Scientific Realism and Phenomenology Through the Case Study of Autism

Themistoklis Pantazakos
UCL

Submitted for the degree of Doctor of Philosophy
January 2019

Declaration

I, Themistoklis Pantazakos, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Acknowledgements

Acknowledgements is the graceful place within a philosophy doctorate where one does not have to provide sustained argument for absolutely anything. I will then take it for granted that we live in a culture celebrating individual achievement while displaying profound illiteracy on the topic of relating collectively. Ironically, it is also true that no achievement has one owner, especially so in the case of intellectual achievement. If anything of value is to be found in the following dissertation, it should be attributed to many authors.

First, to pretty much everyone within the STS department at UCL for creating such a collaborative and accommodating atmosphere to work in. Especially so to Julia Sánchez-Dorado, who kept showing me the ropes from my first day until her graduation, and who repeatedly provided company in times of inevitable academic awkwardness. Moreover, to my intellectual centre in Athens, the pop culture and critical studies magazine SKRA-punk, for providing both a stimulating and cosy space to work in, the invaluable companionship of its members, and a sense of belonging in times when the fear of being constantly left out of an elusive 'we' is at its social highest.

This dissertation should also be attributed to my friends, double so to those doubling as commenters and editors. To those in the UK: Foivos Dousos, Jordan Osserman, and Foteini Dimirouli. To those in Athens: Maria Vardaki, Mirto Kirli, and Nikos Dalamagas. To the new ones: Christos Triantafyllou, Seta Astreou-Karydi, and Maria Antoniadou. To those of old: Doukas Rasidakis and Eva Pliakou. To those closest to my heart: Areti Theofilopoulou and Fotis Stamatopoulos. Last, to Danai Avgeri, who showed me how profoundly a loving relationship can change a person. To be loved this deeply is itself the highest form of privilege; to be as fortunate as to having been loved by you is beyond my describing capacities.

I am not an easy person. Nobody is, but I am a little extra. My primary supervisor Chiara Ambrosio is most of the reason I did not quit a project that I often thought would never come to fruition. Her unending support and way to make me feel sheltered in a foreign and often alienating environment need to be recognised as necessary conditions for the completion of this doctoral dissertation. Thank you for connecting me with people, guiding me in career choices, pointing me to absolutely crucial literature for this project, offering valuable and critical feedback on all fronts. I wish every student taking up such

an endeavour to fall upon hands so soft, especially so in an academic environment which is a constant threat to the mental health of those who partake of it – and which is responsible for maintaining a culture of celebrating exhaustion, fierce antagonism, ruthlessness. Of course this is a structural, societal problem at large, but until it is fixed, such contributions are arguably the most important.

My secondary supervisor, Phyllis Illari, put in tirelessly work of the highest calibre towards the betterment of this dissertation's content. Without her the quality of this work would have been half what it is now. Seeing someone agitating over the quality of your own work is perhaps the sincerest and most tender form of concern. Naturally, the responsibility for any mistakes found herein falls upon me and me alone.

Not any less than the above, this dissertation should also be attributed to my parents, Thanasis Pantazakos and Sofia Papageorgiou, both for bestowing upon me the gift of neurotically hunting for intellect even when it hides at the bottom of a deep dark well, and also for never ceasing to support and fund this hunt. For similar reasons, I have to thank my *in loco parentis* and the subject supposed to know, Theodosios Christodoulakis. You helped me discover who I am, why I am who I am, and why I do what I do. In so doing, you made it possible for me to be someone else, and to do different things. This debt I certainly will never be able to repay.

Last, I am grateful to mooing Efterpi and grumpy Jacob for their unconditional love and support. Their hoof-and-paw-signed eternal love pact has kept me stable and safe during bad times and good.

Emphatically, it is no exaggeration to say that everyone mentioned above is my co-author. If one subtracts the contributions of these people from the present dissertation, then no dissertation remains to be read.

This dissertation was funded by the Onassis Foundation (Athens, Greece) with a scholarship of 48 months (doctoral studies).

Abstract

In this thesis, I propose a radical reframing of the analytic scientific realism debate via the phenomenological concept of the life-world. I provide motivation for examining science's situatedness by interrogating the observable aspects of the world. In so doing, I propose to drop any notions of ecumenical truth and reality in the frame of the debate. The case study of autism spectrum conditions (ASCs) is explored to demonstrate what this suggested reframing implies for scientific practice.

I offer that the best construal of the observables is the concept of the life-world (Edmund Husserl's *lebenswelt*) from continental phenomenology. I perform a series of analytic tweaks on the concept and define it, for the frame of this dissertation, to be the world of immediate – yet theory-laden and prism-mediated – experience as cashed out by a subject's perceiving capacities. The main improvement of the life-world to traditional analytic construals of the observables is that it captures extra-linguistic elements, allowing us to interrogate these crucial facets of science that are not language- and theory-based *strictu sensu*.

Following I highlight the life-world's pluralistic dimensions. Theoretically, I do this by defending conceptual scheme pluralism against certain tendencies in the analytic philosophy of language, and then apply this defence to life-worlds. Turning to extant cases of life-world difference, I investigate the case study of autism spectrum conditions. I argue that what this case brings to the fore is first our being compelled to recognise the autistic life-world as 'real and true' in the way we take the neurologically typical life-world to be and, second, that autism spectrum conditions treatment should be oriented towards this life-world, in the sense of attempting to maximize happiness and well-being in its own terms. Unfortunately, this is found to be in stark contrast with the extant ASC-related treatment situation.

Finally, I claim that we should philosophically be haunted less by any claims of ecumenical Truth and Reality and related, somewhat stale metaphysical issues typically associated with the debate. Rather, it is both more philosophically interesting and humanitarianly urgent to interrogate how what a science takes to be true shapes the practice itself and how it affects human lives associated with it.

Theoretically, my philosophical position abides first and foremost by life-world incorrigibility and pluralism and is thus appropriately named pluralistic incorrigible

realism (PIR). ‘True’ is here taken to cash out what is incorrigible for a perceiving subject, but whatever notion of truth may arise herein is only in the form of a (subjective or intersubjective) admittance within the confines of a life-world.

Impact Statement

In this dissertation, I propose a reframing of the analytic scientific realism debate. I argue that the debate, as it currently stands, focuses too much on whether unobservable entities postulated by scientific theories really exist, and insists on somewhat stale metaphysical questions such as whether science captures the ecumenical truth and a picture of reality 'as it is'. I argue for a practical orientation of the philosophical examination of science's truth and reality claim, and I explore the case of autism spectrum conditions (ASCs) to demonstrate how this may come about. Towards the above I employ the phenomenological concept of the life-world, through which I demonstrate that science's truth and reality claim is always conditioned upon a subject or group of subjects.

The contribution of this dissertation to the analytic literature of the philosophy of science revolves around two main philosophical points: the construal of the observable level of the sciences through the life world, which incorporates all those elements of an 'inner core' of the empirical that science crucially relies on, and the conceptualisation of differences between subjects through the life-world, rather than on the basis of unduly constraining language differences, as per the traditional analytic philosophy of language view.

By focusing on autism spectrum conditions to bolster this theoretical framework, my thesis invites its own applicability. The argument that people with ASCs diagnoses should be construed as operators of different life-worlds stands in stark contrast to the contemporary, almost purely behavioural approach of the sovereign method of treatment, Applied Behaviour Analysis (ABA). I conduct a life-world analysis of the heated ethico-political debate of ABA versus neurodiversity activists and show that we may reach a resolution by filtering ABA to the autistic life-world *and* by pursuing phenomenologically oriented treatments, which are currently unfortunately understudied. Through the ASCs case and by thinking philosophically about the orientation of treatment of people with neurological differences, I suggest that we should indeed pay more attention to the fact that what we take to be true within scientific practice *shapes human lives*. Plausibly, we should leave traditional questions of ecumenical truth and reality behind in favour of a more practical approach, which relates to scientific practice.

No major change in medical practice came about without a subtext of rigorous research: I envision this thesis to be part of a bigger picture of the cross disciplinary

attention paid to ACSs conditions and possibly beyond, to other areas of interest to professions related to physical and mental health. This approach will add to challenging received notions of normativity, mental health, and well-being, and will attempt to substantially incorporate feedback from mental health patients in what the treatments that regard them should *aim towards.* Necessarily, this is impossible to achieve without disseminating the theoretical maxims to the related professionals, such as people with ASCs diagnoses themselves, their carers, educators, doctors, psychologists. Upon the completion of my doctoral project, I will first and foremost seek out collaborations with hands-on practitioners of ASCs treatment.

Table of Contents

List of Figures

The aspects of things that are most important for us are hidden because of their simplicity and familiarity. (One is unable to notice something — because it is always before one's eyes.) The real foundations of his enquiry do not strike a man at all. Unless that fact has at some time struck him.
-Ludwig Wittgenstein (1953), *Philosophical Investigations*, section 129

Introduction

The scientific realism versus scientific antirealism debate is one of the central issues within contemporary analytic philosophy of science. Abstractly, the central question of the debate is whether (certain kinds of) scientific statements are true and whether the (mature) sciences describe the world and its contents as they really are. Scientific realists defend science's truthful description of reality as it is, while scientific realists deny it. In its received form, the contemporary debate circles around the unobservable entities populating scientific theories (e.g. the subatomic particles). Science's relation to truth and reality is thought to be exhausted by its capacity to correctly map the unobservable entities that inhabit the world. If we have valid reasons to believe that science maps the unobservables as they are, it is thought, then we have valid reasons to believe that science articulates true statements about reality as it is.

I begin this dissertation by surveying the scientific realism debate in chapter one. Therein, I argue that, besides being fixated with the unobservables, the contemporary debate seems to be governed by a certain dialectic pattern. After reviewing the central arguments for and against scientific realism, I argue that scientific realism seems to be taken as the self-evident position towards science unless a counter-example from the history of science prompts us to think otherwise. That is, a given (mature) scientific theory A is taken to deliver a true picture of reality unless a scientific theory B, of the same ambit and presumably exhibiting the same virtues as A – and usually a predecessor of A – is brought to the fore. This development is evidently unfavourable for the scientific realist, seeing as the virtues of A seem no longer a reliable basis from which to infer its truth and referring to reality. Following, the debate becomes one of the scientific realist arguing that either A did not exhibit the virtues allowing us to infer it delivering a true picture of the world as it really is to begin with, *or* that B is in fact less virtuous than A. The scientific realist argues to the opposite conclusions.

My purpose is neither to defend the scientific realist nor the scientific antirealist in the frame of this conflict. Rather, I argue that this comparative-historical dialectic, which begins with taking a successful theory to be true unless compared with another theory with the same kind of success in the history of that same science, is unduly limiting and calls for an urgent reframing of the scientific realism debate. I argue that even if a theory faced no evidential and historical hardships whatsoever, we would *still* have ample reasons to challenge the view that it delivers some *tout court* true picture of reality of the facet of the world it seeks to explain. I proffer that such a more 'direct', conceptual examination of science's claim to truth and reality should prioritize the investigation of the situatedness of science as an activity conducted by specific beings and not from a God's eye point of view. I state that I am going to embark on this project by examining science's truth and reality claim to the *observable* aspects of the world, which the contemporary scientific realism debate typically glosses over.

In chapter two I turn to those analytic philosophers who *have* discussed the observables in connection with the scientific realism debate, mainly philosophers of science of decades past and philosophers of language. I find that these scholars address mainly two issues. First, philosophers like Grover Maxwell and Bas van Fraassen inaugurated a debate about the *legitimacy* of the observables: of whether there is a valid separation to be made between the observable and the unobservable aspects of the world. Maxwell contends that things are always theoretically observed through a medium and thus the dichotomy makes no sense, and van Fraassen argues that, despite this, the dichotomy does make sense. What it takes to see this, per van Fraassen, is to realise that, still from within a theory and always through a medium, we always define a substratum of observables (read roughly: an empirical foundation) that science epistemically relies on. This debate was proliferated by numerous others arguing in favour or against the dichotomy. Second, philosophers like Hilary Putnam put forward the problem of *what kind* of thing the observables are (e.g. sense-data, phenomena) as well as *what kind of access* we, as humans, are legitimized in claiming we have *to* them. Putnam, being a philosopher of language, and others following in his footsteps, ask: how do we know *what* we refer to with our words is, and *how* do we know that we *refer* to it? These issues are evidently crucial for my dissertation's project: if I am to investigate science's relation to truth and reality via the observables then I must certainly establish that there is a valid dichotomy to be made between the observables and the unobservables and that there *is* a way for us to refer to the observables.

In chapter three I set out to find the best way to think about the observables, especially within the scientific endeavour. To this end, and after having considered the analytic insights of chapter two, I lay down some principles for the observables' best construal. First and foremost, the observable level decidedly resists naïve construals: it may not be construed as a static image encapsulated by one or more of the naked senses, and it may under no circumstances be considered non-theoretical. *While* theoretical and not restricted to the human senses (but sometimes externalised to technological instruments), however, the observables' proper construal should encapsulate the basic motivation behind pursuing an 'inner sanctum' of the empirical altogether: decoding an extant substratum of *assumptions* and *tropes* (which I will later group as *admittances*) that science departs from, returns for validation to, is conducted via, and is not challenging while being conducted. Even those analytic philosophers who are taken to argue *against* the observable-unobservable dichotomy, I will show, do not deny this: what they deny is a simplistic conception of the observable, naïve in the way I have described just above.

In this spirit, I proffer that an unlikely candidate, the concept of the *life-world* – a concept from Edmund Husserl's continental phenomenology – is the best construal of the observables in science and beyond. To tailor it for the uses intended for it in this dissertation, I perform a series of analytic tweaks on the concept. In Husserl, the life-world is defined to be the world as it is reflexively (without conscious consideration) had by every being from its subjective point of view. In my version, the life-world is defined to be the realm of *incorrigible admittances* – those one finds oneself unable to 'peel away'. Incorrigible admittances include whatever we seem unable to do away with while we are thinking, theorizing, and acting: they include a basic parsing-out of the world, a basic sense of the self and extend, as we will see in detail, even to our cognitive and bodily tropes and the relations we incorrigibly perceive between entities. A subject's life-world is the world as it is filtered by its perceiving capacities and delivered to its consciousness *incorrigibly*. Incorrigibility, a concept I borrow from Hasok Chang, denotes that the life-world includes *only* those admittances one finds oneself *unable to do without* – in the strongest, metaphysical sense of the expression.

This, I claim, is a viable solution for demonstrating philosophically that science *both* depends on an unquestioned substratum *and* that this substratum may not be simply, for known philosophical reasons, considered given, raw data of the world *as is* given by e.g. something as simple as a static image to consciousness. Moreover, I highlight that the life-

world has an intersubjective dimension (it may be shared by similarly oriented subjects) and I delineate the life-world's incorrigible admittances across four non-exhaustive, potentially overlapping categories: ontological (regarding what there is); metaphysical (regarding how it is and relates); semiotic (regarding what it means); emotional (regarding how it feels). One of the chief advantages of the life-world, I claim, is that it also transcends definitions of the observable level as a realm of observational statements. Going beyond the construal of science as a purely linguistic-theoretical endeavour, the life-world demonstrates both the situatedness of the incorrigible substratum of science upon the subjects who conduct science, as well as the multifarious post-linguistic elements that shape the scientific process. This advantage of the life-world is to be fully developed in chapters five and six.

In this chapter I also examine a famous case of a purported observation of the unobservable: that of the electron. By investigating the cloud chamber case, an experiment whereby the electron is supposedly observed, I showcase the ways in which the life-world is both crucial and necessary for science. I find irremovable, necessary for the experiment life-world elements seated not only in the beginning of the inferential-experimental chains that lead to the purported observation, but also along all of their links. I conclude by fighting off arguments seeking to diminish the importance of the life-world. Such arguments I take to claim that the life-world is of minimal importance for the sciences because, at the end of the day, the sciences may with their sophisticated means get to a deep-seated reality and truth about the world no matter what situated material they begin from. I argue that since the sciences find their justification exactly *in* the life-world, dismissing the life-world for a more deep-seated picture of reality immediately takes away our reasons *for* believing in the maxims pertaining to any such deep-seated realities.

In chapter four I slowly start turning to the significance of the above phenomenological apparatus for the scientific realism debate. I dig into the subjective dimension of the life-world and follow up on the claim that, as subjective, the life-world is a pluralistic concept. Recall now that I have defined the life-world to be the world as incorrigibly had, in which process perception plays a crucial role. In the analytic literature, there is a sizeable debate about whether the content of perception is conceptual and, if so, how much of it is conceptual. Evidently, I neither can nor wish to arbitrate this debate here, so I allow for all possible cases: that perception is wholly non-conceptual; that it is wholly conceptual;

that it is part conceptual and part non-conceptual. I argue for extensive life-world differences in all cases.

The case of perception being partly or wholly conceptual is complicated – and there are many reasons why we should think that subjects conducting science, a richly conceptual endeavour, perceive conceptually. A famous analytic philosopher of science, Donald Davidson, has influentially argued not only that there are no alternative conceptual schemes, but that the idea of a conceptual scheme is in and of itself nonsensical. Thus, to evince life-world plurality, in chapter four, following others, I take it upon myself to demolish Davidson's arguments. I show that Davidson follows a faulty construal of conceptual schemes that identifies them with languages and thus constricts any way of exploring conceptual scheme difference within the confines of translation. Turning to conceptual schemes *users*, their behaviour, and related extra-linguistic elements goes way further to evince conceptual scheme difference. The life-world, not arrested by purely linguistic interpretations the way the observable level is thought of naively and traditionally is, I argue, just the tool we need to go past a linguistic- and Davidsonian-flavoured understanding of how concepts may differ across perceiving agents.

In chapters five and six I move from a theoretical defence of life-world plurality to a case, I will claim, of extant life-world plurality. I provide a case study of autism spectrum conditions (ASCs) and I argue that people with ASCs diagnoses are best understood as people of different life-worlds to the neurologically typical ones. Moreover, I map the ASCs-related differences, as evinced through the cognitive theories of ASCs and testimony from people with ASCs diagnoses, to the four categories of the life-world (ontology; metaphysics; semiotics; emotions). Following this, I turn to ASCs treatment. ASCs-involved communities, I show, find themselves amidst a heated – and oftentimes bitter – conflict regarding the mainstream ASCs treatment method, Applied Behaviour Analysis (ABA). The pro-ABA camp claims that ABA helps people with ASCs diagnoses acquire skills necessary for the maximization of their well-being and autonomy, while the anti-ABA, *neurodiversity* camp claims that ABA is plainly behaviourally disciplining people with ASCs diagnoses, seeking to normalise them. ABA, it is often argued, is in violation of consent ethics within treatment and, against the people with ASCs diagnoses' will, seeks to instil in them behaviours that make minimal or no sense to them so that they behave in a manner that is socially acceptable.

I claim that the controversy at the heart of ASCs treatment is best understood as a controversy around the autistic life-worlds. The neurodiversity camp is effectively arguing, I claim, that the autistic life-world should be considered a valid mode of being and not a product of defect to be corrected through behavioural therapy. Their main claim, I argue, should be construed as highlighting autistic particularities of being and that ASCs are not plainly behavioural, inappropriate digressions from the neurologically typical state of affairs. This runs contrary to the purely behavioural correction as the treatment approach to ASCs – to which, I take occasion to highlight, not all ABA supporters necessarily subscribe. Employing the life-world analytical apparatus, I side with the neurodiversity activists: not only is the autistic mode of being plausibly characterised by significantly different ontology, metaphysics, semiotics, emotions compared to the neurologically typical mode of being; it is further the case that this mode of being appears to be incorrigible. People with ASCs diagnoses, I argue, can indeed acquire some practical skills through behavioural interventions but, for all we know, they continue to operate in life-worlds markedly different to the neurologically typical ones. Thus, treatment should not seek to alter people with ASCs diagnoses behaviourally beyond very urgent situations – such as those where people with ASCs diagnoses conduct harm upon themselves or others. Instead, the life-world approach invites more phenomenologically oriented treatment approaches to ASCs, which would seek to maximize the well-being of people with ASCs diagnoses in their own life-worlds' terms. I provide an example of such an approach by demonstrating the related work of one of the most famous neurologist in the world, Oliver Sacks.

Last, in the conclusion of the chapter I mark some limits of applicability of the life-world approach in ASCs-like cases, and I show how important moving beyond the linguistic-Davidson line has been in approaching ASCs. Markedly, had one gone looking for purely linguistic differences in the ASCs case, one would have found oneself failing tremendously to grasp the depth of difference running between the autistic and the neurologically typical modes of being. This, in turn, would plausibly have resulted in treatment analysis that would not have taken proper notice of how ASCs treatment impacts people with ASCs diagnoses – or at any rate a way more superficial notice than the life-world approach. Thus, as is also demonstrated in chapter seven, moving from observation statements and conceptual schemes as languages to the life-worlds toolkit is not only more philosophically interesting, but also more humane.

In chapter seven I summarise the overall philosophical picture of this dissertation by connecting chapters three to six back to where it all began from: the issue of scientific realism. I argue for a life-world based, *pluralistic*, *incorrigible* realism. Within its premises one is justified in speaking of a statement being true and of describing reality but only in the sense of this something being incorrigible for them and under given circumstances – which could be and probably are indeed otherwise for others. That said, within pluralistic incorrigible realism, one may also apportion their belief to the truth or real existence of a given thing or statement respectively to the available evidence – we are free to believe that a given thing is *likely* real or a statement *likely* true, given a life-world. I demonstrate how the case of ASCs attests to the above conclusions. Last, it is argued that settling the issue of truth by identifying it with 'incorrigible-for-X-in-a-given-circumstance' and passing the question of an ecumenical Truth alongside allows us to move past certain somewhat stale metaphysical debates the scientific realism debate is currently involved in. The space is then free to be occupied by practically oriented scientific realism – the credo in employing the insights of reality's situatedness to real cases of scientific practice, seeking to benefit our lives and those of others.

1. Scientific Realism and Scientific Antirealism in the Analytic Tradition

Introduction

The received way in which the contemporary scientific realism-antirealism debate is conducted overlooks the observable aspects of the world. This is the first claim of this chapter. By surveying the main nodes of the debate, I argue that observables seem today (with some notable exceptions, which I will discuss in later chapters) to comprise a straightforward case for the analytic philosophical examination of science: what is true of them, it is thought, has already been figured out. In turn, the unobservables make up the central problematic by an overwhelming majority.

The second claim of this chapter, which will come to full fruition over the next couple of chapters, is that this has a very unfortunate depth-limiting impact on the inquiry into science and truth. In the second part of the chapter, I offer an argument for why this omission of observables is philosophically unjust and motivation for why it should be rectified. The importance of the observables, I claim in the following chapters, is revealed when we ask 'who' is conducting a given science as well as to whom it is tailored. Beyond being of interest to theoretical discussions about science, this issue bears the weight of crucial humanitarian consequences, especially so in fields like mental health.

Overall, this dissertation comprises an inquiry into the importance of the observables for science's claim to reality and truth. Chapters two and three seek a rigorous and philosophically sound definition of observability, and settle on Edmund Husserl's 'life-world' as the best fit (with a few analytic twists). Chapter four argues, mainly theoretically and *contra* Donald Davidson, that there is not one life-world but many. Chapters five and six evince this in scientific practice and argue for the importance of life-world difference therein. Chapter seven draws conclusions of the theoretical and practical discussion for the scientific realism debate.

The present chapter is structured as follows. In section 1.1 I present the established definition of scientific realism and scientific antirealism. In section 1.2 I analyse the cornerstone argument in favour of scientific realism: the 'no miracles' argument (NMA). The 'no miracles' argument claims that scientific realism is the only philosophical attitude towards science that does not render its vast success a miracle. Following, I consider the counter-argument that wants NMA to be logically incoherent and find it not guilty of such

allegations. I thus conclude that the scientific antirealists need independent argument(s) in favour of their own position. Accordingly, in section 1.3 I interrogate the most accredited such argument: the pessimistic meta-induction (PMI). The pessimistic meta-induction offers a multitude of historical counter-examples to the NMA: successful theories that are incompatible with other successful theories of the same ambit, thus divorcing success from truth in the scientific theories' case. Subsequently, in section 1.4 I point to realist retaliations to the PMI, which all fall under the rubric of selective optimism: entity, structural, and preservative realism. I find that all three moves share the same method: essentially to restrict the ambit of the NMA to something more feasible than its original formulation. Furthermore, I find that all the above scientific antirealists' moves also share the same method, namely the PMI, which is in turn to look for a historical counter-example to cancel out the new, more modest versions of the NMA. This is in keeping with other, influential overviews of the scientific realism debate such as John Worrall's (1989) and Anjan Chakravartty's (2011, especially paragraph 2).

