The Human Subject in the Age of Neuroscience: The Influence of Neuroscience on the View of the Human Subject in Psychology

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Abstract

Over the past two decades we have witnessed the meteoric rise of neuroscience. For the most part this development was driven by new imaging technology, growing public interest in brain science and financial support by governments and the pharmaceutical industry. Neuroscience is having a major impact, not only on various scientific disciplines like medicine, linguistics, psychiatry and psychology, but also on popular opinions about who we are as human beings. The ontological model of the human underlying the mainstream core of neuroscience is to a great extent deterministic, reductionist and mechanistic. Psychology has, since its beginnings in the 19th century, always had doubts about its status as a science and often in the past turned to the natural sciences for guidance, especially physiology, biology, evolution and genetics. Since the rise of neuroscience it is on this discipline that psychology is leaning ever more heavily in order to establish itself as a true (i.e. natural) science. Thus it has become necessary to take a critical look at the relationship between neuroscience and psychology. To that end this study aims to answer these questions: What is the ontological model of human functioning as propagated by neuroscience? What is the influence of this model on psychological research endeavours and theory? What alternative models exist and how do they explain the relationship between brain and psyche? How can these alternative explanations be used to create a humanistic ontology that reflects true human experience and reality? I will conclude that the neuroscience model is too reductionist and mechanistic to be a true reflection of human functioning, restricting the multi-faceted human personality to brain processes. Focussing on the brain and neuroscience also restrict the scope of psychology, causes psychology to make biology the central focus and neglect aspects like social interaction and interpersonal processes of meaning making and to not engage critically with socio-political realities but rather to support the *status quo*. However, there are alternative views about the relationship between brain, mind and environment. These views argue that the mind and cognition are extended beyond the brain. The brain is necessary for explaining cognitive processes, but not sufficient, opening the way for acknowledging the role that factors other than brain processes play. I will investigate this extended view of cognition and mind and compare it with the more traditional, mainstream neuroscience view. Lastly I will connect the extended view with the ontological conception of humans as story tellers, as propagated by narrative psychology, arguing that it is not information processing that define us but rather the creation of personal and cultural narratives.

Key Words: critical neuroscience; neuroscientific ontology; natural-scientific psychology; humanistic-scientific psychology; extended cognition; mind; consciousness; narrative identity; narrative psychology

Opsomming

Oor die afgelope twee dekades het neurowetenskap groot opgang gemaak. Hierdie ontwikkeling is grootliks toe te skryf aan nuwe tegnologie om na die brein te kyk, toenemende openbare belangstelling in brein wetenskap en finansiële ondersteuning deur regerings en die farmaseutiese industrie. Neurowetenskap het nie net ‘n reuse impak op ander wetenskaplike dissiplines soos geneeskunde, linguistiek, psigiatrie en sielkunde nie, maar ook op populêre menings oor wie en wat die mens is. Die ontologiese model wat die hoofstroom kern van neurowetenskap onderlê is grootliks deterministies, reduksionisties en meganisties van aard. Sielkunde het sedert sy ontstaan gedurende die 19de eeu nog altyd twyfel gekoester oor sy status as a wetenskaplike dissipline en het dikwels na die natuurwetenskappe gekeer vir leiding, spesifiek biologie, fisiologie, evolusie en genetika. Sedert die opkoms van neurowetenskap is dit hierdie dissipline waarop sielkunde al hoe meer leun ten einde sigself as ‘n ware (d.i. natuur-) wetenskap te vestig. Dit het daarom nodig geword om krities te kyk na die verhouding tussen neurowetenskap en sielkunde. Hierdie studie wil dan antwoorde soek op die volgende vrae: Wat is die ontologiese model van menslike funksionering soos deur die neurowetenskap verkondig? Wat is die invloed van hierdie model op navorsing en teoretisering in die sielkunde? Watter alternatiewe modelle is daar en wat is hulle siening omtrent die verhouding tussen die brein en psige? Hoe kan hierdie alternatiewe sienings gebruik word om ‘n alternatiewe ontologie te ontwikkel wat die komplekse aard van menslike funksionering kan weerspieël? Ek kom tot die gevolgtrekking dat die neurowetenskaplike ontologie te reduksionisties en meganisties is om ‘n ware refleksie van menslike funksionering daar te stel omdat dit die ryk geskakeerde aard van die menslike persoonlikheid reduseer tot blote brein funksies. ‘n Fokus op die brein en neurowetenskap sal ook die omvang van sielkunde as vakgebied beperk sodat sielkunde prioriteit verleen aan biologie en ander aspekte soos sosiale interaksie en interpersoonlike verhoudings van betekenisskepping sal afskeep, asook die gevaar loop om huidige sosio-politieke realiteite te help versterk in plaas van om krities daarmee om te gaan. Daar bestaan egter alternatiewe sienings oor die verhouding tussen brein, verstand en omgewing. Hierdie sienings argumenteer dat die verstand en kognisie verby brein prosesse alleen strek. Die brein is nodig vir die beskrywing van kognitiewe prosesse, maar nie voldoende nie. So ‘n konsepsie open die weg vir die erkenning van ander aspekte wat ook ‘n rol speel. Ek sal hierdie idee van uitgebreide kognisie ondersoek en vergelyk met die tradisionele hoofstroom neurowetenskap siening. Laastens sal ek die uitgebreide siening van kognisie verbind met die ontologiese konsepsie van die mens as storieverteller, soos voorgehou deur narratiewe sielkunde, en argumenteer dat nie informasie prosessering nie, maar die skep van perssonlike and kulturele narratiewe, ons as mense omskryf.

Trefwoorde: kritiese neurowetenskap; neurowetenskaplike ontologie; natuurwetenskaplike sielkunde; humanisties-wetenskaplike sielkunde; uitgebreide kognisie; verstand; bewussyn; narratiewe identiteit; narratiewe sielkunde

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General Introduction

When the general interest journal, *Nature,* launched a new periodical called *Nature Neuroscience,* it proclaimed that neuroscience "is one of the most vigorous and fast growing areas of biology. Not only is understanding the brain one of the great scientific challenges of our time, it also has profound implications for society…" (cited in Horgan, 1999, p.16-17). Because neuroscience and psychology are both interested in the underlying mechanisms of human behaviour it is not surprising that many academic psychologists today accept the inclusion of neuroscientific findings in psychological research as an essential part of what counts as "hard" scientific psychology (Valsiner, 2012).

In this study I would like to take a look at the rise of neuroscience over the past two decades and its influence on psychology. More specifically I want to investigate what mainstream neuroscience proclaims about the biological functioning of the brain and how it relates to psychological functioning. The aim of this inquiry is then to bring into focus the ontological model of the human subject that is being created by neuroscience. From the literature I conclude that the view of the human subject from the mainstream neuroscientific perspective is one of biological determinism and reductionism. Furthermore I aim to investigate the influence of this mechanical neuroscientific picture of the human subject on contemporary psychology. I will conclude that this picture is not only in conflict with humanistic notions of growth, autonomy and responsibility, but also potentially damaging to the field of psychology. Then I will consider some critical views of the role of mainstream neuroscience generally and as it pertains to psychology specifically. Next I will look at arguments about the relationship between brain, mind, consciousness and environment that diverge from the mainstream by proposing less mechanistic theories and notions of mind as extended beyond

brain processes. From this investigation I aim to propose the hypothesis that the brain is necessary for explaining mental life, but not sufficient. Lastly I would like to suggest ways in which neuroscience and psychology can together create a more balanced picture of the human by way of the hermeneutical and narrative traditions in psychology. When we conceive of people as story tellers, constantly creating and recreating personal and cultural narratives, they become more than uniform information processors, more than the products of their biology.

The issue at stake is not whether psychologists should look for ways to incorporate brain research in their own endeavours. It would be foolish not to at least be cognisant of developments in neuroscience. Rather, this study is about the deterministic and mechanistic ontological model accompanying an influential mainstream core of neuroscience and whether this model is true to the human psychical reality or whether an alternative model of brain and mind - one that acknowledges subjective experience, individual agency and socio-cultural influences - would suit the field of psychology better.

For the purposes of this study I take the concept of an ontological model to mean: a broad outline of the basic nature of human existence.

RATIONALE

As I shall try to demonstrate in chapter two, neuroscience has had a profound influence on developments in psychology over the past decade or so. Not only has neuroscience influenced the direction of research in various fields of psychology, but more importantly the mechanistic and deterministic ontological model of the human subject propagated by many neuroscientists has also become the standard view of many scientific psychologists.

As the history of psychology shows, there has always been a strong reaction against such mechanistic models, primarily from humanistic psychologists, resulting in two broad streams of psychology. The existence of this second stream has helped psychology as a discipline to not fall into an overly reductionist, mechanistic view of the human, but to keep the uniqueness of its subject matter in mind and to acknowledge important aspects such as human agency, experience, being-in-the-world, morality, meaning and broader socio-cultural influences. But under the rise of neuroscience the rich humanistic model of the human is quickly fading away.

With a general lack of a critical engagement with neuroscience on the part of psychology, there is a need to investigate neuroscientific claims about human psychological functioning and to bring a humanistic perspective into the discussion.

RESEARCH AIMS AND QUESTIONS

My aim with this study is firstly to investigate the claims of mainstream neuroscience about the relationship between brain functioning and psychological functioning in order to bring into focus the mechanistic model of the human subject as it is emerging from that field. Secondly I want to trace the influence of this model on the ways in which psychology views its subject matter and the effects thereof. In the third place I would like to look at alternative arguments for the relationship between brain and psychology and the possibly less mechanistic models emerging from these. And lastly I want to suggest ways in which psychology can use these and other alternative models to engage more meaningfully with neuroscience while maintaining its independence as a unique and separate discipline.

The research questions that will guide my study are as follows:

1. What is the ontological model of human functioning as propagated by neuroscience?
2. What is the influence of this model on psychological research endeavours and theory?
3. What alternative models exist and how do they explain the relationship between brain and psyche?
4. How can these alternative explanations be used to create a humanistic ontology that reflects true human experience and reality?

METHOD AND ETHICAL CONSIDERATIONS

This investigation is a philosophical, theoretical enquiry and its method will thus consist of a search for and study of as many relevant texts as possible. Texts will be appraised for their relevance to the research questions and arguments of this study.

Because I will not be conducting any research on test subjects I do not foresee any ethical pitfalls, except those pertaining to plagiarism, of which I will stay aware.

OUTLINE OF STUDY

Chapter 1: The creation of the nature versus freedom dualism in philosophy since the Enlightenment and the reflexion thereof in the development of psychology. A look at the history of psychology from the nineteenth century onward; the rise of natural- scientific psychology as an answer to the call of the nature ideal; the development of humanistic psychology as an answer to the call of the freedom ideal; its criticism of natural-scientific psychology

Chapter 2: The rise of neuroscience; the development of the standard neuroscientific ontology of the human. The growing use of neuroscientific data in natural-scientific psychology; the influence of the neuroscientific ontology of the human on natural-scientific psychology. Criticism of some aspects of neuroscientific practice, especially imaging techniques

Chapter 3: Taking a critical look at the neuroscientific ontology of the human by comparing it to some alternative arguments about the role of the brain in human psychological functioning. The relationship between brain, mind and the environment; Rowland's thesis of the extended mind.

Chapter 4: Wilhelm Dilthey and the hermeneutic tradition in psychology. Explanatory and descriptive psychology. Paul Ricoeur's philosophy of narrative identity. We are essentially story tellers and we create our identities and social realities through stories. An ontology of the human based on narrative rather than brain. A comparison of narrative and neuroscience. Towards a narrative neuroscience.

Chapter One

Origin and History of Two Psychologies

INTRODUCTION

With this first chapter I aim to provide a brief background of the history of psychology in order to place the further discussion of the influence of neuroscience on psychology in a broader context. This background is not just of historical value, but highlights certain philosophical points of departure that still shape the development of theory today.

First I will discuss the origin of a nature vs. freedom ideal (also called the science vs. freedom ideal) in European philosophy since the enlightenment. Then it will be shown how this dualism manifested in the early years of the establishment of psychology as a science, leading to two distinct conceptions of what the discipline of psychology should be. I will argue that the nature or science ideal gained the upper hand and led to the conception of psychology as a natural science. Today, this natural scientific conception of psychology rules the discipline. We will also look at the ideas and alternative conceptions of some major critics of the established mainstream.

My aim is to show that right from the birth of psychology as an independent science, there were critical voices arguing that due to the unique character of its subject matter, psychology cannot be considered a purely natural science but that a natural scientific approach need the support of a more human focused approach. The nature ideal strives towards the objectification of the subject through the use of ever more sophisticated techniques of investigation. But philosophical problems cannot be resolved through purely technical, methodological innovations. The objectification of the human subject does not guarantee

scientific knowledge that accurately reflects human existence. Philosophical and theoretical questions pertaining to issues of freedom, personality, subjectivity, autonomy, personal experience, cultural and social situatedness, processes of meaning making etc. still remain. Usually these problems get pushed to the sidelines and are declared to be unsuitable or unimportant subject matter for a pure science. Such a stance however, does not make these issues disappear but subvert them just to reappear at a later stage as vexing gaps, shortcomings, paradoxes and dead ends in scientific theories and research. Questions of subjectivity etc. are central to philosophies that lean towards the freedom ideal, housed in psychology in the humanistic and critical traditions. Therefore a balanced science of the human need the inputs from these approaches. In later chapters I will develop this argument further in the context of the current relationship between neuroscience and psychology.

PHILOSOPHICAL FOUNDATIONS

It is generally accepted that the European Enlightenment constitutes the birth of 19th and early 20th century modernity (Schmidt, 1996; Heilbron, Magnusson & Wittrock, 1998; Schroeder, 2005). The Enlightenment thinkers held to the ideal that through reason and the progress of science humanity could free itself from the constraints of nature and traditional authority and make itself master over nature and shaper of its own destiny (Schmidt, 1996; Schroeder, 2005). Enlightenment thus carried two interlinked ideals; human freedom on the one hand and progress through science on the other, or human freedom through scientific progress. But the science of this period, based as it was on Newtonian physics and supported by mathematics, which has begun to evolve from a specialized discipline into a universal language applicable to any field of science, created a mechanistic and deterministic worldview (Cosgrove, Wheeler & Kosterina, 2015). This worldview, which incorporated the

human as object of inquiry, threatened the ideal of freedom. Thus was born an unresolved dualism in Western thought.

The Dutch philosopher, Herman Dooyeweerd, conducted a thorough study of the history of Western philosophy and traced this dualism in the writings of all the major philosophers from Descartes to the early 20th century thinkers (Dooyeweerd, 1956; Kalsbeek, 1970; Clouser, 2010). He termed it the motive of nature vs. freedom. The ideal of the autonomous human personality evokes the drive to dominate nature by discovering her laws and using them to gain control over natural processes, thus liberating humanity from nature's constraints and also ensuring the progress of knowledge, culture and civilisation. The vehicle that should drive this quest is rational, objective science, grounded in mathematics and physics. Galileo, Kepler and Newton laid the foundation for modern mathematical natural science by construing nature as a system of functional causal relations. All of reality should be understood as being part of this causal system. But nature conceived of in this way does not leave any space open for human autonomy (Dooyeweerd, 1956; Clouser, 2010). Human thought, will and action are all grounded in this system of determined causal laws (Kalsbeek, 1970). Therefore human personality, autonomy, subjectivity etc. must either be defined from the perspective of natural scientific laws, or removed from scientific enquiry altogether as unsuitable (and therefore unimportant) subject matter.

Time and again thinkers have ascribed primacy to either the nature or the freedom ideal (Dooyeweerd, 1956). Hobbes, saturated with Galileo's conception of mathematical mechanics, would not recognize any limits to the continuity of the natural science ideal. Reality in all its aspects, including the psychical, logical, linguistic and moral, must be brought under the laws of mechanical movement (ibid.). For Descartes the mathematical science ideal retained the primacy even in his attempt to solve the problem of the relation between body and mind. He placed the ideal of freedom within the science ideal itself and

exalted the mathematical method as the norm of metaphysical truth and the standard of the moral good (ibid.). Leibniz also tried to express the basic characteristics of the freedom ideal in a metaphysics derived from the mathematical science ideal. He identified the essential characteristics of things with the logical possibilities in creative mathematical thought, thus the psychical sensory aspect of reality is only an expression of eternal mathematical relations. Even the aesthetic aspect is brought under the basic denominator of mathematical thought. Music charms us, although its beauty consists of nothing but the proportions of numbers and in the calculation of the vibrations of the sounding objects which meet one another at fixed intervals (Kalsbeek, 1970). Locke also maintained the fundamentals of the mathematical science ideal. He clung to the idea that human personality can only maintain its freedom of action by being obedient to mathematical thought (Dooyeweerd, 1956). Hume stated that he wanted to achieve the same results in the study of human nature as was achieved in astronomy. He wanted to reduce all the phenomena pertaining to human nature to the smallest possible number of simple principles. He replaced mathematics as the basic denominator of the science ideal with the psyche, stating that all our experiences and knowledge are derived from inner impressions alone. These inner sensations can be reduced to atomic elements. He then continued to present a mechanistic theory of human emotions in which there was no room for the ideal of the freedom of the will (ibid.).

In the philosophy of Rousseau the tension between the ideal of science and that of personality reached a crisis. It signified a passionate attack upon contemporary European society which was dominated by the science ideal and had greatly damaged the rights of human personality, reducing it to that of natural phenomena. He contended that science may not encroach upon the contents of human feeling and opposed the rationalistic psychology of his day which had excluded the psyche from its field of investigation. The science ideal strives towards control and domination; it has not brought freedom but slavery, inequality and exploitation (ibid.).

Rousseau's philosophy can be seen as the prelude to the shift of primacy from the empiricist and rational science ideal to the freedom ideal. Kant can be seen as the first philosopher who saw and acknowledged the science/freedom dualism. But he still maintained an unshakable faith in the primacy of mathematical and natural scientific thought over the entire empirical reality in space and time. Only in respect to the metaphysics of the mathematical science ideal did he sought to establish the freedom ideal of personality. He made a distinction between the sphere of the experience of nature and that of ethics and religion, and in so doing withdrew the ideal of personality from the supremacy of natural scientific thought. He divided the cosmos into two spheres, that of sensory appearance and that of super-sensory freedom. The first sphere is ruled by the ideal of science; the mind is the law-giver of nature. But the ideal of science with its mechanical principle of causality cannot get a grip on the supra-sensory sphere of moral freedom. In the realm of moral freedom the autonomous personality is lawgiver of human action. For this reason he proclaimed that psychology can never be a pure science. Because science is limited to the sensory aspect of experience, it is impossible to acquire scientific knowledge of supra-sensory phenomena. The self is free in its acts and above the coercion of nature. In setting such a sharp distinction between mechanistic nature and free moral action, Kant could not develop a theory that would unite the two again in a meaningful way. The person finds himself in a body in the natural world, functioning according to natural laws. The freedom ideal cannot be attained by ignoring this reality (Dooyeweerd, 1956).

Hegel identifies the governing ideal of modernity as freedom (Schroeder, 2005). He argues that freedom requires self-realization and self-expression and to be in harmony with one's surroundings. Hegel differentiates between mechanical systems, which can be understood purely quantitatively, physical systems, which can be studied through the use of experimental investigations, and organic systems, which are self-organizing and contain a principle of

explanation within themselves. Furthermore he developed the idea of spirit, which he defines as ultimate reality, a dynamic, self-governing whole. Because of this aspect of self-realization it distinguishes itself from nature. The defining characteristic of spirit is the norms it creates to organize itself and control its own actions. The task of spirit is to improve its self-expressiveness. If it can do this in a self-satisfying manner it becomes freedom (ibid.).

The Life-philosophers again presented a deterministic view of human existence in which freedom played no significant role. For them life processes that operates on the unconscious level control human emotions, thoughts and actions. Just like animals, we are driven by instincts and governed by habit. The most important life-philosopher, Nietzsche, cannot accept that humans are basically rational and self-determining. He contends that biological drives and culture govern human development and that natural phenomena explain the dynamics of human action (Walsh, Teo & Baydala, 2014). He focuses on the influence of drives and believes that the type and amount of drives that a person processes determines what that person can become. Drives strive towards more and better organization and strength and the result of this is the will to power. This will to power is the central motivating force in human behaviour. Those who possess the ability to accept and utilize this will to power have the potential to become super-humans (Schroeder, 2005). Schopenhauer says that our individual characters are so completely determined that personal responsibility is unintelligible. Bergson believes that human action is controlled by habit and is thus never free. The Life philosopher's contention that unconscious processes control our actions and especially Nietzsche's focus on the importance of drives, had a great influence on Freud who shared his view that most of our behaviour is determined by unconscious drives (ibid.).

Three influential movements of the early to mid 20th century all strive to do justice to the ideal of the human personality and provide alternatives to science's deterministic, reductionist conception of the human by focussing on the richness of lived experience.

Hermeneutics (Dilthey, Heidegger, Gadamer) wants to clarify the process of interpretation of texts, actions and artefacts. It stresses the richness and complexity of experience, the importance of context and background assumptions operating in all forms of understanding. Phenomenology (Husserl, Heidegger, Sartre, Merleau-Ponty) is the study of the fundamental structures and characteristics of experience (such as the intentionality of consciousness and the ability to transcend a given situation), basic types of experience (e.g. perception, imagination, emotion, thought, judgement) and the objects correlated with them (like events, processes, the body etc.). Phenomenologists underline the interactive relationship between subject and object, or between person and world, which acknowledges that these two poles cannot be separated from one another. In harmony with this is the general conception of the person as a constantly self-restructuring whole who must meet the demands of a constantly changing environment. It is a first-person mode of thinking, describing the world from the perspective of the active agent, and not from a third-person standpoint that objectifies both person and world, the typical standpoint of empirical science (ibid.). The third movement is existentialism (Heidegger, Sartre) which is primarily concerned with explaining the human condition and laying bare the fundamental or existential truths pertaining to that condition (Cox, 2009). Existentialists argue that people are not fixed entities, but beings in a constant process of becoming and changing. Furthermore, they believe that all people are always free. Because of this freedom, we are responsible for our choices and how we live our lives. Existentialism also argues that an important aspect of human existence is the search for meaning and purpose. If meaning is to be found in this world, it must be found by each person from within the context of his or her own individual reality. Therefore we are not simply passive observers of the world, but we are constantly interpreting the world. The world is thus for each person a product of the attitude with which he or she approaches it (ibid.).

