 2)*. New York: Macmillan.
- Heidegger, Martin. 1953. *Being and time*. Translated by Stambaugh, Joan, New York: State University Of New York Press.
- Klawonn, Eric. 1991. *Jeg'ets ontologi - En afhandling om subjektivitet, bevidsthed og personlig identitet*. Odense: Odense Universitetsforlag.
- Lamm, Claus; Decety, Jean & Singer, Tania. 2011. Meta-analytic evidence for common and distinct neural networks associated with directly experienced pain and empathy for pain. *NeuroImage*, 54, 2492-2502.
- Latané, B; Darley, J. 1970. *The unresponsive bystander: Why doesn't he help?*. New York: Apple.
- Macaulay, J.; Berkowitz, L. (Eds.). 1970. *Altruism and helping behavior*. New York: Academic Press.
- Manning, Rachel; Levine, Mark & Collins, Alan. 2007. The Kitty Genovese Murder and the Social Psychology of Helping – The Parable of the 38 Witnesses. *American Psychologist*, Vol. 62, No. 6, 555-562.
- Matusall, Svenja Kirsten Verena. 2012. *Searching For The Social In The Brain – The Emergence Of Social Neuroscience*. PHD dissertation.
- Milad, Mohammed R.; Rauch, Scott L. Rauch. 2012. Obsessive-compulsive disorder: beyond segregated corticolstriatal pathways. *Trends in Cognitive Sciences*, Volume 16, Issue 1, january, 43-52.
- Murphy, L. B. 1937. *Social behavior and child personality*. New York: Columbia University Press.
- Mussen, P.; Eisenberg-Berg, N. 1977. *Roots of caring, sharing, and helping: The development of prosocial behavior in children*. San Francisco: Freeman.
- Penner, Louis A; Dovidio, John F.; Piliavin, Jane A.; Schroeder, David A. 2005. Prosocial Behaviour: Multilevel Perspectives. *Annual Review of Psychology*, 56:14.1-14.28.
- Porter, Theodore M. 1995. *Trust In Numbers - The Pursuit of Objectivity in Science and Public Life*. Princeton: Princeton University Press.
- Racine, Eric; Waldman, Sarah; Rosenberg, Jarett; Illes, Judy. 2010. Contemporary neuroscience in the media. *Social Science & Medicine*, 71, 725-733.
- Roepstorff, Andreas. 2007. *Navigating the Brainscape: When Knowing Becomes Seeing* in “Skilled Visions – Between Apprenticeship and Standards” by Grasseni, Cristina ed. New York: Berghahn Books.
- Rose, Nikolas. 2003. The neurochemical self and its anomalies, in R. Ericson, ed., *Risk and Morality*, pp. 407-437. Toronto: University of Toronto Press.

- Rose, Nikolas. 2007. *The Politics of Life Itself*. Princeton: Princeton University Press.
- Rushton, J. P. 1976. Socialization and the altruistic behavior of children. *Psychological Bulletin*, 83, 898-913.
- Rushton, J. P. 1980. *Altruism, socialization, and society*. Englewood Cliffs, N.J.: Prentice-Hall.
- Sambo, Chiara F., et al. 2010. Knowing you care: Effects of perceived empathy and attachment style on pain perception. *International Association for the Study of Pain*, 151, 687-693.
- Singer, Tania; Seymour, Ben; O'Doherty, John; Kaube, Holger; Dolan, Raymond J.; Frith, Chris D. 2004. Empathy for Pain Involves the Affective but not Sensory Components of Pain. *Science*, 303, 1157.
- Singer, Tania; Lamm, Claus. 2009. The Social Neuroscience of Empathy. *Annals of the New York Academy of Sciences*, 1156, 81-96.
- Slaby, Jan. 2010. Steps towards a Critical Neuroscience. *Springer Phenomenology and the Cognitive Sciences*, 9:397-416.
- Taylor, Charles. 1985a. *Human Agency and Language - Philosophical Papers 1*. Cambridge: Cambridge University Press.
- Taylor, Charles. 1985b. *Philosophy and the Human Sciences - philosophical Papers 2*. Cambridge: Cambridge University Press.
- Taylor, Charles. 1989. *Sources of the self*. Cambridge: Cambridge University Press.
- Taylor, Charles. 2007. "Self-interpreting animals" in Human agency and language. *Slagmark*, nr. 49.
- Timmermans, Stefan; Berg, Marc. 2003. *The gold standard— The challenge of evidence-based medicine and standardization in health care*. Philadelphia.: Temple University Press.
- Vasconcelos, Marco; et al. 2012. Pro-sociality without empathy. *The Royal Society, Biology Letters*, vol. 8, no. 6, 910-912.
- Weisberg, Deena Skolnick; Keil, Frank C.; Goodstein, Joshua; Rawson, Elisabeth; Gray, Jeremy R. 2008. The Seductive Allure of Neuroscience Explanations. *Journal of Cognitive Neuroscience*, 20:3, pp. 470-477.
- Wispe, Lauren G. 1972. "Positive Forms of Social Behaviour." *The Journal of Social Issues*, vol. 28, no. 3.
- Wispe, Lauren G. 1981. Research on positive and negative social behavior. *Social Behavior and Personality*, 9 (2), 203-209.