This is a crucial point: this two-fold pattern governing the scientific realism debate is all but innocuous, I argue in section 1.5. This is for two reasons. First, the pattern precludes any direct conceptual examination of science's claim to the truth and what kind of claim this may be; it simply takes scientific realism for granted unless history makes us face difficulties by means of counter-examples. Second, and in close relation with the first point, it focuses exclusively on the unobservables since, within this pattern of argument exchange, the observables are taken for granted, as unproblematically settled. Over the span of the rest of my dissertation I attempt to show that the observables are not only enmeshed in delicate theoretical problematics regarding scientific realism but also that they and their pluralistic nature are crucially important for scientific practice and human well-being.

1.1 An Outline of Scientific Realism and Scientific Antirealism

In trying to provide an initial definition of scientific realism, the first matter for consideration is the multiplicity it comprises as well as the sizeable divergence between the philosophical theses subsumed under its rubric. Consequently, any contemporary definition of scientific realism will always be short-handed in the offing: it will unavoidably be to a nontrivial degree unfaithful to its numerous, multifaceted and fine-grained specific formulations (Chakravartty 2011, section 1.1). Abstractly speaking, however, most

influential and defining sources hold scientific realism to be concerned with three theses (Psillos 2000, 706; Chakravartty 2011, paragraph 1.2):

- **The Metaphysical Thesis**: There is a mind-independent world, which has a mind-independent structure.
- **The Semantic Thesis**: Scientific theories should be interpreted literally and have a truth-value[1]. If a scientific theory is true then the terms regarding unobservables in it refer to actual things in the world.
- **The Epistemological Thesis**: Mature (in some way predictively successful) scientific theories provide descriptions of the world that are at least approximately true.

The first thesis stands in contrast with antirealist world conceptions of the idealist kind. The metaphysical thesis asserts that the world consists of things that inhabit a definite structure, the structure often understood in terms of interconnections between them and hierarchies they form. Whether one has a word for things, can see things, can manipulate things, can corroborate the idea of their existence via experiment or not is here irrelevant, for the things that inhabit the world exist nonetheless. The world, in other words, consists of natural kinds, independent of whether humans, or for that matter anyone else, discovers, defines and uses them.

The second thesis aims at distinguishing scientific realism from antirealist claims that treat scientific theories (or at least the unobservables within them) merely as instruments that bear no reference to the actual world. According to such antirealists, scientific theories are instruments that either have no truth-value or whose truth-value is reducible to their discourse about the observables (Psillos 2000, 706-707). The semantic thesis denies most metaphorical interpretations of scientific claims even about the unobservables. According to it one should never interpret a scientific claim as an attempted systematization of its observable consequences. If science says that an unobservable structure populated by unobservable entities underlies observable reality then this is a claim that is either strictly true or strictly false.

[1] At least for the most part – see below for scientific theories as 'approximately true' according to scientific realism.

The third thesis is intended to ground the above two in the here and the now; to make scientific realism applicable to specific scientific theories. Notice that the above considerations do not particularly refer to any scientific theory: it is entirely possible to believe in the mind-independence of the structure of the world as well as to interpret scientific theories literally, and simultaneously deny that one can currently or at any specific time be cognizant of any scientific claim's truth-value. That is, one may be sceptical towards pointing the finger at any one specific scientific claim, literally interpret it, and announce it as true or false. Such scepticism should be avoided or so the epistemological thesis contends. Mature scientific theories that are well corroborated and make successful novel predictions (for example, current such predominant theories in physics) are approximately true of the world.

For an applied example of the three above theses consider what an electron is according to an electron realist. The metaphysical thesis prohibits the electron from being a social or a linguistic construct, an arbitrary categorization of the world, or anything besides literally extant. The structure it inhabits as a subatomic particle with specific function and interconnections with other entities is also every bit as real, both for those who know it and articulate it and for those who do not. The semantic thesis prohibits theoretical discourse about the electron being an instrument to manage the observable world. Either there are electrons as described or there are not. Either they function as described or they do not. Finally, the epistemological thesis demands that, being a mature and well corroborated scientific theory, the *current* theory of electrons is indeed approximately true of the world; its putative unobservable entities really do exist and function as described.

The above is a list of commitments that scientific realists generally share. To repeat, delving deeper into specific scientific realists' theses brings to the fore significant tensions between them (the realists). These tensions do not usually involve the first, metaphysical commitment; idealist approaches are almost non-existent in contemporary analytic philosophy of science (Chakravartty 2011, paragraph 1.2). The second, semantic commitment seems to be one that scientific realists are occasionally unfaithful towards. Several authors have advanced positions that allow for subscription to the (approximate) truth of (a certain type of) scientific theories independently of subscription to those theories' fulfilling the criteria of the correspondence theory of truth regarding unobservable entities and structures (for the most modern articulation of which see Ellis 1988).

Chakravartty (2011, paragraph 1.2) characterizes such authors (for example, Giere 1988, 82; Devitt 2005; Papineau 2010) as preferring 'deflationary accounts of truth'[2]. Regarding the third, epistemological commitment, the most prominent brands of scientific realism today do not buy into it wholesale (that is, they withhold belief in the total truthfulness of mature scientific theories). Ian Hacking's entity realism, for example, is a thesis that forbids belief in the whole truthfulness of scientific theories that fulfil certain criteria but encourages belief in the existence of (certain of) the entities they postulate. More specifically, entity realism purports that belief in the existence of an unobservable entity X should be apportioned to the causal ability to manipulate that X (Hacking 1982; Cartwright 1983, chapter 5). In opposition, Worrall's (1989) structural realism and its derivatives prohibit belief in entities *per se* as metaphysics most likely to change over time but encourages belief in structures (mostly cashed out in terms of mathematical relations between entities) that are purportedly responsible for the novel predictive success of mature scientific theories. Finally, preservative realism as embraced by Philip Kitcher and Psillos motivates belief only in those structures and entities that are indispensable for a mature theory's empirical success (Chakravartty 2011, paragraph 1.3).

Scientific antirealism is an equally multi-faceted doctrine. To be a scientific antirealist one has first got to deny some or all the aforementioned scientific realist commitments *powerfully enough* in order to cross over to the other side. The latter remark is necessary because, as the above paragraph shows, it is possible to be partly exempt from the commitments that generally characterize scientific realism and still be considered a scientific realist. The most historically known ways of objecting to scientific realism are expectedly of the three same kinds as scientific realism is: metaphysical, semantic, and epistemological.

To be a metaphysical antirealist means to deny that there is a mind-independent world. This of course amounts to much more than scientific antirealism: if there is no mind-independent world, no scientific theory can refer to real entities that inhabit it, nor can it provide a description of it that is (approximately) true. There are, however, other ways of

[2] It should be noted that, in an article earlier than Chakravartty's and most of the articles he cites, Stathis Psillos (2000, 707) confidently asserts that "theoretical discourse is taken to be irreducible and assertoric (contentful) by all sides of the debate". However, this matter is not of particular importance to the present dissertation.

being more specifically a scientific antirealist metaphysically, the most famous one being adopting a neo-Kantian view about the structure of the world despite admitting the mind-independence of the latter. That is to say that the world-in-itself (the world as it really is) is inaccessible to the cognition of humans and that the structures of the world that scientific theories pose are merely imposed, 'projected' onto it (Rohlf 2010, paragraph 2.2). Next, to be a semantic scientific antirealist amounts to rejecting literal interpretations of scientific claims regarding unobservables – to deny ascribing a truth-value to them. The most famous doctrines that spring out of this position are instrumentalist epistemologies of science, which contend that descriptions of everything unobservable in science function as instruments for having control over the observables and for subsuming various observable phenomena under concise systems of principles (see for example van Fraassen 1980). Last, to be an epistemological scientific antirealist is, expectedly, the complete negation of the epistemological thesis. An epistemological scientific antirealist may grant that there is a mind-independent world with a non-human-imposed structure and they may also agree to interpret scientific statements about unobservables literally. Nevertheless, they contend, no type of scientific theory does provide true descriptions of this world and its structure. This position does not even tolerate subscription to parts of mature scientific theories' truthfulness as some positions described above do.

This concludes the abstract overview of scientific realism and scientific antirealism in the analytic tradition. In the next section I will take up the task of exploring and critically discussing specific arguments for and against these philosophical doctrines starting with the 'no miracles' argument.

1.2 The Ultimate Argument for Scientific Realism (and the Base Rate Fallacy)

I shall begin with an argument that is still thought to capture the most powerful intuition behind scientific realism, namely the 'no miracles' argument developed by Hilary Putnam (1978, 19) or, as it is otherwise known, 'the ultimate argument for scientific realism' (van Fraassen 1980, 39). In the course of the present section, and besides the argument itself, I will also examine two major positions against it that target its internal coherence.

Putnam's argument begins from the widely-accepted premise that the extant best scientific theories have been extremely successful, where success is cashed out in terms of

instrumentality in achieving various ends. These ends are typically thought to be the abilities to manipulate nature, make empirical predictions and retrodictions, and to produce experimental results of extraordinary precision. Clearly, there is a need to explain this success or so Putnam additionally premises. Finally, the only explanation of this success that does not render it a miracle is that such scientific theories are (at least for the most part) true descriptions of the world, and we should always prefer non-miraculous explanations to miraculous ones. This is Putnam's conclusion, which others have since elaborated (for example Boyd 1989; Psillos 1999, chapter 4).

The NMA has been internally contested in two important ways. Bas van Fraassen (1980, 40) has argued that what explains the proliferation of successful theories and the abandonment of others is that the antagonism of scientific theories is governed by an evolutionary 'survival of the fittest' principle, where the fittest are obviously the most successful. Thus, contends van Fraassen, one does not need to resort to truth to explain the success of contemporary theories. By virtue of this evolutionary principle it is no wonder that the most successful out of all theories 'survive' while those that have failed to achieve the ends specified for them become obsolete. This reply, however, seems to be irrelevant: van Fraassen's account explains why the most successful out of the totality of scientific theories are selected 'evolutionarily', *not* why these theories are so successful in the first place. Chakravartty (2011, paragraph 2.1) expresses this idea in terms of asking why a *particular* theory is successful and suggesting that van Fraassen's explanation is then inapplicable.

Another attack on the NMA, one that is considered much more dangerous, originates in statistical probability with several authors asserting that its reasoning commits a logical fallacy famously known as the base rate fallacy (Lipton 1991/2004, 196-198; Howson 2000; 2013; Magnus & Callender 2004). The base rate fallacy is a certain type of mistake individuals make in answering a probability question about groups when they ignore the relative sizes of these groups within a larger group relevant to the question (Tversky & Kahneman 1982; Spanos 2010). The most famous example of this fallacy consists of a question presented to sixty students and staff at the Harvard Medical School (Casscells *et al*. 1978). The question was:

If a test to detect a disease whose prevalence is 1/1000 has a false positive rate of 5%,

what is the chance that a person found to have a positive result actually has the disease, assuming you know nothing about the person's symptoms or signs?

To this question, only eleven out of sixty participants ($\sim$18.3%) gave the correct answer ($\sim$2%). In formal probability terms the question was asking for:

$$p(disease|positive)$$

From Bayes' Theorem we have that:

$$p(disease|positive) = \frac{p(positive|disease)p(disease)}{p(positive)}$$

From the articulation of the problem we have that:

$p(positive|disease) = 1$
$p(disease) = 0.001$

Which means that one needs only to calculate $p(positive)$ in order to be able to calculate $p(disease|positive)$. From probabilistic calculus we have that:

$$p(positive) = p(positive|disease)p(disease) + p(positive|disease')p(disease')$$

From the articulation of the problem we have that:

$p(disease) = 0.001$
$p(nodisease) = 1 - p(disease) = 0.999$
$p(positive|disease') = 0.05$

It is therefore calculated that:

$p(positive) = 0.05095$ and therefore that:

$$\boldsymbol{p(positive|disease) = 0.019627}$$

The most common wrong answer that Harvard Medical School students and staff gave was 95%. An influential explanation of this is that the examined failed to take into account the probability that any given person suffers from the disease – the prior probability $p(disease)$ – and thus instantiated the base rate fallacy (Tversky & Kahneman 1982).

To get back on-topic, I do not believe that the NMA commits this fallacy. Consider the formula with which to calculate the probability that a given theory is true, given that it is successful.

$$p(true|sucessful) = \frac{p(successful|true)p(true)}{p(successful)}$$

From the articulation of the problem, we have that theory is picked from the set of successful theories. Therefore, we have that $p(successful) = 1$. Also, if a theory is true, one can surely take it that it will also be successful and so we have that $p(successful|true) = 1$, therefore:

$$p(true|sucessful) = \ p(true)$$

The accuser will of course contend that it is impossible to know how many out of all scientific theories are true and therefore to ascribe a numerical value to $p(true)$. However, the crucial consideration here is, I submit, that that the NMA is *precisely* about determining $p(true)$. The argument it makes is that *it is a miracle* if its numerical value is anything other than 1. What is more, this argument is not viciously circular since the conclusion is not included in the premises. One may dislike argumentation about miracles but having suspicious premises is *not* the same as including the conclusion in them. Whether this is a good argument *is* what the scientific realism debate is about, namely the question of whether it indeed is a miracle if (certain) scientific theories are not true, and whether there is an alternative explanation for their success.

If I am right in claiming the above it seems that the NMA is not at internal fault. Moreover, in their recent paper Richard Dawid and Stephan Hartmann (2018) claim that the NMA may be construed to have three forms, only two of which commit the base rate

fallacy (thus the NMA can be shown to be base rate fallacy-free). The technical details of the latter will be spared here due to reasons of space. The overall moral is the following: since the NMA is not self-defeating, developing an independent argument against NMA denotes the baseline of a convincing scientific antirealist thesis. I will thus now proceed to investigate such independent arguments in favour of scientific antirealism, beginning with the most influential one.

1.3 The Pessimistic Meta-Induction

In 1981 Larry Laudan put forward an empirical argument, the pessimistic meta-induction, favouring the history of science as the evidential basis from which to argue for a specific scientific antirealist position. He maintained that the historical record of the sciences forces the philosopher of science to side with the scientific antirealists, his rationale being the following. First, the history of science overflows with scientific theories that were amply successful and prominent but failed to refer[3] and were more or less generally false (Laudan 1981, 33). Some such theories, for example, are the phlogiston theory and the caloric theory of heat in chemistry, and the vital force theory in physiology. These theories and numerous others enjoyed elaborate experimental confirmation, made possible successful engineering, and more generally equipped humanity with the ability to manipulate nature according to certain desired ends. Albeit displaying all these virtues, they ended up being false, and their postulated entities are now considered non-existent. It is then the case that, by inductive logic, one has no good reason to believe that our *present* successful scientific theories are any closer to the truth than those superseded theories, since they do not display some virtue the superseded, false theories did not themselves display. This is the answer that the PMI provides to the NMA. Miracle or no miracle, Laudan contends, no kind of success is a guarantor of truthfulness when it comes to scientific theories.

The original articulation of the argument is wanting and we will need to tweak it a bit to avoid destructive pitfalls (similar tweaks can be found in Psillos 1996; Lewis 2001; Mizrahi 2012). First, the PMI needs not stay inductive, for inductive arguments have the

[3] 'Refer' is the term Laudan and others use to imply the ontological truthfulness of a scientific theory. When a theory 'refers', the unobservable entities it posits indeed exist and inhabit the mind-independent world.

known weaknesses of delivering dubious results (see Hume 1738-40/1888, 89 and Popper 1963, 53 for more on the subject). Moreover, the argument, as is, is not even, strictly speaking, inductively sound. A hidden assumption hovers in Laudan's original formulation: that we are indeed cognizant of whether a theory refers or not, at least concerning the empirical cases intended to back up the PMI. However, according to Karl Popper's (1934/1959) falsificationism, this cannot ever be beyond doubt. Scientific statements are universal, the latter meaning that they are general and regard the past and the present as well as the future. Thus, scientific statements are in no way verifiable seeing as humanity does not possess a time machine with which to witness instances of the future. What it does possess, however, is the ability to observe circumstances which falsify universal statements. Thus, Popper concludes, the scientific endeavour should consist in conceiving of theories that make conjectures about how things are in conjunction with the best possible attempts to falsify these theories via experiment. The more a theory withstands the trials of attempted falsification, the more reason one should abide by it[4].

Compelling as this claim may sound, Imre Lakatos' (1978) criticism of falsificationism showed that it is untenable. Lakatos pointed out that no single theory can ever be put to the test against the data in and of itself. What actually happens is that a bunch of scientific theories get tested against the data. Consider the example of a microbiological experiment, one that tests two competing scientific theories that purportedly describe a specific phenomenon at the microscopic level. This experiment would typically include looking closely at the phenomenon and, through the acquisition of empirical data, deciding which theory gets the story right. Suppose then that this experiment takes place and, as Popper would have it, one of the theories is falsified while the other one is corroborated. Popper as we saw him here would claim that, since the results of the test point towards the acceptance of one theory and the rejection of the other, scientists should accept the winner and abandon the loser. However, to conduct this very experiment one needs to use a specific instrument to look at the microscopic level: the microscope. The Lakatosian problem with the Popperian claim in this example lies with the fact that in order to hold the empirical data derived from this experiment to be reliable one has to additionally

[4] I have chosen the phrase 'abide by it' rather than 'believe that it is true' because the discussion of whether Popper meant the latter as interchangeable with the former in this statement is massive and may not be pursued here.

accept certain theories about how the microscope works and conclude that it indeed works properly – that it is an instrument that depicts with precision what goes on at the microscopic level.

Consequently, what a scientist really does in this hypothetical experiment is, as Lakatos claims, to test a bunch of theories (the theory they want to test and the theories about how the microscope works – and others) against the data. Anyone, then, wishing to save the 'falsified' theory in this hypothetical experiment could claim that said theory is correct and that a certain other theory concerning the proper function of the microscope, a specific theory about light refraction for example, is wrong. This generalises: every theory needs auxiliary assumptions to be accepted before a test can be set up to evaluate it. At the same time, should the test results come back negative for the theory in question, one can always claim that what is in fact falsified is one or more of these auxiliary assumptions instead of the theory under test, unless one accepts those auxiliary assumptions as true beyond doubt. However, as has been noted above and as the failure of the verificationist criterion of science shows (for an elaborate discussion see Creath 2011, paragraph 4.1), no theory can be verified beyond doubt and this of course includes the theories that accompany any theory we may wish to evaluate by experiment. Hence, this convention of regarding auxiliary assumptions as true could only be dogmatic. Lakatos is encapsulating his point in the following quote:

> It is not that we propose a theory and Nature may shout NO; rather, we propose a maze of theories, and nature may shout INCONSISTENT. (Lakatos 1978, 45)

I have just demonstrated two problems of the PMI. Luckily for the argument, the most sophisticated version of the PMI gets around these problems. The trick is to turn it into a deductive argument. We can show that we may reach Laudan's original argument without needing induction or assuming the definite truth or falsity of any theory. Specifically, what is required is to show that the success of a scientific theory says nothing about its referring and its truthfulness without premising this conclusion on an argument that is either inductive or ignorantly ascertains that any one scientific theory is doubtlessly false. The key consideration for reshaping the PMI is this: the history of science provides cases of successful scientific theories of the same ambit that are ontologically mutually incompatible and the truth of one implies the falsity of the other. If a set of such theories

includes n theories, then it is necessary that at least n-1 do not refer/are false. This allows the scientific antirealist to divorce success from referring and truthfulness *without the need to assert the definite truth, falsity, referring and non-referring of any theory whatsoever*.

Take the example of two scientific theories from the 19th century optics, namely Isaac Newton's and Augustin-Jean Fresnel's theories of light. Both have exactly the same ambit, which is light and its function. Newton's theory was the first to be articulated and it was largely successful. It was the dominant optical theory for more than a hundred years, it was used in technological achievements during its era such as Newtonian telescopes (Hall 1996, 67) and it was even repeatedly experimentally confirmed (Worrall 2000, 47). Fresnel's antagonistic theory of light displayed the same virtues. It was experimentally confirmed (the most impressive case being Arago's bright spot) and it was employed in milestone achievements in technology, such as the Fresnel lens (Watson 2005), as well as in certain computer graphics applications that are used even today such as applications for the rendering of water (Hu *et al*. 2006). Yet these two theories are mutually exclusive[5]. If the corpuscular theory of light (Newton's) tells a true story about the nature of light the wave-theory of light (Fresnel's) does not and *vice versa*. If Newton's theory is true then Fresnel's is false and *vice versa*. Certainly, the possibility of none of the above theories to refer or to be true is always open. The crucial point here, however, is that we have a case of at least one successful theory that does not refer and is not true. We do not know which one and it does not matter for Laudan's original conclusion has proven to be tenable: the success of a theory does not entail its referring nor does it entail its truthfulness. The necessary connection between success and referring/truthfulness that the NMA (at least as we saw it above) attempts to establish is shown to be groundless through this counter-example.

A closing note before moving on. An immediate, well-known move to save the NMA from the sophisticated version of the PMI would be to restrict its ambit so as it defends

[5] One can claim that by a quantum account of light, Newton's and Fresnel's ontologies are not mutually exclusive; light is sometimes a particle and sometimes a wave. Going into such detail regarding this matter is beyond the scope of this paper. I believe, however, that the same cannot be said about numerous other pairs of successful theories, such as the one consisted of the phlogiston theory and the oxygen theory, which will be discussed later here.

only mature scientific theories. Such a move is achieved by refining the notion of 'success' in the NMA so as it points to scientific theories that successfully predict novel phenomena. This is because such 'mature' theories do motivate belief in them whereas those that simply accommodate the phenomena do not; their success can be explained by their having been tailored exactly to accommodate the phenomena. Unfortunately this will still not do: the pair of Fresnel's and James Maxwell's theories of light, both mature scientific theories, seeing as they are mutually exclusive, will force us to the same conclusion in favour of the PMI.

Has, then, the PMI won? Surely not yet. Allow me to examine the retorts available to the realist's hand.

1.4 Answers to the Pessimistic Meta-Induction: Selective Optimism

Post-PMI the scientific realists face a difficult question: how to do away with the apparent incompatibility of two or more theories displaying the right kind of success? This, however, is hardly yet a dead-end. In the preceding discussion 'success' was at best a definition of maturity. While the sweeping claim "Science is successful; therefore, science is true" as it was put forward may have been proven untenable, a refinement in the meaning of 'success' and a specification of *what kind* of success motivates belief in a scientific theory's truth could perhaps put this scientific theory's truth on a philosophically convincing track. In this section I am going to examine the sovereign scientific realist answers to the PMI. I will claim, following others, that these answers essentially share the same form: they all restrict the ambit of the NMA to a specific kind of scientific theories or specific things within scientific theories. After every such restricting move the scientific realists' hope is that the PMI will be inapplicable as an answer to the 'new', restricted NMA by virtue of the latter excluding certain scientific theories from those that have a genuine truth claim.

Take the last example falsifying the NMA mentioned in the previous section, namely the pair of Fresnel's and Maxwell's theories of light. Suppose now that one gives a new definition to what a successful scientific theory is, one that forbids Fresnel's theory of light from being included in the set of scientific theories or at any rate in the set of scientific theories that have a claim to the truth. It is then the case that the PMI proponent will have to draw a new pair of theories from the ambit of the new, success-specified, NMA to falsify it. What is left to be seen, then, is if any one of these restricting moves, provided that it

remains sufficiently realist, is able to rob the PMI of its evidential basis; to restrict the scope of Laudan's 'historical gambit' to the point of making it non-feasible.

I will now examine the three most influential answers to the pessimistic meta-induction, all characterized by the umbrella term 'selective optimism' (Chakravartty 2007, paragraph 2.3). Each of them makes for a specific strand of scientific realism: structural, entity, and preservative realism. Besides highlighting their similarity in form, which will be very crucial in the meta-discussion of the debate soon to follow, I will occasionally (where space and complexity permit) offer my own arguments on the matter of whether these realisms are internally coherent and on whether a crushing counter-example against them can indeed be raised. Granted, this discussion will remain partial as the aim here is to present the main arguments for and against certain nodal positions within the scientific realism-antirealism spectrum and not to exhaust the matter of whether these positions are actually to be adopted. With this material in hand, I will then proceed, in section 1.5, to give critical remarks on the debate regarding mainly the observables and their lack of feature within.

The departure point of selective optimism is observing that *something* in science gets *some* things right about the world and that this 'something' is that which one ought to be a realist about. We may even think that, despite science being packaged in theories, what gets novel things about the world right is not. Above, we saw that non-mature theories were excluded from the NMA's ambit but that this was not enough to philosophically support scientific realism. Once again, I claim, all the scientific realist's next moves consist in 'cutting out' more theories from the NMA's ambit: if the NMA has less (and the correct) theories to defend it will, hopefully for the realist, offer more resistance to defeat by PMI counter-example. Alternatively, the scientific realist will apply the NMA not to whole theories but to things *within* theories such as certain structures or entities, arguing that certain 'elite' parts of scientific theories are in fact responsible for science's latching onto the truth about the world. In this line of argument one would have to excavate these elite parts from a pit of unnecessary metaphysics, excess content et cetera and then, when they are excavated, show that among them no two pieces are mutually incompatible (once again in an attempt to resist the PMI). Or, better yet for the scientific realists, the scientific antirealists would then be encumbered with the burden of proof: to show that they can find two such mutually incompatible pieces. Let me note here again, as I did in the introduction, that framing the scientific realism debate in the contemporary analytic

literature as largely an issue of NMA versus PMI follows and is in keeping with Worrall's (1989) and Chakravartty's (2011, especially paragraph 2) related works.