TWO PSYCHOLOGIES

The same tension between the nature ideal and the freedom ideal that exists in philosophy can be found in the historical development of psychology, as well as in contemporary debates. Up until the 19th century psychology was classified as a branch of philosophy, and although later 19th century and early 20th century psychologists have struggled to free the discipline from its philosophical roots and to place it on a scientific footing, philosophy continued to influence the development of psychology (Cosgrove, Wheeler & Kosterina, 2015; Walsh, Teo & Baydala, 2014; Teo, 2005). Natural-scientific psychology is based on a specific belief of what science is, and this belief is rooted in epistemological and ontological (thus philosophical) views (Cosgrove, Wheeler & Kosterina, 2015). For this reason it is easy to see how the nature/freedom dualism in philosophy became a dividing force also in psychology.

The most salient result of the nature/freedom dualism in psychology is the widely accepted existence of two distinct psychologies which support and promote two different ontologies, epistemologies and methodologies (Walsh, Teo & Baydala, 2014; Teo, 2005). I shall call these two psychologies natural-scientific psychology and human-scientific psychology. Natural-scientific psychology leans towards the nature ideal or science ideal side of the philosophical dualism. It produces knowledge about psychological objects and events that are studied in isolation or broken down into smaller parts. This knowledge is usually presented in the form of causal laws. Research problems are well defined, detailed and specific. Experimental and quantitative methods are regarded as the appropriate methods for gaining reliable knowledge (Teo, 2005). The guiding premise of natural-scientific psychology is that better research with ever more sophisticated tools will provide the truth of every psychological object. Physiological psychology, structuralism, functionalism, psychoanalysis (to an extent), behaviourism and cognitive psychology can be grouped under natural-scientific psychology. Human-scientific psychology, in contrast, leans more towards the

freedom ideal and produces knowledge about subjects (individuals, groups and cultures) in their totality, rather than about psychological objects. This knowledge should contain meaning for the subject. Qualitative methods are used to study wholes or to synthesise parts with wholes. The purpose of research is greater understanding that could lead to empowerment and change (Teo, 2005). Hermeneutic, phenomenological, existential and humanistic psychologies fall under this category.

The first differentiation between the two systems of psychology was made by Christian Wolff in the 18th century when he wrote about a rational and an empirical branch of psychology (Teo, 2005). Other prominent writers like Herbart, Fortlage and Volkmann followed in his footsteps. Towards the end of the 19th century Wilhelm Dilthey divided psychology into a descriptive (human-scientific) and an analytical (natural-scientific) part (ibid.). Although he acknowledged the importance of a natural-scientific psychology he nevertheless strived to establish a human-scientific psychology, arguing that human experience is the proper subject matter of psychology and that its method should be understanding. Windelband again based the dualism on methodological considerations, distinguishing between nomothetic (science of laws) and idiographic (science of events) methods (ibid.). Wundt differentiated between an experimental psychology that focused on the precise analysis of the basic processes of consciousness and a folk psychology that studied psychological processes in the context of values, customs, and language. For him, such complex psychological processes demanded a nonexperimental approach (Ibid.). Spranger labelled a natural-scientific psychology that dissected psychological processes a psychology of elements, and a philosophical psychology that treated psychological phenomena as wholes in meaningful contexts a structural psychology. In his writings on psychopathology, Jaspers distinguishes between a psychology of meaning and a psychology of causality, emphasizing the importance and interrelationship of both (ibid.). Allport, following Windelband, also spoke of a nomothetic and idiographic

psychology. He deplored the growing commitment to nomothetic psychology, arguing for the inclusion of an idiographic approach. Maslow again made a distinction between a mechanistic and a humanistic psychology (ibid.).

CONCISE HISTORY OF PSYCHOLOGY

Psychology's Beginning: A Difficult Birth

Before the 19th century psychology existed as a branch of philosophy (Walsh, Teo & Baydala, 2014; Teo, 2005). The first attempts to wrest psychology from philosophy and establish it as an independent discipline did not come from scientists but philosophers who admired the successes of the natural sciences (Teo, 2005). Especially in Germany psychology became an ideological battle ground for the different perspectives on the nature of scientific knowledge (Valsiner, 2012). Before psychology became established as an empirical science based on the experimental method by the end of the 19th century, the period between 1810 and 1880 saw many debates between supporters of psychology as a human science and those who considered it to be a natural science (ibid.). Even Wundt, generally acknowledged as the father of natural-scientific psychology and the experimental method, idealised two kinds of psychology: one based on experimental research and the other focusing on the observation and interpretation of more complex phenomena (Gough, 2015). On the natural-scientific side there were people like G.E. Muller and Ebbinghaus who focused on experimentation and who favoured an atomistic and empiricist approach. Brentano, Stumpf and Dilthey on the other side argued for a holistic, phenomenological and humanistic approach to psychology (Bolles, 1993). Others, like Hermann Lotze, again tried to work out a synthesis between the two factions (Valsiner, 2012).

Psychology's Establishment As A Natural Science

The subject matter of psychology – the psyche – does not easily fit into any category that constitutes the field of study of the natural sciences. How then did psychology came to be seen as a natural science? During the 19th century many discoveries were made in various branches of the then already firmly established and respected natural sciences. The progress of the natural sciences promoted the belief that its methods were the only legitimate methods for gaining reliable scientific knowledge in any field (Danziger, 1990; Seidmann & Di Iorio, 2015). It is not difficult to understand why promoters of the emerging discipline of psychology would turn to the methods of the natural sciences in order to generate what they believed to be objective knowledge that would bolster the status of psychology (Walsh, Teo & Baydala, 2014).

Another important driving force for establishing psychology as a natural science, and one that flows from the prominence of the natural sciences, was the development of the idea that psychological phenomena can be understood and analysed by studying physiological processes (Van den Berg, 1973; Danziger, 1990; Valsiner, 2012). Gustav Fechner, a German physics professor, was the first person to find a way to connect psychological phenomena with measurable physical phenomena. He began with an idea created by the physiologists Ernst Weber, which is that our senses do not measure differences in sensations in an absolute manner but in a relative manner. He then argued that the intensity of a stimulus is a physical entity that can be measured scientifically, while the perception of that stimulus is a psychological judgement. Psychological phenomena can thus be studied by connecting them with some measurable physical phenomena (Bolles, 1993; Cosgrove, Wheeler & Kosterina, 2015).

Although phrenology was ridiculed even in the 19th century, some of its assumptions were taken up by emerging psychologists and are still widely held today: the brain is the organ where the mind is situated and specific faculties are located in specific parts of the brain (Sokal, 2001). When the work of F.J. Gall became known and established in the United States by the mid 19th century, groups of practical phrenologists emerged who travelled throughout the country and offered themselves as psychological examiners and counsellors. They identified character traits by examining client's skulls and made recommendations as to the cultivation of desired traits and restrainment of undesired ones. In focusing on behaviour and courses of action and not on their client's emotional and intellectual life, they helped to prepare the way for behaviourism and a focus on research that has practical value (Sokal, 2001). Furthermore, in 1861 Broca discovered an area in the brain connected with speech. Nine years later Fritsch and Mitzig found that by stimulating areas of the brain with electric shocks, certain parts on the opposite side of the body contracts. And shortly thereafter Wernicke found another area in the brain connected with speech (Van den Berg, 1973). These discoveries helped to further strengthen the idea that the psyche can be studied by examining physiology, thus establishing psychology as a natural science (Walsh, Teo & Baydala, 2014). When Wundt, for instance, published his first book on experimental psychology, the majority of the content covered the physiology of the nervous system (Danziger, 1990).

Not only did developments in physiology open the way for psychology to be established as a natural science, it also influenced many pioneers of psychology to develop a mechanistic view of the human person. The most influential physiologist of the the 19th century was Johannes Muller (Bolles, 1993; Valsiner, 2012). Muller, and a number of his students, including Du Bois-Reymond, Hermann von Helmholtz, Carl Ludwig (who later had Ivan Pavlov as a student), and Ernst Brucke (under whom Sigmund Freud later studied) were ardent mechanists (Bolles, 1993). They were militantly opposed to the romantic, human-

spirited nature philosophy that dominated Germany in the early parts of the 1800's. They were committed to rid physiology of vitalistic explanations and to seek physical and chemical explanations alone. At an inaugural address, Du Bois-Reymond set a puzzle before his listeners: Suppose you encounter a person and a robot standing next to each other. Suppose this robot looks and acts just the same as the person. How can you determine which is the human person and which just a complicated machine? Du Bois-Reymond's answer was that both of them are machines, they are merely constructed of different materials (Bolles,1993).

A Further aspect that drove psychology towards natural science was the strong belief that emerged in the 19th century that science must have practical value (Danziger, 1990; Shore, 2001; Valsiner, 2012; Cosgrove, Wheeler & Kosterina, 2015). According to Shore (2001) the use of experimentation ensured institutional as well as popular support for psychology, especially in North America. As soon as the discipline of psychology was perceived as representing objective laboratory investigation, it was called upon to help solve economic, educational and social problems and provide the foundation for the shaping of an emerging industrial workforce. A consequence of this was that mainstream natural-scientific psychology aligned itself with the ruling economic and political powers and worked towards strengthening the status quo (Walsh, Teo & Baydala, 2014). It also means that the requirements of the market influenced the direction in which psychology would develop (Danziger, 1990). In this regard the measurement of individual differences and the experimental use of treatment groups became the staples of psychological investigation, as they proved to be of practical use in a variety of experimental situations (Danziger, 1990). Valsiner (2012) supports this view and adds that the quantification imperative that has become a dogma in psychology is largely due to the socio-political organization of society. Numbers appeal to bureaucratic officials because they are seen as objective and thus meet the moral demand for impartiality and fairness and lend authority to official decisions. In this

regard natural-scientific psychology was greatly strengthened by the emergence of new statistical methods that emerged during the late nineteenth century and which helped to create new conceptions of populations in terms of properties and regularities of aggregate numbers (Donnelly, 1998).

These driving forces; the need to maintain psychology's status by presenting it as a natural science, the influence of natural scientific discoveries and the need for practical applicability to bolster the relevance of the discipline, are still very much present today and represent some of the reasons for the great influence that neuroscience has come to play in psychology. But as Danziger (1990) has pointed out, what was lost in the process of establishing psychology as a natural science based on quantitative experimentation was the richness of individual human experience. Also left unanswered is the question whether psychological phenomena can indeed be measured using natural scientific methods, and whether these measurements have any meaning in the real world (Cosgrove, Wheeler & Kosterina, 2015).

Early Criticism: Wilhelm Dilthey

Dilthey argued that natural processes and mental processes are qualitatively different and can therefore not be studied in the same way (cited in Teo, 2005). According to him, natural-scientific psychology focused on the forms of mental life, its formal laws and formal behaviour, and completely ignored the content of mental life. This he found unsatisfactory. Instead of the focus on form, he desired psychology to focus on content because it is this content that held the meaning that guided a person's life (Teo, 2005).

Furthermore he promoted the idea of a descriptive psychology as an alternative to experimental psychology. Where experimental psychology studied parts of mental life in isolation, descriptive psychology concentrates on the interconnection between parts and the

experience of mental life in its totality, as well as the individual mind's relationship with the external world of other minds, culture and socio-historic background (Teo, 2005; Walsh, Teo & Baydala, 2014).

Dilthey also contended that natural-scientific psychology could never study the mind sufficiently in all its complexity because causal explanations could not be applied to mental life. Natural-scientific psychology could only study basic processes, whereas descriptive psychology would grasp the complete reality of the mental world. He considered understanding through experience the most appropriate method, arguing that we explain nature but we understand the mind. Understanding is possible because of the connection between the individual mind and the external world of other minds in which common products like language, art, values, modes of conduct etc. are created which provide common meaning between people (Teo,2005; Walsh, Teo & Baydala, 2014).

He saw natural-scientific psychology's focus on behaviour as a core category as problematic, because it does not allow for a complete description of mental life. Behaviour is only one category of a person's existence, which also includes thinking, feeling and willing (motivation). All these categories are in constant interaction; one cannot understand one without taking all the others into consideration (Teo, 2005).

Early 20th Century Trends

In his *Principles of Psychology,* published in 1890, William James set out to lay the foundations for a natural-scientific psychology that would be free of any philosophical speculations. Following James the new generation of scientific psychologists displayed a thorough contempt for philosophy. Psychology gained its status as a separate discipline at

American universities in the early years of the 20th century by playing up to the interests of business, education and the military; by distancing itself from philosophy and establishing itself as an applied field with utilitarian value (Tolman, 2001). In the process many insights, warnings and critiques from philosophers were ignored and simply forgotten. The fact is that no science can be entirely free of philosophy. When psychology claimed for itself the status of a science, that science was thought to be of a naturalistic and positivistic nature. Claims and beliefs about what science should be touch on epistemological and ontological issues, issues which are rooted in philosophy. Many of the diverging viewpoints and branches of psychology have developed from philosophical considerations just as much as from scientific ones.

American Functionalism developed during the time when psychologists were struggling to establish the discipline as a science with practical application. It grew out of the philosophical pragmatism of William James and the instrumentalism of John Dewey. Functionalism was the study of mental operations as opposed to mental elements (Bolles, 1993; Walsh, Teo & Baydala, 2014). The focus was on how mental processes work, i.e. on the activities of the mind rather than on its contents. Therefore Functionalists rejected introspection as a legitimate method for gaining psychological knowledge and rather embraced the method of studying observable behaviour. Functionalism thus lay the foundation for the development of behaviourism (Richards, 2010).

The two major movements of the early 20th century – Freudian psychoanalysis and behaviourism – shared the same basic ontological model of the human subject out of which grew their different theories and programmes. What they shared was the belief that human beings are not free agents. Driven by the science ideal they sought to reveal the natural laws that cause human behaviour. Freud was very much influenced by the strong deterministic models of science that was so prevalent in the 19th century, and deeply connected with the

materialistic philosophy of the Helmholtz school (Viney & Parker, 2016). For Freud people are under the control of unconscious drives. People do not act on what they consciously think or plan or will, but on hidden forces and desires. Although these hidden desires can be suppressed, they will still manifest in some way; they can never be escaped (ibid.). Freud also used the mechanical principles of energy formation and energy retention to explain psychic functioning. Like a mechanical machine, the psyche converts physical-biological energy into psychic energy according to the principle of energy transformation. Thus, the desires of the id as well as the internalised moral laws of society situated in the superego, contains energy. It is this energy that drives behaviour on the one hand and tortures the person with feelings of guilt on the other. The person must contend with these two opposing energies which, according to the principle of energy retention, never goes away (ibid.). In his later writings Freud tackled the question of free will. He acknowledged that people do have certain fragile freedoms, freedoms that can be attained through hard work and self-knowledge within definite constraints and necessities, but that the idea of a free will is an illusion (ibid.). The later Freud provides an interesting case study of a thinker very much aware of the tension between the science ideal and the freedom ideal, trying to find some kind of tentative balance between the two. Nevertheless, throughout his life Freud stayed committed to the deterministic science ideal.

Early 20th century behaviourism, as it developed in North America, can be characterized as the attempt to interpret behaviour as the automatic result of environmental factors alone. Behaviourists left factors like motivation, purposefulness and will out of the equation, arguing that these things cannot be studied scientifically. They built on the philosophical school of empiricism that declared sensory experience as the only source of knowledge (Richards, 2010). Behaviourism furthermore leaned heavily on Darwin's theory of evolution and environmental determinism (Fitzgerald & Whitaker, 2010). Because human beings, like

all animals, are the result of evolutionary processes, there is essentially no difference between humans and animals. Therefore these early behaviourists saw it fit to study the behaviour of animals and apply their findings to human behaviour. Not only are humans the product of evolution and in principle like animals, but their behaviour is also produced through a process akin to evolution. Human and animal organisms engage in random, unplanned acts and the environment strengthens certain of these acts while discouraging others (Richards, 2010). A very important consequence of behaviourism is that it created the idea that human behaviour can be predicted and controlled by controlling the environment. Behaviourism thus made psychology a powerful practical science in the eyes of educators, social administrators and the military. But with this it also spread the model of the human subject as a manipulatable, mechanical machine. The freedom ideal of the human spirit was truly buried with behaviourism (ibid.).

During the first half of the 1930's most of the more influential academic psychologists proclaimed that the basic method of psychological research should be characterised by the manipulation of independent variables and observing the effects on dependent variables while controlling for all other conditions. The writings of these psychologists suggested that independent variables are the causes of behaviour and functional relationships discovered through experimentation counted as the explanation of phenomena (Winston, 2001). This understanding of what causes, functions and experimentation are in turn influenced the way in which psychological questions were asked and answered. Its philosophical foundations can be found in the positivism of Leibniz, Hume and Comte. However, these psychologists were especially influenced by the physicist Ernst Mach (ibid.). According to Mach there is nothing more for natural science to discover than the dependence of phenomena on one another. Every phenomenon is a function of other phenomena. Functional relations are descriptive and there is no need to refer to inner forces like will or motivation. The focus on function

supported a practical, technological purpose for science and thus helped psychologists to become advisors to industry, education and the military. By predicting the actions that will lead to change, functions steer the application of scientific knowledge towards individual and social improvement. Psychologists could now lean on the philosophical ideas of Mach to distance themselves from difficult questions about the nature of human existence and how the unique qualities of human beings should be studied, by labelling them as non-scientific metaphysical problems (Winston, 2001; Walsh, Teo & Baydala,2014).

A last development we need to mention here is the cognitive revolution that emerged during the 1950's. During this time the model of the human subject as a stimulus-response organism changed to that of an information processing system using a computer (the brain) to organise and execute a variety of psychological phenomena (Teo, 2005; Richards, 2010). The task of the psychologist was seen as studying the "software" of this information processing system (Bermudez, 2010). The model has changed, but the idea of the human person as a functional machine with no or very limited freedom to exert his or her will and take control of his or her life, as the basic ontological assumption, remained intact. The rise of the neurosciences from the 1970's onward greatly supported the growth in cognitive psychological research and cemented the view of the human person as a system processing information according to pre-programmed algorithms, rather than an autonomous agent engaging in his or her environment in a creative and meaning-making way. Individual psychic reality is replaced by a universal physical reality as the defining characteristic of human existence (Teo, 2005).

Humanistic-Psychological Criticism of the mainstream

During the early part of the 20th century various researchers and thinkers criticized a natural scientific approach to psychology. In Germany, Spranger, who studied adolescents from a

hermeneutic standpoint, argued that no matter how much the physiological changes that take place during adolescence were studied, it will never shed light on the problems of psychological development (cited in Teo, 2005). For him physiological development and psychological development were two different and independent aspects. A focus on the physical does not take the contexts of meaning in which experiences are shaped into consideration. Spranger argued that the shortcoming of natural-scientific psychology was that it treated mental life as a mechanism consisting of material parts that can be divided into different categories like cognition and emotion, thus destroying the meaningful wholeness of mental life. For him understanding meant comprehending that all mental connections are meaningful parts of a larger standard of values (Walsh, Teo & Baydala, 2014).

Husserl was critical about the use of natural scientific methods in psychology and doubted whether mental life can be understood fully by assigning to it the same ontological status as natural phenomena (Teo, 2005). The problem was not that psychology turned towards science, but that it turned towards one very specific view of science: "a positivist, empiricist model that objectified its subject matter, believed that the methods of the natural sciences were the only valid route to knowledge, and failed to appreciate the socio-political grounding of experience" (cited in Cosgrove, Wheeler & Kosterina, 2015, p.17).

In the English-speaking world Allport played an influential role in promoting a more humanistic-scientific psychology. He criticized natural-scientific psychology's objectification of the individual. This diminished understanding because the focus on the generalized mind ignored the uniqueness, particularity and richness of individual minds (Jastrzebski, 2011). Natural-scientific psychology was obsessed with method rather than the diversity and depth of human experiences (Teo, 2005). He argued that some psychological problems could not be studied by way of the natural scientific method.

Abraham Maslow thought that natural-scientific psychology, with its focus on prediction and control, oversimplified human experiences. He distinguished between natural scientific knowledge which he called spectator knowledge and experiential knowledge. Spectator knowledge lacks participation, involvement, conceptualized people as passive and under the control of external forces and made a distinction between the subject and object of research. Experiential knowledge, in contrast, focuses on peoples' individuality, identity, spontaneity, responsibility and sees them as active participants in their worlds (Winston, 2016; Teo, 2005). He did not consider natural scientific knowledge to be wrong, just too simplistic, and argued that psychological knowledge should be of a more experiential kind.

Giorgi again pointed out that the focus on natural scientific methods forced psychology to be empirical, positivistic, reductionist, deterministic and predictive. It caused psychological methods to become embedded in these criteria. But then these criteria in turn determines the questions researchers ask about psychological phenomena. Things that cannot be measured are in time deemed as unimportant or inconsequential (Broome, 2014). Giorgi acknowledged that measurement provided rigor in the natural sciences, but argued that because psychological phenomena differed from natural phenomena, measurement may not necessarily ensure rigor in the social sciences and other ways of ensuring rigor should be explored (Teo, 2005). He was instrumental in the establishment of empirical-phenomenological research as a systematic, disciplined qualitative method (DeRobertis, 2013).

These thinkers laid the foundation of a humanistic critique of the mainstream that continued throughout the 20th and early 21st century (see for example Martin & Thomson, 1997; Martin & Sugarman, 2001; Mos, 2003; Parker, 2007; Valsiner, 2012). With its view of the human subject as a unique, autonomous whole, its emphasis on human capacity and potential, and its focus on creativity, responsibility, social embeddedness and free choice, humanistic-scientific

psychology offered an alternative to Freudian, behaviourist and cognitivist determinism and reductionism. It also led to the development of a different research paradigm and research methods like the heuristic method of Moustakas (Tudor, 2015). Qualitative research methods has gained official status in the American Psychological Association's (APA) division for evaluation, measurement and statistics, partly as a result of the work done by humanistic psychologists (DeRobertis, 2013). Today, humanistic psychology continues to have an influence on various theoretical movements and sub-disciplines like social constructivist psychology, transpersonal psychology, ecological psychology, dynamical systems psychology, cultural psychology, postmodern psychology, positive psychology and theoretical psychology. Some of these movements are in turn asserting their influence on educational psychology, developmental psychology and research areas such as motivation, emotion, stress, psychotherapy and personality (ibid.).

An interesting line of thinking that developed from this critique was a psychology from the standpoint of the subject, associated with Klaus Holzkamp. He pointed out a representational problem that exists in an insufficient clarification of the relation between experimental findings and the need for theories based on these findings. Because of this unacknowledged problem scientists tend to view reality through the lenses of their experimental concepts. Instead of reflecting reality, research help to create reality. These insights lead him to rethink psychology's modelling of the human being and he concluded that in general, psychology helped to strengthen existing ideological power relations by ignoring subjectivity, agency and processes of meaning making within political-social structures. A psychology from the standpoint of the subject has its focus on subjective reasons for actions and social self-understanding. Human experiences are not conditioned by external forces, but are grounded in a person's particular life situation (Shraube & Osterkamp, 2013).