Each thesis I will present will be followed by three questions: first, how is it a restriction of the original NMA? Second, is the thesis internally coherent? Third, can the PMI shine anew by bringing a counter-example against the more modest NMA instantiated by this given strand of selective optimism?

Entity Realism

The first attempt in the way of selective optimism that I will examine is Hacking's entity realism. Hacking argues that the scientific realism debate has focused unjustifiably much on scientific representation rather than on scientific experimentation. However, the first is, according to Hacking (1982), in and of itself just a means of organising the phenomena into systems, to make models, which, as Hacking has it, "make our minds feel good" (as quoted in Lycan 1988 155). As he claims, these models aim exactly at 'saving the phenomena' and thus should have no truth claim past them. What does have a claim to fame, according to entity realism, is scientific *intervention*. An unobservable hypothetical entity should get upgraded to the status of an unobservable theoretical (real) entity insofar as it is employed in intervening in the world, changing it in ways that one wishes to change it in. As Hacking puts it:

> Reality has to do with causation and our notions of reality are formed from our ability to change the world... We shall count as real what we can use to intervene in the world to affect something else, or what the world can use to affect us. (Hacking 1982, 46)

Or, as he vividly puts it in his iconic phrase: "So far as I'm concerned, if you can spray them, then they are real" (1982, 23). As for all these unobservable entities that have not yet been used in manipulating the world (as are, for example, neutral bosons), they should not be considered a part of its causal structure and should therefore be regarded as 'convenient constructs' (Hacking 1983, 272).

My first task should be to argue that entity realism indeed consists essentially in 'chopping away' at the original ambit of the NMA. This is not difficult. David Resnik (1994, 404-405) has convincingly argued that Hacking's argument is an argument for the success of science. As he points out, Hacking makes no sustained argument for the

opposite being the case. Indeed, Hacking plainly states, without deeper philosophical argument, that since scientists succeed in using such and such entities in experimentation then these entities must be real. Surely, it would not be much of a leap to construe this statement as saying "Well, it would be a *miracle* if they were not real!". Entity realism's philosophical thrust does not consist so much in including theoretical entities in the scientific realist approach but in *excluding* hypothetical entities from it, and in so doing showing what was wrong with the initial, full-blown, 'no miracles' scientific realism. In other words it is to, as noted above, *excavate from within scientific theories that which one has reasons to believe has latched onto the structure of the world.* Thus, Hacking's argument is one for the success of science. Additionally, that his argument's ambit is less than the original NMA should be readily evident.

Before proceeding to further interrogating entity realism, it should be noted that Hacking (1983, 202; 271) has strongly protested that his argument is an argument for the success of science. The reason that Hacking so protests is, I think, that he indeed does not argue for the wholesale success of science. That is, he does not argue for the success of 'scientific theories' or 'science-in-general'. As he himself notes, "[my] argument is much more localized" (Hacking 1983, 202). Localized, however, does not mean importantly different in form; it does not even mean at all different in form. Arguing for the success of scientific experimentation is, after what was presented, I think, enough to classify this argument as one for the success of (something in) science.

Onto the argument's content: entity realism, I believe, immediately raises two important questions. The first concerns its coherence. To be sure the abundant and famous causal theories of reference (see Reimer & Michaelson 2003, paragraph 2.2 for a comprehensive summary), which Hacking leans on, provide him with the conceptual ground to claim that one can keep referring to the same entity throughout different theories. This, however, does *absolutely not* mean that one can refer to theoretical entities of interest without the use of *any* theory. Reznik (1994, 407-408) argues that a causal theory of meaning renders entity realism metaphysically consistent since it shows that we can refer to an entity without believing the theory that describes it. For Reznik, the problem starts when one is asked the question of whether they are justified in believing in the entity they believe in without the support of any one theory – thus the problem is epistemological. Metaphysical or other, this problem apparently amounts to a pretty

sizeable one for Hacking: for him to be consistent what would be needed is a theory-less referring to an entity, something quite distinct from dependence on a *particular* theory.

I will illustrate this through an example. Specifically, I want to consider the 1977 Stanford University experiment, which Hacking (1983, 23) himself holds to be the main motivation behind entity realism. In this experiment, George LaRue, William Fairbank, and Arthur Hebard (1977) were looking for 'free' (ungrouped) quarks using a niobium ball. Quarks are entities that are alleged to have one third of an electron's charge. The electron's charge is itself derived from a 1909 experiment by Robert Millikan (1911)[6]. Here is how Hacking himself describes the experiment:

> The initial charge placed on the ball is gradually changed. … Now how does one alter the charge on the niobium ball? 'Well, at that stage,' said my friend, 'we spray it with positrons to increase the charge or with electrons to decrease the charge.' From that day forth I've been a scientific realist. *So far as I'm concerned, if you can spray them then they are real.* (Hacking 1983, 22-23)

If "How do we know that electrons exist?" is the question, "Because we can spray a niobium ball with them and detect quarks!" is Hacking's answer. Further, according to him, this answer is compatible with scepticism about scientific theories so long as this scepticism stops at scientific claims postulating the existence of unobservable entities scientists can causally manipulate. So far so good? I do not believe so. The scientific definition of the electron is that it is a subatomic particle with a negative charge. Subatomic particles are defined as the indivisible components of all matter, while negative charge is one of three types of electric charge. In turn, electric charge is defined as the physical property of matter that causes it to become subject to a special kind of force when placed in an electromagnetic field. The behaviour of charged matter is purportedly governed by the famous Charles-Augustin Coulomb's principle: two positive charges or two negative

[6] At least that is the only Millikan I know of that conducted any relevant experiments around that time; Hacking refers to a "J.A. Millikan" but given the unfavourable possibility of such a coincidence – it would be a *miracle* if this was someone else – I conclude that this is rather due to a typographical mistake or Hacking getting Millikan's first name wrong.

charges repel each other and a positive charge and a negative charge attract each other (Young, Freedman, & Ford 2012, 688).

So what? So, these claims are all clearly theoretical and all of them involve the electron. Of course, they are not the only such claims. Electrons are, for example, further thought to have a spin of a half-integer values of the Planck constant, which classifies them as fermions. Consequently, two or more electrons, *qua* fermions, are thought to never occupy the same quantum state (Curtis 2003). All the above statements can be divided into two important categories: those that attribute defining properties to the electron and those that attribute additional properties to it. Within contemporary physics one could contest, for example, the type of spin that electrons have but not that they have negative charge or that they are subatomic particles, for then the word 'electron' would be deprived of its very *meaning*. Hacking is right to think that one is not obliged to buy into every theoretical claim that involves entity X wholesale upon admitting the existence of X. However, he is wrong to think that one can leave all theoretical claims to one side and unproblematically admit the existence of unobservables. That things in the world have electric charge is undeniably both a theoretical and a necessary claim to know what one is talking about when one is talking about the electron. The importance of this problem cannot be overstated. Admitting *some* theoretical claims is necessary in admitting the existence of unobservable entities. Avoiding to answer questions along the lines of "Where is this electron?", "What is it?", "What does it do?" will make a 'no theory' electron realist seem, by Alan Musgrave's metaphor, like someone who asserts that there are hobgoblins, but that they do nothing:

> This is incoherent. To believe in an entity, while believing nothing further about that entity, is to believe nothing, I tell you that I believe in hobgoblins (believe that the term 'hobgoblin' is a referring term). So, you reply, you think there are little people who creep into houses at night and do the housework. Oh no, say I, I do not believe that hobgoblins do that. Actually, I have no beliefs at all about what hobgoblins do or what they are like. I just believe in them. (Compare contemporary believers in God.) (Musgrave 1996, 20)

Now, then, for the final question. How does this, entity realism-borne NMA fare against PMI? As Hasok Chang (2012, chapter 1) has pointed out, and even if we turn a

blind eye to all the previous, internal entity realism's problems, Hacking's doctrine still appears to be untenable. That is, Chang holds that there is still a version of the PMI to which entity realism falls prey to, seeing as there are multiple mutually-exclusive entities which displayed the right, Hacking-kind kind of success in the history of their science. Chemists in the 1700s were performing the kind of interventions Hacking advocates by employing phlogiston, a postulated chemical entity superseded by, and mutually exclusive with, oxygen, to achieve various ends. There are thus two incompatible entities that scientists were able to use in causally manipulating the world. Therefore, if Chang is right on this count, it appears that we need not discuss entity realism further.

Structural Realism

Structural realism was proffered by Worrall in 1989 as what I will claim is another way to restrict the NMA's ambit to make it impervious against the notorious PMI. Worrall contends that it is the *structure* of scientific theories that is responsible for its empirical success, and this structure is maintained across theories. In his presenting paper, Worrall explores the antagonism between two specific theories from physics. In fact, these are the two same theories with which I provided the crucial counter-example in favour of the PMI regarding novel prediction realism: Fresnel's and Maxwell's theories of nineteenth century optics. After investigating the transition from the former to the latter, Worrall states:

> There was an important element of continuity in the shift from Fresnel to Maxwell – and this was much more than a simple question of carrying over the successful empirical content into the new theory. At the same time, it was rather less than a carrying over of the full theoretical content or full theoretical mechanisms (even in 'approximate' form) … There was continuity or accumulation in the shift, but the continuity is one of form or structure, not of content. (Worrall 1989, 17)

First things first: is Worrall's doctrine a restricted NMA? Worrall does not contend that either of Fresnel's and Maxwell's theories is in fact non-mature. He does not reduce the ambit of the NMA theory-wise. He, too, like Hacking, focuses on a particular component *within* theories: structure. It is by this virtue that it is certainly a *miracle* if structures are not true, and thus one should adopt a realist treatment of such structures. To this effect, the history of science is encouraging, Worrall claims: mature structures

persist through theory change. Besides the case Worrall discusses in the original paper proffering structural realism, a number of scientific changes that preserve some structural content across them have been highlighted. To give two examples, Newton's laws have been preserved as limiting cases in Einstein's special theory of relativity and the second law of thermodynamics was preserved intact in the switch from Carnot's to Clausius' thermodynamics despite significant ontological changes (Ladyman 2014, paragraph 3.1).

The question of the essence now is whether Worrall's move can in any form indeed save scientific realism from the claws of the PMI. This question dissolves into two others, much like with entity realism. The first question pertains to its internal coherence, the second to whether the PMI can rise anew, providing a counter-example of two or more mutually incompatible mature structures of the same ambit. To take up the first question, Psillos (1995, 31-32) argues that it does not make sense to speak of two separate components of an entity, its *nature* and its *structure*. The laws of which an entity partakes, argues Psillos, are *necessary definitional components* of said entity, and that is especially true after the scientific revolution. Psillos (1995, 32) illustrates this view with the example of mass: "[Knowing] what mass is involves knowing what laws it obeys, and in particular, what equations it satisfies within a scientific theory.". Others (Papineau 1996, 12; Stanford 2003, 570) have followed suit, while scholars like Ladyman stand in stark contrast by proclaiming that structural realism is still the most defensible form of scientific realism. The details of this debate are too sizeable and technical to be accommodated here, however we luckily do not dig deep into it, as the point here, it is reminded, is to present the scientific realism debate enough to then conduct a meta-study of it.

Onward, then, to the second critical question about structural realism, namely whether the scientific antirealist can find a counter-example with which to divorce structure from truthfulness in mature theories. Kyle Stanford claims to provide such a counter-example:

> Francis Galton's ancestral law of inheritance, for instance, was the central mathematical formalism and the most predictively successful aspect (see below) of his 'stirp' theory of inheritance: it claimed that the germinal materials received by each individual (and determining her characteristics) are composed of fractional contributions made directly from each ancestor, in the proportion 1/4p + 1/8pp + 1/16ppp… where p is the contribution from the parental generation (on each side), pp from the grandparental, and so on. … But contemporary genetics does not recognize

> the fractional relationships expressed in Galton's law of ancestral heredity (that is, 1/4 from the parental generation (on each side), 1/8 from the grandparental, 1/16 from the great-grandparental, and so on, ad infinitum) as describing any fundamental or even especially significant aspect of the mathematical structure of inheritance. By present lights, it would be extremely misleading, if not outright mistaken, to say that even the mathematical structure expressed by Galton's Ancestral Law is preserved in contemporary genetics. (Stanford 2003, 570-572)

Again, unfortunately, to what extent this model satisfies the criterion of having been used in genuinely successful novel predictions is a matter of dispute. Of much more dispute is the matter of whether genetics qualifies as a branch of science one should be a realist about, and if not whether similar counter-examples can be found in branches of science that traditionally have been the objects of scientific realism such as physics and chemistry. Again, pushing these questions further would necessitate a doctoral project in its own right (for an example of such a comprehensive study see Frigg & Votsis 2011).

Preservative Realism

The last topic of the present section is, as anticipated, preservative realism or, as it is otherwise known in the literature, explanationism (Chakravartty 2011, paragraph 2.3). This time, the restriction of the NMA is not provided in terms of postulated entities or structures but in terms of 'working posits' within mature scientific theories. Kitcher (1993, 140-149) calls the posits that do not carry out any genuine predictive work within a scientific theory 'presuppositional posits' or 'idle parts' of this theory. Psillos (1999, chapters 5 and 6) argues that one does not have to buy into a mature scientific theory wholesale; the absence of any unpreserved mature parts across theory change will do just fine in putting scientific realism back on track in the face of the pessimistic meta-induction, be them entities or structures.

The method by which to identify which parts are actually indispensable in making any given successful novel prediction is not a simple matter but, especially since it is unlikely that this selection is not very case-specific, it is an issue I will not press further here. Turning now to the usual question of how the PMI fares against preservative realism in terms of counter-examples, Chang (2003, 909) claims that, regarding the case of caloric and its counterpart of the mechanical theory of heat, assumptions about the material

nature of caloric were working posits in making successful novel predictions (e.g. the adiabatic gas law). Moreover, these are strictly incompatible with their mature counterparts in the mechanical theory of heat, which superseded that of caloric. If Chang is right this is a perfectly admissible counter-example for the PMI against preservative realism.

Whether Chang is indeed right, whether the theory of caloric was mature in the right way, whether the mature parts cancel each other out in the right way, and whether this example warrants the same conclusion about significantly many or all fields of science are still open debates in the analytic philosophy of science. As might be expected, these are also issues that cannot be pressed further here, nor will such an elaboration be necessary. What has been discussed so far is enough to allow me to proceed to the next session, regarding having the whole debate in view, and highlighting and discussing the pattern that runs through it.

1.5 The Form of the Debate

The goal of this chapter is not to stand by any specific scientific realist or scientific antirealist thesis. Indeed, after purportedly shooting down novel prediction realism at large and entity realism, the issues of structural and preservative realism were left open. Arguably, it is beyond the scope of this dissertation to close them here and now. After having the whole debate in view and the arguments lined up, it is now time to highlight the pattern that the argument displays and the hidden assumptions it gives out. As programmatically announced, I will arrive at the conclusion that the observables have been unfairly assigned a secondary role within the debate.

Let us run through the pattern. The cornerstone of the whole debate is the NMA. As iterated a few times by now, it contends that it is simply a miracle if science, being so successful, is not also true regarding unobservables. Along comes the PMI: miracle or no miracle, two or more mutually incompatible, mature scientific theories can be found. At this point, the scientific realist starts thinking more carefully. What is it that motivated the NMA in the first place? The putative answer is, of course, the success of science. But is *everything* in science responsible and indispensable for the kind of success that motivates belief in its truthfulness? Evidently, this is not the case, or the scientific antirealist would not be able to find a PMI kind of counter-example in the first place. So how does one start thinking about what to do away with? There seems to be no better way other than

analysing scientific theories into their composing parts, namely entities and structures. Which of the two should one pick to defend? Different philosophers have given different answers, which give rise to different strands of selective optimism. "Entities!" Hacking contends. "No, structures!", Worrall disagrees. "Neither set in and of itself! One should pick those entities and structures in particular that are *necessarily operative* in making successful novel predictions!" Psillos and Kitcher maintain. Each of these philosophers makes a compelling case for their choice. They all, as I believe to have shown extensively in section 1.4, share a method, whether they admit it (Worrall, Psillos) or not (Hacking): essentially to restrict the NMA to their own set of choice. Thus, three smaller heads spawn for the hydra of scientific realism where its large head was chopped off by the PMI. How is the scientific antirealist to answer, given that these three 'heads', these three brands of selective optimism, are internally coherent? Again, with the same weapon. They are now called to find a new pair of entities, structures, or working posits in mature scientific theories that are mutually incompatible, and in so doing to successfully apply the PMI to each of the three strands of scientific realism. This is the one single play here. Despite its vastness and complexity, I claim that this is how the scientific realism debate is conducted within the sovereign analytic literature today.

The main problem with this business, in my view, lies with the fact that, as it were, scientific realism is initially taken to be self-evidently true; as evidently right: it is a *miracle* if the enterprise of science is not true while being so successful. The scientific realist falls back to this premise under different guises: what else can explain science's (or parts of science's) success if not its (their) being true? The NMA is, I believe, not so much an argument as much as it is *a contention that no argument is really needed* to warrant belief in the truth of such a wildly successful enterprise as science is. It is essentially an appeal to intuition – an appeal to something that does not need to be argued for. Take the basic premise: if success does not imply truth then we certainly have a *miracle* going on amidst us. Or: scientific realism is not something that the realists need to argue for – the opposite camp should have to make their case. This, I claim, is a typical case of appealing to the court of philosophical axioms to favour the realists rather than an argument *strictu sensu*. Consider philosophical argumentation very generally; that a philosopher wants to argue for point A. A popular argumentative strategy within at least analytic philosophy is, I believe, to show that point A is directly derived from self-evident principles; to, perhaps by utilizing some sets of intermediary principles, reduce point A to these principles. When

these principles have been reached, it seems that the argument made is *always* the no miracles argument: point A can be faithfully reconstructed as if it were saying that it is a *miracle* if these, purportedly self-evident principles do not actually hold. This seems perhaps like a very sweeping claim but I cannot think a reason that this recast is not in principle applicable. If I am right on this count, then, this amounts to the whole 'no miracles' move being more about recasting the 'success implies truth' relation as something self-evident rather than being an argument itself.

This is not a problem in and of itself. Every philosophy needs axiomatic departure points. I do, however, believe that this *particular* departure point is problematic. This problem becomes impressively evident when we consider that most of the discussion has been limited to unobservable entities and structures. What science says about the observables is, the problem of induction notwithstanding, quite easily taken to be right. This is at least until a given law faces empirical hardships, having observational consequences disagree with it; until empirical discrepancies start piling on the pressure for a new theory – a paradigm shift as Thomas Kuhn would have it. Leaving the observables side-lined, I claim, is to blame for a very important omission pertinent to the contemporary scientific realism debate. The problem here is that posing (parts of) science as basically true unless strongly proven otherwise shuts down any philosophical discussion examining *directly* the kind of inquiry that science is, as well as the truth-bringing claim it may have. Specifically, casting the debate in such a way leaves untouched the issues of the situatedness of science as an enterprise conducted by specific beings with specific features (perhaps even differing among them). Indeed, if we follow the received way in which the analytic scientific realism debate is conducted today, it astonishingly seems like empirical or historical hardships are the only reason to start challenging scientific realism's claims. Conceptual philosophical inquiries have here shined in their absence.

To be more specific, imagine the improbable case that a scientific theory comes along which faces no empirical counter-instances, which has no significant problems accommodating the data and thrives at making successful novel predictions; a theory that is not mutually incompatible with any other displaying any of its virtues in its field. It is then the case that, according to how the mainstream scientific realism debate is conducted, little philosophical discussion about its claim to the truth could be conducted. In the upcoming chapters, I will claim that this hypothetical theory, same as any other, departs from a certain point (the observable realm widely construed) and is conducted in certain

ways (cognitive and other) that are predicated upon a certain condition – in the case of typical human science, the typical human condition. For example, if this theory was a theory about light's nature and function it would take its cue for scientific investigation from the thing in the world (some/a particular kind of?) humans separate from all others and call 'light'. In turn, this theory would presumably divide the parts of the world subject to its ambit in further categories in the process of investigating light. Following, the investigation into light would be directed and limited, minimally, by the cognitive capacities and tropes of the people conducting the investigation.

This former consideration seems to be completely amiss in the analytic conversation between scientific realism and scientific antirealism. To start introducing some terms we will often meet in the upcoming chapters, the typical conceptual universe human scientists operate in, it seems in what we have seen thus far, is not thought to be contingent and specific but the universal, uncontested point of departure for inquiry. What is left for science is to get the subsequent categories right, the unobservable categories that underlie the observable ones, as well as their interaction and ways of function. The 'first-level' ontology which denotes areas for scientific research is not touched upon in what we surveyed above. In other words, the phenomenology – human phenomenology and its conceptual contents – that unavoidably underlies the scientific enterprise seeing as it is conducted by human scientists, is not discussed.

This phenomenology is not one. We may imagine projects of knowledge stemming from other phenomenologies. Perhaps even more importantly, as I will claim throughout this dissertation, this phenomenology is not even one *among extant humans*. How would science be, for example, if science was conducted by beings like us but importantly different in certain sections of their brain biochemistry and cognition? How would science be if science was conducted by beings not sharing an organization and navigation of the world in categories and entities such as the one most humans possess (time, space, et cetera)? Can we even speak of such a divergence in concepts, are we able to represent it using our own? Most importantly, what practical consequences should this have for science, if any? Should science about humans that are seemingly committed to importantly different conceptual schemes be informed by those schemes? And finally, to get closer to the topic of discussion, what does it mean for a situated enterprise, having its beginnings in certain 'axiomatic' categories in organising the world, to be 'true'? Is it possible for such an enterprise to claim any kind of universal truth or is it the case that the best it can hope

for is to elaborate these initial categories by posing other ones within them, and to be instrumental in achieving certain ends in the context of these axiomatic categories?

Over the span of the rest of this dissertation I aim to discuss these questions in depth and to provide further motivation for taking them seriously in thinking what kind of truth claim science is supposed to have. To get, that is, beyond supposing science's truth until solid, mathematical-like proof emerges to motivate antirealist considerations. Of course, discussing alternative conceptual schemes, as well as the importance of phenomenological categories in acquiring understanding of the world and our 'truth-grip' on it, are not new ideas that belong to me; they have rather been important themes in both analytic and continental philosophy for decades. It seems, however, rather unfairly to me, that they have been bracketed in the contemporary analytic debate regarding scientific realism. To get the conversation about observables started, then, I will, in chapter two, interrogate the analytic philosophers of science, from Grover Maxwell to van Frassen and from Putnam to Donald Davidson and Richard Rorty, who *have* discussed observables in the realism frame. To this mix and in the hunt of the best conceptualization of the observable level and its tropes, I will later add phenomenologists like Edmund Husserl and his conception of the life-world.

Conclusion

In this chapter, I have surveyed the received contemporary way of conducting the scientific realism debate. First, and within the limits of a certain abstraction, I gave an initial definition to scientific realism and scientific antirealism. Then, I introduced the 'no miracles' argument and the pessimistic meta-induction, the cornerstone arguments of scientific realists and scientific antirealists respectively. The former argues that science's truth is an unavoidable implication of its instrumentality, while the latter uses the history of science to divorce the two notions. After having all the main lines that scientific realists and scientific antirealists follow in view, I claimed that they can all be subsumed under the form of a 'restricted NMA' versus 'restricted PMI' sort of chase game. Each time the two main issues are: is the new NMA internally coherent? If so, can it, free of the weight of unnecessary volatile metaphysics, escape the historical grasp of the PMI? Who knows – there is voluminous literature that argues for positive and negative answers pertaining to the different doctrines of selective optimism. My point was, rather, to point out that, very importantly, this way of conducting the debate turns a blind eye to some very interesting

direct, philosophical, conceptual discussion on science's truth claim that may be had beyond examples and counter-examples. Further, it is my belief that this discussion has the observables, and not the unobservables, aspects of the world at its heart. To orientate things in this spirit in the remaining chapters of this dissertation, I will, in chapter two, start thinking what the observable level may be, if anything legitimate at all.