CONCLUSION

The purpose of this chapter was firstly to investigate the origin and development of two different psychologies, i.e. the natural-scientific and the human-scientific psychology, and to look at how natural-scientific psychology became the mainstream. Second it was to show that there exist a long tradition in both philosophy and psychology of thinkers who have deemed a purely natural scientific study of the human subject inadequate. In the current study I would like to add my voice to that of these critics, specifically in regard to the role that the neurosciences has come to play in reinforcing psychology as a natural science. These writers from different eras and different backgrounds agree that a natural-scientific approach alone renders the human subject a mere automaton and cannot describe the richness of situated human existence and processes of meaning-making as the experimental method tends to divorce people from their social contexts (Dashtipour, 2015). Natural scientific methods cannot resolve theoretical issues pertaining to human freedom, subjectivity, individual experience, processes of meaning-making etc. On the contrary, by rendering the human subject a kind of biological machine driven by uncontrollable forces, the natural scientific approach places in sharp relief the contrast and the gap that exists between a deterministic ontology of the human and the actual lived experiences of real people. There is thus a need for mainstream natural-scientific psychology to include human-scientific insights in their ontological model of the human subject in order to acknowledge and incorporate these remaining philosophical problems in theory and research. As Teo (2005) claims: "…history has taught that a colonization of all branches of psychology are not beneficial to psychology in terms of ontology, epistemology, and ethics, and….does not lead to an advancement of knowledge." (p.31:). However, today, just as during the birth of psychology as an independent discipline in the 19th century, there is a renewed focus on physiology. This is

mainly due to the rise of the neurosciences. It would seem that the study of the psyche has become the study of the brain as many psychological researchers now use brain imaging techniques to investigate various psychological phenomena (Valsiner, 2012). In the following chapters I shall discuss how the neurosciences, rooted as it is in the natural scientific tradition, view the brain as an information processing machine controlling all human decision making and action. In this model very little attention is given to the role of environmental, social and cultural forces and individual identity, values, motivation and will. I shall look at the ways in which this brain-centred view of human action helps to reinforce natural-scientific psychology's limited model of human experience and, as Holzkamp has pointed out, contribute to the individual's powerlessness in the face of existing social structures, and consequently help to maintain the current socio-political status quo. These developments have not received much critique in the literature (Cromby, 2015), and therefore makes this study relevant.

Chapter Two

Influence of the Growth of Neuroscience on Psychology

INTRODUCTION

In the previous chapter I have shown how two distinct psychologies developed out of the philosophical dualism of nature vs. freedom. I argued that natural-scientific psychology, rooted in the nature side of the divide, became and continues to be the mainstream with the result that the philosophical issues pertaining to the freedom side was pushed out of the scope of psychological theorizing and research. These philosophical issues did not go away, however, and continues to pose unsolvable obstacles for natural-scientific psychology. Today, natural-scientific psychology has found a strong ally in neuroscience. In conjunction with neuroscience, a radical reductionist, biologically based ontology of the human subject emerged, creating the hope that philosophical issues of freedom, personality, subjectivity, meaning-making etc. will finally be resolved through technical, methodological means. However, as I will argue later on, these philosophical issues are not being solved at all but once again shifted to the sidelines by deeming them illusions created by the brain.

In this chapter I will take a look at the rapid growth in neuroscientific research and some of the reasons for this growth. Then I will discuss the influence of this rapidly expanding "neurorevolution" (Lynch, 2009) on different fields in psychology, for example psychopathology, psychotherapy and social psychology. I will also look at some of the more important reasons why psychology is currently embracing everything neuro- so readily. We will see that these reasons are very much the same as those that led the early 19th century pioneers in psychology to embrace the methods of the natural sciences. Then a discussion will follow on the view of the human subject that is being created and becoming entrenched

in psychological thinking. Lastly I shall look at criticism of some of the mainstream neuroscientific assumptions and methods.

THE GROWTH OF NEUROSCIENCE

In 1990 the then United States president, George W. Bush, declared the next ten years to be the decade of the brain (Choudhury & Slaby, *eds.*, 2012; Rose & Abi-Rached, 2013). This declaration, with the stated purpose of advancing public awareness of the benefits of brain research, fuelled a spate of large scaled research initiatives to study the brain for the ultimate purpose of understanding and overcoming brain disease, but also to lay bare the assumed biological basis of our uniquely human capacities and habits (Choudhury & Slaby, *eds.*, 2012; White, Richey, Gracanin et al., 2015).

The growth of the interest in all things neuroscience, particularly over the past twenty years or so, is reflected in the rapid expansion of the US based Society for Neuroscience. At its first conference in 1979, 1300 people attended, by 1990 it could boast over 13 000 attendees and in 2000 more than 24 000 (Rose & Abi-Rached, 2013). Today the society has a membership of over 40 000 people (Stadler, 2012). Furthermore, centres, institutions and laboratories focusing on brain research shot up at major universities all over the US and other countries like Britain, Japan and China (Rose & Abi-Rached, 2013). On the back of this came undergraduate and graduate courses in neuroscience programmes. Consequently the neuroscience community mushroomed. In 1996 404 doctoral degrees were awarded in the US. In 2005 the number of PhD's awarded in neuroscience grew to 689 and in 2008 it was well over 1000 (Stadler, 2012). The growing interest in neuroscience can also be seen in the increase of articles published in scientific journals. For the year 1978 there were about 6 500 articles on brain related topics published, by 1998 this figure stood at over 17 000 and in

2008 more than 26 500 papers were published in more than 400 journals (Rose & Abi-Rached, 2013).

One major factor that has accompanied and driven the growth of neuroscience is the development of more and more sophisticated brain imaging techniques. The structure of the living brain became visible with computerized tomography (CT) scanning during the 1970's and magnetic resonance imaging (MRI) early in the 1980's. And with the later development of positron emission tomography (PET) and functional magnetic resonance imaging (fMRI), researchers could also begin to study the functional brain while research participants engaged in set activities. As these technologies quickly became widely used, the belief spread amongst researchers that what they were showing was the direct biological correlates of human mental states. Soon every conceivable human state came under scrutiny and became linked to its perceived brain state. By 2011 more than 600 academic papers based on imaging research were published every month (Rose & Abi-Rached, 2013).

A second contributing factor is the huge financial investments made by companies and governments who have a vested interest in the results of neuroscientific research. It has been estimated that in the United States alone the combined investment by the National Institute for Health, the pharmaceutical industry and biotechnology companies grew from 4.8 billion dollars in 1995 to 14.1 billion in 2005 (Rose & Abi-Rached, 2013). Between 1999 and 2010 venture investment in neurotechnology has nearly tripled and constitutes a 145 billion dollar global industry (Stadler, 2012).

The growing interest in neuroscience has also expanded far beyond the scientific community. Governments all over the world increasingly turn towards neuroscience research results to inform public policy. For instance, in 2009 the United Kingdom Institute for Government was commissioned to investigate the implications of neuroscience for public policy, and in

the same year the French Government also launched a project with the purpose of reforming public policy in line with the most up to date neuroscience research (Rose & Abi-Rached, 2013). But it is not only governments that show a growing interest in developments in neuroscience; through popular science books, newspaper and magazine articles, television shows and even films the general public is made aware of the growing global neuroscientific revolution. The Dana foundation organizes and run the brain awareness week every year in March around the globe in order to make the public aware of the progress of brain research through open days at neuroscience laboratories, museum exhibitions, special lectures and displays at libraries, schools, universities, community centres etc. (www.dana.org/baw). The self is increasingly portrayed in neurological terms, leading some commentators to claim that we are now living in a brain generation or a biological age (Van Ommen & Van Deventer, 2016). The growing belief is that to define psychological experiences in terms of brain activity is the only true way in which we can not only understand and combat brain diseases, but also understand and better ourselves (Schultz, 2015). The public interest in neuroscience is largely bolstered by neuroscientists themselves, claiming that their research will eventually unlock all the secrets our brains hold and finally reveal what makes us human and how we should live in order to be happier, healthier and more successful; surpassing other social, cultural and philosophical explanations (Choudhury & Slaby, *eds.*, 2012; Schultz, 2015).

THE NEUROSCIENTIFIC MODEL OF THE HUMAN

How then does neuroscience view its subject? At the root of the neuroscientific world view lies a traditional biological reductionism (Pinker, 1997; Swaab, 2014; Rose & Abi-Rached, 2013). The assumption underlying this reductionism is that the best method to study biological phenomena is to break complex systems down to its simplest components. This is

indeed a useful methodological strategy in the natural sciences. But neuroscientists go further by claiming that psychological phenomena can also be understood by reducing them to their biological processes (Rose & Abi-Rached, 2013). In fact, the widely accepted assumption is that biological processes alone are sufficient to explain the psychological phenomena associated with them. Thus, mind is nothing more than brain processes, or put differently, the psychological (and closely related social) domain is qualitatively not distinguishable from the biological (Rose & Abi-Rached, 2013; Kirmayer & Gold, 2012). Studying brain processes at the molecular level, and especially the differences in these processes between individuals, can potentially reveal the causes of behaviour and the reasons why certain individuals act in certain ways (Rose & Abi-Rached, 2013). "Lofty questions about the mind are fascinating to ask – philosophers have been asking them for three millennia - but it is only in the brain that we can eventually hope to find the answers" (Ramachandran, 2003, p. 45).

One consequence of this way of thinking is that there is no real need or reason to study psychological phenomena and first person experiences in order to explain human behaviour; studying brain processes will eventually be enough. This is most evident in the field of psychiatry, where some scholars have argued that it is fast becoming a clinical neuroscience discipline rooted in the assumption that a objective, scientific theory of mind will be a solely neuroscientific theory (Raikhel, 2012; Mooij, 2012). Whereas traditional psychiatry acknowledges the central role of psychological experience and meaning and the role of the social world in psychopathology, neuroscientific psychiatry in contrast treats experience as a marginal by-product of, and the social world as a set of variables that function independently from, brain processes (Kirmayer & Gold, 2012).

Before we look at the neuroscientific model of the human in more detail, I want to state here that not all neuroscientists agree with such a radical reductionist conception. For instance, well known neurobiologist and popular author Antonio Damasio, argues that the self, far

from being an illusion created by the brain, is rather the key to understanding consciousness and the mind (Damasio, 2010). From his earliest writings he acknowledged the possibility that consciousness extends beyond the brain (Damasio, 1999). However, a core of mainstream neuroscientists do adhere to a reductionist ontology as set out below. This allows some natural scientific psychologists to also promote a reductionist, biologically based psychology. It is this brain-centred conception of psychology that poses a challenge to humanistic ideals. Therefore I put forward the following view of the human as espoused by an influential core of neuroscientists with a reductionist bent, in order to criticise it in the following chapter.

We are our brains

As we have stated, the general assertion of neuroscience is that all mental activities are the result of brain functioning. "Everything we think, do, and refrain from doing is determined by the brain. The construction of this fantastic machine determines our potential, our limitations, and our characters; we are our brains. Brain research is no longer confined to looking for the cause of brain disorders; it also seeks to establish why we are as we are. It is a quest to find ourselves" (Swaab, 2014, p.3). And again: "[A]ll the richness of our mental life – all our feelings, our emotions, our thoughts, our ambitions, our love lives, our religious sentiments and even what each of us regards as his or her own intimate private self – is simply the activity of these little specks of jelly in our heads, in our brains. There is nothing else" (Ramachandran, 2003, p.4). It is the physical brain, not the mind or the conscious self, that is responsible for creating a persons' individual as well as social reality (Rose & Abi-Rached, 2013). It is the brain, rather than the mind, which acquires knowledge and manipulates concepts (Rose, 2012). Romantic love (Zeki, 2009), responses to art, music and literature

(Ramachandran, 2003), experiences of grief, hate and fear (Rose and Abi-Rached, 2013) are universal human capacities that originate in the brain independent of societal or cultural practices.

Over the past twenty years and more, popular science writers, like neuroscientists Joseph Ledoux and Dick Swaab and cognitive scientist Steven Pinker, contributed with bestseller books towards entrenching the model of the biological self among the general public and scientists alike. They take the uncompromising stance that the way in which a persons' brain develops in the womb already determines his or her character, talents, restrictions, levels of stress and aggression and gender identity for life (Pinker, 1997; Swaab, 2014). By the time a person reaches adulthood his or her character is fixed and there is very little that can be modified (Swaab, 2014). The influence of parenting, social and cultural mores and practices have a negligible influence (Pinker, 1997). We do not learn things like feelings of love, friendship and fairness through our interaction with others in a specific cultural environment, rather we are born with built-in assumptions about the universal laws governing each aspect of the social world (ibid.). In other words, it is not our environments that nurture or hamper what and how we learn, but the structure of our brains. And it is also brains that ultimately create social and cultural environments. Here then we witness the complete reduction of human psychological life, social and cultural realities to the structure and functioning of the brain. The brain becomes the final reverence point of what makes us human and the panacea for all scientific enquiries into the human.

The Computational Model of Mind

A great majority of neuroscientists and cognitive scientists adhere to the assumption that minds are information processing machines (Bermudez, 2010; Franks, 2010). According to

this model mental activity is a rule-governed mechanical process (Franks, 2010). Complex tasks of information processing are broken down into hierarchies of smaller sub-tasks according to algorithms. For the most part this mechanical process happens below the threshold of our awareness (Bermudez, 2010). Thus, this information processing happens blind to the specific meaning of the information (Franks, 2010). According to Pinker: "…computation has finally demystified mentalistic terms. Beliefs are inscriptions in memory, desires are goal inscriptions, thinking is computation, perceptions are inscriptions triggered by sensors, trying is executing operations triggered by a goal." (1997, p.78).

The computational model of mind treat minds as machines that function in more or less the same way. This destroys any conception of unique individual experience; what it feels like to be a specific person in a specific environment. Individual psychic reality is replaced by a universal physical reality (Mooij, 2012).

Contrary to the computational model, research has shown that the human mind does not process information according to an automated rule-based system, but process information in an active and constructive manner by inferring meaning rather than remembering a string of symbols (Franks, 2010). Yet, neuroscientists and cognitive scientists generally continue to adhere to the computational model of mind, perhaps because this model provides a mechanistic account of mental functioning that accords with the biological functioning of the brain. But, as I will argue, in doing so we are losing sight of the human embededness in a wider social world made up of meaning.

The Self as an Illusion

The feeling you have of a more or less constant "I" is just an illusion created by your brain. This is the stance of many writers of popular and semi-popular books on neuroscience and cognitive science over the past twenty years. The general assertion is that the sense of personal identity is nothing more than the result of the actions of a vast array of nerve cells.

For Steven Pinker, staying true to the computational model of mind, the experience of the self is caused by an executive function in the brain: "The agents of the brain may very well be organized hierarchically into nested subroutines with a set of master decision rules, a computational agent sitting at the top of the chain of command. It would not be a ghost in the machine, just another set of if-then rules…" (1997, p. 144).

Joseph LeDoux (2002) argues that, although the brain consists of physically and functionally distinct units, by acting in parallel, these different units store different aspects of the same experience. Synaptic plasticity makes it possible for cells that are activated simultaneously to strengthen their connections and become bound together. There are also convergence zones in the brain (e.g. the prefrontal cortices) which integrate the information from these various distinct units. Convergence zones facilitate a unity of experience and thus create the feeling of a coherent personality.

Thomas Metzinger (2009) claims that no-one has ever had a self. The brain creates an internal image of the person as a whole and the person, experiencing this image as a more or less independent I, is unable to realize that it's not real, that it's just the result of neurons functioning together on a completely unconscious level. The brain creates a kind of "ego tunnel" in which we experience a first person perspective, but are cut off from outside reality.

Dick Swaab (2014) agrees. He is of the opinion that consciousness, and thus the feeling of the self, is "an emergent characteristic generated by the joint functioning of specific areas of the huge network of neurons in our brains. Brain cells and areas have their own separate functions, but their functional links with one another jointly endow them with a new, 'emergent' function" (ibid., p. 170). He goes on to say that there are many examples in nature of emergent properties. Hydrogen and oxygen are gasses. But when they combine a new substance emerges, namely water. The problem with such examples is that the elements that combine and the new element that emerges are all physical, whereas consciousness and the self are psychical. This is the challenge for those who seek a purely biological cause for the existence of the self, to show the material mechanism by which the psychological emerges from the physical, a point we will return to later on.

Although it remains unclear by what exact biological mechanism the physical brain gives rise to the feeling of the self (Miller, 2010), it has become something of a scientific fashion to conceptualize any ontological model of the human in terms of a reductionist biology in which the physical is primary and all encompassing and in which no explanation of the psychological is complete (or truly scientific) without reverence to its supposed physical cause (Schultz, 2015). Not even concepts like the self and consciousness which have been considered purely psychological up until the end of the 20th century.

Perception of the world as an illusion

Early studies of learning in rats have shown that they form mental maps in order to orientate themselves within an environment, for instance to find their way to a food source through a maze. From this researchers inferred that brains create and use representations of the outside world, in other words they recreate the outside world and use these recreations in planning for

action (Bermudez, 2010). Thus, we cannot know the world directly, but only through our brain's representations of the world. Pinker explains: "Plato said that we are trapped inside a cave and know the world only through the shadows it casts on the wall. The skull is our cave, and mental representations are the shadows" (1997, p. 84).

We perceive a representation of the world created by our brains, based in part on expectations and prior knowledge and predictions linked to our actions and the feedback they provide (Rose & Abi-Rached, 2013). In the same way we (or rather, our brains) also create representations of other peoples' thoughts, emotions, motivations and actions (Frith, 2007). All of this happens unconsciously (ibid.). Thus, things like language, meaning, culture, values and socio-political aspects play no role in the ways we perceive the world. Everything happens inside the skull where information from the senses are processed according to basic rules and become part of the brains' representation of the world without the conscious interference of an "I".

Free Will an Illusion

It stands to reason that if the concept of the self is an illusion, then the idea of free will is also an illusion. According to Swaab, our behaviour is determined from birth due to the structure, and consequently the functional capacities, of our brains. By the time we reach adulthood our brains, and thus our behaviour, has only a limited capacity for modification (Swaab, 2014). Furthermore, our brains perform a great many functions without us being conscious of it (ibid.).

But it would seem that even intentional acts are illusory. Research done by Libet and colleagues on the time between a conscious intention to act and brain activation has become

the standard reference for discussions of free will from a neuroscientific perspective. They asked test subjects to move their fingers or wrists whenever they felt the urge to do so, indicating the time when they became conscious of the urge, while recording their brain activity for the readiness potential. The researchers found that brain activity started several milliseconds before the subjects indicated their intention to move their fingers or wrists. They concluded that voluntary acts start off as unconscious processes in the brain (cited in Rose & Abi-Rached, 2013; Urbaniok, Laubacher, Hardegger et al., 2012). Although many flaws and shortcomings of Libet's research has been pointed out (amongst others that a trivial decision to lift a finger is qualitatively far removed from making real life decisions like a career choice, that the subjects reporting of their awareness and their actual awareness are not the same things and that the acts they were asked to perform were not chosen freely because they were following the researchers' instructions) and other researchers who recreated Libet's experiment could not find any evidence that voluntary actions are initiated unconsciously (Trevena & Miller, 2009), many neuroscientists and philosophers still invoke Libet when arguing that a conscious free will is incompatible with a neuroscientific model of the human (Rose & Abi-Rached, 2013).

An assumed limited capacity to make choices freely has consequences for issues of responsibility, morality and criminal justice. Swaab (2014) asserts that moral acts are instinctual and hardwired through the process of evolution. Thus, people tend to act impulsively and only after the fact do they think up moral reasons for what they did unconsciously. The discovery of mirror neurons shows that we learn moral actions through imitating others' behaviour; an automatic process. When we observe someone the same neurons active in their brains while they perform the act fires in our brain. This makes empathy possible, but it is an empathy based on unconscious brain processes and not on a metaphysical moral choice (ibid.).

Furthermore, because behaviour is hardwired in the brain and criminal behaviour is consequently caused by neurobiological deficits: “moral condemnation based on personal accountability rests on very shaky ground” (2014, p. 179). Urbaniok, Laubacher, Hardegger et al. (2012) cite various research results in which correlations have been found between certain brain abnormalities or damage and aggressive or criminal behaviour, but they argue that it remains unclear whether such brain abnormalities are the causes of criminal behaviour or either the result of other causes or one of a range of other causes, including socio-political causes of criminal behaviour. “Behaviour is the result of complex individual and social interactive processes and is, therefore, in most cases not as easily experimentally replicable or explained by cause and effect” (p. 179). Therefore, the lack of criminal responsibility cannot be argued on the basis of a single psychological or neurological abnormality, unless that abnormality can be shown to seriously hamper a persons’ ability to understand or exercise self control (ibid.).

Thus, a strictly deterministic and reductionist interpretation of neurobiological research can lead to an overly mechanical cause and effect ontological view of the human subject. As I have pointed out, there are various methodological and theoretical problems with such a view. This creates the opportunity for thinkers from the social sciences to engage critically with the neurobiological paradigm. Yet, because of mainstream psychology’s drive, from the 19th century to the present day, to establish the discipline on a firm natural scientific footing, this reductionist biological model has taken firm root in much of psychological discourse. Today then we find the same pattern of thought as that which was discussed in chapter one. The 19th century pioneers of scientific psychology, enamoured with the discoveries made in the field of physiology, sought ways in which they could connect psychological phenomena with observable physiological phenomena. And at the beginning of the 21st century many

psychologists are trying to connect all kinds of psychological phenomena with brain processes.

INFLUENCE OF NEUROSCIENCE ON PSYCHOLOGY

Most undergraduate courses in psychology at universities around the world are divided into various sub-disciplines. Because psychology is a broad field and most scientists focus on narrow areas of specialization, this categorization seems to make sense. It also creates the impression that all sub-disciplines receive equal attention or carry the same weight. With lip-service given to the biopsychosocial model, the further impression is created that at some point the different perspectives of all these sub-disciplines will merge into one unified explanation (Cromby, 2015). This, however, is not the case. Because of biological or physiological psychology's close links with neuroscience, and the status and rapid growth of the latter discipline over the past two decades, there is a definitive shift of interest towards biological psychology and biological explanations of psychological phenomena at the expense of other explanations like the role of social, economic and political influences (Valsiner, 2012; Rose & Abi-Rached, 2013; Cromby, 2015). Most South African universities provide undergraduate modules on biological psychology with a strong focus on the brain. The universities of Cape Town, Pretoria, Johannesburg, Witwatersrand, Rhodes, Limpopo and the Nelson Mandela Metropolitan teach a module in neuropsychology at the honours level, while the university of Cape Town offers a masters degree in neuropsychology (internet search, 30/05/2017). A few other institutions are waiting for approval to also instate a masters degree in neuropsychology (www.sacna.co.za).

Neuroscience provides biological psychology with the strong natural scientific foundation that scientific psychologists have sought since the 19th century. Due to the prestige of the

natural sciences, and particularly neuroscience, more funding for biological psychology research into the neurological causes of psychological diseases are made available, further strengthening the position and influence of biological psychology (Cromby, 2015).

However, my argument is not that neuroscience represents a radical natural scientific take-over of psychology; neuroscience rather represents a promise and an ideal. The promise is that all of human psychological life will finally be understood in terms of scientifically well defined, generally applicable, biological processes and mechanisms. The ideal is that the study of the human subject will then be a purely natural scientific endeavour. I will argue that neuroscience cannot make good on this promise and that the natural scientific (nature) ideal cannot lead to a complete grasp of human psychological life without incorporating the philosophical issues pertaining to the freedom ideal. There are neuroscientists and psychologists who already understand that an overly reductionist philosophical stance will not be conducive to a complete understanding of the human subject, but currently there exist a strong mainstream core that still hold on to the reductionist promise and ideal of a purely natural scientific approach to the human subject.

Diagnostics and Pathology

The DSM Classification System

This promise can clearly be seen in the changes occurring in the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* classification system since the 1990's. In the latest version of the *DSM*, the *DSM-5*, definitions of mental disorders highlight biological explanations while at the same time deemphasizing social and cultural ones (Kamens, Elkins & Robbins, 2017; Gambrill, 2014). This is in line with the stated primary goal of the *DSM-5*

"to produce diagnostic criteria and disorder categories that keep pace with advances in neuroscience" (cited in Kamens, Elkins & Robbins, 2017, p. 7). These writers claim that, in spite of many advances in neuroscience and the new *DSM* definition of biological causes underlying all mental disorders: "not one biological marker can reliably substantiate a *DSM* diagnostic category"(2017, p. 5). A more accurate interpretation of existing evidence would be that psychopathology is complex with multiple causes (ibid.). True to the neurobiological view of the human, the *DSM-5* also erased the difference between medical and mental disorders, leading to the conclusion that mental disorders are in fact medical or biological disorders (ibid.). A substantial body of research showing that there is a strong correlation between adverse environments and what is deemed as abnormal behaviour, is being pushed to the side (Gambrill, 2014).

Some members of the *DSM* revision board have speculated that in future versions of the manual even the five axes on which diagnoses should be based might change (cited in Rose & Abi-Rached, 2013). The multiaxial system, introduced in *DSM-III*, allows for information of clinical disorders (axis I), personality disorders and mental retardation (axis II), general medical conditions (axis III), psychosocial and environmental problems (axis IV) and global functioning (axis V). In future this might change to Axis I for genotype: identifying genes playing a role in symptoms and diseases, Axis II for neurobiological phenotype: identifying the phenotype through neuroimaging and cognitive testing for the purpose of allocating psychopharmaceuticals and psychotherapies, Axis III for behavioural phenotype: identifying the severity and frequency of specific cognitive, emotional and behavioural disturbances, Axis IV for environmental modifiers or precipitants evaluated in the context of genotype and Axis V for therapeutics (ibid.).

Psychopathology

Since the start of the decade of the brain researchers of various psychological illnesses carried the hope of pinning the causes of these illnesses to neurobiological markers. This hope was driven by the desire to define the difference between normal and abnormal behaviour more clearly and to develop better treatment strategies (Rose & Abi-Rached, 2013). Within the neurological paradigm any specific pathology should be seen as having the same cause(s), the same symptoms and the same meaning for all sufferers regardless of their individual experiences and backgrounds (Schultz, 2015). In other words, the assumption was that by placing psychopathology on a biomedical footing it would become a more scientifically rigorous endeavour (according to the standards of the natural sciences).

Since those hopeful years it has become clear that psychological illnesses cannot be correlated with specific brain abnormalities or specific brain regions in a simple cause and effect manner. For one, the same brain regions and abnormalities are implicated in a number of different pathologies. Furthermore, personal experience and environmental influences can never be excluded from understanding psychopathology. For instance, during the 2008 stock market crash there was a sudden rise in reported cases of depression and distribution of antidepressant drugs. To explain these increases in terms of brain chemistry would be pointless. It would be better explained by referring to many people's anxiety about their financial difficulties (Schultz, 2015). Another example is addiction, which is increasingly understood and defined as a disease of the brain (Choudhury & Slaby, 2012). The aim of addiction research that focus on the brain is to locate molecular mechanisms that can be targeted by new treatments. But addiction constitutes much more than just brain chemistry and includes social environments, drug markets, political factors etc. Yet a growing body of researchers continue to spend millions of dollars exclusively on finding causes for mental illnesses in the brain (Rose & Abi-Rached, 2013; Choudhury & Slaby, 2012).

Shifting focus of Psychological Research

The consequence of psychology's turn to the brain is that research has become more and more directed towards finding the neurological causes of various mental illnesses. In this research neurotechnology has come to play a pivotal role, replacing other social research methods. White, Richey, Gracanin *et al.* defines neurotechnology as " devices and applications used to understand, assess and manipulate processes within the neural system" (2015, p. 797). It is used to understand both normal and abnormal processes in the brain. Neurotechnology makes it possible for researchers to look for the causes of almost any aspect of human nature in the brain, building on and simultaneously strengthening the assumption that the brain holds the key to understanding ourselves (Dumit, 2012).

In 2013 American president Obama initiated the BRAIN project with the goal of mapping the activity of every neuron in the human brain, providing a huge impetus for neurotechnology-based research and consequently neuroscience-based therapies for mental illness (White, Richey, Gracanin *et el.*, 2015). Some researchers have already proposed guidelines for the use of technologies like fMRI as a therapeutic tool (Stoeckel, Garrison, Ghosh *et al.*, 2014). Technology-based intervention focuses on the supposed underlying physiological mechanism(s) that cause pathology. The union of clinical psychology and biomedical engineering has removed the need for the clinician to understand the subject in his or her uniquely individual, moral, economic and social contexts and processes of meaning-making, instead trusting the technology to reveal the biological underpinnings of behaviour, which is assumed to be the true, scientifically validated, causes of human action (ibid.).

A few examples will show how the focus on the brain has changed the way in which certain psychological concepts, mental illnesses and sub-disciplinary fields are defined.

The Study of Emotions

Throughout the 20th century various theories on emotion were developed, from James and Lange's theory of physical reaction to events that creates emotional reactions, Freud's conception of emotion as an energy source directed towards an object, Schachter and Singer's two factor theory that emotions involve physical arousal and cognitive identification to Scherer's integrative theory that involves multiple factors (Stenner, 2015). These theories do not represent a progression in knowledge or understanding, but rather a collection of often incompatible conceptions. Over the past two decades there has been a renewed interest in the study of emotions, partly fuelled by the growth in neuroscience (Stenner, 2015; Volz & Hertwig, 2016). The assumption driving this new interest is that with the help of neuroimaging techniques this particular psychological problem can finally be investigated in a proper scientific way; as a biological problem (Stenner, 2015).

The role of emotions in various contexts, such as decision making, moral behaviour and social interaction has been studied using brain imaging techniques. For instance, investigators have found that subjects with lesions to the ventromedial prefrontal cortex and the orbifrontal cortex can overcome emotional revulsion about morally bad actions to accomplish a goal and others with dorsolateral prefrontal cortex damage have weaker emotional impulses concerning fairness and follow selfish impulses without restraint (cited in Volz & Hertwig, 2015). With this rapidly growing body of research, emotions are being conceptualised as purely physical reactions. Interactions between the amygdale, striatum and prefrontal cortex have been found to play a role in the regulation of emotions, prompting some researchers to suggest that intervening with the functioning of these brain areas have the potential of affecting change more successfully than traditional therapies, and may in future supplant them (White, Richey, Gracanin *et al.*, 2015).

For LeDoux emotional states play a key role in the organization of brain activity like perception, thought, learning and the formation of memories (cited in van Ommen & van Deventer, 2016). By coordinating different processes, emotional states promote the development and unification of the self. Furthermore, synaptic processes represent a universal form of communication resulting in all human brains operating in the same way (ibid.).

Freudian Psychoanalysis

Also other sub-disciplines outside biological psychology are turning to neurobiological explanations for the phenomena they study. Neuropsychoanalysis has as its aim combining the psychoanalytic system of Freud with findings from neuroscience. Neuropsychologists Solms and Turnbull, and neuropsychiatrist, Erik Kendal, have claimed that psychoanalysis faces the possibility of being left along the wayside unless it incorporates neuroscience in its descriptions (cited in Geroulanos, 2011 and Bassiri, 2013). Solms wrote extensively on Freud's contributions to neurology, the correlation of neuroscientific findings with psychoanalytic concepts and also proposed a neuroscientific account of the functions and aims of dreams (Geroulanos, 2011.). Although Freud himself was against the idea of brain localization, Solms and colleagues use cases of neuropathology to identify specific brain areas that they connect with psychoanalytic concepts. "Psychoanalysis throughout its history has called for a health…that speaks of subjectivity…as something operative in interpersonal and social contexts. Through the neuropsychoanalytic approach, this social dimension of health becomes an anatomical one…Here the psychological realm's independence is erased." (2011, p. 238).

Psychotherapy

Some scholars have begun to apply neuroscientific research findings to psychotherapy in the belief that strategies based on brain research will greatly enhance therapy. For instance, Moss (2013) proposes a dimensional systems model in relation to cortical processing and memory. According to this model all memories (explicit and implicit; positive and negative) are stored at the cortical level and involves the same mechanisms. When important emotional memories activate at the cortical level, there is also increased activation in associated subcortical structures. Each cortical hemisphere can only send information to its own subcortical structures. Specific cortical areas only process specific information. For instance the medial cortical columns code stimulus information that is internal and self-referential while the lateral cortex codes for external stimuli. There are fewer cortical columns in the right hemisphere which means it can process information faster but with less details. It is suited for quick processing of other's emotional expressions and perceived danger. Furthermore it has a limited verbal ability. Its typical responses is to attack, freeze, escape or avoid. The left cortical hemisphere is involved with more detailed processing and can initiate more complex responses with greater verbal expression. This is also where internal dialogue and labelling of emotions take place. But because the left hemisphere cannot access the emotional information stored in the right hemisphere, verbal labelling of emotional experiences in the right hemisphere consists of educated guesswork based on experience. The different hemispheres assumes control of the sensory stimuli best suited to it. The cause of psychological distress is often an inability of the two hemispheres to align their responses with each other (ibid.).

Moss now uses this model to account for certain psychological problems. For instance, extreme negative emotions generated in the right cortical hemisphere results in experiences of anxiety in the absence of verbal labelling or conscious awareness of the source of the anxious

feelings. Treatment of anxiety based on knowledge of the dimensional systems model would then follow a pathway of helping the client to verbalize the feelings of anxiety which will activate the left hemisphere and bring it into conscious awareness. This will reduce the role of the right hemisphere in generating feelings of anxiety and help the left hemisphere to "take control". However, it is important that both hemispheres should be activated during therapy in order to guide a client towards full resolution. The right hemisphere is best activated by the use of visualization strategies, for instance visualizing the situations in which anxiety occurs. This will help the client to identify the onset of anxiety in order to control it with the input from the left hemisphere. It also allows the right hemisphere to alter its responses in alignment with the left hemisphere (ibid.).

Social Psychology and Risky Sexual Behaviour

We are social beings. We live our lives in families, communities and societies. We come into this world incomplete and require interaction with others - to be immersed in language, culture and meaning - in order to become complete human beings. Under the influence of the neuroscientific ontology of the human, there is a growing acceptance of the conviction that the conditions that make us social as well as the forms that social interactions take, can be understood solely by studying our neurobiological makeup (Rose & Abi-Rached, 2013).

The term "social brain" has come to stand for the belief that the human brain is specialized for a collective form of life. It is argued that the capacity for being social is located in specific brain areas, i.e. the amygdale, orbital frontal cortex and temporal cortex. These regions help the individual to understand the motivations, dispositions and intentions of others and form the basis of social cognition (ibid.). This largely automatic (unconscious) ability to deduce the mental states of others and make predictions about their future actions is called

mentalization. We can furthermore engage in the process of mentalization because of the existence of mirror neurons. When we observe the actions and emotions of others a small number of neurons are activated in the regions of our brains that are active when we carry out those same actions or experience those same emotions. It is believed that these mirror neurons form the basis for empathy, learning of language, understanding other's intentions and thus our social way of life (ibid.). Critics of the mirror neuron hypothesis argue that there is very little evidence that these mirror neurons actually understand the intentions of others simply by mimicking their behaviour or feelings (Dinstein, 2008). There is also no empirical evidence that empathy necessarily leads to prosocial behaviour (Singer & Lamm, 2009).

In spite of such doubts, a growing body of researchers in the field of social psychology are convinced that there is a causal link between human social phenomena like empathy, cooperation, racism etc. and our specific neurobiological makeup. No doubt our social way of life has a universal neural basis on the individual level. But different ways of social interaction are also shaped by varying cultural practices, history, language, values and meanings that cannot fully be explained by brain processes alone. Social behaviour is very much context specific and far from universal (Rose & Abi-Rached, 2013).

The causes of risky sexual behaviour, resulting in unplanned pregnancies and sexually transmitted infections like HIV and AIDS, has traditionally been sought primarily in socioeconomic, political and moral factors. However, over the past decade and more a growing body of researchers has turned to the brain for answers (Ross, Duperrouzel, Vega *et al.*, 2016). Lesions in the orbitofrontal cortex, medial prefrontal cortex, striatum, nucleus accumbens and thalamus can lead to sexual disinhibition. These areas play a role in aspects of reward, punishment and motivation, aspects related to sexual behaviour. Neuroimaging techniques used to study impulse control and emotion regulation revealed correlations between heightened blood flow in certain brain areas and risky sexual behaviour (ibid.). Even

socio-cultural factors identified as playing a role in risky sexual behaviour have been redefined in terms of brain activity. For instance, Khurana found that low socioeconomic background and age of first sexual experience are mediated by poor working memory (cited in Ross, Duperrouzel, Vega *et al.*, 2016). They conclude: "These findings suggest that some neurocognitive abilities may continue to account for risky sexual behaviour even when controlling for relevant psychosocial factors" (p. 588).

REASONS FOR THE INFLUENCE OF NEUROSCIENCE ON PSYCHOLOGY

As we have seen, the influence of neuroscience on psychology is all encompassing. Mainstream scientific psychology has always tended towards a reductionist, deterministic ontology of the human subject (see chapter one). The alignment of psychological concepts and sub-disciplines with the standard neuroscientific paradigm has cemented this ontology into something like an irrefutable dogma and threatens to reduce the psychological self with his or her unique, rich and meaningful inner life to a universal neurological self divorced from context (Mooij, 2012).

The reasons why mainstream psychology has embraced neuroscience are almost the same reasons why 19th century psychology embraced physiology and the methods of the natural sciences. First and foremost is mainstream psychology's drive to be seen as scientific. But then, scientific according to the standards of the natural sciences which is still deemed "pure" or "hard" science, even by many in the social sciences. Because the general neuroscientific assumption is that mental processes are simply brain processes, or at the very least the result of brain processes (Schultz, 2015), and because of the status of neuroscience today (Choudhury & Slaby *eds.*, 2012), looking inside the brain with the help of imaging technology for answers to psychological problems has become a logical step for many

psychologists. The American Psychological Association (APA) promotes psychology as a STEM (science, technology, engineering, mathematics) discipline with the consequence that it is expected of psychologists that their work will conform to the principles of quantification, technicalism and instrumentalism (Cushman, 2012). The use of brain imaging techniques furnish psychological research with the means of being seen as rigorously scientific (Schultz, 2015). As we have seen in chapter one, there is a long tradition of thinkers who have questioned the assumption that natural scientific methods are adequate for studying the human subject. We can add to that the argument that chemical and electrical processes in the brain does not tell the whole story of human experience. The importance of context and meaning should not be ignored.

A second reason why psychology has embraced the methodological, ontological and epistemological assumptions of neuroscience so readily is the desire to be seen as a practical science that provides useful data for policy makers. In the wake of "the decade of the brain" came a socio-political drive to tackle head-on the burden of brain diseases (which now includes almost all mental illnesses as well) (Rose & Abi-Rached, 2013). Lobby groups, multinational organizations and policy makers focus on the economic burden of brain diseases and call for the need of early intervention. As a result many pathologies – for instance ADHD, autism, schizophrenia, bipolar disorder – are reframed as developmental and a growing body of research tend to focus on discovering biomarkers in the brain that might predict future pathology (ibid.). Investigating the neurobiological causes of mental illness provide scientific psychology the opportunity to demonstrate its social relevance.

A third factor is funding coupled with the influence of pharmaceutical companies (Schultz, 2015; Rose & Abi-Rached, 2013). The development of neuroscience – specifically the search for the biological causes of mental diseases – went hand in hand with the growth in psychopharmacology and the increasing use of drugs for the treatment of mental illness (Rose

& Abi-Rached, 2013). For instance, between 1996 and 2005 there was an increase in the prescription of antidepressant drugs from 5 to 10 per 100 persons in therapy in the United States (Schultz, 2015). Psychiatric medication sales reached 70 billion dollars in 2010 in the USA (ibid.). There is also a close relationship between the Diagnostic and Statistical Manual (DSM) developers and the pharmaceutical industry (Teo, 2015).

More than half of the funding that supports research on the brain comes from industry (Rose & Abi-Rached, 2013). This investment is coupled with the expectation that neuroscience research will expand the market for psychodrugs and other neurotechnologies. Thus, there has developed a close relationship between researchers and pharmaceutical and neurotechnology industries. This has created what some call the translational imperative: a standard by which investors only support research that will generate returns, creating the drive amongst researchers to focus on those areas that will generate results that can be translated into financial gain (ibid). This translational imperative influences research proposals and grant applications in many countries all over the world. Thus, for a psychological researcher who might be interested in studying the moral development of adolescents for instance, it would be much easier to receive a grant if he or she should focus their research on, say, brain processes during the completion of a moral judgement task, than on some psychological or social factor influencing morality.

CRITICISM OF SOME ASPECTS OF NEUROSCIENCE

In this chapter we have given an outline of the reductionist and deterministic ontological model of the human subject from the perspective of neuroscience. Of course there is nothing wrong with a reductionist, deterministic ontology *per se*, if it is a true reflection of reality. As we have seen from chapter one, previous reductionist, deterministic models - like those of

19th century physiological psychology and early 20th century classical behaviourism - have been criticised by humanistic and critical psychologists. The most salient point being that reductionism and determinism unavoidably leads to overly simplistic explanations of both normal and that which is deemed abnormal human functioning. It can easily imbue research with naivety and superficiality and researchers with a lack of socio-political awareness (Cohn, 2012). This can have very negative consequences. For instance, many neuroscientists with a reductionist bent see psychopathology as chemical imbalance that can and should be corrected with drug treatment. But such a view does not take into account that neurotransmitters cannot be associated with specific functions, behaviours and disorders. They generally do not code for a specific type of information processing but are linked to pathways that perform different functions in different circuits. Consequently a drug treatment that works on one type of neurotransmitter has a great number of effects, many of them negative (Kirmayer & Gold, 2012).

In the next chapter I will discuss alternative views on the relationship between mind and brain and environment that also challenge the current mainstream neuroscientific ontological model. For the remainder of this chapter however I will critically look at some other aspects of neuroscience.

Brain Imaging techniques

Central to the growth of neuroscience was the development of various brain imaging techniques such as PET and fMRI that can visualize the functioning brain. Neuroscientists rely heavily on these technologies and almost all neuroscientific research is based on imaging techniques (Rose & Abi-Rached, 2013). This dependence on and faith in imaging is based on the assumption of localization (that certain groups of neurons work together to form distinct

areas and to fulfil specific functions) and the assumption that mental functioning is equivalent to brain functioning. Thus, with the help of imaging techniques, brain areas responsible for specific mental processes can be identified (ibid.). However, critics point out that a specific brain region active during the performance of a task is not necessarily sufficient or even necessary for the performance of that task. The brain often utilizes different ways to perform a cognitive task (Poldrack, 2008). It is also well known that the same brain areas are active in a variety of different tasks. The amygdale for instance has been reported active in tests for fear, reward, fairness, moral decision making, subjective reports of beauty and many more (Raz, 2012; Rose & Abi-Rached, 2013).

fMRI can only detect large-scale activities. A voxel (the anatomic volume-pixel unit of imaging) contains millions of neurons. Generalizations about subtle processes can only be speculations. Currently fMRI signals are also weak and makes this technology only an indirect and crude tool for measuring cognitive processes and specific neural mechanisms. Yet it is often claimed that fMRI studies reveal higher brain functions (Raz, 2012).

Furthermore, research reports on brain imaging results seldom acknowledge the properties of the laboratory setting in which tests take place (Rose and Abi-Rached, 2013; Langlitz, 2012). The laboratory is an unusual setting for the test subject, and lying in a scanner an unusual experience. PET scans trace the flow of molecules in the brain over a short period of time. The subjects' mood, thoughts and behaviour at that time has a great influence on results (Dumit, 2012).There is a brief but intimate relationship between subject and researcher. How does this social setting influence what goes on in the subject's brain? The subject is also asked to perform a task outside of any normal context, removed from their daily milieu and relations. "The brain of the individual is given the opportunity to produce something that it would not otherwise be able to produce. But that setup, with all its sociality, contingency,

specificity, and embedded meaning, disappears in the interpretation of the measurements produced" (ibid., p. 77).

Also, in the analysis and presentation of the imaging data, computerized methods are used that had been programmed to choose among a range of available algorithms to transform quantitative data into spatial images. The process involves transforming, smoothing, warping and stretching the data of each subject to fit a standardized anatomical map of an average brain (Cohn, 2012; Rose & Abi-Rached, 2013). " It takes a lot of computer processing and human judgement to get from blood oxygen levels to a snapshot of a higher brain function" (Raz, 2012, p. 265). Also, cellular events take place in thousandths of a second, but detecting and processing signals for making images takes the bigger part of a minute. Therefore researchers have to normalize the data by averaging the results obtained from a number of subjects. The averaging process removes a considerable amount of information (Noë, 2009). Often, researchers will use the most extreme images – images that look the most different from each other - in writing up articles to enhance the textual argument in a powerful visually persuasive way (Dumit, 2012). The ways in which imaging technology function, their capacities and limitations, determine the kind of data that can be produced and from which theories are generated. Thus, the technology and the theory become intertwined. Imaging technology "start off as the means to produce data and end up providing the theories of the data that they themselves have produced" (Rose & Abi-Rached, 2012, p.159). This is an example of what Holzkamp called the representational problem: due to an insufficient clarification of the relation between experimental findings and the need for theories based on these findings, researchers tend to view reality through the lenses of their experimental concepts. Thus, instead of reflecting reality, scientists create a reality to fit the science (see chapter one).