2. The Analytic Discussion of the Observables

Introduction

In the previous chapter I surveyed the most influential literature in the scientific realism debate as it is conducted within the analytic philosophy of science today. The major conclusion drawn was that scientific realism is self-evidently taken as the correct philosophical position towards science until a series of crucial counter-examples from the history of science arise to challenge it. From then on scientific realism adapts to survive and assumes more modest versions, and the question becomes one of these new versions' internal coherence and of whether the case of historical counter-examples that apply against these modest versions can still be made. I argued that this pattern is philosophically limited in that it prevents a direct examination of science's claim to the truth. It was further suggested that the place to start such an examination from is the observable aspects of the world, which have been overlooked in the literature examined in chapter one. Accordingly, this chapter and the next are dedicated to the complex and problematic issue of demarcating the realm of the observables.

Specifically, the present chapter surveys the work of those analytic philosophers (of science and language) who *have* discussed the observable level in connection to the realism debate. I find that their work addresses two questions: whether *there is* a legitimate dichotomy to be made between the observables and the unobservables and what the intricate connections between theorizing, conceptualising, and access to the world's observables precisely are. This scholarly work is found to be largely divergent with one point, however, largely conceded: even those philosophers who argue against the legitimacy of the observable level admit that *some* kind of a 'directly empirical' realm is necessary for science. That is, these philosophers challenge more observability as traditionally construed rather than the idea of a privileged empirical realm which science importantly refers to altogether. In the end of the chapter we are going to have in hand a few appealing intuitions about what this realm must be, but no clear definition of it yet.

In chapter three I proffer that Edmund Husserl's 'life-world' (*lebenswelt*), a notion from continental philosophy can, with certain tweaks, very much accommodate the most attractive intuitions and avoid the biggest pitfalls pertinent to observables from the analytic literature. In chapter four I argue that, despite often intersubjective, the life-world is not singular, but plural, and contingent on a variety of factors. In chapters five and six I move to such extant examples by exploring the case of autism spectrum conditions, a purported

case of such difference. In chapter seven I take stock of the philosophical picture painted throughout this dissertation and I connect it back to the scientific realism debate.

The present chapter is structured as follows. In section 2.1 I examine one of the most influential movements in the history of the analytic philosophy of science, that of logical positivism. Within it I locate the idea that the observable level is important for science in the sense that all scientific statements should acquire their validation in relation to the observable level, and suggest that this idea is tenable as well as not organically tied to the larger enterprise of logical positivism, which has famously been met with collapse. In section 2.2 I interrogate the beginnings of the dialogue on observability in connection with scientific realism within the analytic framework, starting with the influential and conflicting views of Grover Maxwell and Bas van Fraassen. Maxwell argues that all the world's entities are more or less directly observed and that drawing a line in this continuum, separating the observables from the unobservables, may only be arbitrary. Moreover, he argues that what is observable is contingent on the current human technological apparatus, which can only absurdly assume the role of an ontological criterion. Van Fraassen attempts to resist these conclusions by maintaining that observing is a different thing than observing *that* and by claiming that observability, though a vague predicate, is not a faulty concept. Further, he adds that observability is (should be) not an ontological criterion but a proper *epistemic stance*.

In sections 2.3 and 2.4 I initially examine Alan Musgrave's, Paul Dicken's and Peter Lipton's, and Hasok Chang's attempts to adjudicate the Maxwell-van Fraassen debate and solve the observability mystery. Dicken-Lipton and Chang seem to side more with van Fraassen, while Musgrave joins Maxwell's ranks. Chang tries to sidestep van Fraassen's problems by making observability quality- and incorrigibility-based rather than object- and certainty-based. Musgrave points out that van Fraassen's doctrine may be logically incoherent and tries to push him to admit that unobservables must be considered observables too based on the inference to the best explanation, thus collapsing the dichotomy. Dicken and Lipton proffer arguments to the effect of shutting down Musgrave's most powerful protestations against van Fraassen. Last, I present the causal account of observability through one of its main proponents, Peter Kosso who, despite his doctrine's name, seems to also sit comfortably with the Maxwell side of things, arguing that observability is a multi-dimensional issue and also a matter of degree.

In sections 2.5 and 2.6 I explore an angle of the problem of observables which regards what *kind of access* we may have to them. Are the observables sense-data, phenomena, qualities, objects, a veil of flux, or something else? For the answer to this question I turn to the analytic philosophy of language and to Hilary Putnam's multi-faceted internal realism. Putnam and others have extensively discussed what form of access we may have to the world via the observable level and have offered many important arguments, both extremely optimistic (we have direct access to the world as is) and extremely sceptical (the world hopelessly deceives us). Their insights will prove invaluable in providing a tenable notion of observability in chapter three. I introduce the topic here, but much of what I say in the following chapters is necessary to elaborate my own position on it. Thus, the presentation of my own position on the matter will have to await the last section of chapter seven.

To sum up, I repeat that two questions are going to occupy us in this chapter: is there a legitimate realm for the observables and, if yes, what kind of things are the observables? In this chapter I gather the analytic insights on the matter and survey the scene. In chapter three, I provide my own notion of observability through Husserl's life-world.

2.1 Observability in Logical Positivism

If the observables can, for now, be roughly cashed out in terms of human experience of the world, then to argue for the importance of the observable level for science is just about reinventing the analytic philosophical wheel. Indeed, the idea that the natural sciences somehow importantly depend on experience and the observables exists since antiquity (Creath 2011, paragraph 4.1). Simultaneously, it is also the case, especially with the explosion in the advancement of microscopic and other related technology in modern times, that scientific theories have become increasingly populated with entities that are not directly observable. In the analytic tradition, the first movement that systematically discussed the relation and the balance of importance, so to speak, between statements about the observables and statements about the unobservables, was that of logical positivism, established by scholars like Moritz Schlick, Rudolf Carnap and Carl Hempel

of the Vienna Circle, having the empiricists John Locke and David Hume as their forefathers. Three out of logical positivism's most basic tenets[7] are of relevance here:

- **The Verifiability Criterion of Meaning:** A statement is meaningful insofar as it is verifiable in experience.
- By extension, a scientific statement is meaningful insofar as it is verifiable in experience.
- All unobservable terms should be translatable to terms in an observation language in order to be meaningful.

Let us now examine these statements and what they precisely claim about observability. First, as an overarching comment, all the above statements are to be distinguished from two scientific antirealist positions: that unobservable entities do not exist and that statements pertaining to the unobservables comprise useless, excess content in science that should be eliminated (Maxwell 1962/2012, 1054). Some logical empiricists gave due credit to statements about the unobservables in science as a means of organising and systematizing observation statements while remaining agnostic about the actual existence of the unobservables. Granted, others simply dismissed the existence of such entities and such content (Chakravartty 2011, paragraph 4.1)[8]. Moving now to the actual statements, I will start from the bottom. The third statement – that all unobservable terms should be translatable to terms in an observation language in order to be meaningful – was first advanced by Carnap in his paper *Testability and Meaning* (1936-37). The motivation for it stemmed from one of logical positivism's flagship projects, a reductionism pursuing the unity of science. Carnap, however, retracted this statement in his paper *The Methodological Character of Theoretical Concepts* (1956). Therein, Carnap shifted his

[7] Any and all claims about logical positivism made in this section should be read as "most or some important logical positivists argued that X". Logical positivism is a movement, not a doctrine and, therefore, to try and find even a few commitments shared by all of its members throughout their philosophical careers in order to define it would leave the set of logical positivists vacuous.

[8] For a detailed discussion on what various logical empiricists believed about the unobservables see Giere & Richardson (1997), and Richardson & Uebel (2007).

reductionist demand to whole *statements* rather than *terms*, thus falling back to statement two of the above list (Friedman 1987; Richardson 1998). What prompted Carnap to do so was Karl Popper's critique of the third statement in his *The Logic of Scientific Discovery* (1935/2005). What Popper showed was that most unobservable terms in a scientific theory included in their definition other unobservable terms, which partake of the same scientific theory, and that this situation was ineliminable. This is to say that it is impossible to perform a one-to-one reduction of unobservable terms in scientific theory to categories of a public observation language: unobservable terms most often acquire their meaning only when viewed in the context of a general scientific theory. Thus, Carnap retreated to the more modest position.

I turn now to the second statement, which contends that a scientific statement is meaningful insofar as it is verifiable in experience. I would like to particularly highlight the forceful intuition behind this position by pointing out that it does not amount to more than the standard argument against God, the occult, and other suchlike entities and concepts: it is simply the demand that one should not take seriously statements about the world that are not confirmable in experience, for which there is no evidence, and with which one does not seem to be able to change the world one perceives. As illustrated in the first chapter, a large discussion is required to address the question of just *which*, out of the statements that are translatable into the observable, one should adopt or take literally, but the present will do as an adequate cornerstone: eliminate those that are not. Unfortunately, however, this powerful intuition would not serve to seal the discussion and establish the legitimacy and primacy of the observables. The picture would be substantially complicated following the infamous logical positivism's demise.

Indeed, the philosophical movement to which Carnap himself subscribed did not fare well in philosophical history. Despite its being baptized as the 'Received View' (Putnam 1962; Hempel 1970) and its still being called the 'Once Received View' (Craver 2002), logical positivism's view of scientific theories was largely abandoned. There are several forceful reasons behind this development, the most decisive being the failure of the verifiability criterion of meaning, which is centrally relevant here[9]. Recall that what the

[9] Another group of reasons why logical positivism was abandoned are presented in Willard Quine's *Two Dogmas of Empiricism* (1951), one of the most important papers in the analytic

criterion holds is that statements are meaningful insofar as they are verifiable by experience. Succinctly put, the problem with it is that it renders the set of scientific theories vacuous. As we saw in chapter one, scientific statements are of a general form that extends to, besides the present, the past and future. Since one does not find time machines aplenty, and one cannot travel to the future or the past to test this statement for all possible objects, Newton's first law of motion, for example, is rendered, per logical positivism's verifiability criterion of meaning, meaningless. This generalises: all scientific laws are of this form, and they are all rendered meaningless by the same token. Expectedly, philosophers of science chose to leave the criterion, rather than the meaningfulness of science, behind.

It is now time to ask: does this mean that the second statement, namely that all scientific statements should be verifiable in experience, must go? As it is put, and for the reasons pertaining to the untenability of the verifiability criterion of meaning, on which it (the second statement) crucially depends, the answer is clearly yes. The stress of the failure, however, is put on the word *verifiable* rather than on the phrase *in experience*. The crisis we explored above had broadly to do with being *sure that something holds across time* (and space, it could be argued), *not* with the position that experience should apply the material for theory and belief acceptance. Analytic philosophers of science responded to the crisis of verification by advancing alternative doctrines of comparing scientific theory with experience, based on the weaker notion of confirmation – of *apportioning* belief to experiential evidence, not of *abolishing* the notion of experience and its utility in science. As we saw in the previous chapter, Popper (1963) devised the doctrine of falsificationism and Imre Lakatos (1978) pointed out the problems of this doctrine (a bunch of theories faces experience). Following, Lakatos devised the more complicated notion of progressive and degenerating *research programmes*: bunches of theories that either progress (are of adequate scope and solve novel problems) or degenerate (can only accommodate the data *ad hoc*). These doctrines do not demote the centrality of experience in science; they are just attempts to cash out how the two are wedded in ways that are philosophically sound. None of the theories of science that inherited logical positivism's crown in analytic philosophy did away with the notion of statements about unobservables referring to experience to get their validation: what changed is that they were considered, in some way

---

philosophy of the twentieth century. I discuss this paper later in this dissertation, in the frame of chapter four.

or other, *confirmed* instead of verified, and that what was confirmed was held to be bunch of statements rather than isolated statements or terms.

It is now clear that logical positivism's holding the observable level to the standard of being a distinct and indispensable level for science echoes loudly through the analytic tradition even today. This, however, will again not be the end of the discussion. Simultaneously with Popper's and Lakatos' above writings, Maxwell, an analytic philosopher of respectable stature, was attempting to undermine the observables by killing the observables-unobservables dichotomy in principle. It is to this attempt that I will momentarily turn.

2.2 Observability in the Late Analytic Tradition: Grover Maxwell and Bas van Fraassen

In his influential paper, *The Ontological Status of Theoretical Entities*, Maxwell (1962/2012) launches an all-out attack on the 'observational-theoretical dichotomy'. The bulk of his attack is that if one is to hold that unobservables, for example microbes, are not observed through microscopes but only shadows of their images are observed instead, then one may only arbitrarily claim that observables, for example birds, are directly observed through a fogged window or any other medium except a vacuum. This is to say that, per Maxwell, entities are in the clear majority of cases observed through a mediating prism, whether that is the microscope or the atmosphere or the pouring rain or something else. Unless one wants to claim that things are only seen when seen in a vacuum, and there is likely no philosopher that would want to claim this, then one must admit that there exists a continuum in which things are more or less directly observed, and that drawing a line dividing this continuum in actual observations and quasi-observations could only ever be arbitrary. It may be objected, adds Maxwell, that it is theory that says that microbes exist, not mere observation, and thus that microbes are in a worse ontological fate than birds. This position, however, appears to directly contradict the generally agreed-upon thesis on the theory-ladenness of observation: the philosophical maxim that there is no observation statement made without theory involved[10].

[10] For the basic works on the issue refer to Norwood Hanson (1958) and Thomas Kuhn (1962).

This argumentation regards the impossibility of drawing a non-arbitrary dichotomy between the observables and the unobservables. Moreover, Maxwell argues that, even if this possibility was granted, the ontological significance that empiricists want to ascribe to it would be unfounded. To illustrate this regarding the example at hand, consider the position that microbes were never actually posed as unobservables in principle; that the possibility was ever present that humankind would one day develop an apparatus by which to observe microbes, which was in turn indeed materialised in the form of the microscope. This, maintains Maxwell, would ascribe to humanity's contingent occasional technological apparatus the significance of an ontological criterion, which may only be absurd. In a hypothetical world of blind people who infer that tables exist because they stumble upon them, it would be entirely unfortunate if tables started being considered extant insofar as these people developed functioning eyes[11].

Last among the objections to his position that Maxwell considers is the Lockean (Locke 1690/1894) idea, later proliferated by Hume as well as by Bertrand Russell's and Ludwig Wittgenstein's logical atomism (which they later abandoned), that there is no conception of anything without a preceding impression of it[12]. Even if the tenability of this position is granted, says Maxwell, one is then immediately led to phenomenalism, the view that physical things cannot be said to exist in themselves but only as perceptual phenomena or sensory stimuli. Phenomenalism, continues Maxwell, is surely out of fashion, but even if it was not, it is the case that phenomenalists themselves would surely grant that what are normally thought of as the observables are no better off than the unobservables in the sense discussed here. By the phenomenalist approach they both exist as sensory stimuli: the ball outside the window is as much an impression as the microbe looked at through the microscope. In phenomenalism, if one wants to admit the independent existence of one, then one would want to admit the independent existence of the other, which is effectively the summary of Maxwell's own position.

Finally, Maxwell makes a remark that I want to particularly highlight, as it will prove of extreme importance for the purposes of the next chapter. I have italicised the parts

---

[11] The example is mine but I believe it readily encapsulates Maxwell's spirit.

[12] For the purpose of following the present argument one may freely swap the term 'impression' with observation.

where he admits the necessity of an immediate empirical level seeing as it will soon prove crucial to my defence of the observables.

> Although I have contended that the line between the observable and the unobservable is diffuse, that it shifts from one scientific problem to another, and that it is constantly being pushed toward the 'unobservable' end of the spectrum as we develop better means of observation – better instruments – it would, nevertheless, be fatuous to minimize the importance of the observation base, *for it is absolutely necessary as a confirmation base for statements which do refer to entities which are unobservable at a given time.* ... But we should take as its basis and its unit not the 'observational term' but, rather, the quickly decidable sentence. ... *A quickly decidable sentence* (in the technical sense employed here) *may be defined as a singular, nonanalytic sentence such that a reliable, reasonably sophisticated language user can very quickly decide whether to assert it or deny it when he is reporting an occurrent situation.* 'Observation term' may now be defined as a 'descriptive (non-logical) term which may occur in quickly decidable sentence, and 'observation sentence' as a sentence whose only descriptive term are observation terms. (Maxwell 1962/2012, 1057)

We may take these points home from Maxwell: first, there is purportedly a continuum of observation, seeing as observation is always prism-and-theory mediated. Second, even if it was not, observation is unable to perform the ontological heavy lifting friends of the observables want it to perform. Third, there is nevertheless a realm of quickly decidable sentences that bootstrap our empirical considerations – that act as the basis of our empirical evaluations. Hold these points in mind. In chapter three, where I advance the notion of the life-world as a proper construal of the observables, I will argue that, indeed, observability should come to capture much more than certain senses (e.g. sight) momentarily meet. Nevertheless, this should not be taken to mark the demise of the observables. That observability is always-already multifariously mediated and no certain guarantor to existence are points that must be conceded but, I will claim, the life-world notion takes very good notice of both arguments. In fact, van Fraassen will now lend us a helping hand relating to these points.

A few years later than Maxwell's paper, van Fraassen (1980) published *The Scientific Image*, a book advancing a specific scientific antirealist position, namely and famously

constructive empiricism. Chief among the tasks to achieve was, unsurprisingly, to halt Maxwell's attempted collapse of the observable-unobservable dichotomy. For van Fraassen (1980, 8) scientific realism is the position that "science aims to give us a literally true story about what is going in the world, and that holding a theory involves the belief that it is true". By contrast, constructive empiricism is the position that "science aims to give us an empirically adequate story about what is going on in the world, and adopting a theory involves the belief that it is empirically adequate" (1980, 12). 'Empirically adequate' is here cashed out in terms of a theory's 'saving the phenomena', where the realm of the phenomena is delineated by means of observation statements, regarding of course only observable entities. Thus, van Fraassen goes on to defend the genuineness of observables, evidently necessary for him as for any empiricist.

Van Fraassen's first move is to point out a purported 'category mistake' that Maxwell commits, namely conflating theoretical concepts with (un)observable entities. Concepts, says van Fraassen (1980, 12) are theoretical; entities are either observable or unobservable. This separates the dichotomy question into two sub-questions. The first question is whether language can be separated into a theoretical and non-theoretical part, and the second question is whether entities can be classified into observable and unobservable. Maxwell, following scholars like Paul Feyerabend and Wilfrid Sellars, answers the first question negatively: language is unavoidably theory-laden. Van Fraassen agrees with him, but notes that the place where the philosophical juice of Maxwell's paper lies is in the quite distinct and in his view independent second question (observable-unobservable dichotomy), which Maxwell answers negatively as well. According to van Fraassen (1980, 15), in doing so Maxwell commits the important mistake of conflating observing with observing *that*. Observing that something or other is the case that putatively indicates the presence of an entity, he says, is not the same as observing the entity itself: observing the tracks of a bear in the snow is not observing the bear itself. Observing the tracks that an electron putatively leaves in a cloud chamber is not the same as observing the electron. I understand this point as saying that, although, per Maxwell, an image produced on the retina through a medium mediates ontological inference, in the case of the unobservables in science this image is *not* of the entities themselves but of undulations in the environment in which the latter purportedly at some point existed[13]. Van Fraassen's point, I submit, is

[13] Importantly, this would be granted, I think, by the scientific realists as well.

effectively this: while indications and (theoretical) mediations abound, not all indications and mediations are equal and of the same kind.

Moreover, van Fraassen (1980, 16) holds that Maxwell's continuum does not correspond to the observability of a given X: the fact that Jupiter's moons can be observed through a telescope does not cancel out the fact that they can be observed with the naked eye if looked at from adequately closely. Per van Fraassen, the definition for when something is observable is that it is observable *under the right circumstances*. Maxwell's argument against (un)observability in principle is a trick, he submits: if one has a mortar and pestle made out of copper and weighing about a kilo, should one call it breakable because a giant or a suchlike being could break it? Hardly – what Maxwell's argument shows, he argues, is that 'observable' is a vague predicate. There is, however, no need to panic about this. The existence of a vague predicate is fine if the predicate has clear-cut cases: looking at the moon through a telescope is such a case of observation, looking at tracks of a supposed electron through a microscope is definitely *not*.

Finally, regarding Maxwell's contestations to the importance of the dichotomy even if it could be drawn, van Fraassen admits that the predicates 'is observable' and 'exists' are not linked together by any necessary means. They are, however, surely bound together in a sense regarding the proper *epistemic attitude* toward an X's existence (1980, 19): someone at time T has no reason to believe that something exists unless that something has been registered in the registry of observables by humans at time T. This of course does not alleviate Maxwell's pressure regarding the contingency of the observing apparatus but it is a bullet that van Fraassen is willing to bite, seeing as he considers it not much of a bullet: if in the future humankind develops electron-seeing (not electron track-seeing) means, then electrons can be freely admitted as extant. If, in the future, humankind develops God-seeing means, the same would hold for God, but this does not imply that one should believe in God right here right now. This conclusion sits well with van Fraassen's, not explicitly negatively antirealist, but rather agnostic attitude towards the unobservables.

In summary, Maxwell contends that there is a continuum of observation. Observation is mediated by theory and matter, thus the continuum may only arbitrarily be separated into genuine and non-genuine observations. Moreover, he challenges the role of the ontological adjudicator on behalf of observation. Van Fraassen attempts to resist these conclusions in the way we just saw: separating observing from observing *that* and defending observability *qua* vague notion and proper epistemic stance. In chapter three,

where I utilise the notion of the life-world as observability proper, I will make elaborate use of van Fraassen's arguments. The life-world will be defined as a vague predicate indeed, admitting its theory-mediated character as no sin. Moreover, it will be argued, besides the proper epistemic stance, it is the *only* epistemic stance science may rely on: it (non-exhaustively) denotes the areas of science's points of departure, mode of conduction, evidential evaluation.

2.3 Analytic Arbitration of the Observability Debate: Alan Musgrave and Hasok Chang

We have a bulk of material in hand for chapter three where we will try to find the most proper way to define observability. There is a series of notions turned headaches already: mediation, ontological adjudication, proper epistemic stance. As is to be expected, however, others have tried to come between Musgrave and van Frassen ever since the debate's inauguration, offering valuable insights. In this section I will address the work of Musgrave and van Fraassen. In his *Constructive Empiricism Versus Scientific Realism* (1982) Musgrave attacks van Fraassen's antirealist prohibitions using inference to the best explanation. Musgrave contends that the best explanations in scientific theories are couched in terms of the unobservables and argues that van Fraassen's is a curious sort of empiricism that sets the available evidence aside for a false cause. He borrows van Fraassen's own example to demonstrate the supposed absurdity of his case:

> I hear scratching in the wall, the patter of little feet at midnight, my cheese disappears – and I infer that a mouse has come to live with me. Not merely that these apparent signs of mousely presence will continue, not merely that all the observable phenomena will be as if there is a mouse; but that there really is a mouse. (Van Fraassen 1980, 19-20)

"Will not the same pattern of inference lead us to believe in unobservable entities?" asks Musgrave (1982, 265). What sort of absurd empiricism is that which permits someone to believe in yetis and mice in hope of their one day seeing them, but does not permit the physicist to believe in their electrons?

Bracketing the answer to the above question until the next chapter, I now turn to Chang's view. As the title of his paper *A Case for Old-Fashioned Observability, and a*

Reconstructed Constructive Empiricism (2005) indicates, Chang makes a case for the dichotomy in the van Fraassen side of things and reformulates constructive empiricism in a manner that purportedly deals better with the chief scientific realist objections to it. Chang's observability pertains to qualities (reports of sensation) rather than objects (Chang 2005, 876). This is in line with logical positivism's conception of experience (Carnap 1995, 225) and also in sharp contrast with the predominant object-centred conception of terms of experience – see for example van Fraassen (1980, 15) and Kosso (1988, 451), the latter arguing directly that qualities can only be perceived as belonging to a certain object. Against this contention, Chang (2005, 878-879) presents an array of examples from both scientific and everyday observation such as the instances of measuring the gravitational or Planck's constant or noticing a smell of rot in the air, which clearly do not pertain to any particular object. Here, observation "consists in registering a *quality*, and ... observations are perfectly meaningful and coherent without any knowledge or presumption of an object to which the quality belongs, or even an object which causes the quality to be present". Per Chang's formulation, an entity is observable if, and only if, it has any observable properties and is unobservable if, and only if, it does not. This is where Chang partially crosses over to the Maxwell side of things by stressing that this primacy of qualities over objects urges us to believe that entities traditionally thought of as unobservable are observable via their manifest qualities. It is high time, argues Chang, that we stop privileging vision over other means of access to the world and the entities that inhabit it:

> We need to recognise that a sufficient number of chlorine molecules sprayed in the air are just as observable as a rock that hits my head ... Vollmer (2000, 361; 365) says that caffeine is an observable entity because we can discern its molecular structure though X-Ray crystallography. I say caffeine is observable through the buzz I feel after I ingest it (and indirectly observable through the unimaginable number of people who stay awake at philosophy conferences). (Chang 2005, 879)

As recognised by himself, Chang's thesis should find several objectors in its offing, first among them being the one logical positivists faced themselves in replacing objects with sense-data as the terms of experience: that no system of knowledge could ever be constructed on predicates like "white here now" and "round shape" without additional theoretical assumptions that synthesize them into statements interesting for any kind of

knowledge: theories. Notably, this is a point conceded by one of the leading figures of logical positivism, Schlick (1934/1979, 382) himself. So, is there any hope for this substitution of objects by qualities in the place of observables to serve as a tool to finally get around the problem of theory-ladenness of observation? In other words, are the qualities one perceives finally non-theoretical and will they serve as the objective building blocks with which to build objective knowledge – is this a signal for a return to non-theory plagued phenomenalism? Absolutely not, says Chang: the bulk of our sense-data is separated out into individual qualities in exactly the same theory-laden way that the bulk of our vision is separated into individual entities. This much is true, admits Chang, but he turns now to a new notion: that of *incorrigibility*. What separates the 'launching pads' of inquiry from the rest of observation is not non-theory mediation but the fact that we seem to be quite unavoidably stuck with them; they "provide the starting points and some crucial later ingredients for our evolving interpretation" (Chang 2005, 882). By this, he only means that "we have no way of changing them at will" (ibid., 880), not that they are constituted of truth and fact (same as incorrigible people, who may often be wrong). It is on this basis that Chang draws his dichotomy, and claims that sense can be made of it, even if statements pertaining to the observables and statements pertaining to the unobservables are both interpretations.

Finally, Chang argues that this status of the incorrigible sense-data can be contingently externalised to instruments. This is what happens when I wear my glasses and accept the instrument-mediated input as sensation input itself unless I have a reason to doubt this incorrigibility (the instrument independently shown to be unreliable). Moreover, Chang holds, it is the case that instruments create new observable qualities via operational definitions: the length of a mercury column is incorrigibly supposed to be a medium for the registration of the quality of temperature (Chang 2005, 881). It is further the case, he adds, that even with long-learned and embodied interpretations, one can by reflection peel them away if they can in principle be peeled away (Chang 2005, 882-883). But does this not, as Maxwell would interject, privilege human accessibility to various things as an unwarranted ontological criterion? Only if observations are taken to be true, correct and objective in any way claims Chang, something from which he takes distance. Again, he turns to incorrigibility and repeats that "... the incorrigibility of observations only means that we are stuck with them, not that they are correct", a statement which he is quick to complement with the admission: "Still, we are pretty well stuck with taking the testimony

of human senses on the whole as a starting point of our empirical knowledge. … there is … here only … *humanism* in the form of a recognition that we cannot, and should not try to, get away from ourselves" (Chang 2005, 883).

So, what is Chang's gift to van Fraassen and constructive empiricism? According to Chang (2005, 884) it is van Fraassen's object-based definition of observability that "continually drags him towards realism". As has already been showcased, one influential objection to van Fraassen's line of argument is that there is no necessary correlation between what humans have access to and what exists, something which van Fraassen gets around by highlighting that he talks epistemology, not ontology. However, interjects Chang brilliantly, "[W]e can dispense with the difficulty completely by insisting that observability really has *nothing at all* to do with the existence of objects, rather than trying to hold on to the idea that observable things must exist". By his definition, *all* entities belong in the realm of interpretations, rather than observations, as "we do not have thing-perceivers in our sensory apparatus" (Chang 2005, 884). This move from object-based observability to quality observability, per Chang, serves to do away with various other problems associated with van Fraassen's account, such as asserting that medium-sized members of the kind X exist while their small, undetectable by the eye counterparts, do not – a certain absurdity. If qualities take the place of entities in observation then the above problem automatically dissolves. This, per Chang, emphasizes the 'constructive' element of constructive empiricism by showing that interpretations (entities among them) are constructed, not discovered: "they need to fit with observations, but they cannot be proven by observations" (Chang 2005, 885). In other words this move unshackles van Fraassen's constructive empiricism from having to admit that science possesses some kind of truth about observable entities, which, by the same token can then easily be extrapolated to the unobservables. Chang does not argue that there is a dichotomy between unobservable and observable objects: he restricts observation to the realm of qualities and argues that a dichotomy between qualities and objects can much more easily be drawn. This, of course, as he notes, comes at the price of giving up all absolute certainty one may have regarding scientific knowledge pertaining to the observables, which is (wrongly, per Chang) affirmed in van Fraassen's original version of constructive empiricism.

Let us take stock. First, Maxwell gave us the mediation and ontological adjudication problems. Van Fraassen retorted with the position that observability is a vague predicate that denotes a proper epistemic stance towards the empirical. Musgrave came to hit back:

what sort of empiricism casts aside inference to the best explanation? In turn, Chang proffered an incorrigibility-and-quality-based definition of observability. This serves to give additional force to the argument for observability as proper epistemic stance, untangling van Fraassen from realist commitments that continually drag him down: it is not that what we observe decidedly *exists*, it is that it constitutes the basis of inquiry, and also has a feedback relation with it: products of inquiry may come to inform what is incorrigibly observed (as with the case of eyeglasses). In this picture, the continuum of observation, relating to objects, disappears along with the disappearance of objects from observation. Incorrigible qualities are all equally incorrigibly observable.

Overall, in the above picture, van Fraassen and Chang pull towards observability, and Maxwell and Musgrave try to resist the related dichotomy. Evidently, seeing as my whole argument is predicated upon the importance of observability, in the next chapter I am going to side with the former camp, addressing the problems the latter brings to the fore. Via the life-world, the realm of incorrigible (the term now evidently taken from Chang) admittances, I will claim that observability needs indeed to be seen as the sum total of things we are stuck with, not things that *exist* in any transcendental, self-evident way. It is (or should be), following van Frassen, indeed a vague predicate. We can dispense, I will claim, with the continuum worries by referring to incorrigibility but I will also part ways with Chang: to do all that he rightly wants us to do with observability, I will argue, we need not erase objects from the picture; object-ness is, after all, most often an incorrigible quality. Moreover, it is not that what is incorrigibly present only helps launch science and feeds back into it: it also affects the tropes of science conduction. Nor is it the case that observability should only relate to the world: it should also relate to the perceiving subject; it is the faculties of a subject that actively represent the observable world *in synergy* with material from the world. Last, regarding Musgrave, I will argue that the mouse in the wainscoting, *qua* mouse in the wainscoting is no incorrigible admittance (the sound it makes does).

2.4 The Dicken–Lipton Intervention and Causal Accounts of Observability

In their paper entitled *What Can Bas Believe? Musgrave and Van Fraassen on Observability* (2006), Dicken and Lipton explore yet another objection raised against van Fraassen by

Musgrave in the same paper cited above[14]. As we saw, van Fraassen's contention is that, being within a theory when observing as we may, we can still very well let this theory tell us what is observable and what is not (call this theory T). However, Musgrave begins his argument, van Fraassen is a constructive empiricist: this means that he is only allowed to believe statements about the observables. Thus, he needs to know which statements of T are about observables and he only has T at his disposal for this task, thus T must be applied to itself. This is not an immediate cause of alarm for van Fraassen. One who sets out to prove him incoherent will now have to show that this does not only denote a circularity but a *vicious* one at that (Dicken & Lipton 2006, 227). Unfortunately, says Musgrave, the statements of T on observability are not themselves statements about the observables and thus a constructive empiricist is not philosophically legitimized to believe them. Why? Because *some* of T's statements will necessarily be of the form "X is unobservable.", which is clearly not a statement about observables.

There are a few ways in which we can answer this, Dicken and Lipton claim: we can hold that statements about unobservables may be tentatively *accepted* rather than believed or, more naturally, that we can believe those statements of T that *are* about observables. However, they continue, since T is not complete, we are in the dark about what to do with its remaining consequences: are they about observables or are they not? Towards this, Dicken and Lipton (2006, 228-229) reply, agnosticism is fine: so long as we know what is observable, a line separating the observables from the unobservables and the maybe-observables can be finely drawn[15].

This, however, Dicken and Lipton note, is not the line van Fraassen actually takes. The line he takes, as they understand it, is this. Suppose that T entails that a certain X is unobservable. Further, suppose that this X is in fact observable. Then, T entails something

---

[14] Albeit the two being part of the same paper and argumentative line, I consider this objection by Musgrave here, along with Lipton's and Dicken's work. This is because Lipton and Dicken exhaustively raise and explore it before finally rejecting it, and thus I will not be taking it with me in the next chapter.

[15] To this I must add that I think van Fraassen's base is covered from his original paper: when he talks about the proper *epistemic stance* rather than a guaranteed ontology, I believe he has exactly this in mind: we may legitimately remain agnostic toward that which we have no sufficient evidence of.

false about an observable entity. However, if we, as constructive empiricists, take T to be empirically adequate, then we believe that what T says about observables is true. So, we would *never* take T to hold something false about an observable *and* be empirically adequate. What does this mean? Dicken and Lipton explain: we can only be agnostic about a statement of T insofar as it does not have any false empirical consequences. Thus, statements about unobservables *do actually function as statements about observables* since it is only by means of observation that we can derive the existence of a certain thing. If we have another scientific theory, call it T', under examination and believe that T is empirically adequate then we are legitimized to believe T, by means of observation, in saying that a certain X is unobservable. With one qualification: if and only if X *exists*, as Dicken and Lipton hasten to add, for there is always the possibility that T may be asserting something not, strictly speaking, false but empirically 'irrelevant' about an X: this X may not exist. Thus, the constructive empiricist is entitled to believe all statements of the form "X is unobservable (iff X exists)." because, by means of observation, they know that X is not observable.

Even after this long course Lipton and Dicken rest unsatisfied for they now start generating possible retaliations on behalf of Musgrave to van Fraassen's answer. This objection is based on a different understanding of observability, which allows for the falsity of "X is unobservable (iff X exists)." even if T is empirically adequate. How so? In the case where what is observable is only a *property* attributed to an entity *contra* the entity itself being observable. For, then, even if the statement "X is unobservable." were false, T would not be making a false contention about an observable entity, but about a property instead (Dicken & Lipton 2006, 231). For this they have a rebuttal as well, which is to take the claim that a theory is empirically adequate to already presuppose a demarcation between what is observable and what is not (ibid.). Dicken and Lipton proceed to note that it is not immediately clear whether this solves Musgrave's objection but I will not pursue this issue's technicalities here for they will start taking me off track. The discussion that the present chapter prepares us for involves neither an adoption of a property-centric notion of observability nor is it resulting in some version of constructive empiricism to begin with. After I survey the notions of observables that have populated the literature in analytic philosophy I will, in the following chapter, adopt my own notion that, *contra* constructive empiricism among others, argues fiercely that the observables should anything but be taken for granted.

Finally, an account of observability that surfaced in connection with the scientific realism debate is the causal account of observability (information-interaction account). In the causal accounts of observability, the concept is analysed in terms of information passed onto an observer apparatus (and eventually to the human scientist) on behalf of the world. This clause is put there to ensure that cases of information acquired through machines are not dropped out of the observation picture. One of the most central and characteristic proponents of this stance, Kosso, in *Dimensions of Observability* (1988) argues for a multi-dimensional definition of observability, the main advantage of which is, allegedly, that it ascribes to science itself the role of the most appropriate adjudicator of observability (Kosso 1988, 450). Moreover, Kosso raises a clause of the information being new, 'non-redundant', conveying something about the object the observer did not know beforehand.

Kosso analyses observability along four dimensions: immediacy, directedness, amount of interpretation, and dependence of interpretation. The first one, immediacy, points to the neighbourliness of the observed state to the human observer. By this Kosso (1988, 454) means observability in principle – a "description of the object's potential to interact in an informationally correlated way". If this object cannot reach the human organs at all it is called *unobservable in principle* (such as the colour of quarks); if it can interact with the human organs only via a machine it is called *unobservable in fact* (such as electrons, which can allegedly be observed in cloud and bubble chambers); if it can interact with the human organs with no prisms necessary, this object is called *perceivable*. The second dimension, directedness, points to the number of 'intermediate messengers' that are needed to carry the message to the human organ – it is a measure of the number of interactions needed for some information to reach us. For example, information acquired with the aid of a magnifying glass is less direct than information acquired with the naked eye. Third, the dimension of the amount of interpretation is different to directedness in that it does not measure the prisms needed for information to pass through, *but the number of laws we need to believe in* so as to also believe that such and such information has been accurately conveyed in such and such ways. The last dimension, that of independence of interpretation, refers to how *independently* the observation of the putatively observed object

may be corroborated: how many theories that confirm its observation are not theories of the object itself[16].

Besides delegating the role of the observability referee to science, Kosso (1988, 457) claims that he asks the right question instead of the wrong one, the wrong question being whether something is observable or not. Observability, he maintains, comes in *degrees*, and it is (in the spirit of Maxwell) a continuum, albeit a multi-dimensional one. Moreover, after exploring a few case studies, Kosso (1988, 458-463), somewhat tentatively, argues that the dimensions of immediacy, directedness, and amount of interpretation are relatively less important to evaluating observability compared to the dependence of interpretation. This is an analogy with the epistemological evaluation of scientific theories, which we take to be less or more corroborated by measure of their independent confirmation than of how complex they are in and of themselves. Last, Kosso draws a related implication for the scientific realism-antirealism debate: the inference to the source of information. This principle suggests that we should proportionate our belief to observing an X according to how well it fulfils the four dimensions of observability, weighed for their epistemic significance (dependence of interpretation weighing more than the others). Just like Nancy Cartwright's (1983) inference to the best explanation principle suggests, the inference to the source of information urges us to look at the reliability of the information-conveying process: if we decide how reliably a piece of information from an X has been conveyed *qua* information from an X, and in so doing evaluating the X's corresponding existential claim. Kosso (1988, 466) closes with a remark I will comment extensively on in the next chapter. Without the word of God or prior information about what exists in the world regarding the epistemology of science, he maintains, "independence in the interaction-information account is the surest epistemological foothold".

[16] As an overarching comment on this paragraph: one may raise that the quantifications Kosso calls for are worrisome: it is not immediately clear how one would individuate and quantify things as intermediate messengers and the number of interactions needed for observation. I am sympathetic to this counter-argument. The reason I do not explore this objection here is that I will, for reasons that overlap with it, reject Kosso's notion of observability altogether in chapter three.

With Musgrave's second objection decidedly defeated by Dicken and Lipton, the situation regarding what we are to take with us in the next chapter is pretty much the same as it was at the end of the previous section: Maxwell's continuum, mediation, and ontology adjudicator issues, van Fraassen's vague predicate and proper epistemic stance, Musgrave's call to maintain the inference to the best explanation about the empirical, Chang's attempt to rejuvenate constructive empiricism via turning to qualities and incorrigibility. As I said in the end of the previous section, so I do now: the life-world, I programmatically announce, will address all these issues in the next chapter and synthesize them in a rich and philosophically competent definition of observability, taking care to avoid the pitfalls rightly highlighted by the analytics. This observability will include all the things we are 'stuck with', which are crucial within conducting science. It will also relate to the perceiving subject, and it will feature objects as one of its components.

This concludes the analytic discussion on the observable level's legitimacy; the matter of whether it makes sense to talk about the observables as a distinct realm of reality. I will now turn to an issue that is not entirely separate to what I have discussed above but that needs to be unfolded along a length that would be forbidding to accommodate above. This is how observability relates broadly to theorising and conceptualising – a matter traditionally situated in the philosophy of language. Have we, ask the philosophers whose positions I will momentarily explore, any right to claim that we have access to the world's observables? If so, what kind of access is that? This issue directly relates to this dissertation's theme: if I am to claim that the observables are so crucial for science, then it is only fair that I address worries that meaning grounded in the observables may be merely a façade, perhaps even radically at that. I will begin this story by showcasing Putnam's internal realism and make the connection with the above material as I go.

2.5 Putnam and Internal Realism

Internal realism is a multifaceted doctrine, which touches upon realism versus antirealism issues at large. It has corollaries for, but is not limited to, matters scientific. Seeing as its range is broader and as it discusses more abstractly the kind of access humans may have to the world (mainly via the observables) compared to the doctrines explored in chapter one, I am discussing it here. I will first provide a general outline of internal realism and then spell out how it relates to the observables and to the general issue of the present chapter. Let us then begin the tale of the question that essentially asks: have we any reason

to ever believe that we have ascribed the correct meaning to the world's observables and latched onto them?

Internal realism's story begins in 1977, when Putnam published the book *Realism and Reason*, soon followed by *Reason, Truth and History* (1981) and the paper *Models and Reality* (1980). Putnam's target here is external[17] realism construed as the position that the world *is* in a certain way, utterly independently of us[18]. Across these works, Putnam's attacks develop mainly two angles: the model-theoretic arguments, and the brain in a vat argument. There are two model-theoretic arguments: one indeterministic and one infallibilistic. The former goes as follows: if we messed up our current classifications of the world however we liked nobody would be logically authorized to tell us off. Imagine, for example, that we have a very small system of classification. It is comprised of three things that we would currently recognise as a basking shark, a trout, and a whale, named X, Y, and Z respectively. Add a predicate "X and Y are fish". Should we swap the trout with the whale and keep the names Y and Z in place (the name does not follow the creature when the creature moves), we would still have "X and Y are fish", albeit a different system of classification. This new system may not be as useful as ours for certain purposes (it may, however, be more useful for others) but there is, strictly speaking, nothing prohibiting us from devising what we like. The infallibilism argument states that if a theory is ideal then it is at the very least consistent. If a theory is consistent, there is certainly a way of making it true: nothing could ever be brought to the fore as definite evidence for its falsity.

Thus, two points surface here: that reference is radically indeterminate and that truth does not outrun the notion of idealized justification. The former immediately amounts to a problem for the external realist: if reference is radically indeterminate, if things in the world do not 'cry out' for a determinate classification, Putnam says, if they do not possess innate qualities calling for their structuration in only one way, it is hard to see how the

---

[17] Putnam's original term is 'metaphysical realism', aligning with my chapter one's terminology. I will nevertheless be following the term 'external' here for reasons I will explain soon below.

[18] This statement is meant here with all appropriate qualifications and specifications: that the world is comprised of some determinate entities and structures which we may either pick out or fail to pick out, and that of course some things are minimally dependent on us humans, e.g. the things we build and maintain.

world may 'be' independently of us in a certain way. If we can successfully lay out many correspondence relations then it is wholly under-determined which one is *the one true relation* that characterizes the world, says the first model-theoretic argument. Thus, we may develop here, words refer to observables *constructively*: there are no fixed items which are words 'catch'. As for how the infallibilist argument amounts to a problem for the external realist, we must note that metaphysical realism in the philosophy of language, unlike the scientific realism debate in philosophy of science today, comes tied to the additional principle of what Tim Button (2013, 10) names, in *The Limits of Realism*, a book offering an exhaustive interrogation of internal realism, *Cartesian angst*. Cartesian angst is the uncomfortable credo by which, if the world is in a certain way utterly independently of us, then we may be perpetually fooled in thinking we have gotten things (read: chiefly the observables) right; even an ideal theory may be radically false. In effect, the infallibilist argument argues that there is hardly any way to make sense of this claim for *nothing* could be brought to the fore for the falsity of an ideal theory.

These arguments did naturally raise a heap of objections from the camp of external realists. A clear majority of them centred on somehow constraining reference, prohibiting it from flying around freely as it does in the picture of the first model-theoretic argument. Appeals for this purpose have been made to causality (as in Devitt 1983), eliteness (as in Lewis 1984), and to the more technical notions of fullness and modality (as in Shapiro 1997; McGee 2005 respectively). The content follows the label: causalists claim that the causal relations running through the world constrain reference. Elitists claim that there may be pseudo-relations that we are free to determine arbitrarily in the world but that there are also elite, genuine classes of things that are typically revealed to us through advanced science, which elite classes dictate reference. Fullists claim that a second-order theory, somehow exempt of the confusing vices of the first-order theory, may come in to fix the indeterminate reference of the latter. Modalists carry out what is probably the most interesting attempt to constrain reference. Suppose we have a theory: this theory denotes not only what is true, but what *would* be true in every possible world characterised by this theory. Modalists then introduce *rigid* designators: those that denote the same object in all such possible worlds, thus purportedly pinning down reference.

Putnam's retaliation to these moves is the notoriously famous *just-more-theory manoeuvre*. He treats all the above (and any other possible) attempts to constrain reference as 'just more theory' susceptible to the original arguments. If the answer to what fixes

reference is, for example, 'causation', then Putnam asks: and what fixes causation? What ties the word 'causation' to actual causation? If it is theory that does this work – and what else could it ever be – then what prohibits us from devising a total theory in which causation simply does not exist, a classification of things worldly among which causation does not feature? Nothing, Putnam maintains. There are many interpretations available for the word 'causation' as the indeterminacy model-theoretic argument shows. This obviously generalises to eliteness, fullness, modality, which are *theories themselves* and are thus susceptible to the original first model-theoretic argument. To this, the external realists have a ready reply, as Putnam notices in both the original trio of works and in *Realism with a Human Face* (1990): it is not the *word* causation that fixes reference but causation *itself*. Button (2013, 29) agrees with this argument: Putnam has indeed only discussed the *word* causation and not the property itself. Seeing as the external realist can only phrase their defence with words, to say that nothing can fix reference because everything is mediated via a word is here to beg the question against the external realist – the thesis presupposes what it wants to demonstrate. To ask of someone an answer and then demand this answer be word-less: this is an unfair demand to make.

Button (2013, 32-52) takes the baton from Putnam at this point, trying to rescue him from begging the question. He thus starts examining theories of experience to see how experience may link up with the world to pin down reference. Naturally for an analytic philosopher, he starts with the aforementioned logical empiricists and Carnap's methodological solipsism, whereby the building blocks of experience are *sense-data*. Unfortunately, says Button, this picture, in which our world is 'constructed' out of sense-data, is still vulnerable: we may shuffle the constructions of these sense-data around in many equally valid ways according to the indeterminacy model-theoretic argument. Nor will introducing causation as a 'posit word' (which helps us to navigate our way around experience) help: any claim about it is still enmeshed in experience (crafted inescapably out of sense-data) and thus susceptible to the just-more-theory manoeuvre. This generalises: whatever we think experience is crafted out of senses, phenomena, some kind of flux et cetera we can always run the first model-theoretic argument and the just-more-theory manoeuvre against the constructions and classifications we derive, because they are *themselves empirical theories*. I should note here that Putnam and Button do not speak strictly about full-blown scientific theories. These empirical theories relate broadly to what

it is to observe and to theorise, *not* to scientific theories *strictu sensu* but to the widest possible sense which we may give to observing and theorising.

An important point surfaces. Following Button, meaning is now again shaky. We are faced with an inability to refer to things in the world (read for the purposes of this chapter: observables) that threatens to cut very deeply: we may not be able to refer to anything *at all*. Appeals to these things being of a certain *kind* (sense-data, phenomena et cetera) will not do the trick either, a predicament owed to the just-more-theory manoeuvre. Moreover, as Button has it, this dead-end is solely the result of *bracketed empiricism*, i.e. the way of construing experience that closes the world behind some kind of veil (of sense-data, phenomena et cetera) that does not make it directly available to the observer. This is of course a *sine qua non*-position for the Cartesian angst upholder, who strictly prohibits a direct connection between observers and the world. However, this principle will prove to be external realism's undoing: once an interface has been established between the user and the world, screening off the world behind sensations et cetera, then the user unavoidably loses the world. The active agents that bring this to the fore are, again, indeterminate reference, and the inability of truth to outrun justification. Thus, summarily so far: to be an external realist means claiming that we may not refer to anything at all (or so the Putnam-Button line argues). Quite dislikeable.

One may here imagine another escape for the external realist. They may admit that they have no way of pinning down reference and try to turn the tables and claim that this is so much worse for their opponent. If nothing pins down reference then this amounts to even more reason to think the world may be radically fooling us. A famous argument by Igor Douven (1999), however, shows that this is not so. The trick here is to emphasize how deeply the model-theoretic arguments cut. If reference is underdetermined then this applied to *the whole* of language. This text included, every text included, but more importantly, *the external realist's piece of language when uttering their scepticism included*. With this ingenious argument, Putnam's camp concludes that the Cartesian angst of external realism must go for it forces us into a wholly incoherent sceptic position. Can we then cast it away, and if so, how? The next section explores this theme.

2.6 Brains, Vats, and the Observables

It is now time to connect the above matter explicitly with the observables. First, let us take stock. We have followed Cartesian angst to its logical conclusion and we are found

in a desperate position. Meaning appears to be in shambles and we feel the urgent need to drop any notion that the world may be radically fooling us (and thus external realism). However, how may we be *justified* in doing so? Sure enough, we have seen that if we close the world behind a veil of any kind we are led into a radically incoherent position. Thus, we must pursue accounts of experience – in other words accounts of *observables* – that do not fall under the rubric of bracketed empiricism. From here on, Putnam's grappling with realism becomes largely to find a satisfying such account; effectively to pin down what kind of thing observables are and what human access to them may be.