Samples are generally small, between 4 and 20 test participants (Cohn, 2012). Because there is often no independent verification of imaging data, corroborating imagining data entails comparing it with the imaging data of a "normal" group. But defining what a "normal" group is, often proves difficult and different researchers use different criteria (Dumit, 2012). To make matters easier researchers often use subjects with the same demographics, usually white males (ibid.). Furthermore, 90% of peer-reviewed neuroimaging studies are done in Western countries (Chiao & Cheon, 2012). The use of such an exclusionary group generate questions about the value of "normal" databases.

Furthermore, the use of brain imaging often results in confusing a manifestation with a cause. Observing the activation of a specific brain structure while a subject performs a task simply points to the neural mechanism mediating that behaviour, it cannot be interpreted as the cause of that behaviour (Paus, 2009). A growing body of research shows how experience influence brain development. Behavioural patterns may well determine brain structure and function rather than the other way around (ibid.).

Another point to remember is that brain images cannot be seen as bridging the gap between physical processes and mental states. They may show the activity in the brain when a subject performs a task, but they say nothing about the content of the subjects' thoughts and feelings at the time when the image is captured. As we have seen earlier in the case of the amygdale, the same brain areas are active in many different cognitive tasks and emotional states. The specific thoughts and states cannot be deduced from looking at the brain alone. They depend on context and meaning and a persons' intent. Thus, we could argue that the brain provides the structure and the means for thinking, feeling etc. But the content of our thoughts and feelings, why we think and feel the way we do in specific contexts, lie outside the realm of biology. It belongs to an aspect that differs from the physical and need a different approach for scientific study. This may seem like a mundane point, but blurring the border between

different aspects often leads to confusion and unwarranted reductionism. Here then is an example of what was argued in chapter one, namely that philosophical and theoretical problems pertaining to personality, subjectivity, experience, processes of meaning making etc. cannot be resolved through purely technical or methodological innovations.

In spite of these issues, research based on imaging technologies carries a lot of scientific prestige. In India, for example, brain imaging is already admissible in court. It has also been introduced in isolated court cases in the US (Rose, 2012).

The lack of a mechanism connecting biology and psychology

According to Miller (2010) there are a plethora of scholarly articles proclaiming the biological causes for psychological phenomena, but a fully developed explanatory mechanism by which biology effects psychology is lacking. In these articles the psychological phenomena that define specific behaviours or pathologies are often made out to be imprecise folk psychology and are replaced by an assumed sufficient and more scientifically grounded biological explanation, despite the fact that mental illnesses are still defined according to their psychological symptoms. This means that, in the case of depression for instance, chemical processes in the brain can be conceived as a more fundamental cause than emotional disappointments or life stressors, although the influence of the latter on emotional well being might currently still be better understood than the former. There is a belief that every psychological phenomenon must be grounded in a biological explanation to prove that it is indeed a true psychological phenomenon. But, there is no explanation how and when biology turns into psychology. It is assumed to be self-evident. It is this assumption that Miller criticises. He argues that the relationship between biology and psychology cannot continue to rest on an assumption, but must be shown by means of a

explanatory mechanism. Currently, the means by which such a mechanism can be identified is also lacking. Brain imaging techniques will not do: "Although we may posit that neural generators implement psychological function, it must be understood that a psychological function does not have location in space. To make this case by example, memory deficits are well established in schizophrenia. But a memory encoding deficit in schizophrenia cannot be located in a specific brain region. Memory deficits are functional impairments that are conceived in cognitive, computational and overt behavioural terms, not in biological terms." (ibid., p. 725).

Maintaining the Socio-Political Status Quo

As we have seen earlier, there is a call from policy makers to develop early intervention strategies to tackle the burden of brain/mental diseases. A majority of these intervention strategies focus on training parents in managing the behavioural difficulties of their children combined with the use of psychopharmacological drugs (Rose & Abi-Rached, 2013). Social ills like criminal and antisocial conduct, low levels of education etc. must be addressed by governing children through their families. "Social justice, it seems, lies not in tackling the causes of structural inequality, poverty, poor housing, unemployment, and the like, but in managing parents in the name of the formation of good citizens" (ibid., p. 196). Thus, early intervention strategies based on brain research are developed and implemented in such a way as to help maintain socio-political power structures. Because of the assumption that psychological phenomena are caused by biological phenomena, attention is diverted from social and environmental influences on mental problems and political and social interventions are replaced with individual biological interventions (Cromby, 2015). This happens in spite

of research showing that social inequalities are among the most important determinants of health (cited in Kirmayer, 2012).

We should also mention the influence of pharmaceutical companies. Being a major contributor to research funding, these companies influence researchers to focus on finding brain abnormalities for every kind of mental pathology for the purpose of developing new drug treatments (Rose & Abi-Rached, 2013; Hartmann, 2012). Steering research towards the generation of financially lucrative data means that researchers help to strengthen unequal economic power relations as well as diverting attention from the socio-political realities which play a role in almost all aspects of mental illnesses; from definitions of pathology, to prevalence, susceptibility and treatment (Rose & Abi-Rached, 2012).

Addiction, as an example, is increasingly held as a disease of the brain. Addictive substances influence the frontal regulation of the limbic system, taking control of the brain's reward system . (Choudhury & Slaby *eds.*, 2012). Neurobiological researchers work towards locating molecular mechanisms implicated in addictive behaviour for the purpose of developing new treatments. But addiction is much more than brain processes. "'Addiction' denotes a family of conditions that are inextricably tied up with social environments, drug markets, and cultural triggers, and depend on collectively developed and sustained habits and also upon institutional practices that emerge in response, as feedback, to the original phenomenon…" (ibid., pp. 32-33).

There is also another way in which neuroscience helps to maintain the socio-political *status quo.* Hartmann (2012) suggests that conceptions of the brain reflect current power structures. The conception of a decentralized brain in which there is no "I" but just a multiplicity of functional systems reflects the decentralized globalized capitalist system of the 21st century

and work towards depoliticising this system by making it a natural consequence of our biological makeup.

CONCLUSION

In this chapter I provided a broad overview of the growth in neuroscience, the ontological model of the human subject underlying neuroscience, the influence of neuroscience and its accompanying ontology on directions in which psychology is developing and also discussed some issues in neuroscience critically.

For mainstream scientific psychology many of the things discussed will not be problematic. Because scientific psychology builds on the philosophical foundation of the science ideal of control, finding and describing deterministic, general laws that govern human conduct drives its epistemology, ontology and methodology. The question then comes up about the future of psychology. Should psychology become neuropsychology? What should then happen with the decades of critical and humanistic psychological contributions to our understanding of the human and of the discipline of psychology and its place in broader socio-political arenas? Scientific psychology, with its drive to be seen as a practical science, tend to be uncritical and conservative in its acceptance of the political, economic and scientific mainstream. A document drawn up at the APA Science Leadership Conference titled “How to Advance Psychology as a STEM Discipline”, for example, lists the many ways in which psychology can serve various sectors, including big business, the pharmaceutical industry, government and the military. The emphasis is on fitting in and supporting the status quo and there is no mention of critical engagement with any of these sectors (cited in Cushman, 2012). Thus, there is a need for critical voices in psychology.

This study wants to critically engage with neuroscience and scientific psychology and offer alternative interpretations and theories that might open a space for the inclusion of a more humanistic understanding of the relationship between brain, mind and environment within current socio-political realities. As we have seen, there is much in neuroscience to be critical about, much opportunity for the social sciences to not simply absorb neuroscientific claims, but to question and reinterpret from the unique perspectives of the social sciences. In recent years, new discoveries in the field of neuroscience (for instance brain plasticity), have begun to open up cracks in the edifice of the reductionist, deterministic ontology, providing an opportunity for humanistic psychologists to bring their insights to bear on neuropsychological theorising. I hope this will stimulate scholars from the mainstream to rethink their view of the human subject in relation to neuroscience. In the next chapter I will look at these discoveries and alternative perspectives on the relationship between brain, mind and environment.

Chapter 3

Extending Mind Beyond Brain

INTRODUCTION

In the previous chapter I discussed the ontological model of the human that underlies a core of neuroscientific thinking. We saw how this model supports and strengthens the natural scientific psychological conception of the human. This model has far reaching consequences, not only for research paradigms in both fields, but also for the broader society. Fuchs (2012) summed it up well: "The basic research program of the neurosciences consists in naturalizing consciousness, subjectivity and also intersubjectivity – in other words explaining them in neurobiological terms. Even though this program is far from being realised, the impression is being created that subjective experience can be imaged in the brain and in this way, as it were, materialized. This has far reaching effects on our image of the human being in general. The use of "brain language" is increasingly permeating our self-conception. In the wake of a popularized neurobiology, we are beginning to regard ourselves not as persons having wishes, motives or reasons, but as agents of our genes, hormones and neurons. Consequently, our problems and sufferings are often no longer considered existential tasks that we must face, but results of malfunctioning neuronal circuits and hormonal metabolism" (p. 331).

Thus, it is necessary and important to take a look at the often unexamined assumptions of human functioning underlying this strand of reductionist neuroscience. Is it a true reflection of reality, of our everyday experiences? In this chapter I will take a critical look at the neuroscientific ontology of the human as set out in the previous chapter and suggest alternative views.

In chapter two it was shown how the neuroscientific model defines philosophical issues pertaining to the freedom ideal as mere illusions. In this chapter I will argue that feelings of an autonomous self, feelings of free will and subjective conceptions of the world are not illusions at all but core aspects of human functioning. Furthermore, I will argue that cognition does not begin and end in the brain but also extends into the environment. The brain can thus not be studied in isolation as if it contains everything we need to understand human functioning; it must be studied as one part functioning in an intimate relationship with other parts of our physical and psychological make-up as well as with our social and cultural environments. I will argue that if we see the brain in this way, a radical reductionist ontology becomes unsustainable.

CRITICISM OF THE MAINSTREAM NEUROSCIENCE ONTOLOGY

The mind is more than the brain

In chapter two I argued that, according to the standard reductionist neurobiological view, the conscious mind is equivalent to the brain, or the mind is simply the result of brain activity. In this view the rest of the body in which the brain resides, as well as the environment, are peripheral in understanding the mind and cognitive processes (Nakayama, 2013). I do not wish to deny the important role that the physical brain play in creating the mind. Rather, I want to put forward the hypothesis that the brain is indeed necessary for the mind to exist, but certainly not sufficient. I argue that in order to understand human psychological life and the life of the mind, we cannot look at the brain alone. The brain cannot create the conscious mind on its own. The mind comes into being in the spaces where brain, body and environment interact.

Cartesian Dualism

The assumption that the mind is completely situated inside the brain seems like a logical point of departure, so logical that it does not need to be questioned. To reject this assumption would, on the face of it, mean that we should accept some untenable kind of dualistic conception of the mind; that the brain and the mind are two different, unconnected entities. Such a dualism has been criticised and rejected by most cognitive and neuroscientists.

Descartes developed the most famous dualistic conception of the mind. According to him the mind is an organ with a function just like any other bodily organ, and its function is to think. But it differs from the other organs in that the mind is a nonphysical organ. By this he meant that the mind is non-spatial. But although the mind is non-spatial, it does have a spatial location, i.e. in the brain. Thus, the dualism of mind and brain (cited in Rowlands, 2010).

According to Cartesian dualism then the mind is a nonphysical organ and the mind exists in the brain. Cognitive and neuroscientists have rejected the first aspect of the Cartesian dualism; that the mind is a nonphysical entity. But they have accepted the second aspect; that the mind is in the brain. In other words, they have not fully rejected the Cartesian conception of the mind. Consequently Descartes' much criticised conception of the mind still forms the foundation of current neurological conceptions (ibid.).

If we truly want to move forward from Descartes' dualism we should also reject the idea that the mind is situated in the brain alone. Conceptualising mental states and processes as things that does not just happen inside brains but also partly in bodies and partly in the world outside of bodies does not constitute a return to dualism but in fact a more complete rejection of it.

The brain alone does not make us conscious

Although mainstream neuroscience claims that consciousness and the experience of an autonomous self is the result of brain activity alone, there is no empirical evidence for such a claim. The brain is part of an animated body and that body is situated in an environment. Why should we then accept that consciousness happens in the brain alone? Neuroscientists argue that the fact that we dream and that conscious experiences can be produced by directly stimulating the brain (thus, independent of its larger context), proves that the brain alone is responsible for creating the conscious self (Noë, 2009; Vidal & Ortega, 2012). For example, by stimulating cells in the middle temporal area of the brain using magnetic pulses, illusions of motion can be created. The problem here is that it is through the intervention of the scientist and his technology that these illusions are created. Thus, it cannot be argued on the basis of these experiments that neural activity in the brain creates consciousness automatically (Noë, 2009). Furthermore, when the scientist produces an episode in a persons' consciousness, she is simply modulating already existing states of consciousness and not generating consciousness out of a previously non-conscious state. We can only conclude that experiments of this kind can alter aspects of consciousness, but not that they prove that the brain alone creates consciousness (ibid.).

For many neuroscientists the fact that we dream proves that consciousness only depends on brain activity (Vidal & Ortega, 2012). In dreams we can have vivid experiences that feel very real, and yet we are sleeping and thus cut off from the world. The conclusion is that we do not need to be interacting with the world in order to have conscious experiences. Such a line of thinking however, is not convincing. The only logical statement we can make is that dream states depend on brain activity alone, but not that consciousness too necessarily depend on

brain activity alone. It can also be argued that dream experiences are for the most part dependent upon real life experiences. In other words, dreaming is not entirely cut off from our lived experiences and can therefore not be seen as providing evidence that conscious experience is brain activity alone (Noë, 2009; Vidal & Ortega, 2012).

A core of mainstream neuroscientists believe that it is the neurons in the brain that enable us to experience the world and to have thoughts. Noë (2009) however argues that brain cells are the wrong unit of analysis when it comes to seeing, hearing, feeling, thinking etc. All neurons have more or less the same structure and functions in the same way. Thus, it is impossible, when looking at neurons alone, to know what a person is thinking or experiencing. Neuroscientists cannot bridge the gap between specific neural states and the resulting conscious experience. Not even large scale clusters of neurons provide the right kind of unit of analysis because they still provide limited information on how thinking and consciousness work (ibid.). Moreover, the assumption that specific brain areas are alone responsible for specific functions like seeing or hearing has also been challenged. Sur and colleagues (cited in Noë, 2009), for instance, rewired the eyes to the brain areas normally used for hearing in newborn ferrets. What they found was that the brains of these ferrets learned how to see with these parts of the brain playing a role in hearing. Thus, there is no fixed connection between the behaviour of specific cells in the brain and the character of conscious experience. Furthermore, research has revealed that the behaviour of cells in the cortex varies according to what a person is busy doing or paying attention to (ibid.).Thus, Noë (2009) suggests that clusters of neurons and brain areas still only represent parts of a larger system that should include the rest of the body in which the brain resides and also its embeddedness in and interaction with the environment. “[T]radition teaches that the skull is the boundary marking off what is inside from what is outside. And, crucially, we are inside: mind depends only on what happens within us… [W]hy not take seriously the possibility that the causal processes

that matter for consciousness are themselves *boundary crossing* and, therefore, world involving?" (italics in original)(ibid:, p. 49).

Noë (2009) goes on to explain that the brain is changeable and plastic, especially so during infancy. Sensory stimulation results in the development of neural connections and functioning which makes consciousness possible. In fact, brain development is so dependent on stimulation from the environment that sensory deprivation can result in permanent damage and deficits. Research by Hubel and Wiese, for instance, showed that cats reared in the dark failed to learn how to see (cited in Noë, 2009). For the human infant relationships with caretakers are of crucial importance, not only for brain development, but also for learning how to integrate the self in the environment. The environment becomes part of the self and therefore rapid changes in the environment has such profound psychological consequences (ibid.). Researchers in developmental psychology have pointed out that basic sensory-motor capabilities found in infants from birth are geared towards interaction with others (Gallagher, 2012). Some of these capabilities include the capacity for imitation of caregiver's facial and verbal expressions. Infants vocalise and gesture in ways that accord with the vocalisations and gestures of caregivers. In other words, right from the beginning infants are geared towards interaction and not just observation, and through this interaction they gradually develop a sense of self. And as the infant matures these capacities become more nuanced (ibid.). Over the past few decades some researchers have become aware of the human brain's plasticity, not only during infancy, but right across the life-span (Doidge, 2007; Rose & Abi-Rached, 2013). Brain plasticity means that the human brain is not simply formed and controlled by genes, but can change due to a person's experiences. Synaptic connections between neurons are constantly being created and moulded according to life experiences. It may very well be that, due to plasticity and every person's unique developmental path, no two brains can ever be exactly the same (Rose, 2012). There is also evidence that

environmental stimuli influence gene expression in the brain. This is called epigenetics and refers to the research findings that show how certain genes can be activated or inhibited by environmental stimuli (Rose & Abi-Rached, 2013). All this suggests that viewing the brain as the sole source of human action in a linear cause and effect system may be overly simplistic as human action in turn also influence the architecture of the brain. Behaviour, environment and biology seems to be linked in a complex circular relationship. It also means that we humans are not completely bound by the structure of our brains but we have the capacity to actually change that structure (Doidge, 2007). However, there are some neuroscientists and popular science writers who use the idea of the plastic brain to promote brain based practices of human growth and change. If the brain is malleable, then we have the power to enhance our capacities and personalities through the application of techniques developed specifically to change neuronal pathways. Thus, governing the self becomes governing the brain (Pitts-Taylor, 2010). Once again we see that the brain alone is made the centre of possibility and change, whereas brain plasticity rather points towards an intimate relationship between biology, environment, personal experience and selfhood.

Noë (2009) argues that the specific character of conscious experiences is not governed by neural activity alone, but rather by the person's ongoing and dynamic relation to objects and the neural responsiveness to changes in the person's relation to objects. We can look at vision as an example. The traditional assumption underlying studies of vision is that it is something that happens within a person, involving the eye and the brain. But seeing also involves bodily movement. Moving the head or eyes produce changes in sensory stimulation. In other words, there is a relationship between sensory stimulation and bodily movement. A person's perception of an object depends upon the perspective from which he views it. If he moves around the perspective from which he views the object will change and so also his perception of the object (ibid.). Based on this insight, vision is not something that happens within us,

rather, it is something we actively do or participate in. Seeing also involves interaction with the things we see. “It is an activity of exploring the world making use of our practical familiarity with the ways in which our own movement drives and modulates our sensory encounter with the world” (ibid., p. 60). Thus, the conscious experience of seeing cannot be explained in terms of the relation between neurons and sensory organs like the retina alone, the neural processes must be understood in the context of the person’s relation to the world around her. Consciousness of the world is not something that happens within the brain, it is something we do. “It is thus only in the context of an animal’s embodied existence, situated in an environment, dynamically interacting with objects and situations, that the function of the brain can be understood”. (ibid., p. 65).

Another example is that of the artist and his sketchpad. When busy sketching, the artist externalises an image which makes it possible for him to manipulate and transform that image in ways that cannot be done through imagination alone, making it part of the cognitive process (Loughlin, 2013). The sketchpad becomes a vehicle through which the artist can recreate what he sees according to his own interpretation and the meaning(s) he wants to convey. It is a back-and-forth process in which a new addition to the sketch adds new information and opens up further possibilities for the artist. Seen in this light it means that the sketching artist is busy with a conscious process, and this conscious process includes his interaction with his sketchpad (ibid.). Here too we see that consciousness is best understood as action and includes involvement with objects outside of the brain.

The mind is extended beyond the brain

As we have seen, consciousness is not something that happens in us, not simply the by-product of brain activity. We should rather see consciousness as something we do, as part of

our engagement with the world. These considerations lead us further to the idea that the mind extends beyond the brain. The philosophical foundations for an extended mind can be found in the thoughts of Merleau-Ponty. He argued that mental activity only takes place within the context and from the perspective of a perceiving body in an environment. Our bodies are always geared towards the environment, we are aware of and we perceive our environment through our bodies' intentional actions within this environment. There exists an intimate relationship between our bodies' situatedness in an environment and our perceptions. And our embodied experiences again influence how and what we perceive. There is then a strong element of subjectivity in perception, as two people with two different sets of experiences may see the same environment differently. Our experiences colour our perceptions(Carman, 1999; Ribeiro, 2014).

Clark and Chalmers (1998) were the first to argue explicitly for the extended mind thesis. They argue that cognition does not depend on neural activity alone, but also on features of the body and the body's existence in an environment. Certain forms of cognition involves processes of feedback loops between brain, body and environment. Now we will look at two aspects through which we will explore the idea of the extended mind some more, i.e. the use of tools and language.

Psychologists call the implicit, practical body plan that a person holds of her body and which enables her to use her body effectively the "body schema". The body schema helps us to use our bodies effectively to perform tasks without having to pay too much attention to the mechanics of executing those tasks. The body schema can only come into existence through a mind that is not limited to brain functioning but that is open to the world and actively engaged with it (Noë, 2009). Now, the use of tools can modify our body schema. By integrating a tool into our practical repertoire we can extend the possibilities of actions open to us and thus expand our body schema (Carlson, Alvarez, Wu *et al.*, 2010). As long as we

are using a tool, that tool becomes part of our body for us (Noë, 2009). For instance, when a blind person uses a cane to explore the ground in front of him. The blind person does not experience the characteristics of objects he encounter as residing in the cane or in his hand that is holding the cane. For him the cane is a vehicle of awareness: the cane is not something of which he is aware but a tool with which he is aware. The consciousness of the blind person extends through the cane to the world (Rowlands, 2010). He directs his attention through the cane. And such a direction of attention reveals the world to him. "The nature of the blind person's revealing activity is that it travels through his brain, through his body, through his cane out into the world itself" (ibid., p. 201). And as our body schema changes, so do our relation with the world around us. What was beyond our reach or ability become reachable and possible (Noë, 2009). The point here is that through the use of tools our body schemas become extended beyond our physical bodies: thus, the mind reaches beyond the physical boundaries of the body and extends into the world.