In his original trio of works Putnam proffered a picture centred on a verificationist theory of understanding. This is most commonly introduced in the literature by the name of internal realism. However, Putnam (1994, 461-465) has claimed that this was a result of a combination of his readers' sloppy reading along with his possibly confusing writing. Internal realism, he writes, is a name he intended for the much broader idea that realism is compatible with conceptual relativism, a claim that I will explore thoroughly in later chapters of this dissertation. Putnam's understanding-based realism claims that fixing reference comes from *understanding*, not from a correspondence relation of terms to the world. To know the reference of something is to understand it and to understand it is to know the conditions for its being verified (or, more modestly, confirmed). However, Putnam soon moved away from this position. He did so because, purportedly, this doctrine is hardly any different from bracketed empiricism. Since it makes no mention of the world and refers only to what is going on inside the mind, the veil is not lifted – or rather is lifted only to be replaced by a *radical* Cartesian scepticism. If there are *no* outer objects then we may be able to pin down reference by virtue of its conditions of verification, but we are condemned to roll back to subjective idealism and solipsism, an anathema in Putnam's view.

Putnam's second attempt at dodging Cartesian angst tackles the core tenet of bracketed empiricism directly. This position is called natural realism and was developed much later than the doctrines discussed above, in *Sense, Nonsense, and the Senses* (1994). Here, Putnam departs from his previous positions and suggests a 'naivete', as he calls it, about perception. According to Putnams naivete, objects appear directly to perception – we are in direct touch with the world. There is no Kantian veil of phenomena hiding the noumena, or any veil of any other sort. Simply put, we can speak about trees, our 'tree' word refers to trees because we perceive trees directly. Following Wittgenstein, his thinking is that, if we have

a philosophy of perception that can convincingly do away with the notion of a human-world mediating interface, then we need not worry about Cartesian angst. Philosophers like Michael Dummett (2007), however, objected to this position: I may have direct perception myself but how do I interpret the speaker of a language I do not know since, in this case, I obviously do not have the relation of 'direct access' which Putnam presents us with? John McDowell (1994) came to Putnam's rescue. I obviously interpret the speaker using my own concepts. This may limit interpretation in that it makes it a projection of my own conceptual array (we will take occasion to explore this issue thoroughly in chapter four) but to demand of someone to interpret without concepts is patently absurd; it is like demanding of someone to ground syllogisms without using thoughts or to speak without using words. *Of course* I must use words and concepts of my own to translate the other and, more generally, *of course* I must use words and concepts to articulate that I have direct perception. One could surely ask in turn "What grounds the meaning of the words you are using to explain your position?", and I could use other words to ground the meaning of them, and then the sceptic could ask the same question to infinite regress. McDowell suggests that this is an unfair demand to make of the direct-perceptionist; it is a demand that in its articulation precludes all possible answers (since all possible answers must be articulated with their own words and concepts). We are thus justified, McDowell suggests, to claim that our thoughts *are already hooked onto the world* (Button 2013, 85-86). This is meant to soothe the sharp contradiction befalling us at the end of the previous section threatening to undercut all meaning. Effectively, it is to say that the demand that language should vindicate itself (and much more so, extra-linguistically) is an absurd demand. We must reinstate a 'blind trust' in our senses and words: this is the natural realism of Putnam and McDowell.

Can we then seal the deal here and postulate direct access to the world? Unfortunately, no. The problem, according at least to Putnam, is that our senses, and the words we attach to them, very often *deceive* us. Therefore, the natural realist must also be a *disjunctivist* about perception: they must regard seeing a cat and hallucinating a cat as two genuinely different experiences. This division, however, is enough to bring back the Cartesian angst in a manner we are already familiar with: we obviously do not know when we are hallucinating

and when we are not and thus meaning reference is up for grabs again[19]. Further, any attempt to settle the issue of hallucinations at the level of evidence is a stillbirth: how can we ever take meaning as fixed at the epistemological level? Its indeterminacy owed to hallucinations and deceptive perceptions would apply here again: *our evidence could be contaminated by hallucinations and deceptive perceptions.*

Throughout the 1980s Putnam tried another way to tackle Cartesian angst: justificationism. Here, Putnam tries to fix truth via idealized justification: whatever is true is whatever is justified under ideal conditions. However, we may ask: how do we know that we are *now* in conditions ideal for a given justification? This question is enough to reintroduce Cartesian angst and lose the world, for it is impossible to know. It *really is* impossible: save for a time machine, how do we know that new methods of justification will not emerge in the future? Moreover, and this point I have curiously never seen rise in the relevant literature, even if all this were not the case, I still do not see how *meaning*, as in individual term meaning, would be fixed in this way. It seems to be supposed here that meaning is fixed and that then, somehow, we can speak about the truth of statements, but tying truth to idealized justification does not fix meaning: it presupposes its fixity. To test a given statement for truth or falsity *presupposes* that we know what the terms in this statement refer to. So, if justification is what is supposed to anchor meaning, how can we apply it to individual terms before testing whole statements comprised of individual terms? It seems to me that we cannot.

These are Putnam's attempts at certain *specific* pictures of realism – his attempts to show *how* we may have knowledge of the world. They all seemingly fail. For someone who has followed the argumentative line here positively, the severity of the situation cannot be overstated. First, we kicked meaning in the teeth with indeterminacy and infallibilism, and decided that we needed to urgently find a way out of Cartesian angst if our words are to mean anything at all. We then turned to various forms of realism but we

---

[19] Putnam does here and there imply that there is a genuine difference between hallucination and non-hallucination that we can perceive by citing stories of people who recount hallucinations of an X as not identical with the experience of seeing that X. I will not pursue this line here: what would solve the problem would be knowing that one is hallucinating *at the time of the hallucination* which is evidently not always the case: thus, reference is swimming freely again.

were not (or rather Putnam was not) able to reinstate the missing plank via which to access the world. Philosophical chaos in meaning looms in the bushes. Luckily, Putnam has another ace up his sleeve, and it comes from his (in)famous brain in a vat argument. Putnam calls us to imagine the following scenario: suppose that all sentient beings in this world are nothing but brains in vats. By the works of an evil scientist the brains are hooked onto a super-computer, which, via electronic stimulation, makes the poor brains think that they are experiencing an outer world while in fact they only ever experience images, sensations et cetera produced for themselves by their interactions with the super-computer. This is effectively an extreme form of Cartesian angst, Cartesian *nihilism*. We, the supposed brains, are radically deceived by the world, for our words and theories and projects of knowledge radically fail to refer to anything that is actually out there.

Emphatically, holds Putnam, any scenario such as the above that I can conceive is *not* my own predicament. For suppose that Brian, an envatted brain, articulates their own predicament. Brian has only ever had an experience of images, sensations et cetera underlying which are only electronic signals. The point is that Brian's words *can only refer to these images, sensations et cetera*. As Button (2013, 119) puts it, Brian's relation to the world is *so causally messed up* that his semantics cannot maintain any hope of referring to actual things. As a corollary of this, Brian has no intentions that would allow him to refer to actual brains, and therefore cannot articulate his own scenario of doom. Similarly, Putnam continues, *we* cannot even articulate such a scenario *for us*; only the evil scientist watching us poor envatted brains could ever articulate our predicament: we and everyone else that is a brain in a vat are causally excluded from making such claims. For, the problem Brian has with brains, he also has with causation, and by extension with any 'bridge' attempt we may postulate to allow him to refer to brains: he cannot talk about *genuine* causal relations, only pseudo- such relations brought about by computer-produced stimuli.

It seems, then, that we have managed to abolish Cartesian nihilism: the world may not be radically fooling us for, if it were, like the in the brain in a vat scenario, we would be unable to articulate this scenario. We can evidently articulate this scenario; therefore, we are not in it – or so Putnam's brain in a vat argument goes. There are however, as Button (2013, chapter 16) explains, two flip sides to this method. First, it provides us with no specific philosophical *picture* – it fails to answer the question of just what things observables are. We do not know whether the world is composed by sense-data, phenomena, observables, all the versions of experience Putnam went through while trying to examine

the claim that *something* could fix reference. Any proponent of sense-data may employ the semantic argument involved in the anti-brain in a vat scenario argument and claim that we cannot articulate a scenario where sense-data radically deceive us, but that is also true of the proponent of phenomena, observables, et cetera. Second, the preceding argumentation is only enough to cast away *extreme* Cartesian angst/nihilism. Button (2013, chapter 15) offers several arguments for this, in the vein of supposing that a brain has only recently become envatted, and therefore that it *can* actually refer to 'actual' things. Moreover, I would add a third point, the anti-brain in a vat scenario argument does not tell us much in the way of scientific realism debate, neither regarding the observables nor the unobservables. Should we accept the brain in a vat argument, we are merely assured we are not radically deceived, but we cannot derive much more from that.

Finally, Button underlines, the move of admitting inability to refer to the 'real' world and postulating it as something ineffable cannot reinstate Cartesian angst. For it is then the case that the 'sense' in which I may be deluded falls nothing short of the magical: it has no empirical content whatsoever. The ineffability argument only conveys a feeling of anxiety upon us in the worst metaphysical sense there is, and must therefore be ignored.

I ask the reader to keep all this in mind, especially the last point concerning the ineffable, for it will be one of the most relevant when I compare internal realism(s) with my own position later. Although the material presented above evidently pertains to the analytic discussion of the observables, it is far too early in this dissertation to provide my own suggestion of how meaning regarding the observables may be grounded. Thus, I ask the reader to suspend their curiosity on the matter until chapter seven.

To sum up these past two sections: pondering the indeterminacy of reference and the infallibility of ideal theories Putnam argued that reference is radically underdetermined and Cartesian angst threatens to belie all meaning. This was shown to be an incoherent position, so Cartesian angst had to go. Unfortunately, attempts to make it go only bore the fruit of casting away Cartesian nihilism: neither was Cartesian angst cast away to a more satisfying degree, nor did we conclude regarding the means by which humans have access to the world via the observables. Another, broader realism-antirealism issue remains inconclusive.

Conclusion

In the course of the preceding chapter we have been through the main nodes of the analytic discussion of the observables in the context of scientific realism-scientific antirealism debate. There are two big questions that run through here: whether there is a legitimate realm for the observables and, if so, what kind of things the observables are. Sections 2.1-2.4 examine the former question, while sections 2.5 and 2.6 examine the latter.

Regarding the first question, the material we surveyed is sizeable, and the arguments presented not always converging toward the same conclusion. In fact, many of the main maxims seem to be in direct conflict: Maxwell argues against the traditional observable-unobservable distinction based on his argument from the continuum of observation and the impossibility of observing apparatuses to legitimately receive the status of ontological adjudicator. With him sides Musgrave calling for a proper empiricism which seems to admit electrons and, though utilising the notion of observability, it is probably the case that Kosso should be counted in their camp. After all he makes an argument that runs close to Maxwell's (or, as I will show in the next chapter, too closely to Maxwell's for its own sake), albeit from a multi-dimensional standpoint. It is not, however, clear how this camp wants to construe the empirical level, whether under the label of observability or another. Maxwell leaves us with the rather enigmatic notion of 'quickly decidable sentences' and Kosso does not say much about which part of his continuum we are legitimized in regarding as genuinely observable; about whether or not a quantitative difference in degree of observation should also play a qualitative role.

On the other camp, we have van Fraassen, Dicken and Lipton, and Chang. Van Fraassen argues *contra* Maxwell that the continuum is fine as long as the theory we are working within clearly defines what is observable, even as a vague predicate. Moreover, he argues that observability denotes the proper epistemic stance towards science, and not genuine ontology. Dicken and Lipton engage with freeing him of Musgrave-inspired contradictions, and Chang proffers that a quality-and-incorrigibility-based notion of observability should make constructive empiricism, or for the same matter observability, a much more defensible concept, which is, in the final analysis, necessary and central to science. We do rely on observation, and the *humanness* of observation, claims Chang, and this should be philosophically recognised.

Regarding now the second question, that of what kind of thing observables are, we also made many remarks. First, there was the issue of the model-theoretic arguments and

Cartesian angst, which prompted worries that we may have no access to the observables at all – that the world may be radically fooling us. By seeing how Cartesian angst becomes its own demise, with Putnam, we embarked on a quest to reinstate human access to the world. There, we found that every kind of bracketed empiricism (whether that was of sense-data, phenomena, observables, a veil of flux et cetera) was ultimately, at least according to Putnam and his commentators, a Trojan horse of Cartesian angst. Other attempts included justificationism, verificationist semantics and direct access to the world. The first was found, per Putnam, to be untenable, the second too private and solipsistic, while the third one went bankrupt for the purpose because of the problem of perception deception. At this moment of desperation, the anti-brain in a vat argument came in, which served to relieve us from Cartesian nihilism, though the victory was pyrrhic: we ended up with a significant amount of angst, as well as with an unclear picture of observables.

It is readily evident that the two basic questions, of whether there is a legitimate realm of the observables, and what kind of thing they are and what our access to them may be, still loom open. After this extensive literature review, I will take up the task of answering them myself in the next chapter. My answer will be that phenomenology's life-world does justice to most of these maxims.

3. The Intersubjective Life-World and Its Indispensability for Science

Introduction

In chapter one I argued that the contemporary scientific realism debate is governed by a pattern: presupposing science's truth unless suggested otherwise by means of historical counter-examples. I suggested that limiting the philosophical investigation of the science-truth relation to this facet is a philosophical injustice that should be rectified. Science, I claimed, is an endeavour conducted by specific agents with certain dispositions in a variety of contexts (one of which – the neurologically typical – I aim to discuss extensively later in this dissertation). This situatedness of science calls for an examination of what kind of truth it may bring – and for whom – beyond the limit of incompatibility of scientific theories. I further suggested that pushing this limit would necessitate a discussion of the observables *contra* the contemporary debate's obsession with the unobservables. Accordingly, in chapter two, I surveyed the work of analytic philosophers who have discussed the observables in the frame of the (scientific) realism debate. Their work addressed mainly two questions: whether there is a legitimate dichotomy to be made between the observables and the unobservables and, if so, what kind of access we may have to the observables. The end of the discussion was rather inconclusive and consisting of strong divergent arguments.

In this chapter I argue that Edmund Husserl's 'life-world' (*lebenswelt*) is the best construal of the observable level. Regarding the legitimacy of the observables I claim that the life-world can, with some tweaks, very much accommodate the most attractive intuitions and avoid the biggest pitfalls pertinent to observables from the analytic literature. Moreover, I argue that science is inextricably bound to the life-world since it invariantly takes its investigative cues from there, is conducted in it, and returns to it for validation. Regarding the kind of things the life-world is comprised of, I maintain that it is the world of ordinary experience as incorrigibly and reflexively had through perception. In chapter seven, when I take stock of the thesis developed herein, I claim that the life-world is compatible with various accounts of experience (sense-data, phenomena et cetera).

In chapter four I argue that the life-world is not singular but plural, and contingent on a variety of factors that could be otherwise. In chapters five and six I explore the case of autism spectrum conditions, a case of such difference of life-worlds. I find that the weight this difference must have in navigating the related scientific practice is rather significant, and I make a related proposal regarding autism spectrum conditions treatment. In chapter seven I take stock of the philosophical picture painted throughout this dissertation and show how it helps us overcome somewhat stale metaphysical debates that have occupied the scientific realism debate for far too long (such as the quest for Truth and the denial of radical scepticism). I motivate focusing on more interesting, practical issues that severely affect human lives.

The present chapter is structured as follows. In section 3.1 I offer a guided tour of the philosophical neighbourhood in which the life-world concept arises. I specify the historical moment of its appearance in philosophy as well as its intended philosophical uses within a larger polemic that the late Husserl advanced against a reductionist conception of the sciences. This will be of crucial instrumentality in adding to the motivation behind pursuing an observable level, and when the issues of *which* entities feature into the life-world, and *how*, are discussed. In section 3.2 I offer a definition of the life-world, which is that it is a substratum of assumptions and tropes (admittances), incorrigibly delivered to perception, upon which all human behaviour is based. In section 3.3 I offer a further specification of what the life-world is via an example from actual scientific practice (the observation, or purported observation, of the electron in a cloud chamber). In section 3.4 I show how the life-world combines the best analytic insights from the previous chapters (except Putnam's, the exploration of which I postpone until chapter seven when a more complete picture of my thesis is at hand). Further, I diagnose a problem in attempting to use the life-world as a substitute for the observable level. This problem is that the life-world, in its original formulation, is subjective (each of us has their own life-world) while the observable level is traditionally construed as if it were unique and universal. To bridge the two concepts, following Husserl and others, I show how the life-world has an intersubjective dimension, and how this dimension can be instrumental as a connective bridge between the two concepts. In section 3.5 I offer an in-principle argument for why the intersubjective life-world is indispensable for the sciences as a point of departure, conduction, and validation. Moreover, I explore arguments to the opposite effect and I argue that anti-life-world reductionism is incoherent.

Some methodological considerations are in order before launching this sizeable endeavour. First, as is very often the case in continental philosophy, so the concept of the life-world is deeply entangled in and defined as a node in a certain philosopher's work – Husserl's for case in point. Extracting it from there to use in an analytic context requires some delicacy. It is, however, far from an impossible task as recent work in, for example, the philosophy of cognitive neuroscience, a branch of analytic philosophy which in fact makes an elaborate use of concepts from continental phenomenology, shows (I provide an example of this in section 3.5). There is, however, a prerequisite for such transplants to work, and this is to give up on harvesting the whole organ. The life-world, that is, as a central point in Husserl's later work, is also a point of some contestation regarding which reading of it is the most valid and whether the concept is continuous with his earlier work. However, the aspiration of the present project is to examine the hidden corners of the realism debate pertinent to the sciences under the prism of the life-world, and thus the exegetic aspects of Husserl's texts and scholarship are beyond the scope of this dissertation. Therefore, I employ a construal of the life-world that suffices for this task without performing an exhaustive historical and conceptual examination of the concept. Whenever I diverge from or add to Husserl I will be informing the reader that I do so. Last, I will be pointing out various interpretations when a particular construal is especially contested or debated in the literature.

3.1 The Life-World: Historical and Philosophical Context

The life-world is a concept simple at a certain level of abstraction, which gets amply complicated as one is pushing for more details pertinent to what it engulfs. For this reason, I provide a bootstrap definition now, adequate for purposes of starting to explore this chapter's content: the life-world is the world of ordinary experience as it is reflexively had by every being from their subjective point of view (this is also faithful to the original definition). Beyond that, I will weave the concept throughout the chapter, adding to Husserl's definition and specifying it by adjusting to challenges of defining the observable that I will face along the way (some of which we have already explored in chapter two).

The life-world is doubtlessly Husserl's most widely known concept, with the term appearing in others before him (e.g. Simmel 1912). It first appears in his last major work, *The Crisis of the European Sciences and Transcendental Phenomenology* (Husserl 1936/1970) and serves as a cornerstone to a larger line of attack on what Husserl calls the 'Galilean

science'. For Husserl, Galileo was the first to secure an analysis of the world purged of prejudice and theology. This feat was achieved by disposing of metaphysics of the divine ilk, and by employing methods of inquiry like the measurement of physical quantities and mathematics to ground Galileo's project in objectivity (Friedman 2010, 100-102). This was a good thing but only insofar as this method remained oriented towards acquiring knowledge about the common-sense world, the world of phenomena, "the only real world, the one that is actually given through perception, that is ever experienced and experienceable" (Husserl as quoted in Majer 2010, 49).

This position is opposed to the sciences (and mathematics) giving their own conceptual apparatus any kind of exclusive ontological authority. What Husserl opposes here is the (supposed) Galilean and modern-scientific mathematical description of the world as the only true description of it, that which aims to render descriptions of the world in an everyday, common-sense manner false, misleading, and epiphenomenal to those of the positive sciences. The claim that only the idealized nature as described by mathematics and physics is real: this is what Husserl took Galilean and modern science to state and took issue with[20] (Friedman 2010, 103). For Husserl, and for most phenomenologists, each scientific and mathematical concept acquires its meaning and validation from the world of ordinary perception, otherwise it is merely an empty symbolism.

Besides realising that inquiry may under no circumstances dispose of ordinary descriptions of the world and replace them with idealized-mathematical ones, Michael Friedman (2010, 104) notes that phenomenology does not seek to admit appearances unreflectively either. He quotes Husserl (1936/1970, 48-50; 103) who warns us against "the surrounding world of life, taken for granted as valid" which is likely to lead us "to then construct mythical inventions for describing the conditions of possibility for the mind's experience of it" (here denoting a parting of ways with Immanuel Kant). Instead, Husserl proposes a reflection, an 'inquiring-back' (*rückfragen*) into the 'pre-given' world of

[20] Some Husserl scholars such as Ulrich Majer (2010, 60) have argued that it is dubious whether a significant number of scientists indeed held this view at the time and whether one can legitimately speak of such a crisis. Majer (2010, 51) proffers that Husserl did not care much about the actual history of science and that he was merely putting his ideas in a 'historical dressing' to advance his own normative programme about science with additional force.

perception to uncover the 'how of its givenness': to delineate its entities, structures, logics, laws, mechanisms et cetera.

Further, an imperative is provided to systematically study *different subjective perspectives* and different ways of experiencing reality (Føllesdal 2010, 28); the concrete reality in all its richness and as experienced by a multiplicity of agents. Husserl urges us to study, that is, how what we perceive is structured, besides the world, also by us. To illustrate this statement I borrow an excellent example from Dagfinn Føllesdal (2010): Joseph Jastrow's duck-rabbit, popularised in philosophy by Ludwig Wittgenstein (1953/1958, 165-166):

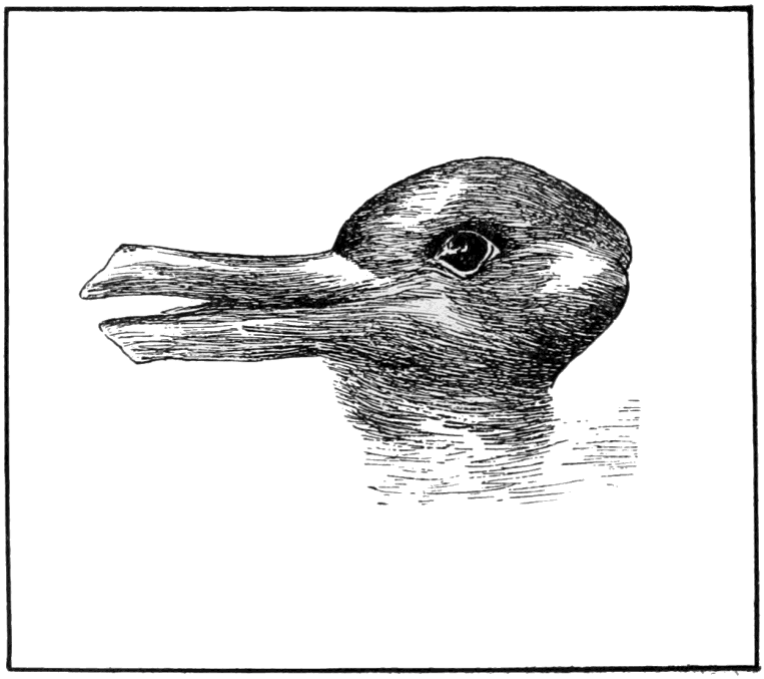


Fig. 3.1: Jastrow's duck-rabbit (Jastrow 1899, 312)

One looks at this image and one typically sees either a duck (horizontally) or a rabbit (vertically). When the complementary option is made available the observer may switch between the two perceptions, synthesizing the same lines as representing a duck at one instance and a rabbit at another. This synthesis is what Husserl calls the *noema*, the bringing-together of stimuli to constitute units, entities, meaningful things. The example of the duck-rabbit is illuminating precisely because of the moment when the alternative option becomes available: the point of realization of the possibility for *another* kind of synthesis and that what was reflexively seen before was also a product of synthesis, albeit unconscious. This is to say that whatever is experienced does not delineate itself into coherent shapes of entities: there is a process of parsing reality at play and this process

resides within us. Some see a rabbit and some see a duck, and solely referring to the lines in the shape itself will never solve disagreement. Just what plays the role of input in the mechanism of this synthesis is a discussion forbiddingly vast to be accommodated here but there have to be minimally *some* biological and historical components to it (Føllesdal 2010, 29): one who does not see the lines cannot synthesize them into anything, and one who has never seen a duck or heard of the concept cannot synthesize the lines into the representation of a duck.

There are several additional central concepts to Husserl's phenomenology which the life-world houses that will be of interest to us when defining the observable level of the sciences. As Husserl and others from a variety of philosophical traditions contend (Føllesdal 2010, 30; Gabriel 2015, 33-34) human consciousness is, besides noematic, normally *intentional*: humans often experience full-fledged objects, not merely scattered qualities and properties. Under conditions that are the usual for most humans what is in front of me right now is not perceived as a diffuse brown-ness and silver-ness and concreteness; it is rather perceived as a table. But does human perception stop satisfied at the point of initial impression? Hardly so. As numerous authors (Belousek 1998, 82-83; Friedman 2010, 105; Føllesdal 2010, 31; Vallor 2009, 5) have highlighted, to admit an entity as real requires the presentation of said entity in a persistent and consistent manner. Perception, that is, escapes a naïve empiricist conception of it as including whatever the eyes (or even more generally the senses) meets momentarily. Imagine that we are sitting somewhere together and I ask you what you perceive. If I have just pinched your eyeball before asking and you are seeing double or if you know that the black spots in your field of vision are products of a migraine, you will not admit that there are two of me in world or that there is dark ball-like thing on the horizon. Rather, you will describe these experiences as produced endogenously by you. It is indeed a phenomenological commonplace, underlines Shannon Vallor (2009, 4-5), that perception includes an anticipatory dimension (*filling* in phenomenological terminology). Husserl himself characterizes the idea of a physical thing as a 'limitless progression of harmonious intuitions' and Maurice Merleau-Ponty (1964/1968, 206-209), another renowned phenomenologist, uses the term 'empirical pregnancy' to describe the way in which physical things manifest themselves. Indeed, it is mounting confirmation of anticipation that warrants a thing's existence and perceptual experiences are counted real because, unlike hallucinations, they are never exhausted in the present sensibilia: they have

invariant manifestations. "Rather than asking whether the thing's impact on our unaided senses produces some definite set of qualia, we must ask whether the thing can manifest itself to us in a perceptual style, that is, in a coherent and pregnant manifold of kinaesthetic relations explorable within our spatiotemporal horizon", puts it Vallor (2009, 8). In the above senses of humans synthesizing what they perceive and then filtering out the 'debris' to decide what they will treat as real and as Husserl would have it, an object *constitutes itself* within our consciousness:

> An object 'constitutes' itself – 'whether or not it is actual' – in certain concatenations of consciousness which in themselves bear a discernible unity in so far as they, by virtue of their essence, carry with themselves the consciousness of an identical X. (Husserl 1913/1983, 69-73)

Let us leave essentialist talk to one side, for it is not of immediate interest here, and focus on the constitution of an object in consciousness. Why does Husserl prefer to say that an object constitutes itself over saying that consciousness constitutes it? Such a choice of words is important. As Føllesdal notes, and this is the point where phenomenology goes beyond the traditional realism-idealism polarity, Husserl writes that:

> [P]henomenological idealism does not deny the factual existence of the real world (and in the first instance nature) as if it deemed it an illusion … Its only task and accomplishment is to clarify the sense of this world, just that sense in which we all regard it as really existing and as really valid. That the world exists … is quite indubitable. Another matter is to understand this indubitability which is the basis for life and science and clarify the basis for its claim. (Husserl cited in Føllesdal 2010, 32-33)

In modern analytic philosophy terms one may put it that Husserl is doubtlessly a metaphysical realist: he believes, and the concept of the life-world is inextricable from this belief, that a world exists 'out there' – that the human mind does not constitute the world. However, as we saw above, it is not that a given thing is straightforwardly grasped by consciousness or any other faculty 'as is' either; there is work being done on the perceiver's end.

Objects (widely construed, including people, properties, relations et cetera) are usually perceived embedded within a framework of relations and dressed in a historical character. For example, when I perceive a refrigerator I also perceive it as being in front of or behind me, and I also perceive its history with it: judging from how rusted or new it looks, I infer its age; from its style, I can infer where it was manufactured; I always assume that it has a past. Reversely, if I realise that the refrigerator was merely a hallucination, I also reconstruct the past of the room I 'found' it in as containing no refrigerator at any moment. I do not perceive the refrigerator as having spontaneously emerged or submerged (Føllesdal 2010, 33).

In Husserlian phenomenology, when we speak of perceiving something as embedded in a world, we make a distinction between the context we focus our immediate attention on, and the related context we tacitly take for granted. For example, I firmly step onto the floor in order to move away from my chair, but I do not normally hold the explicit belief "There is a floor" in my mind when I perform this action. In turn, this 'silent horizon' can be separated into an *inner* and an *outer* horizon. The inner horizon refers to the silent background of the object we *are* intending our perception towards (e.g. a person's past when we are having a conversation with them), and the outer horizon refers to the silent background of the *world* within which that object is constituted (e.g. a person's surroundings and their relation to these surroundings when we are having a conversation with them). As Husserl puts it in Føllesdal (2010, 34):

> [This] aiming-beyond [*Hinausmeinen*] is not only the anticipation of determinations which, insofar as they pertain to this object of experience, are now expected; in another respect it is also an aiming-beyond the thing itself … to other objects of which we are aware at the same time, although at first they are merely in the background. This means that everything given in experience has not only an internal horizon, but also an infinite, open, *external horizon of objects cogiven* …

Those silent expectations and beliefs are dispositional notions, and are difficult to, so to speak, 'gather on paper', especially seeing as they are most often tacitly held or, in some cases, denied (as Freud teaches us, according to Føllsedal 2010, 35). This need not trouble us here, but we do need to know that while Husserl started out with a cognitivist conception of the aforementioned notions (i.e. as if comprised solely of hidden beliefs) he

slowly came to acknowledge that the practical and the body play a crucial role in our constitution of the world (Føllesdal 2010, 36). For example, the way in which we ride our bicycle or sign our name without much thought or effort cannot be simply attributed to implicit *beliefs* about our action, in exactly the same way that Roberto Carlos' notorious free-kicks cannot be attributed to his knowledge of wind-and-kicking physics! There is more to constituting and navigating the world, is the point here, than cognition and neatly categorized articulated statements. The importance of this will become increasingly obvious as the dissertation unfolds.

So, after presenting all these phenomenological notions, we may ask: what *is* the life-world in the phenomenological tradition? Attempting to answer this question resolutely in a few pages is a fool's errand. Arbitrating the voluminous and often conflicting literature on the issue both from the analytic[21] and the continental[22] side of things would certainly require its own doctoral dissertation. However, I can now provide an answer that is adequate for the purposes of this dissertation without much controversy: the life-world is the world constituted in our consciousness and perception, from our subjective point of view, curated by all the above characteristics and dimensions. It is the world as we produce it, synthesizing the stimuli around us to form a coherent picture and ascribe meaning to things; as we expect it to be when we navigate it; as it comes in and out of focus when we direct our attention to a specific object, in all its temporal dimensions that accompany our perception (past, present, future).

According to the phenomenological tradition, the life-world is also the precondition for every kind of thought and action (this is a view that I will also adopt in this dissertation, providing extensive argumentation later in this chapter). The world of science *is* part of the life-world (Føllesdal 2010, 43) in that science delineates phenomena for study from the world of common sense, and is continuous with the reflexive world of our perception in that it must produce empirical results immediately available to life and not foreclosed within an idiomatic universe. Moreover, the life-world is meant by Husserl as *intersubjective*, despite being the world viewed from each being's subjective point of view. Husserl puts it, that is, that we all get versions of the 'same' world through our filters and

[21] For a comprehensive example from the analytic literature on perception see Nöe (2004).

[22] For one of the continental flagship treatises of perception see Merleau-Ponty (1945/2002).

perceiving from our individual positions (Føllesdal 2010, 41-43). Our ability to imagine the world from a third-person point of view, which we encountered as the filling-curated noema above, means that we can produce a picture of the world that transcends our mere subjectivity. I see a ball standing in front of me, and I infer it has a back side. Someone sits diametrically opposed to me in relation to the ball, and they infer the ball has the side that is facing me. Thus, we both produce the same image of the ball by our perception's virtues. This image may be *shared* between us, and it indeed does get shared, as many fascinating collective endeavours of humanity, based on such intersubjectively shared pictures of the world, demonstrate (think of engineering or pedagogics). Besides this, phenomenology incorporates an additional sense into its notion of intersubjectivity. Our basic perception, many phenomenologists hold, is permeated by the presence of others in our world through and through. It is not just that we see the same things: *how* we see these things, what opinions we have of them, what physical and symbolic background the things we see are embedded in, is deeply affected by others' perceptions, opinions et cetera. For example, what I perceive when I face the sun is not simply a physical body; my perception is infused with the physical theories, the historical mythologies, the religious rituals of the past. Or simpler still, I may see someone as shorter than they are if the general opinion of my peers is that they are short. From these two kinds of intersubjectivity, and for reasons that I will explain in section 3.4, I will engage only with the former. As a general note, I should note again that the discussion on intersubjectivity within phenomenology (see e.g. Zahavi 2001) is vast, and thus I do not pretend to cover any grounds more significant than to advance my own version of the life-world as the observable level.

In the above section, I provided an initial succinct picture of the life-world as it is intended by Husserl. The life-world makes a series of points about perception. Where these points are important for my own purposes (e.g. regarding the life-world's primacy for science), I will provide more extensive argument below. For now, let me signpost what I will, and what I will not be taking from Husserl's version of the life-world. First off, very important for my own definition of the observable will be the constitution of the world that is owed to the perceiving subject, seeing as this dissertation argues that there are many ways to constitute the world, and that this does and should matter for science. Second, the life-world primacy to and grounding of all human activities is also crucial for me here, as it is precisely this 'proto-', life-world sphere of the empirical that I examine in this dissertation and in connection with the scientific realism-antirealism debate. Third,

complementary to the primacy of the life-world to science, the 'return-to-for-validation'-of science to the life-world as Husserl means it will be extremely instrumental when I discuss why we should allow for science pluralism based on life-world pluralism.

3.2 The Life-World: A More Analytic Definition

It is now time to further specify what the life-world *is*, to give it a more in-depth and analytic definition than above. I will begin with Husserl's own idea, specifically with a quote from his late work that touches upon all three themes of the sections to follow – what the life-world is, why it is intersubjective and why it should be treated as the observable level of science and, more generally, as the primitive basis for every human activity.

> In whatever way we may be conscious of the world … as coherent universe of existing objects, we, each 'I-the-man' and all of us together, belong to the world as living with one another in the world … We … are constantly active on the basis of our passive having of the world … (Husserl 1936/1970, 108-109)

It is sometimes held (e.g. Friedman 2010, 104) that the life-world includes only whatever *physical bodies* one admits as extant. As one can see in the above quote as well as in other extracts from Husserl (1905-20/1973, section 196, 22-34) and secondary literature on the life-world (Hampe 2010, 152) the life-world is often referred to as the *world* passively had or *the realm of sense*, by which it is reasonable to infer, I believe, *all* senses. It is worth citing Husserl directly here:

> Moreover, this world is there for me not only as a world of mere things, but also with the same immediacy as … a practical world. (Husserl 1913/1983, 51-53)

Moving somewhat beyond Husserl – as here I do not seek to contribute to the continental philosophy literature but rather to examine the scientific realism debate through the prism of the life-world – I define the life-world henceforth as one's sum of *incorrigible admittances*. Here, remaining still somewhat abstract until further demonstration via a scientific practice example, an admittance is whatever we take to *be* or to *hold* (simple example to get the conversation going: I take a match to *be* in front of me, and I take of it

to *hold* that I can light it on fire). *Incorrigible* admittances are those that are *forced upon us*; those which we find reflexively adopting and those whose denial is felt with great resistance from the world,[23] – we may not 'un-see', 'un-hear', 'un-feel' et cetera something incorrigible unless a great force acts upon us. Incorrigible admittances constitute a substratum of *assumptions* and *tropes* that are left unquestioned while we conduct any theoretical or practical task. Such admittances are both owed to something external to us *and to us*. For example, if I walked into a burning woods fire would appear to me incorrigibly. I do not force it into being by my sheer will and imagination but I would perhaps be able to ignore it if I was blind, did not absorb its heat, and had biological capacities by which I would not be suffocated by the smoke due to it. Moreover, these admittances, when reflected upon, may not at any rate be theory-free or pure data: beyond situated to a perceiver's set-up, incorrigible admittances fall under the theory-laden character of observation for the exact same reasons observation statements do. Qualities; entities; relations; meaning systems; emotions, and the way we think about them and put them in language make them always-already fused with a theoretical interpretation as the collapse of the myth of the given has shown us, and thus the theory-ladeness principle applies here too (for more see last chapter and Bogen 2014). Last, the life-world's incorrigible admittances should be understood as 'surface stuff' – e.g. the table my laptop is sitting on features as an entity in my life-world but *not* whichever cognitive process and perceiving capacity is at play by virtue of which I perceive it (because I do not incorrigible admit *them*).

Let us now turn to the most crucial issue. Does the life-world succeed as the best construal of the observable level? Answering this question will help us define the life-world in even greater detail. First, the concept should address worries about us being only arbitrarily legitimized to separate the observables from the unobservables across the continuum of observability (Maxwell 1962/2012). Even if always from within a theoretical and conceptual standpoint (as admitted in van Fraassen 1980) it should be clear, and equally importantly also non-arbitrary, what is observable and what is not, what is included in the life-world and what is not. Even as a vague predicate without necessary

[23] Chang (2017) has developed a similar idea before me, whereby he develops the operational definition of reality as partly a resistance to our will. He is not using Husserl literature towards this purpose.

and sufficient conditions delimiting it, the life-world should non-arbitrarily state ample clear cut cases specifying observability. On this front, I believe that the life-world fares well: the predicate 'what is incorrigible for me' is a vague, non-arbitrary predicate for delimiting my life-world. I have a pretty clear idea of what is incorrigibly present for me right now: myself, the chair I am sitting on, my laptop, and so on. I also have a pretty clear idea of what is not incorrigible for me right now (despite of whether I display confidence in its validity): string theory, the theoretical predicates of psychoanalysis, God. As for the clear-cut cases and paradigmatic examples, I ask the reader to expect them in the upcoming section and chapters five and six.

Second, defining the observable should not be so much about what is observable with the naked eye or, for that matter, the unaided senses. The motivation behind pursuing an observable level altogether lies in that science often refers to an individuated realm, of crucial importance for it, from which it draws investigative cues and empirical evidence. As we saw in the last chapter, we do not get this information with the naked eye (or any other organ) through no medium at all. Echoing Chang and the phenomenologists we surveyed above, the observable level should pay tribute to "the richness of our physical experience" (Chang 2005, 880), including even things like the sensation of temperature, pain, and sleepiness ('qualities best described as feelings' as Chang would have it). My definition of the life-world reflects exactly this point: I incorrigibly admit that my eyeglasses are correcting my sight, and that the room I am writing in feels just right temperature-wise.

Should we, then, pose the observable level of the sciences as the whole of their empirical basis? Certainly not. First and foremost, that would be tantamount to giving up on observability. What is special about observability is that it comprises the 'inner sanctum' of the empirical level: that it is somehow the foundation on which the empirical building rests. Observability is not meant to include a metric from a given instrument which points to a certain highly theoretical conclusion. Rather, it aims more at the level which gives us the certainty that this instrument *works reliably*; the correlation of the numbers it gives us with the intense presence of an incorrigible state of affairs. In Husserl's terms, it would be the level from which 'inquiring-back-behind' to find further evidence for any kind of reliability would be absurd: it should be the 'given' (yet theoretical, yet fallible) from which we start. Let me make this contention clearer with an example and advance a point relating to quantitative approaches to science in general. Suppose that I

hold a digital Geiger counter for detecting ionizing radiation. Suppose also that I see the number '8' (clicks per minute) coming up on its panel when I operate it in a hospital room. The life-world *does not* include the interpretative manoeuvres by which I infer how much alpha or beta radiation this room is curated with (again, no matter how evidentially legitimized these inferences may be). Rather, the life-world as I use it in this dissertation, includes the 'reflexive data' that is to be found in this encounter: the delineation of the tool as a separate object in my perception; the seven lines that form the digital eight on its panel; its panel as a discernible part of the tool; the number eight as embedded in a numerical semantics. Moreover, regarding quantitative scientific endeavours, especially automated ones, we should not be fooled to think that the immediate absence of the human factor implies that no life-world is at play. A machine can take an environment's temperature, sure. However, it is only through human construction, and the correlation of the machine's function with human senses of hot and cold that this process is rendered both possible and meaningful. If the reader is interested in a more thoroughgoing study of how the life-world comes into play regarding the quantitative elements of science, I refer them to works by contemporary phenomenologists on the issue – for example Carusi (2012) and Hoel & Carusi (2017).

Third, the life-world should address the main problem relating to the 'given'. It should neither be comprised of non-theoretical blocks from which to build science and then confirm it (because this is, for known reasons, impossible) nor of any kind of immediate sense-data (we have again seen why this, too, is either possible or useful). What it *should* do is capture the idea that science stands on some kind of ground which it takes for granted and does not question while being conducted. From a similar kind of ground it draws its empirical evidence, and there are certain *tropes of inquiry* which are not questioned while it is ongoing. (I will be much more specific about all these notions in the second half of this section and in the section to follow). Thus, I have chosen incorrigible admittances as a viable solution for observability: admittances we are uncertain of, are likely conditioned to us, but which are nevertheless *sine qua nons* for the scientific endeavour. Incorrigibility is *all we have left*, but we should be careful with how we treat the notion. The life-world's incorrigibility should be neither strict nor too loose: it should allow the basis of empirical confirmation (and thus some relative, minimally short-term immutability) but it should also recognise that this evidential substratum may very well change, as all the scholars we

have surveyed in the previous chapter have noted. Luckily, the notion of incorrigibility is a concept to which such flexibility comes naturally.

With these main four goals (capturing the 'core' empirical level; clarity and non-arbitrariness; avoiding non-theoretical definitions; including subject-and-world synergy definitions) achieved, it is time to dig deeper into the contents of the life-world. I will now offer a classification of the life-world's admittances, which I ask the reader to presuppose along with me, pending demonstration of the usefulness of this classification for engaging philosophically with science – especially science in practice – in later chapters. Importantly, let me note that here I do not seek to work out a fine-grained definition of the life-world *qua* observable level. The scope of the present dissertation and the limited space I can devote to this task make such a sophisticated account forbidding. Doubtlessly, my notion of the life-world and the mechanisms that shape it may be deepened substantially by phenomenological and empirical work, and therefore I submit it here as a working formulation of the observable level. After I have motivated a 'rich' conception of the observable level according to phenomenological tools, I now wish to show how a classificatory system of this conception could look like.

Here are then the four axes along which I organise the life-world's contents: ontological, metaphysical, semiotic, and emotional. I will give a brief characterisation of the more familiar (traditional) categories of the observable (ontological and metaphysical) and a more elaborate one of the semiotic and the emotional axes. Following, I will provide the rationale behind this classification. The contents of all axes are demonstrated in detail and in practice in the next section.

- **Ontological**

The ontological dimension includes, out of the entities which we take to inhabit the world, those the existence of which we incorrigibly admit. They may range from material objects such as tables and chairs to other people (and the self, probably the most incorrigible of all entities) to *prima facie* immaterial entities such as smells and sounds. Note that in, for example, full-fledged objects, what is admitted are those of their properties (here running close to Changian 'qualities') that, again, appear incorrigibly to us – besides of course, their object-ness, which is incorrigibly admitted here by definition. For example, a table features in the life-world as sturdy but not as described in a reductionist manner such as 'entity ultimately consisting of electrons'. This amounts to no more than repeating

the incorrigibility principle: no 'entity ultimately consisted of electrons' features in the life-world incorrigibly – we may operate as if this is not the case.

- **Metaphysical**

The metaphysical dimension includes the ways in which *the world appears incorrigibly to be* or, more specifically, the worldly relations that appear to hold (granted, often between entities). It includes that fire burns trees in certain circumstances. It includes that objects move towards the Earth when they are let go of mid-air on the surface of the Earth. It does *not*, however, include, for example, any theory explaining gravity such as general relativity. This is again a corollary of the incorrigibility principle: that things (sometimes) fall is something that appears incorrigibly. This does not hold for that the physical entities described in the Einstein field equations exist or behave as described in the Einstein field equations. The energy-momentum tensor, for example, is far from appearing incorrigibly to us. Reminder: this has *absolutely nothing* to do with how warranted we are in espousing the notion and utilising it in achieving various ends, as well as with how warranted we are in apportioning our belief in its existence to the available evidence. At the risk of repetition: we are here only specifying the dimensions of incorrigible admittances.

- **Semiotic**

The semiotic dimension may be construed as the noematic dimension of the life-world demonstrated via Wittgenstein and Jastrow's duck-rabbit in section one: the way in which the subject synthesizes the world-material. Despite Wittgenstein's major general influence this dimension of the observable level is something not normally considered in the analytic literature. I suspect that this is because the analytic literature tends to focus, as we had occasion to see in chapter two, more on the world outside of the perceiving subject than on the subject itself. There is an uneven (perhaps even unfair) dichotomy: Maxwell; van Fraassen; Musgrave; Chang; Dicken and Lipton; Kosso; they all discuss the appearance of things but not the appearance and tropes of perception itself. Phenomenology, our mending tool from continental philosophy in this chapter, investigates equally the subject, which, other than perceiving, is also itself situated in the world, and may itself be the focus of life-world production analysis. It is therefore the time to ask not only what appears incorrigibly *to* us, but also what *in* our perception appears to be incorrigible. Highlighting this dimension of the life-world, thus, is an advantage of bringing phenomenology in

conversation with the related philosophical analytic literature on the observables, opening a crucial new field to investigation[24].

Admittedly, as stated above, a large part of perception is the subject matter of sciences that I am neither equipped nor wish to touch upon here like medicine, psychology, and cognitive neuroscience. However, view it as a happy coincidence if you will, this is exactly the part of perception which does not appear *incorrigible* to us: its 'inner workings' and 'hidden mechanisms', if any and whichever they may be are thus, by definition, not part of the life-world. What is, then, the part *in* our perception that appears as incorrigibly so and so? It is, I believe, the way in which we synthesize and communicate meaning. For example, we are equipped, it appears incorrigibly to us, with some capacities to hold information in the 'front' of our minds and to combine it, forming meaningful observations or coherent (and incoherent) narratives and systems of communication. Upon re-reading this chapter for edits it is incorrigibly apparent to me that I can hold some data in the fore of my thinking, signifiers such as letters, words, and paragraphs, and to have them in view to reflect on the chapter. Similarly, we can invent languages, make and perceive metaphors, et cetera. This is not limited to items of language strictly construed: we can follow signs, make up numbers and devise a vocabulary for describing relations between them, and so on and so forth.

Here, too, the incorrigibility principle, naturally, applies. Solving a mathematical equation for X is not something we are incorrigibly bound to. On the other hand, perceiving the passage of time is, as is also, more broadly, causality: my seeing, for example, you drop the plate, and my perceiving the plate breaking because you dropped it from a height adequate to bring about its shattering. In chapters five and six, in the case study of autism spectrum conditions, I will show how autism literature and testimony from people with autism spectrum conditions diagnosis compels us to see the latter as experiencing, among others, a different incorrigible system of meaning synthesis. This case will help shed more light on the semiotic dimension via examining actual scientific practice.

---

[24] Besides phenomenology, this idea is favourable within circles of semiotics associated with Charles Sanders Peirce. For literature on and a comprehensive summary of Perceian semiotics see Albert Atkin's (2006) related thorough article.

- **Emotional**

We have already seen Chang (2005, 880) pointing to the richness of our physical experience and even mentioning feelings directly as incorrigible observations. There is currently plenty of literature surfacing explaining how emotions are irremovably entangled with our perception (see for example Zadra & Clore 2011). This pertains to the 'inner workings' of perception and thus need not trouble us here. This, I suspect, is not what Chang refers to in his paper. What I refer to when I talk about the incorrigible presence of emotions, in the same self-examination vein of the semiotic dimension, is the incorrigibility with which our own and others' emotions (like in the presence of a distressed child screaming) appear to us. As mentioned above when discussing the example of psychology this is sharply differentiated from theories of psychology and psychiatry with respect to the life-world: emotions appear incorrigible to our consciousness; not any particular theory of them (besides the theory individuating them into happiness, sadness, anger, and whatever else of course).

It is contentious how relevant this aspect of the life-world is to science. Anthropological work on scientists and science argues that the emotional (and other) predisposition(s) of scientists are unavoidably reflected in their work (see for example Siegel *et al.* 2018) while other, more traditionally positivist approaches deny any involvement of emotion in proper scientific work. Understandably, this is not the place to settle this issue. There is however, another way in which the incorrigibility of emotions is of interest to science, and that is *for* the sciences *of* emotions, primarily psychology. As I will argue later in this chapter, the incorrigibility of emotions means that they constitute psychology's primary explananda, something which attests to the indispensability of the life-world for the science.

This concludes the four facets of the life-world. To recapitulate, we now have in theoretical view, in adequate detail, what the life-world is: a, van Fraassen-style vague predicate including what is there to stay for us under normal circumstances and without considerable force present to change it[25] by means of affecting the constitution of the

[25] I am adding this qualification having in mind that in principle, *everything* is corrigible. My perception of tables may be what it is now, but if someone hits me in the head with a

perceiving subject. Let me now offer some additional methodological considerations on the classification system provided above. First, I should note that the categories I have chosen to unfold the life-world along are overlapping. This is expectedly so – naturally, I do not aspire to solve long-standing philosophical questions such as, e.g., how one's semiotics may be disentangled from one's ontology and metaphysics, and how they both come to inhabit perception. A quick example: when asked to describe what a match is, I may answer that it is a flammable, largely wooden object. Obviously, beyond ontological, this also pinpoints metaphysical conviction: not only do things such as matches and fire appear incorrigibly to me as entities in their own right but also the world is (again, appears incorrigibly to be) in such a way that things can be set on fire via a certain such and such interaction. This extends: the incorrigible presence of an emotion is also a matter ontological: this emotion incorrigibly exists for me right here right now. So it goes.