Certain types of tools are created to support, enhance or take the pressure off our cognitive abilities (Nakayama, 2013, Bernecker, 2014). Information-processing technologies like computers, cell phones and GPS systems help us to think, remember, plan, communicate etc. Mental tasks are off-loaded or distributed onto the environment, reducing the work we need to do. For instance, in three studies done by Barr, Pennycook, Stolz *et al.* (2015) it was found that people who tend to rely on intuitive thinking rather than on careful analytical thinking often use their smartphones to help them do some of the analytical thinking for them. These tools hold information for us and in manipulating them in an appropriate way we can then access this information. The act of manipulating and using information-carrying tools in this way is a cognitive task that is part of a bigger cognitive process (Bernecker, 2014). Thus, cognition becomes something that does not just take place in the head but extends into the environment (Rowlands, 2010). This process of creating tools to support mental tasks is not

restricted to our current information technology driven era though. “Human cultural development is, in part, a process of creating external information-bearing structures: structures that could be used to enhance our ability to accomplish important tasks” (ibid., p. 15). One such important structure is language.

Just as the use of tools compliment and expand our body schema as well as support and enhance our mental abilities, so language makes it possible for us to expand our capacity for thought and thus extend our minds beyond the mere functioning of brain cells (Noë, 2009). Because thinking is made possible by language and language is socially manufactured, cognitive functioning require the existence of a sociolinguistic community for its practice. “Our minds cross out of the skull and get supported in a shared sociolinguistic scaffolding” (ibid., p. 88). Language enables skilful intersubjective engagement (Fusaroli, Gangopadhyay & Tylen, 2013). This means that language constitutes a mode of socially extended cognition. Through the use of language individuals share and manipulate information together and create information and also interpersonal relations that reach beyond the cognitive abilities of any one individual on her own. Language enables intersubjective cognitive systems and make up what Fusaroli and colleagues call dialogically extended minds. When people interact they readily adapt to each other and progressively align their behaviour. As a result people feel increased emotional attachment and also share higher cognitive processes. Thus their minds also become aligned and begin to constitute a single coordinated system, a collective dialogically extended mind. And language serves as a vehicle through which this alignment is made possible (ibid.). Critics from mainstream cognitive science argue that, although language is a collective tool, every person still internalizes language. Language is a system of rules that must be learned, and once it has been learned it allows one to represent the world, think, reason etc. in that language. Representation, thinking and reasoning still only happen in the brain (cited in Noë, 2009). This view of the use of language rests on a traditional

conception of words and meanings. According to this conception to know the meaning of a word is to know what it refers to. Thus, we use words to describe the world. This traditional view, however, does not hold much currency amongst contemporary linguists (ibid.). We often use words correctly without knowing exactly what they refer to. For instance, I can talk about the foreign Port Jackson tree that is destroying our indigenous plant life and yet not know what the Port Jackson looks like. How is it possible for us to correctly use words without knowing what they refer to in the world? The answer is that a person is not individually responsible for making his words meaningful. Meaning relies on social practice and is shared, it is not something internal to the individual. Linguistic meaning is not static and residing in the brain alone, rather, it is something human beings do, moreover it is something we do with others (Fusaroli, Gangopadhyay & Tylen, 2013). Thus, in using language the mind automatically becomes extended. It is not something that only happens within the individual but for a great part relies on the outside social environment (Noë, 2009).

The human capacity to use language to hold information in the social domain became greatly enhanced with the development of writing. Written language is a code that stores information. We do not need to remember a lot of information, we only need to remember the code in order to access the information. As human culture developed we have learned to create external information-carrying structures like written language, and later on the computer, to help us remember and complete cognitive tasks. These structures replace some of the cognitive tasks we need to do (Rowlands, 2010).

Another way of thinking of the mind as extended is to conceptualize it as a boundary phenomenon rather than a fixed entity that can be reduced to the brain. Volosinov (cited in Neuman, 2003) laid the foundation for a socio-semiotic theory of the mind. He considered psychological experience as the interface between the person and the environment. For him the mind is a semiotic (or sign) system that marks the boundary between the self and the

wider system of which the person is a part and upon which the mind reflects. The consequence of such a conceptualization is that the mind cannot be understood by turning either to the brain or to the environment, but must be seen as a unique and differentiated system. Although cognitive processes can take place apart from semiotic processes, the subjective mind cannot exist without semiotic mediation. The mind, in effect, is a system of signs. According to Volosinov, standard philosophical and scientific conceptions of the mind does not explain the origin and character of the mind sufficiently (ibid.). He contends that signs can only arise where people interact. The mind, as a system of semiotic activity, is thus grounded in social practices and communication. "By adopting this position, the mind is portrayed as a multilevel semiotic phenomenon that stretches beyond the boundaries of the individual skull to the social realm of communicating agents" (ibid., p. 49).

In recent years some neuroscientists have come to realise that the brain is profoundly influenced by environmental factors and that the brain is designed to reach out to other brains. A new sub-discipline called social neuroscience is quickly taking shape. The basic thesis underlying this extended view of the brain is that human cognitive abilities have evolved in response to the growing complexities of social interaction and therefore human intelligence is primarily geared towards social problem solving (Meloni, 2014). Our capacity to perceive the dispositions and intentions of others represents a distinct cognitive domain. Action is always framed in pragmatic and socially defined contexts. Interaction is thus not a process of following uniform laws, but is guided by these contexts. These contexts form part of social cognition (Gallagher, 2012). Although social neuroscience is defined as the study of the neural mechanisms of social cognitive processes and therefore the underlying assumption is still that social processes are primarily the result of brain processes, there is at least some recognition that the brain does not function in isolation but can be influenced by socio-cultural forces (ibid.).

Because the brain is geared towards human social interaction, the mind is not only extended through the use of tools but also through organized group interaction. Slaby and Gallagher (2015) distinguish certain institutions that exist mainly for the purpose of accomplishing cognitive tasks through social interaction such as making judgements, making decisions and solving problems, and call these cognitive institutions. Such institutions include legal systems, educational systems, cultural institutions and the institution of science. They define a cognitive institution as one that includes cognitive practices that are produced at specific times and places according to certain rules or norms in such a way that it extends our cognitive processes when we engage with it. The legal system is a good example of a cognitive institution (ibid.). Specific practices within the legal system relies upon and extends the minds of those engaged with those practices. "For example, a contract is an expression (in this case a legal agreement) of several minds, establishing in external memory an agreed-upon decision, adding to a system of rights and laws that transcend the particularities of any individual's mind. Contracts are cognitive products that, in turn, contribute to and shape our cognitive processes in further thinking or problem solving" (ibid., p.36). Such products of cognitive institutions allow us to think in ways that was not possible without the existence of such institutions. In court cases evidence and testimonies are created and judgements made based on a set of rules. This process consists of many cognitive practices that was established in the past and are also ongoing and are not confined to individual brains or groups of brains, but constitutes the cognitive institution of the legal system itself(ibid.).

Researchers and thinkers in the fields of artificial intelligence and robotics have also come to the realization that cognition is best understood as processes that involve the interaction between brain, body and environment (Kono, 2010). In studying human cognition as a model for artificial forms of cognition, researchers cannot approach intelligence in its totally but have to focus on small domains at a time. These domains are called microworlds. Based on

the traditional assumption that cognition is something that goes on in the brain, such a microworld consists of a small area of human cognitive competence in a specific domain like playing chess or planning an event. This is sometimes called a vertical microworld. The most influential work in this field however is done by researchers who employ horizontal microworlds. A horizontal microworld consists of a range of cognitive competencies and include an organisms' interaction with the environment, for instance in making use of objects to solve problems, dealing with change and the interaction between sensory and motor functions (Rowlands, 2010).

The mind is embodied

The embodied mind entails the thesis that some mental processes consists of not only brain processes but also brain processes combined with other bodily structures and processes. According to traditional thinking, the mind/brain exists separate from the body and, except for things like oxygen and blood, in essence does not need the body in performing its functions. But Rowlands (2010), Dempsey and Shani (2014) and Ball (2015), amongst others, argue that minds are intimately linked with the bodies they are a part of. This means that human cognition cannot occur independently of a human body. Processes of perception, for instance, partly consists of and relies upon bodily structures. Such processes will thus be different for different kinds of bodies (Dempsey & Shani, 2014). For instance, because of the distance between our two ears, sounds reach them at slightly different times and this disparity fosters us with information about the direction from which sounds reach us. The human brain is specifically attuned to this distance between the ears. If our ears were placed differently, perhaps on top of our heads, then the brain would also have been attuned differently

(Rowlands, 2010). Thus, some mental processes are in part composed out of wider bodily structures or processes.

Perception of the world is not an illusion

As we have seen in chapter two, the traditional neuroscientific and cognitive scientific conception of vision is that it is something that mostly happens within us. Perception begins with stimulation of the retina which results in a retinal image that carries relatively little information and must be supplemented by various information-processing operations in the brain (Rowlands, 2010). We do not really see the world, just a cognitive representation of it. The world, as it is perceived by us, is merely an illusion. In seeing, the brain does all the work to transform the distorted, upside-down, time-delayed, only partially colour sensitive pictures in the eyes into a uniformly detailed, high resolution, vividly coloured image of the world (Noë, 2009). Through various experiments it has been shown that we often fail to see what is happening around us. This has been called inattentional blindness (Noë, 2009; Rowlands, 2010). For many cognitive and neuroscientists inattentional blindness proves that our eyes provide us with only a partial, incomplete and vague view. But we do not experience the world as incomplete or lacking in detail. Thus, our brains must create the detailed world we perceive (Rowlands, 2010). In other words, we think that we see more than we actually do due to the brain creating an illusionary world for us.

But in our day to day experience it never seems to us as if we are perceiving an internal model of the world; we experience the world as existing all around us. We experience ourselves as situated within it. We focus our attention outside on aspects in the world, rather than on an internal model of the world. Through our senses and the movements of our bodies we have access to the world. We may not be able to see everything in our vision all at once,

but we are able to shift our attention in order to focus on certain things according to our intentions, interests, goals etc. If something happens in our field of vision of which we are unaware it does not mean that we are being deceived by a brain creating an illusory representation of the world, but simply that our attention was elsewhere. The world is still out there and accessible, just not all at once. What we see depends on where we are situated and what we are focusing on at that moment (Noë, 2009).

For mainstream cognitive and neuroscientists vision begins with the retinal image. There is no reason, however, to draw the line at the retina as if what the retina perceives has no bearing on the visual process. Gibson has argued that vision begins with the optic array (cited in Rowlands, 2010). He explained that the environment is filled with light rays that travel between the surfaces of objects. At any given position in the environment light converges from all directions. Thus, wherever the observer may be situated, there is a densely packed set of visual angles. The intensity of light and set of wavelengths vary from one solid angle to another. This pattern of light forms the optic array. As the observer moves around in the environment the angles or segments making up the optic array will change. The crucial point is that changes in intensity and distribution of wavelengths provide information about the three-dimensional structure and properties of objects in the environment. Thus, the optic array is an external information-carrying structure. Therefore, the retinal image does not have to carry all the information: some of the information is already there in the environment. For Gibson, vision is thus an active process (ibid.). As an observer moves around in the environment the optic array changes and those changes provide information about the layout and orientation of objects. In this way the observer manipulates the optic array in order to make information available to itself. Because cognition entails the gathering and manipulation of information, acting on the optic array should be considered as part of the cognitive process of perception (ibid.).

Furthermore, at the heart of the mainstream neuroscience view of the world as an illusion created by the brain, lies the homunculus fallacy (Noë, 2009). For, if the brain creates a representation of the world built up of scenes of what our eyes see, that representation must be scrutinized by something in the brain for us to be conscious of it. As the eyes see the world, so this homunculus must in turn see the picture of the world in our heads. And again something must be able to see what the homunculus sees and so on *ad infinitum.* There is of course no such homunculus in our brains. However, if we do not see a representation of the world, but the world itself – in other words, if the world is not a picture in our heads but rather out there, all around us, and accessible to us through our engagement with it – then this fallacy falls away (ibid.). The brain does not see the retinal image. Rather, the brain sees the world out there. Thus, there is no real evidence, and no reason to assume, that the brain creates an illusory representation of the world. Seeing is not an inactive process happening in the brain alone. Like consciousness, it is something we do - a being present in the world - that includes our bodies, our intentions and our environments (ibid.).

The Self is not an illusion

As we have seen in chapter two, many neuroscientists believe that the feeling of being or having a self is an illusion created by executive functions in the brain. If we look inside our heads alone in search of this self then it is inevitable that we will conclude that the self is an illusion. But that is because what gives us a feeling of selfhood is not to be found in the brain alone. If consciousness should be defined as something we do, as something emerging from our interaction with the world, then the self should be seen in the same way. “The sense of subjectivity and selfhood we experience from inside interacts with a social construction of personhood seen from the outside. As persons then, we have emergent levels of organisation

of behaviour associated with subjectivity and self-awareness and with our social roles and the corresponding responses of others" (Kirmayer & Gold, 2012, p. 317). Some theorists argue that in order for any living entity to experience a sense of self, that entity must first be an active, participating agent in an environment (Stuart, 2002). Thus we can think of selfhood as something that emerges in the dynamical and circular processes of interplay and feedback between individual and environment.

Moreover, we do not just react to environmental stimuli but we also create stories out of our interactions. These stories provide us with a sense of meaning and continuation amidst constant change. Through them we create a personal identity. The next chapter is dedicated to the creation of selfhood through autobiographical story telling.

The Computational Model of Mind Revisited

Very early on in the history of Cognitive science the Computational model became the guiding framework in which scientists thought about the working of the mind (Bermudez, 2010; Rowlands, 2010). And later the field of neuroscience adopted this model also. As we have seen in chapter two, the computational model views mental activity as a rule-governed mechanical process. Complex tasks of information processing are broken down into hierarchies of smaller sub-tasks according to algorithms. For the most part this mechanical process happens below the threshold of our awareness (Bermudez, 2010). Thus, the brain is seen as an information processing machine, much like a computer, with the physical brain as the "hardware" and the mind as a series of "software programmes". The task for cognitive science is then to identify the programmes (cognitive psychology) and discover how these programmes are "run" by the brain (cognitive neuroscience) (Rowlands, 2010). During the forming years of cognitive science the focus was mainly on the "software programmes" and

scientists set themselves the task of developing abstract formal descriptions of cognitive processes. From the late 1980's onwards, with the rise of neuroscience, the focus shifted to the "hardware" and scientists began to describe cognition in terms of neural models based on brain architecture (ibid.). Despite these shifts in focus, two assumptions remained unchanged and unquestioned; cognitive processes occur inside the skull alone because they are ultimately brain processes and brain processes are computational processes.

The unacknowledged assumption underlying the computational model is that the defining characteristic of humans is that we are rational beings (ibid.). We perceive, evaluate, deliberate, plan. This assumption has a long history in philosophy, from Plato's view that the well adjusted person is not ruled by emotion but by reason to Descartes' belief that we can master the world by recreating it from the ground up through the use of reason alone. This view that humans are ultimately thinkers we can call the intellectualist assumption (ibid.). It is a view that completely ignores the importance of habit in our daily lives. "The intellectualist portrays human beings in the course of their lives as inevitably novice-like and always, for that reason, as unskilled newcomers who are in effect alienated from the world around them. For Intellectual Man the world shows up as strange and objectified, something to be figured out, interpreted, analyzed." (ibid. p. 99). But isn't it true that most of what we do we do almost automatically, habitually, without needing to deliberate? When we learn a new skill, we need to pay close attention to what we are doing, but as we begin to master the skill, less and less attention is needed for the technical details. With time the new skill becomes habit and we hardly think of what we are doing at all (ibid.). Anyone who has learned to drive a car or play the guitar can attest to this. When we engage with the world we are not novices, needing to analyze each situation, focussing on what we are doing, trying to remember the rules; we do many things automatically without the need for deliberation, like experts. And even when we engage in truly intellectual pursuits - reading a scientific article

or figuring out a mathematical problem - we rely on many things we have learned before that had become habit (ibid.).

Let's look at language. The standard view of language in linguistics reflects the more general view of how the mind works in cognitive and neuroscience. Our basic competence as users of a language is tied up with our knowledge of the rules for combining words into grammatically acceptable sentences and the meaning of sentences based on the meaning of individual words. In other words, language use depends on our brains' ability to analyze, break down and decode strings of words (Noë, 2009; Rowlands, 2010). But as the fluent speaker of a language one rarely need to engage in such an analytical process. Here too, habit takes over. Engaging in conversation means repetition. In most of our activities and engagements we hear and say the same things day to day. This is so because the primary function of language is not to express information or to communicate thoughts. It is simply to be social, to reach out and connect (Rowlands, 2010). Furthermore, communication always happens within a context. And the specific characteristics of the context contributes greatly to what is being communicated in what way and the meanings we assign to it. When we speak, listen, write or read in a language, we use that language as a tool to extend our minds and to touch the minds of others. We do not need to grammatically evaluate and deliberate according to the rules in order to do so. Through habit we do it automatically (ibid.).

For many cognitive and neuroscientists the digital computer provides proof that a mechanical construction, such as the brain, can process information. Computers perform calculations, they correct spelling mistakes, they can play chess, they can search for relevant facts amongst vast quantities of information etc. So why not think of the brain as an organic information processing computer? It is true that some problems we face can be solved by using a mechanical process. For instance, at school we were taught to use a procedure (or simple algorithm) to solve long division problems in mathematics. And most of us can prepare a

decent meal by following a recipe carefully. But most problems we face require more of us than the mechanical implementations of an algorithm. It requires understanding. For example, we can only deal successfully with other people in all kinds of social settings if we understand things like others' motivations, emotions, expectations and needs. And it is at this point where something qualitatively more than mechanical, rule-based procedures come into play that the computational model fails to correctly and exhaustively represent how the brain and the mind work (ibid.). At the heart of the problem lies a mistaken conception of what computers actually do. Computers cannot understand the calculations we perform on them. "Just as a wristwatch doesn't know what time it is even though we use it to keep track of time, so the computer doesn't understand the operations that we perform with it. We think with computers, but computers don't think: they are tools…And that fact does not help us understand the powers of human cognition". (ibid., p. 163).

Noë (2009) goes on to argue that brains, just like computers, do not think. The brain cannot make or represent the world. The world exists out there and it shows up for us through our interaction with it. Internal computational states are not responsible for me focussing my attention on a specific object or directing my thoughts in a specific direction. It is my involvement with the world that directs my attention and gives my thoughts its content. Brain processes do not give meaning to my mental states. Meaning is not internal, it is relational and relative to my involvement with events and people around me. Brains do not think; organisms with brains think (ibid.). If cognitive and neuroscientists want to understand the relationship between brain and mind they will have to rethink the unquestioned assumptions guiding their research and theorising, especially the idea that mind is the product of computational processes happening within a brain isolated from a body and an environmental context. A theory of mind should not focus on the brain exclusively. For sure the brain plays

a pivotal role. But we will not be able to understand that role if we refuse to see the brain as part of a body and that body embedded in a meaning making world (ibid.).

If the computational model is a true representation of the human mind then humans should be very good with things like logic, mathematical calculations and reasoning. These are all strictly rule-based disciplines. But humans characteristically struggle with such tasks (Rowlands, 2010). If something like mathematics is a matter of manipulating structures according to rules, and if the human mind is a computational information-processing machine containing these structures and rules, then why do most of us find it so hard to do mathematics? Should it not be something that comes almost naturally for us? Furthermore we find that we are very good at recognition, completion, transformation, problem solving and association tasks. And it is precisely these tasks that rule-based systems like computers struggle with. This makes the computational model a less than optimal model for human cognition (ibid.).

When engaging in a formal logic task like multiplication, we often make use of different strategies. With simple multiplication tasks like 2 x 3 = 6 we use a kind of pattern-completion strategy in that we can see the answer before really thinking about the problem. A more complex multiplication task like 589 x 746 would not be so easily recognizable. When we have to work out the answer to such a task we usually reduce the problem to smaller segments of pattern-completion tasks like 6 x 9, 6 x 8 etc. and store them on paper according to a learned algorithm. We then use these stored pieces of pattern-completion tasks to get to the final answer. Thus, a formal reasoning task like long multiplication becomes an internal task of pattern recognition and completion coupled with an external task of structure manipulation. In other words, just like with the use of tools and language, we engage things outside ourselves to help us complete this cognitive task. We change a challenging formal reasoning task into a process of simpler pattern-recognition and –completion tasks. Cognition

becomes extended beyond computational processes in the brain (Rowlands, 2010, Kono, 2010).

ROWLANDS' THESIS OF THE EXTENDED MIND

Mainstream cognitive and neuroscientists may accept that the use of tools and language, as well as information present in the environment, supports and greatly enhances cognition, but that cognition itself is still a process that only happens in the brain. They may, for instance, argue that the optic array provides us with information about objects around us and that we can access that information by moving around in the environment, but that the cognitive processing of that information still only takes place in the brain. This view is often called the hypothesis of embedded cognition and it states that cognitive processes do not extend beyond the skin but they do depend on external devices (Benecker, 2014).

Rowlands (2010) developed a thesis in which he defends the idea that at least some true cognitive processes extend into the environment because these processes are composed of and are contingent upon actions performed by the organism on the environment. I will explain his thesis in detail here in order to defend my argument against critics who may concede that cognition depends upon environmental variables, but still conceive of cognition as purely brain processes.

Rowlands sums up the thesis under the following points:

"1. The world is an external store of information relevant to processes such as perceiving, remembering, reasoning…(and possibly) experiencing

2. Cognitive processes are hybrid – they straddle both internal and external operations

3. The external operations take the form of *action*, broadly construed: the manipulation, exploitation and transformation of environmental structures – ones that carry information relevant to the accomplishing of a given task

4. At least some of the internal processes are ones concerned with supplying the subject with the ability to appropriately use relevant structures in its environment

As I shall understand it, therefore, the thesis of the extended mind is (1) an *ontic* thesis of (2) *partial* and (3) *contingent* (4) *composition* of (5) *some* mental processes" (ibid., p. 59).

The thesis is ontic because it is about what some mental processes are and not an epistemic thesis about the best way of understanding mental processes. The thesis accepts that there is always a neural component to any mental process and claims that some mental processes are *in part* made out of the manipulation, exploitation and transformation of relevant structures in the environment. Furthermore the thesis claims that some mental processes are contingent upon the manipulation, exploitation and transformation of relevant structures in the environment: They don't necessarily have to be composed out of environmental actions, but they did happen to develop that way. The thesis also claims that, rather than simply depending on the subject's actions upon the environment, some mental processes are actually composed of such actions, making those actions a part of the mental process (ibid.).

The thesis of the extended mind does not claim that cognitive states are identical with environmental structures. Rather, it is about cognitive processes – it is what we do with environmental structures that form part of overall processes of cognition. Neither does it want to claim a specific location for cognition, or where the boundaries of cognition should be drawn. Rather it takes up the position that cognitive processes should be seen as possessing no determinate boundaries at all. The focus of the thesis is what mental processes are composed of, not where they are located. And its claim is that "[c]ognitive processes are an

amalgam of neural structures and processes, bodily structures and processes and environmental structures and processes" (ibid., p.83). And if mental processes are amalgamated processes then we can ask whether looking at brain processes alone to try and understand mental (and psychological) processes makes any sense at all.

Criteria for Cognition

The act of cognition usually refers to the mental action or process of acquiring knowledge through thought, experience and the senses. In setting up the criteria, Rowlands (2010) follows the general conception of cognition as it is understood by mainstream cognitive and neuroscientists. "[W]hen we examine cognitive-scientific practice, what we find is an implicit mark or criterion of the cognitive that looks like this:

A process *P* is a *cognitive* process if:

1. *P* involves *information processing* – the manipulation and transformation of information-bearing structures.
2. This information processing has the *proper function* of *making available* either to the subject or to the subsequent processing operations information that was, prior to this processing, unavailable.
3. This information is made available by way of the production, in the subject of *P*, of a *representational state.*
4. *P* is a process that *belongs* to the *subject* of that *representational state."* (ibid. p. 111)

Rowlands states that these criteria present a sufficient condition for a process to be defined as cognitive, but not a necessary condition. If a process satisfies the four conditions, it is a cognitive process. But, because there may be other ways in which a process can count as

cognitive, if a process does not satisfy the four conditions it does not mean that it is not cognitive. However, as stated before, these four conditions make up the core of current thinking about cognition (ibid.).

The Thesis of the Extended Mind Meet these Criteria

To see whether the thesis of the extended mind meet the criteria for true cognition, let us look again at Gibson's conception of visual perception as something that starts outside of the brain with the optic array. As we have seen, Gibson argues that the environment is filled with rays of light travelling between the surface of objects. At any given point, wherever the observer may be situated, light converge from all directions creating a set of visual angles with differing light intensities and wavelengths. This is the optic array and it changes as the observer moves around from one spot to another in the environment. The optic array is an external information-bearing structure because the character of the structure is determined by the character and position of the surfaces from which light is reflected: it consists of information about the nature and position of objects viewed from any given point. By moving around and thus systematically transforming one optic array into another, the observer makes available to itself information that was previously unavailable. The manipulation of the optic array is nothing else but the transformation of one information-bearing structure into another and satisfies condition (1) of the criterion of cognition. Manipulation of the optic array furthermore makes available information that was previously unavailable and thus also satisfies condition (2). The information present in the external optic array can be supplemented with the manipulation of internal information-bearing structures in the brain. This results in the recognition of the specific character of things observed and orientation of the observer in the environment, in other words the creation of a representational state within

the observer. This satisfies condition (3). But keep in mind that this representational state is the result of both internal and external processes in combination. Because the observer must intentionally direct its attention by moving around in the environment in order to make information available to itself and because the information extracted from the optic array is supplemented by the further manipulation of information-bearing structures within the observer, this is a process that belongs to the subject of the representational state, i.e. the observer and thus also satisfies condition (4). Intentional directedness toward the environment outside should be understood as an activity through which things in the world are revealed or disclosed to the observer. And if intentional directedness is an activity of disclosure, then it is not situated in any one place (i.e. the brain) but wherever this disclosing activity takes place (ibid.).

Reading a book is another example. The symbols on the page are information-bearing structures that are manipulated and transformed when my eyes scan them (1). Information that was not previously available becomes available in this way (2). As I am reading the meaning of the words creates a representational state in me (3 and 4). I do not stop at the words but the words (like the blind man's cane) is a vehicle through which the world is revealed to me. Thus, reading involves a cognitive process that includes not only processes in my brain, but also the manipulation and transformation of an external information-bearing structure.

The external manipulation of information-bearing structures - changing the optic array by moving around in the environment, reading a book - should be considered proper cognitive processes. Thus the thesis of the extended mind cannot be dismissed on the grounds that the manipulation of external information-bearing structures are not proper cognitive processes. Accepting this extended view of cognition leads us to the conclusion that although neural processes are necessary for cognition, they are often not sufficient for creating a complete

picture of many cognitive processes (Slaby & Gallagher, 2015). Such a conception also leads us out of the dead end of Cartesian dualism.

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CONCLUSION

In chapter one we discussed the age old philosophical tug-of-war between the nature ideal and the freedom ideal. For most of this time the natural sciences set to work uncovering the causal laws of the natural world. It was believed that through understanding the mechanisms of nature man can control and rule over nature and in this way attain freedom from the tyranny of the laws that bind him also. But in the process man recreated nature in the image of his science. Nature became a machine. And man became a small cog in that machine, one more mechanical system among others. During the 20th century this became the main ontological model of the human. And in this milieu neuroscience was born and most of neuroscientific research and theorising work within this dominant framework. Today, within the dominant nature ideal, the brain has become the absolute starting point for understanding ourselves, the origin of all human activity. The individual psychological, social, cultural, political, moral aspects have all been tied to what goes on in our heads.

As we have seen in this chapter, the way out of such an overly reductionist ontological model is to define mind and cognition as things that extend beyond the brain. Neural processes are only one part of a much larger system that includes the body and the body's situatedness in an environment. The brain is necessary but not sufficient for understanding cognition, mind, consciousness, selfhood, social interaction etc. In such a broader and inclusive model of human being-in-the-world, there is again space for considering human agency and a degree of freedom within the constraints of natural laws.

There is also a place for humanistic scientific psychology next to natural scientific psychology. Psychology does not have to become a sub-discipline of neuroscience. The psychological aspect, although grounded in the biological, is a distinct and unique aspect that does not need to be reduced to the biological in order to be studied or understood. It should be approached on its own terms and studied using methods appropriate to it.

Chapter 4

People as Story Tellers: An Alternative Ontology

INTRODUCTION

In the previous chapter we saw that the mainstream neuroscientific ontology of the human subject is not a true reflection of reality. The neuroscientific assumption is that consciousness and processes of cognition begin and end in the brain. Therefore we only need to study the brain in order to learn all there is to know about consciousness and cognition. Moreover, mind is brain, and understanding brain will lead to understanding our mental lives and thus ourselves as human beings. But I criticised this assumption and discussed how consciousness and cognition are processes that not only take place in the brain. Indeed, the rest of the body in which the brain is situated, as well as the environment in which the body in turn is situated, play important roles in consciousness and cognition. For this reason physical presence, health, emotional states, personal history and experience, agency, social relationships, institutions, culture, values, socio-economic realities, perception of the self and others etc. are all tangled up with consciousness and cognition in reciprocal relationships in which the border between brain and person becomes blurred.

However, as we have discussed in chapter two, natural-scientific psychology has, for the most part, accepted the assumptions on which the neuroscience model of the human stands and this has already had an influence on the direction in which psychology is headed, as we have seen with the latest version of the DSM classification system, the growing use of brain imaging technology in various areas of research and therapy etc.

In chapter one I argued for the existence of a dualism between the nature ideal and the freedom ideal in philosophy and psychology. The nature ideal envisions greater control over nature by discovering her causal laws and harnessing them for the purposes of human progress. This ideal can only be realised through the use of empirical scientific methods. We saw that the pioneers of psychology, striving to establish the discipline as a true science, adhered to this ideal and thus sought to apply natural scientific methods to the study of the human psyche. For the most part, mainstream natural-scientific psychology has been trying to achieve this ideal throughout the 20th century. With the rise of neuroscience a new door was opened for establishing psychology as a true natural science.

The other side of the coin, however, is that in a cosmos conceived of as a machine driven by causal laws, ideas of human agency are put under pressure. Unchecked, the nature ideal can only result in deterministic and reductionist conceptions and completely destroy any conception of human beings as free, multifaceted and responsible agents. Fortunately, from the start there has been critics of the natural-scientific psychological paradigm. These critics have always argued that the human subject cannot be studied through natural scientific methods alone. Alongside the development of natural-scientific psychology then, ran a humanistic-scientific psychology that has always striven towards keeping the freedom ideal alive by protecting the dignity of the human personality in non-reductionist conceptions.

In this final chapter I will look at one such conception of the human subject that already existed in the early days of psychology's history in the ideas put forward by Wilhelm Dilthey and the hermeneutic tradition. I will trace its development and the form it is taking today in narrative psychology. My purpose is not to put this forward as an alternative to brain research in psychology, or as the one true way of looking at the human subject, rather it must be seen as one alternative conception existing alongside and complementing natural-scientific psychology.

The conception of human beings as story tellers who create for themselves an individual and cultural identity through the construction of personal and group narratives flows naturally from the idea of cognition and mind as processes extending beyond the brain, as narratives include things like a shared language, subjective experience, personal and cultural values, situatedness in time and place. At the same time it acknowledges the important role the brain plays in creating these narratives through introspection and the use of memory for example. Narrative psychology then, is ideally situated between the nature ideal and the freedom ideal and provide us with the opportunity to bring natural-scientific psychology and humanistic psychology closer together. My purpose is to keep a space open for the freedom ideal in the age of neuroscience. We are our brains. But we are also much more. We are not just passive processors of information but active creators of information, creators of our own individual and collective life stories and creators of meaning.

WILHELM DILTHEY

Wilhelm Dilthey was one of the first psychologists to criticise an exclusive natural scientific approach to the study of the human subject. His main contention was that the scientific explanation of nature could only take one so far and that it should be complimented with a theory of how human beings understand their world and their lived experiences through symbolically mediated practices (Ginev, 2014). Whereas the natural sciences observe and *explain* nature in terms of cause and effect, the human sciences should *understand* the human subject in terms of the parts and the whole. Both the natural and human sciences are grounded in the life-context or nexus of life, but whereas the natural sciences tend to create a distance between that context and the practice of science by abstracting away from it, for the human sciences the life-context should be the primary focus of enquiry. The purpose of the

human sciences is to understand and interpret the life-context. If we take into consideration the argument put forward in the previous chapter, namely that consciousness and conceptions of the self are best conceived of not as mental states but as processes that consist of our interactions with the world, then we can appreciate the importance of the life-context in the human sciences.

Regarding practices of interpretation, Dilthey turned to hermeneutics as a tool for understanding the human life world (ibid.).

Explanatory and Descriptive Psychology

Dilthey made a distinction between explanatory psychology and descriptive or analytical psychology. Explanatory psychology studies parts of mental life and basic processes in isolation and from a third person perspective in order to discover causal laws, whereas descriptive or analytical psychology strives to describe and understand how different mental processes come together in what he calls the structural nexus of consciousness (Ginev, 2014). But the distinction he draws between nature and culture, between explanation and description, should not be seen as opposed to each other. These are two distinct domains of scientific enquiry that differ from each other in important aspects, but at the same time they also overlap and complement each other. The distinction is not based on a difference in the objects of study, but rather on two different kinds of facts. Thus the same phenomena can be approached in different ways, either by focussing on the outer material reality or the inner psychic reality. Therefore, Dilthey did not deny the relevance of explanatory psychology in providing knowledge about the physical aspects of behaviour. He saw clearly that physical knowledge overlap with psychical knowledge at some point. At the same time, however,

there are uniquely psychical facts that cannot be approached through natural scientific or explanatory methods (Harrington, 2000).

Dilthey's conception of an explanatory and descriptive psychology was mainly aimed as a critique against the late 19th century idea of psychology as a discipline oriented towards the discovery of causal laws through the use of empirical methods. According to him this kind of psychology destroys the real-world unity of the human subject by reducing behaviour to discreet components, forces and laws and then trying to reconstruct the original unity in an artificial manner. Furthermore, when explanatory psychology tries to make its concepts more specific, it runs up against exceptions and finds it cannot predict behaviour by means of its hypotheses. And so hypotheses remains abstract and empty of predictive power. Dilthey argues that it is at this precise point that the value of a descriptive psychology, that brings the subject's inner experiences and sense of agency into play, comes to the fore (ibid.).

For Dilthey descriptive psychology describes and analyses the whole or the unity that already exists and does not try to reconstruct this whole from dismantled components. Human psychic life is an interconnected whole. Thus the subject matter of psychology already exists as a structured whole and does not need to be reconstructed. Cases under study are not reduced to causal laws, rather the focus is on the typical behaviours of a specific context as compared to other contexts. The role played by purpose, motive and unique life history in individual action, as well as the mediation of behaviour by language and other symbolic structures, are the focus points of descriptive psychology. The aim is to describe the totality of psychic life in all of its contextual parts through methods of comparison in order to develop understanding about the meaning of the content of psychic life. The context in which psychic life takes place he called the psychic nexus of life. It is in this nexus that people gain understanding of themselves and others through lived experience and where consciousness is entwined with emotion and agency.

For Dilthey, psychological understanding does not simply mean theorizing about a subject's experiences by means of empathy in order to extract general laws under which one can group these experiences. In order to understand, the psychologist must investigate the unique historical, social and symbolic contexts of his subject and then explain the subject's actions, development, motives etc. within this contextual framework. Whereas explanatory psychology strives to establish general laws, descriptive psychology want to understand the individual or particular and the relationship between the general and the particular.

Hermeneutics

With his emphasis on meaning and the interpretation of people's life worlds and lived experiences, Dilthey was the first to introduce psychology to hermeneutics. Hermeneutics is the theory of understanding and interpretation. Initially hermeneutics referred to the principles for interpretation of Biblical texts. Later it was extended to the interpretation of legal and classical literature texts as well. Schleiermacher was the first to conceive of hermeneutics as a general doctrine for understanding and interpretation that can be brought to bear on all forms of communication, not just written texts (Gadamer, 2006). This opened the way for Dilthey to conceive of hermeneutics as a more appropriate approach to the psyche than natural scientific methods, a way to study the human subject without losing the important contexts in which we don't just act, but also influence and are influenced by. As, for instance, Jovanovic (2010) states, the subject of psychological inquiry should be seen as a meaning-making subject who subjects his or her world to normative assessment. "It is only this meaning-making subject who can make sense of the world in which it lives. Interpretations given by human subjects are not arbitrary supplements that can be added to or subtracted from the human world; they are constitutive of the human world." (ibid. p. 580).

However, Dilthey was all but forgotten during the first decades of the 20th century when psychology became enamoured with natural scientific methods and moved by way of behaviourism on to cognitivism, both of which pushed context or life-world and the idea of humans as meaning-making subjects generally to the sidelines. This was mainly due to a narrow, reductionist conception of cognition. If we redefine cognition as extended beyond the brain and intimately tied up with our life-worlds, there is every reason to incorporate context and subjective experience within that context as part of the study of the human.

Philosophers like Heidegger, Merleau-Ponty, Gadamer and Derrida continued to develop hermeneutics and there were always psychologists on the fringes, especially humanistic and critical psychologists, who kept pace with these developments. Holzkamp was one such a psychologist. For him the methods that natural-scientific psychology employed distanced researchers from real human beings and ultimately led them to study an artificially created subject. He called for a psychology from the standpoint of the subject rather than from the standpoint of psychological tests and measures. Humans create their own subjective life-histories and it is this subjective point of view that should be the central focus of psychology. For him the human condition can only be understood by studying the ways in which we construct our worlds through our ability for agency, choice, imagination and action, how we search for meaning and how we create meaning (Brockmeier, 2009).

But it was perhaps especially the ideas of French philosopher, Paul Ricoeur, that sparked a renewed interest in hermeneutics and led to the rise of narrative psychology from the mid-1980's onwards with its focus on the creation of meaning through the narratives people develop about themselves and others.

PAUL RICOEUR

Paul Ricoeur's philosophy developed on the foundations of hermeneutics, phenomenology and existentialism. His thoughts had a great influence on narrative philosophy and narrative psychology. He rejected both deterministic and relativistic post-modern ontological models of the human subject. Where other philosophical systems destroyed or relativised human selfhood, his philosophy aimed at saving and grounding the self (Pucci, 1992). For Ricoeur then, a main concern was with the question of who we are as human beings. Especially his later works, for instance *Oneself as Another* (1992), focused on themes of personal identity, which he felt was put under strain by philosophies and sciences with an empiricist and analytic bent.

I have argued in the previous chapter that language is a tool that enables us to extend our minds beyond our physical bodies, beyond place and beyond time. Since the focus of 20th century philosophy shifted to language and the sign, it was increasingly accepted that the human subject can only gain understanding of himself and the world through language. For Ricoeur this constitutes a continuous process of interpretation. Thus, personal identity is never fully developed or clear, but neither is it de-centred or incoherent. It emerges and grows by means of narrative in relation to time; creating meaning out of the past and authoring future possibilities. Due to this relationship between time and narrative, personal identity can have a foundation of stability although it is an ongoing process (Ricoeur, 1992; Thompson, 2016).

We are constantly busy with self-interpretation within our specific life worlds. This self-interpretation creates a narrative that continues to unfold as we live our lives. In this way our past and present actions and experiences become meaningful within an ongoing narrative which also points towards an imagined future. Our self-interpreting narratives are constructed

from our involvement in specific traditions, contexts, relationships etc. Thus, we do not construct them individually and in isolation, but through processes of reciprocal influence and communication with others by means of language and culture. Other voices, past and present, continuously speak and contribute to one's own voice and story. Therefore narratives are not static but open-ended and constantly being revised. (Thompson, 2016).

From these considerations, Ricoeur developed his own hermeneutic circle comprising of the processes of prefiguration, configuration and refiguration. Imagination prefigure lived experience by creating a symbolic plan of action. Experience is then configured into a story consisting of a central theme that ties single events into a narrative whole. Then the one encountering this story (who can be the original creator of it or someone else) refigures the story in connection with new lived experiences. Lived experience has no meaning in itself until it is prefigured, configured and refigured into narrative. Ricoeur called the process by which experience is married to narrative emplotment. Discordant events are made into episodes. These episodes are organized into the narrative according to the narrative's central theme. In other words, the theme structures different events or episodes into a coherent story. It also results in us selectively appropriating episodes to create the narrative in line with the plot. The theme or plot of a narrative in turn is not chosen arbitrarily or forced upon the narrative, rather it develops out of other narratives and in connection with historical and cultural norms and practices. Emplotment then gives meaning to experiences (Ezzy, 1998; Thompson, 2016). However, meaning is not derived from placing an event in a specific category, but rather the meaning of a single event is derived from placing it within the context of a narrative consisting of many other events or episodes. In other words, we make events understandable by placing them in stories. In our narratives, episodes do not have to follow each other chronologically or logically, they just have to fit into the plot in a way that is coherent for the storyteller (Somers, 1994).

Narrative Identity

Thus, through the narratives we create about ourselves (individual and collective) we develop a self-identity. For Ricoeur, action that have meaning can be considered as a text. Put differently, our own and other's actions become stories we tell about ourselves and others (Pucci, 1992; Thompson, 2016).

Ricoeur differentiates between selfhood and identity (Ezzy, 1992; Rasmussen, 2007). For him selfhood is an entity with the distinctive ability to reflect upon itself, whereas identity is the result of this reflection and thus a narrative construct. Narrative identity creates the sense of continued sameness in the theme or plot of the story we tell about ourselves (Rasmussen, 2007). This identity does not exist in isolation, it does not come into being in the individual psyche alone, because as we have seen before, we construct our narratives from our involvement with others through the use of language. Therefore our identities are not completely of our own making. Because it is created in terms of ever changing past, present and future considerations, it is temporal and fluid and sometimes chaotic, but that does not mean it is an illusion, as postmodern theories and mainstream neuroscience would have it. It is a very real conception of the self, born of constant self-interpretation, and makes life coherent and meaningful. "Narrative identity is coherent, but fluid and changeable, historically grounded but fictively reinterpreted, constructed by an individual but constructed in interaction and dialogue with other people" (Ezzy, 1992, p.246).

Because we create our narratives within the confines of time and place and also in relation to other people and other narratives, we are not completely free to create those narratives at will.

There are always dominant cultural, political and socioeconomic narratives that sets limits to our own private and public narratives. When narrative repertoires are extremely limiting to certain individuals and groups, the struggle to create meaningful narratives from experiences could lead to confusion, despair, a breakdown in identity, feelings of powerlessness and even mental illness (Somers, 1994). Narrative identity thus places these things in a broader social reality.

TOWARDS A NARRATIVE ONTOLOGY

The thoughts of Ricoeur lay the foundation for a less deterministic and reductionist ontology of the human subject within psychology. Whereas neuroscience describes the human subject as a logical processor of information according to sets of pre-existing algorithms in which intention, meaning, time and environmental context play insignificant roles, Ricoeur says that human beings are primarily intentional and self-interpreting seekers of meaning within the time frames of past, present and future as well as within dominant cultural narratives. Furthermore, the feeling of selfhood is not the result of different brain areas working in collaboration, but the result of the intentional and ongoing creation of a narrative identity in which language plays a pivotal role. And as I have argued in the previous chapter, language as a tool extends our minds beyond the barrier of the physical brain into the social world of which we are a part. Narrative is “an ontological condition of social life”, (Somers, 1994 p. 614) and “individuals’ stories about their lives ought to be understood as core elements of personality”, (Adler, Lodi-Smith, Philippe et al, 2016, p. 142). Narrative, not mere biology, guide action. Narratives tell us who we are and this knowledge guide us in what to do. The formation of identity, the creation of meaning, patterns of behaviour are all tied up with the stories we tell individually and collectively (Somers, 1994). Whereas a neuroscientific

approach assumes that we act on the basis of logical processes and internalized values, the narrative approach assumes that we act in accordance with how we see ourselves in the plots of our stories at a specific time and place. Our actions are part of our identities and the time and place we live in. Thus, behaviour can only be understood within the various individual and collective narratives in which it is emplotted. The concept of narrative identity allows us to shift our understanding of behaviour in terms of causality to that of meaning and purpose within a narrative plot.

Furthermore, narratives are created within a social and cultural context. "[S]tories are constructed, told, heard and evaluated within particular historical, institutional, and interactional contexts, which include the background assumptions of storytellers and storyhearers as well as the prevailing norms of storytelling" (Loseke, 2007, p. 663). Narratives then, cannot be understood or evaluated in isolation from history and culture. The neuroscience paradigm, with its focus on imaging techniques, often ignore these kinds of contexts, leading to a reductionist evaluation of human functioning.

Actor, Agent, Author

McAdams (2013) developed a framework of the psychological self that can serve as an outline for a narrative ontology of the human subject. He argues that we understand ourselves from the perspective of three different psychological standpoints, that is as actors, agents and authors. These three perspectives emerge at different stages of development, but once established, they continue throughout the life course in conjunction with each other.

The first perspective is that of the social actor. For highly social beings like humans, the self first emerges and is defined within a social context. Infants and young children react to cues

about their behaviour from caregivers and modify their actions according to positive and negative feedback. So, the first conception of the self is one of a self-conscious actor who's actions are evaluated by others. Young children will often describe themselves in terms of concrete actions and dispositional traits. As actors, we constantly observe our own actions and those of others and we define ourselves in terms of these observations. The content of the self-concept thus consists of social roles, traits and skills. As the individual matures through adolescence and adulthood, insights about the influence of other's evaluations and specific social situations on performance become more nuanced. The actor role also becomes more differentiated as we take on more roles like that of spouse, parent, citizen etc.

The second perspective is that of the motivated agent. To see oneself as an agent is to accept responsibility for the direction in which one's life is moving based on the understanding that human beings have a degree of freedom to make choices in order to attain life-goals. During adolescence, when young people start to explore long-term goals and projects and planning for the future, they begin to see themselves not just as social actors, but also as motivated agents. The self becomes defined in terms of personal goals, plans and values. These goals and plans are often developed in accordance with a person's actor self-concept. Whereas the actor lives in the present, the agent extends selfhood from the present into the future.

The third perspective is that of the autobiographical author. Although young children are able to tell stories about themselves, their families and events, it is during late adolescence and early adulthood that people begin to see themselves as authors of their own life-stories when, in order to create purpose and meaning out of experiences and events, social roles and choices, they construct narratives to define themselves. It is during late adolescence that individuals start showing a greater capacity for developing organizing themes or plots for their lives, arranging episodes in coherent stories and contemplating past experiences. In this perspective then, the self is constructed as a narrator, telling the story of the self as actor and

the self as agent. This narrative creates a sense of continuity amidst various social roles a person may take on and the onward march of time. It is thus a very important aspect in identity formation. For this sense of continuity a person needs to be able to go back and forth in time, to remember past events and to imagine future possibilities. But he or she also needs to distil meaning from these past and future events in order to make connections between them and create a plot.

Such a narrative ontology has the advantage of incorporating many different aspects as well as different levels of human functioning and thus being anti-reductionist. It acknowledges important facets of psychological life that is ignored or dismissed by a neurological ontology, such as agency, subjectivity, identity, meaning, choice, values, culture and history. Furthermore, a narrative approach has proven positive practical outcomes.

APPLIED NARRATIVE IDENTITY

A major criticism that natural-scientific psychologists often level at humanistic orientated approaches is the latter's lack of a rigorous methodology. But using individual narratives is a useful methodological tool in psychological research. According to Adler, Dunlop, Fivush *et al.* (2017) many sub-disciplines in psychology have benefitted from making use of narratives in research on such diverse topics as psychotherapy, alcoholism, gender, family processes, emotion regulation, ethnic identity development and mental health, amongst others. In this section I will look at some popular approaches to narrative research and then discuss three research topics from a narrative perspective. With this I would like to show that a narrative approach is not just a theoretical or philosophical stance in psychology, but also provides possibilities for scientific research that can compliment a neuroscientifc approach.

Narrative Research

Narratives represent recollected experiences reconstructed around a theme or plot in order to serve context-specific functions. The purpose of narrative research is to understand these functions (Adler, Dunlop, Fivush *et al.*, 2017). Narratives provide researchers with a tool for understanding people's lived experiences in context. Thus, it is a means for conducting what Dilthey called descriptive research.

The first step in narrative research is to identify core narrative elements or categories. These may be grouped under motivational themes of agency and goals, affective themes of negative or positive outcomes and resolution, themes of integrative meaning and structural elements of coherence and complexity. Narrative questions can be asked around these themes that lead to the formulation of hypotheses (ibid.).

Research questions and hypotheses will guide the researcher in developing appropriate narrative prompts when collecting subject's stories. This helps the subject to tap into memories of specific episodes like challenging experiences, key moments (high, low or turning points) or the memories that are particular to the research. Prompts usually ask for a detailed elaboration of an event or events and for the subjects reflection (meaning making) of that event (ibid.).

Narratives can be in the oral or written form. The form may depend on the kind of research being conducted. Oral narratives usually provide more elaborate data while written narratives can provide more coherent data. After transcription the narratives are coded according to narrative categories. The most used unit of analysis is the episode. This allows researchers to

draw comparisons between subjects on the basis of specific episodes or between different episodes for the same subject (ibid.).

Narrative Identity and Well-Being

Two of the most important functions of a narrative identity are to provide the individual with a sense of meaning and a sense of continuity. These functions add to a person's overall well-being (Adler, Lodi-Smith, Philippe *et al,* 2016). Research has shown that there exists a correlation between narrative themes of motivation and a sense of well-being. The stronger themes of positive motivation and agency in a personal narrative, the higher the individual scores on measures of well-being. Research has also revealed that a positive affective tone in a narrative is associated with positive well-being. Furthermore, when narratives are more coherent and evaluative (and thus contain a strong sense of meaning in its central themes), subjects showed lower levels of depression and anxiety and higher levels of reported well-being (Fivush, Booker & Graci, 2017).

Serious and chronic illness are disruptive, traumatizing experiences. It has been shown that serious and chronic illness often throws people's assumptions and perceptions of self, others and the world into disarray, breaking down the narrative sense of coherence and connection with past events and future plans (Crossley, 2000, Loseke, 2007). Various studies have shown that through a process of narrative reconfiguration, whereby people try to create a sense of meaning and connection in light of their illness, they manage to cope with such traumatizing experiences (Crossley, 2000.)

These research findings makes clear the importance of subjective narratives in people's lives, indicating that an understanding of narrative can be fruitful in many applied settings like

therapy, education and the work environment. For instance, it has been shown that helping clients to increase motivational themes in their stories had positive effects in therapy.

Narrative Identity and Drug Addiction Recovery

In chapter two we saw that addiction is increasingly defined and understood as a disease of the brain. Consequently a lot of research is focused on discovering the biological mechanisms of addiction. These endeavours remain marginally successful due to the fact that addiction, like so many other pathological behaviours, is complex and comprises different variables from the individual to the social levels. If narrative plays such an important role in people's lives as Ricoeur and others have argued, then helping recovering addicts to refigure their narrative identities should have strong positive effects.

Two research projects cited by Taieb, Revah-Levy, Moro *et al.* (2008), shows the power of narrative to help addicts recover from drug abuse. In the first study 51 people who have not used drugs in the preceding two years were interviewed about their recovery stories. What stood out from these interviews was that these subjects showed a strong conception of themselves as being in control of authoring their recovery stories. These stories showed, in Ricoeur's terms, prefiguration in the form of an imagined future without drug dependence, the theme of being drug free is then configured into a new story with episodes of struggling against the urge to use drugs, and as the hold of drug use declines the subject refigures him- or herself in the story as a recovering drug addict. The researchers found that the narratives were not just about recovery, but became in itself an important component of the recovery process as it helped the subjects to create new identities for themselves (ibid.).

In the second study 70 recovering addicts were interviewed with the aim of identifying the ways in which narrative helped them to reconfigure their identities as non-drug users. The researchers found that the subjects first reinterpreted the addict lifestyle and in so doing,

distanced themselves from it. This gave them the chance to reconstruct a self free from drug dependence. Then they created accounts of their recovery processes that reinforced their reconstructed identities (ibid.).

These research findings point out how important subjective experience is in the process of recovery. It is from this subjective experiences that recovering addicts try to create meaning through the telling of their life stories. By reconfiguring their stories, they create new narrative identities which in turn lead to new conceptions of the self. Such positive new identities of the self as a non-drug user or recovering addict, play an important role in recovery. But if we focus our attention on the biological component of drug addiction alone, this powerful tool will be left unexplored.

Narrative Identity and Self-Esteem

Personality partly consists of events stored in memory and selected as part of a person's life story. These selected events then help us to define who we are. As such, these self-defining memories play an important role in self-esteem. Self-esteem, in turn, provides a measure for quite accurate predictions of functioning in various domains like relationships, career choices and well-being.

Liao, Bluck and Westerhof (2017) used a one year longitudinal study to examine the relationship between self-defining memories and self-esteem. They found that the more positive self-defining memories subjects can retrieve, the more positive would be their life stories and self-esteem. Strong and positive processes of meaning making through the retrieval of positive memories and creation of self-defining life stories leads to positive self-esteem. It means that a greater amount of positive as opposed to negative life events are

chosen as being self-defining. But it also means that negative events are given a more positive meaning in the life story. In other words, positive meaning making (even of negative events) leads to better self-esteem.

Furthermore, these researchers found that people with positive self-esteem reflect more on their memories and life stories and rely on them more often for functional purposes, strengthening positive self-esteem even further. "Using self-defining memories functionally involves matching personal goals to environmental needs such that memory flexibility serves the organism across situations. As such, the more one uses self-defining memories as a resource the greater the likelihood of creating a positive self-environment fit that promotes self-esteem" (ibid. p. 17).

COMPARING NARRATIVE AND NEUROSCIENCE

One may argue that creating a narrative is still a cognitive process and thus a brain process, justifying the examination of brain processes through imaging techniques in laboratory settings isolated from real life contexts. But I have argued in chapter three that cognitive processes are best conceived of as extended beyond the brain and include the body in which the brain resides as well as the environment and sometimes also other brains. This is also true for narrative identity in which language plays such a defining role. And as I have pointed out in the previous chapter, language is socially constructed and requires one's involvement in a linguistic community. Personal narrative and identity, individual minds and cognitive processes, can thus never be divorced from social and cultural settings. Context is not peripheral but central in understanding how the mind works.

Furthermore, research have shown that even after severe brain damage, with the loss of episodic and semantic memory, people were still able to recount with relative accuracy what their basic traits are (cited in McAdams, 2013). Thus, in spite of neurological impairment, there is a continuity of a sense of selfhood and narrative identity. It would seem then that the creation and maintenance of a personal narrative involves more than biological (i.e. brain) processes. It also involves social and cultural contexts, the interrelationship with others and the use of language in a socio-linguistic arena. It would seem that some aspects of our selfhood originate and exist in our environments and does not rely on cognitive processes in the brain alone.

Also, cognitive science has revealed that people rely on schemas that make generalized information automatically available in order to navigate their way through the world. Schemas generally consist of abstract social knowledge (how to act in different social settings) and abstract self-knowledge. We construct schemas from repeated experiences. But we also experience unique life events and novel situations that are often significant but not generalizable or repeatable. These distinctive experiences add to our self-knowledge in a different way than does schemas. Often it is from them that we construct our narrative identities. Because they are distinctive we attach strong emotions to these events, helping us to lay them down in memory and make them part of the stories we tell about ourselves (Adler, Lodi-Smith, Philippe *et al*, 2016).

Meaning-making vs. Information Processing

One of the important reasons why people construct narratives is in order to create meaning out of events and experiences. Meaning-making is the narrative process by which we make sense of experiences in such a way as to help us understand ourselves, others and the world

(Fivush, Booker & Graci, 2017). Almost all the disciplines concerning themselves with meaning and meaning creation, like linguistics, cognitive science and neuroscience, locate meaning in the head. For neuroscience it is the system of computational information processing driven by biological mechanisms – a system controlled by causal laws or functional algorithms. In effect these disciplines replaced the concept of meaning with the concept of information. Consequently the mind is stripped from its subjectivity and agency, and divorced from its history, interrelationship with other minds and sociocultural environment (Brockmeier, 2009). Meaning however, is something qualitatively different from mere information. And we do not just passively gather "neutral" information in order to extract meaning by way of cognitive processes. We actively and purposefully engage with a world already imbued with meaning for us. Our engagement, based as it is on subjective agency, is itself also filled with meaning. Thus, meaning does not come about in individual minds and in sociocultural vacuums, meaning is always already part and parcel of our everyday relational, historical and cultural realities (Noë, 2009; Brockmeier, 2009). Whereas the computational paradigm of information processing sees cognition as reactive – reacting to neutral stimuli – the narrative approach consider cognition to be proactive: we live in a world filled with meaning and we focus our attention on and select stimuli who's meaning is important to us. "Making meaning goes beyond the basic capacity of memory as a record of the gist and detail of events. It creates context for integrating life events across a life story, with effects that spill over not only to interpretation of the remembered event itself but to one's view of life and self" (Liao, Bluck & Westerhof, 2017, p. 16).

There are four fundamental types of meaning-making, i. e. coherence, subjective perspective, integrative meaning and motivational themes (Fivush, Booker & Graci, 2017). Coherence is the process by which we create order in a specific episode, and also connect that episode with a larger narrative, through place in time, context and theme. Subjective perspective is the

process by which we connect thoughts and feelings with events and so doing integrate our consciousness with the outside world. As time goes by we tend to look at past events differently than before. By linking past subjective perspectives with current perspectives, we are busy with a process of integrative meaning. Marking change over time allows us to see ourselves as dynamic, autonomous and growing in a purposeful manner. Motivational themes again provide a sense of continuity of selfhood as it provides a consistent plot for a narrative in relation to goals and values that stay the same in different situations (ibid.). Thus, different types of meaning-making may include some computational processing of information as envisioned by traditional neuro- and cognitive science, but it is clear that they also extend far beyond that. Meaning-making consists of interpretation, asking how events relate. It goes beyond "knowing that" to encompass "understanding how".

Two Kinds of Facts

As we have seen earlier in this chapter, Dilthey made a distinction between two kinds of scientific facts in psychology based on his distinction between explanation and description. Explanatory psychology generates facts about the material or physical reality whereas descriptive psychology generates facts about people's inner or psychic reality. Dilthey acknowledged the relevance of explanatory psychology in providing data about the physical aspects of behaviour. However, explanatory psychology can only provide one half of the picture. We are not just physical beings but also contain a psychic aspect. And psychic reality asks for a unique approach, one of description rather than explanation.

Studying the biological functioning of the brain provides one kind or set of facts, i.e. explanatory facts about physical reality. Studying peoples self-affirming, meaning-making narratives provides descriptive facts about psychic reality. It has been my argument

throughout that in psychology we need both kinds of facts. Upholding explanatory facts as the only scientifically legitimate kind of facts, as is being done under the influence of neuroscience, can only lead to a reductionism that does not do justice to the complexity of the human subject. We have seen this happen time and again throughout the history of psychology, leading to schools of thought that end up reducing the psyche into insignificance, thus losing much power in explaining human behaviour.

Dilthey also acknowledged that these two kinds of facts does not have to be opposed to each other. They can complement each other and together create a more detailed picture. There is the assumption amongst many neuroscientists and neuropsychologists that we only need descriptive, natural scientific facts about the functioning of the brain because these facts will eventually tell us what we need to know about the mind and the psyche. There are many problems with such an assumption and we discussed them in chapter two and three. Equating mind with brain will simply not do. Mind is more than brain, more than information processing. The findings from brain research should be complemented with insights from descriptive approaches such as narrative psychology. For instance, there is great potential for cooperation between neuropsychologists, cognitive psychologists and narrative psychologists on issues surrounding the study of memory, from brain and cognitive processes concerning memory recall to the use of memory in creating narrative and identity. Collaboration in terms of theory and model development is also possible. For instance, rethinking the information processing model of cognition in light of meaning-making processes of narrative.

TOWARDS A NARRATIVE NEUROPSYCHOLOGY

It the final analysis it is about two ways of conceptualising the brain in psychology. One is to follow mainstream neuroscience and focus exclusively on the biological, mechanical working

of the brain and consequently defining the brain as essentially an information processor. Mind, consciousness and the self are reduced to brain activity and are the products of this activity. The other is to define the brain not as something that we are, but as something that we use – a tool for making sense of the world. The brain alone cannot tell us who we are. In order to understand ourselves we need to put the brain in its place, situated in a body that is situated in the world. The border between brain and body and world is forever shifting and diaphanous.

From a psychological perspective the brain is a hermeneutical problem, not a physical one. Conceptions about the brain can never be divorced from narratives about the brain, because in a certain sense, we can define the neurobiological self as a kind of narrative in itself. In more and more scientific articles and books: "we find a narrative that turns reasons into causes, minds into brains, and intentional human action into physical or (neuro-) physiological processes," (Brockmeier, 2009, p. 225). As psychologists we need to understand this narrative process of meaning-making, even if, or especially if, we want to study the physical processes and characteristics of the brain. The brain is not just a physical entity, but also a psychological entity. But we cannot understand the brain as a psychological entity without the inputs from humanistic psychology. Therefore no psychological conception of the brain can ever be complete without contributions from hermeneutic and narrative perspectives. A neuropsychology that wants to contribute to brain science from the perspective of psychology, will have to critically engage with the mainstream reductionist neuroscientific narrative of brain and mind. Otherwise it will just be absorbed into natural scientific neuroscience and lose its relevance as a separate discipline with a unique and important perspective on the study of the brain.

CONCLUSION

In this chapter I looked at the development of narrative psychology, from the early ideas of Dilthey and the later conception of Ricoeur's narrative identity that formed the foundation of narrative psychology to some themes of narrative psychology itself. We have seen that the creation of an ongoing narrative is a very important aspect of personal identity. As such narrative identity should be central to any ontological model of the human subject. However, the neuroscientific ontology of the human subject, with its focus on computational information processing, does not leave room for ideas of human beings as meaning-making creators of life stories. As Dilthey predicted long ago, an explanatory psychology leaning on the methods of the natural sciences can only lead to a reductionist view of human functioning. In order to curb the neuroscientific reductionism in psychology it is necessary to step away from an exclusive focus on brain processes to also incorporate people's lived experiences in social and cultural contexts through the insights from schools with a more descriptive approach to the human subject, like narrative psychology.

If narratives are ongoing processes of meaning-making and identity formation, the narrative of the neurobiological self works towards rallying natural scientific psychologists together around shared conceptions of science and the subject matter of psychology. It maintains and strengthens a reductionist world view and an institutional identity. Challenging this narrative of "we-are-our-brains" has become necessary in order to prevent a dogmatic and restricted idea of psychology as a (biological) natural science alone. In this dissertation I have tried to show that minds cannot completely be reduced to brains and physical processes are not enough to explain intentional human action, thus criticising some aspects of this neurobiological narrative.

General Conclusion

I began this study with a description of a dualism in philosophy that emerged during the Enlightenment period. The Enlightenment thinkers held to the ideal that through reason and the progress of science humanity could free itself from the constraints of nature and traditional authority and make itself master over nature and shaper of its own destiny. But progressively nature was seen in mechanistic terms and in time human beings became defined as part of this mechanical system. Thus, instead of being freed from nature through science, we became enslaved by nature. And so was born the dualism between the science ideal of control and the freedom ideal of the human personality.

Since that time philosophers have tended to lend more weight to either the science (or nature) ideal or the freedom ideal. We have looked at the major philosophers and how, either consciously or unconsciously, they have tended to lean towards one or the other ideal. A majority of them sided with the nature ideal and various philosophies of science, which became the ontological, epistemological and methodological foundations for especially the natural sciences, promoted a mechanistic view of nature.

From the start psychology carried this same dualism. Many early psychologists wanted to build the new discipline on the model of the rising natural sciences. In so doing they also inherited the mechanistic ontological view of nature. Furthermore they thought to study the human psyche by means of physiology. These two factors resulted in a very narrow, reductionist and mechanistic view of the human subject. Already during this time, Dilthey and others criticised this overly reductionist view and suggested that the human psyche cannot be studied using natural scientific methods. They wanted to see human autonomy and agency acknowledged.

Throughout the 20th century this dualism in psychology persisted, resulting in two streams of psychology. The mainstream natural scientific psychology tended towards a natural scientific approach, valuing quantitative experimental methods, seeking cause-and-effect relations between phenomena, believing in value free science etc. In this paradigm a reductionist ontological model of the human is simply pragmatic. On the other hand the alternative humanistic scientific psychology gained some momentum during the civil rights movement in America and also the rise of existentialism in some European countries. This approach to psychology argues for more qualitative methods, an acknowledgement of people's embeddedness in socio-economic and cultural realities, human agency, growth, creation of meaning etc. There has always been the call for a non-reductionist ontology. Humanistic psychology has made quite a few inroads into establishment psychology, succeeding in establishing qualitative methods on an equal footing with quantitative ones, managing to make researchers cognisant of socio-economic factors in individual lives, among others.

However, over the past two decades psychology has lost this fragile balance and tilted towards the natural scientific side of things (or the nature ideal) once more. This is mainly due to the rise of neuroscience. In chapter two I discussed this rise. I also set out the main points of neuroscience's accompanying reductionist ontology of the human subject. Neuroscience is having a profound influence on psychology and I looked at features of this influence in relation to some fields within psychology.

From a neuroscientific standpoint it would seem that all facets of human life are a direct result of how our brains function. We are indeed our brains. Therefore, focussing on how the brain works is the key to understanding not only brain disease and mental illness, but also our behaviour, social relations and what makes us human. In chapter three I criticised the idea that the brain should be seen as this kind of self-sufficient black box holding the answers to every conceivable question about ourselves. The brain is embedded in a body and the body in

turn is embedded in an environment. Cognition extends beyond the brain in an intimate relationship with both body and environment. Thus, the brain is only one part, albeit an important part, of a larger system and cannot be upheld as the ultimate key to understanding ourselves. In light of this way of looking at the brain I also criticised the neuroscientific ontology as not being a faithful representation of human functioning. We are not just, or not primarily, biological. We are multi-faceted and yet not one of these facets define us. We need a theoretical foundation on which we can build an ontology of the human that captures this multi-faceted nature. We need to move beyond the brain, beyond biology and beyond natural scientific mechanistic and reductionsitic explanations, we need to transcend the nature versus freedom dualism.

In chapter four I discussed the hermeneutic tradition in psychology and its leading up to the conception of human beings as story tellers. The idea of a narrative identity challenges the information processing model of mind. Furthermore it extends the mind into the environment as narratives are created through language and language in turn is always socially constructed. The human person cannot be studied in isolation from this sociolinguistic context, by reducing him or her to a brain in a scanner. Cognitive and brain processes cannot be understood in isolation from bodies and environments. Therefore, natural scientific approaches to the human, whether it is neuroscience or neuropsychology, need the contributions of a less reductionist and deterministic humanistic and critical science.

Today neuroscience, carrying with it the prestige of the natural sciences, being promoted as opening new frontiers of knowledge and holding the promise of someday soon revealing to us who and what we truly are, have had a profound influence on psychology, a discipline that has always been hampered by a lack of self-confidence about its status as a science. No doubt brain research has revealed many new insights and it is a very important, not to mention exciting, field of enquiry. Unfortunately with it has come a view of the human that does not

do justice to our multi-faceted nature. Neuroscience is not completely to blame for this. Since the rise of the science ideal, nature has been seen as a machine and human beings as cogs in that machine. However, neuroscience, with its current influence and prestige, is promoting this view of the human as a kind of dogma that reaches far beyond science. But with what consequences for science, human dignity, ideas of freedom and responsibility, political, educational, social and economic policy, treatment of mental illness? Human beings are not computers, or machines, or cogs in machines and should not be conceived of nor treated as such. Therefore we in the social sciences should take a more critical look at the ontological claims made by neuroscience and work towards developing more balanced and broader models of human functioning that can guide not only our own research interests, but also those of neuroscience. I hope this thesis has made one small step towards such an endeavour. Thank you.

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