Second, as noted above, these four categories are not meant to provide an exhaustive list of the life-world. For example, it may be plausibly defended that the life-world admittances are also shaped by one's *values* and *socio-historical context*. Granted, but I choose to put it here – mostly as convention – that these sorts of influences are embedded into one's perception. That is, a historical influence is not present in one's life-world *qua* historical influence, but reflected in one's, for example, cognitive tropes and emotional reactions to given situations (my 'historical' life-world is, for example, to be found in my blushing and embarrassment if I find myself in the street naked, because ours is an age of clothing in public). Despite the argument I have just provided, one may still, if one is put to it, add more categories to this system, or likely come up with a different categorization. Why then, despite these issues, have I chosen to categorise the life-world's admittances in this way? This is because this system holds two crucially important advantages for the purposes of the present dissertation. First, it deploys the life-world along philosophically interesting dimensions – ontology, metaphysics, semiotics, and emotions have been, I believe, diachronically of chief interest to philosophy. Second, this classification system will prove crucial for examining science in practice, especially in the case of autism spectrum conditions that I intend to explore in the later chapters of this dissertation. As we will see, people with autism spectrum conditions often populate life-worlds

---

hammer, causing extensive brain damage, I may stop recognising around me objects that are now familiar to me and appear to be incorrigible. More on this in the next chapter.

significantly different to the neurologically typical life-worlds from the perspective of meaning and emotions. As for ontology and metaphysics, there are several reasons for giving each a life-world category. First of all, parsing-out reality into entities and having a sense of how these entities will behave and interrelate is a huge part of our sense of the world, something necessary in order to navigate it. Second, the philosophy of science has long been interested in issues of ontology and metaphysics of scientific theories: what, if any, ontological and metaphysical presuppositions certain theories hold, how and in what form ontology and metaphysics of a paradigmatic era survive in a post-paradigmatic era, et cetera. Not surprisingly, my own claim regarding the scientific realism debate will be that with an alternative life-world may come an alternative ontology and metaphysics, and with them an alternative kind of science, sometimes for a good reason. This is a claim I will explore thoroughly in chapters five through to seven. Third, and in close relation with the second point, *intersubjective* ontology and metaphysics are of special weight as the building blocks of science. Think about a laboratory populated by many scientists, as is the received form of laboratories today: the absolute first thing we need for an experiment to obtain is for people to have roughly the same idea of what there is in the room and how it functions. Not that the importance of the meaning of experimental results or the emotional state of scientists may be demoted on this consideration – but it is true that ontology and metaphysics, and in particular an intersubjective commitment to specific ontologies and metaphysics, is 'absolutely where we start from'. There is more room for subjective semantic and emotional discrepancy in the lab, let us put it so, than for ontological and metaphysical discrepancy. Semantics and emotions, as it were, importantly shape science, while intersubjective ontology and metaphysics appear perhaps to be 'more pre-conditions' for its being carried out.

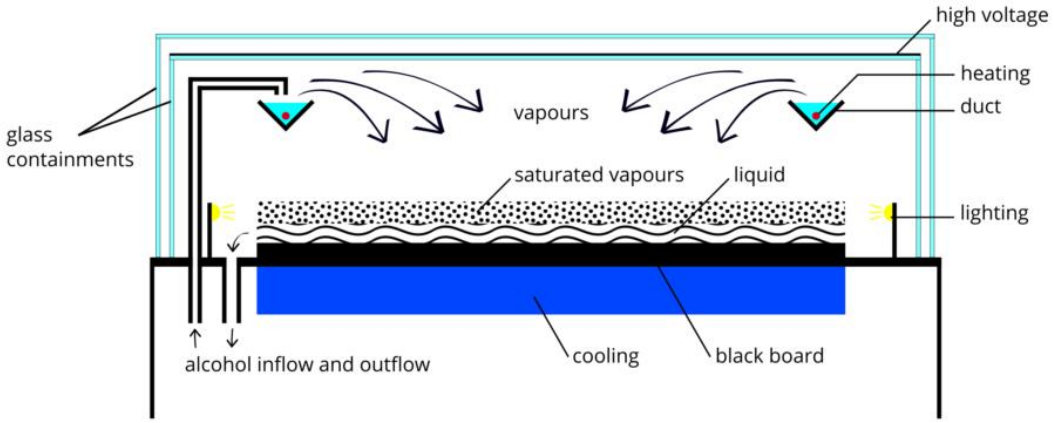
Thus, they consist an analysis of the life-world via which the analytic reader can grasp the concept while simultaneously highlighting terms particularly important to the scientific realism debate. This is a claim that I will explore thoroughly in chapters five through to seven.

The defining theoretical work is now done. However, as noted above, the life-world is a predicate illuminated in its uses. Let me now then turn to the best way of demonstrating the concept: an example from scientific practice.

3.3 The Life-World in Action: Electrons in the Cloud Chamber

In this section, I investigate one of the most famous examples of 'unobservable observation' in the history of science, namely the electron in a cloud chamber. In what follows I will pick apart the main (owing to space limitations) scientific notions involved in this observation (or 'observation'[26]) until I reach the incorrigible admittances involved. Following, I will pinpoint the locations of the life-world elements that I will have met along the way and I will explain how the four dimensions of the life-world work complementarily to form the observable, a level upon which the overall endeavour is founded. During the below argumentation, I will be speaking about the scientific notions and entities I meet along the analysis of the cloud chamber experiment as if they are certainly real. For example, I will not be saying "Purported entities called electrons are purportedly much lighter than purported entities called protons" but "Electrons are much lighter than protons" instead. This is for reasons of literary economy and not, of course, a result of adopting a scientific realist position on the issue all of a sudden.

A cloud chamber is a sealed glass container cooled to a temperature of -40 degrees Celsius. During the electron observation experiment, a radioactive material, e.g. uranium, is placed at its centre. Following, the container gets filled with vapour emitted from alcohol. Some of the vapour condenses on the glass surfaces while the rest of it forms a cloud of supersaturated vapour inside the container.



[26] The quotes are to expect disagreement that what is observed in the electron observation experiment is actually the electron.

Fig. 3.2: 'A Diffusion Type Cloud Chamber' by Wikipedia is licensed under CC BY 2.0. Retrieved December 28, 2018 from https://en.wikipedia.org/wiki/Cloud_chamber

The idea is that the various charged particles emanating from the radioactive material crossing this vapour knock electrons off molecules thus forming ions. This causes the droplets of alcohol to condense around the new-born ions thus leaving tracks of the 'culprits': ionizing particles. These tracks are visibly individuated between them. Judging from the shape one may conclude that it is an electron, and not a proton, that has carved a particular trajectory (electrons are much lighter), much in the same way that one looks at a footprint in the snow and infers that it was a goat that traversed a mountain passage and not a bear. Cloud chambers were among the most important particle-researching tools from the 1920s to the 1950s, later superseded by Donald Glaser's bubble chambers[27] (plus, theoretically, by the quantum field theory of electrons[28]).

Let us further inquire into this description starting with the more complex concepts. First, I spoke of materials that are in the process of radioactive decay by which an unstable atomic nucleus loses energy and emits radiation: radioactive materials. How have we come to adopt the notion of such a process in modern physics? In 1896, the French physicist Henri Becquerel noticed that uranium and metallic uranium salts placed on a photographic plate wrapped in black paper caused a blackening on said plate over time. Following this observation, it was suggested that a form of invisible radiation that could pass through the paper was present. Marie Curie and Pierre Curie led subsequent research into this radiation, using it in 1898 to isolate two new elements: polonium and radium. This was decidedly the point of the scientific community's conviction of the existence of this radiation, and the term 'radioactivity' was coined for it (Curie 1904).

[27] For a more thorough scientific presentation of cloud and bubble chambers see Cyril Henderson's (1970) monograph.

[28] Roughly, this is that particles are localised excitations of a field (like a localised wave). Even what we count as a particle can depend on our situation, e.g. whether we are accelerating or not. Perhaps ironically enough this could be shown to give more credo in the subject-world synthesis thesis I have abided by. For the classic quantum theory of the electron see the monumental study by Paul Dirac (1928).

Isolating a new element mandates recording the number of protons in its atomic nucleus to be a unique number. But why were scientists convinced of the atomic structure of the world in 1898? To answer this, we must regress once more, further back to 1827 and the Scottish botanist Robert Brown. Brown observed that pollen grains, seen through a microscope, released tiny particles dancing around in a seemingly random manner[29]. Not until almost another century had passed (1905), a young physicist named Albert Einstein put forward a paper investigating the statistics of this dance. He showed that his formula gave a good account of it assuming that said motion was owed to the collision of individual atoms with the particles. We may now ask, arriving at the human organ: why were Brown's observations taken to be valid? Because they were made via the microscope, an instrument thought to be reliable by its correlation of what it showed from afar with what the human eyes saw from up close[30].

What, then, about the structure of the atom and most importantly for our case in point, the nucleus? Building on the Curies' work, Ernest Rutherford (1911) performed a series of experiments in Joseph John Thomson's laboratory. Initially, Thomson proposed that the atom was a uniform mass that contained both positive and negative charges (seeing as its total charge was neutral). In a glorious experiment, however, Rutherford observed that when he aimed a stream of α particles (a particular kind of radiation) at a very thin gold foil target, a number of them came back at him or were even deflected at large angles on a photographic film around the foil. Given that similar charges repel one another, this suggested that the mass and the positive charge were concentrated in the centre of an atom (nucleus).

---

[29] Admittedly the motion must have been observed much before Brown, at least as far back as Jan Ingenhousz's (1785) time and perhaps even from antiquity. I will stick with one and arguably the simplest version here since historical justice bears no significance for the points raised herein. For a more comprehensive and accurate summary of the story see American Physical Society 2016 and Nye 1994.

[30] A thorough exploration of the matter in a scientific realism versus scientific antirealism manner can be found in the dialogue between van Fraassen's (2009) article on Perrin and Alan Chalmer's (2011) reply to van Fraassen.

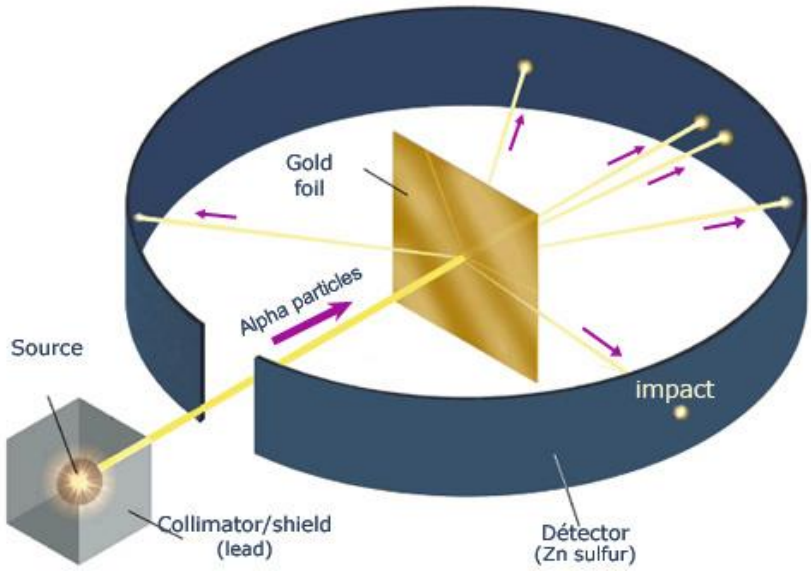


Fig 3.3: Untitled illustration of Rutherford's experiment. Retrieved December 28, 2018 from http://www.radioactivity.eu.com/site/pages/Rutherford_Experiment.htm

The form of the electron[31] was conjectured in 1897, also by Thomson, who was experimenting with currents of electricity inside empty glass tubes. What he was considering was the puzzle of 'cathode rays': the phenomenon whereby a glass tube, after most air had been pumped out of it and was run with voltage, would illuminate in various patterns. His proposal was that these rays were composed of small particles: 'corpuscles'. This was a radical proposal at the time: the consensus then was that the atom was something that could not be further divided. To turn the opinion tide, Thomson (1897) argued in favour of his conclusion via a series of crucial experiments – the cathode ray experiments. I could push the experimental-inferential chain more, interrogating cathode rays and electricity, tracing them back to Benjamin Franklin or the ancient Greeks, but this will not be necessary. We already have more than enough material in our hands for life-world purposes.

So, let us recall the purpose of the present section, and spell it out three-fold. First, to show what is included in the life-world and what is not in a case of actual scientific observation – or 'observation'. Second, to show there is a distinctive level, that of incorrigible admittances, which science unavoidably begins from, is conducted via, and

[31] For an extensive history of the electron's discovery (or 'discovery') refer to Theodore Arabatzis' (1996) elaborate study.

turns to for ultimate validation, and thus that there is a reason to terminologically and conceptually preserve this level as a 'special place' within the empirical (via the life-world). Should we achieve this end, then it will be clear that a distinction of observables and unobservables needs to be preserved, though not without adopting a richer and more sophisticated construal of the observables. Third, to show how the four dimensions of the life-world work together to produce this special level of the empirical; the observable level defined anew. Let me now turn to these tasks.

Carving the above trajectory of scientific discoveries, we met numerous definitions, experiments, observations taken to be evidence conclusive to different ends and degrees and in different ways. Nevertheless, we can find the life-world elements nested in two main areas having the criterion of incorrigibility in hand. First, in what the first 'link' of every experimental-inferential chain includes. Second, in certain elements of *every* link of the experimental-inferential chain. Let me start with the first area. We saw how Brown's observations leading to the Einstein formula convinced the scientific community of the atom's existence. The validity of these observations themselves, however, was based on the validity of the microscope. In turn, the validity of the microscope was derived via its production of images approximating those of the naked eye when looking from up close. *This* matching of the images sets the evidential sequence in motion, establishing a theoretical discourse from the ground up: the microscope (rather, Brown through the microscope) watches particles from the pollen grains dance away, Einstein calculates their motion and encapsulates it in formulas that corroborate the atom assumption, Rutherford uses this work as a basis for his nucleus work, and so on and so forth. Of course, it is not that we could have watched the tiny particles dancing away from the pollen grains with the naked eye. Rather, we see that the microscope works as intended in cases where its effect is the same as looking from really close at something, and then induce that it should work as intended even with stuff we cannot observe with the naked eye.

Is the eye image, then, certainly a part of the life-world? Not without qualifications. In the beginning of this chapter we saw how admitting things as extant is not simply a matter of momentary sight and of things external to the observer (noematic synthesis). Things must present themselves in a 'real profile' to get ontological legitimacy. Moreover, this, is emphatically, not non-theoretical: so much should by now be out of the question. The incorrigible 'image' (rather: perceptual intake) we get from the microscope is incorrigibly individuated into separate entities, which we incorrigibly perceive as having distinct

qualities (by which point we are already well into theory). Similarly, to take another issue from the above example, the natural properties of elements with different atomic weight are registered and correlated with this weight via senses or via ways which are judged reliable due to the correlation of their maxims with our sensory input.

Take for another example the 'founding link' of the second of our experimental-inferential chains leading together to the observation of the electron; electricity (the other being the atom). Taking Benjamin Franklin's story at face value for the economy of the present discussion, let us try to – partially, non-exhaustively – recreate some admittances necessary to the Franklin experiment from Franklin's point of view and in statement form. Pre-experiment, Franklin obviously perceived himself as a separate entity from his surroundings: the ground he stood on; the kite; the wind. He utilised his body's capabilities and his incorrigibly perceived metaphysics (the wind blows) to navigate the kite-cum-metallic-key in the raging storm – which he in turn understood to be a phenomenon distinct from the calm weather. There is a lot more: his incorrigible time sequencing of events; the cognition with which he synthesized these events to arrive at the conclusion that "Electricity exists"; the metaphysics pertaining to the continuity of himself first and foremost before and after the experiment; the shocking sensation received to his body after the thunder. After the experiment, he reported his findings via writing them down, utilising certain signifiers he knew others would incorrigibly extract a certain meaning from.

Could Franklin perform Husserl's *rückfragen*, inquiring back from any of his life-world's admittances in the frame of the experiment without running into the absurd? Could Franklin have behaved as if they were not the case? I hardly think so. Not only is it the case, for example, that the experiment cannot be performed without an experimenter; it is also the case that Franklin *cannot but* behave like he is himself an entity – the same entity before and after the experiment – an observer different to, for example, the kite, which is in turn different to the thunderstorm. These are all delineations of the world handed to him (and in the delineation of which, per phenomenology, he plays a constitutive role), and for that matter to the scientific life-world of the experiment in question. Generally, there is a certain primitive form of the world *given* to science whenever it is conducted, which acts as a precondition of its being conducted. It cannot be otherwise – we must start from somewhere and hold a stratum steady to stand on and do science.

In fact, it is here worth to depart from the eyeglasses example to comment on the mutability and the dynamic nature of the life-world more generally. As neurological studies on perception reveal, one does quite literally 'learn to see'[32] in the most basic sense of the expression, moving from an 'indeterminate blur' to an (often) pretty well-parsed out reality in one's early years of existence. More evidence for this is that people who *gain* sight at an old age take some time, often years, to sort the 'world soup' they find themselves swimming in (see e.g. Sacks 1995/2012). What all this shows is that incorrigible admittances are anything but set in stone, even for a given individual, and are in fact quite prone to elasticity during certain periods in one's life or special conditions. Nevertheless, I submit, the incorrigible admittances that one finds oneself with during most moments in one's life and for the foreseeable future are pretty much the same. Considering that science is most often conducted by adults in more or less stable perceptual conditions, the scientific life-world still denotes something relatively stable as the empirical basis of science. Here, a historically-minded scholar of science may interject that historical and social contexts also affect how we see. Granted, but this influence on perception has, I feel, more to do with our corrigible admittances: values, social antagonisms, historical meanings, they generally shape perceptive elements which we *can* perform rückfragen on even as we are having them. I do not have the space to expand on this here, but I will definitely concede that if the socio-historical training and situatedness is ever in a position of placing incorrigible admittances upon one, then one's life-world is also shaped by this training and situatedness.

This was the first area of the life-world's scientific locus, the, so to speak, 'first links' of any experimental-inferential chain. Let me now take up the second area of the life-world elements, which is, I submit, *every other* step. Let us ask: can we speak of life-world elements at the cloud chamber level? How about the isolation of radium level, or the atomic nucleus and the electron experimental levels? Here we must draw a very delicate line. It is of course not incorrigibly present to us that an electron is being observed in a cloud chamber: we may leave that theory to one side and we have already seen how much mediating thinking is needed to infer this conclusion in the first place. What excludes things from the incorrigible, it is reminded, is our inability, in Chang's terms, to 'peel them

[32] See for example Glaserfeld (1989) and Damasio (1994), also on the influence of emotions on perception and cognition.

away', to act as if a certain admittance is not part of our life-world – compare a table in front of us with the quark or the shocking sense of touching power cables with a metallic item with the electron. Thus, many things *are* incorrigible in the 'final' cloud chamber setup, e.g. the individuation of the container and the materials in it as separate entities; 'white here now' that we later interpret as electron tracks; the passage of time and ourselves as the same entities pre- and post-experiment. It is *not* that we should be looking for life-world elements only in founding links of experimental-inferential chains and organs closely related to the senses like the microscope and the thermometer. Quite on the contrary, it is the case that if the life-world was not present in levels 'higher up' in theory and experimentation we would not be able to draw scientific conclusions at all.

Take the uppermost level of the present case, the cloud chamber itself: that we are seeing 'white here now' and in a sequence forming a straight line, reminiscent here of Chang's quality-centred incorrigibility, is certainly an admittance of the life-world. Similarly, we take the glass surfaces to constitute a container, in which we may place things. Equally importantly we hold this information to the fore of our minds while conducting this experiment and drawing conclusions: we do not start seeing a particular area of one glass side of the container as separate from the others or suddenly start wondering what this weird apparatus sitting in front of us is and what has just happened before. We, typically, to get things done, have an – incorrigible – ability to synthesize all of this into continuous thought. Moreover, we may *not stop* seeing white in a straight line unless a *force majeure* acts upon us, and it is readily evident that this incorrigibility constitutes the basis for asking questions but also for interpretation and conclusion: the white is *there*, but *what* is it? To make an analogy with pharmacology, I, a doctor, may administer paracetamol and let a time interval pass, by which passing the patient's pain ceases to be. Is the ceasing of pain *due to paracetamol* part of mine and the patient's life-world? Certainly not, not least because that is exactly the kind of thing researchers in medicine are trying to causally disambiguate when they are researching, which is proof that they are not stuck with a certain causal assumption in a life-world sense. However, the ceasing of pain *is* the basis on which inquiry proceeds in a life-world sense: the sensation either is or is not incorrigibly present and, when it is not, drawing a line from this fact to the agent causally effecting the change is more or less what coming up with a cure is. Similar examples can be found all along the scientific chains I have presented. The blackening of Becquerel's plate: that I see 'black here now' and 'plate here now' are

incorrigible versus that the blackening comes from radiation, which is not. That my train of thought is not disrupted or fragmented (or does not have further capabilities than the present, to not only speak of possible disaster) while thinking about things and that I am able to hold them in mind straight through are all integral to the process.

This generalises to the Curies' elements, Becquerel's plate, Thomson's rays. *Something* was always incorrigibly present within their experiments: that these things are uranium salts, this other thing a photographic plate, that this other thing is uraninite (then pitchblende, the Curies were researching this material when they isolated polonium). I will spare the reader another lengthy description of the life-world. The point is this: every high theoretical conclusion steps on life-world admittances – but it is not itself (usually) a life-world admittance. Of course, we must stress here, this fully applies *to the electron*, which does not present itself incorrigibly during the cloud chamber experiment – 'white spots here now' that are putatively electrons' tracks do. "How so?" one may now interject. "Is it not the case that highly theoretical conclusions appear incorrigibly to us? If there is heavy radiation somewhere can I just pretend that there is not? Can I walk through there without having my DNA altered, suffering all the unfortunate consequences of radiation?". The way we answer this question is of critical importance. The immediate answer is that of course you cannot. However, it is *not* the case that radiation or the DNA in this case appear (incorrigibly) under the theoretical profile of physics or of medicine. They appear as pain and deformation: *these* are the incorrigible elements here. Further explanations from physics and medicine may be very good explanations but they are not incorrigible in appearance. This generalises to, for example, psychology. The emotion of anger, appears incorrigibly in and to us. Issues of suppression notwithstanding, it is not something that we can take away the same way we can decide to go for one theory of psychology or the other. There is a qualitative difference between going from happy to sad and between moving from being a proponent of psychoanalysis to one of cognitive psychology. The impossible to do without, what we are unable to un-see, un-know, behave differently towards (the effect of a *force majeure* notwithstanding), the tropes of thought with which we think about things and synthesize them into narratives: these are prime examples of what the life-world consists of.

This concludes the 'life-world in practice' demonstration. In the next section I will take stock of how the life-world convincingly incorporates most of the analytic intuitions of the previous chapter and pinpoint its intersubjective character, which is of special importance

to science, seeing as science always comprises, to some extent, a collective endeavour (even scientists who work alone publish their results and are evaluated by peers). In section 3.5 I will add to the arguments presented in the scientific example above regarding how *crucial* a science's life-world is for it, providing more general argumentation.

3.4 The Scientific Life-World: Relation to the Analytics and Intersubjective Character

Let us now see what we have made above of the analytic insights showcased in the previous chapter and settle what has been left undiscussed. Regarding Maxwell: his answers to quickly decidable ontological questions coincide with the life-world cashed out in statements[33]. Regarding Chang: first, the expansion of perception beyond concrete objects and the visual that comes with the life-world concept would surely find him in agreement. Second, note the ways in which perceptual reports must be manifest to be registered as indicating genuine things of one's life-world (versus, for example, an internal experience) of section one. Chang would certainly agree with the first move. The second may be seen as a further explication of his incorrigibility. It is here hard to resist quoting a passage from Husserl (1936/1970, 186-191) talking about the realm from which scientific evidence is ultimately derived (an issue I will discuss extensively in the next section).

> Having arrived at the ego, one becomes aware of standing within a sphere of evidence of such a nature that any attempt to *inquire-back behind it would be absurd*.

The parallels, I think, between *unable to peel away* (Chang 2005, 883) and *absurd to inquire-back behind* are striking. Unfortunately, not all things fall harmoniously into place and there is a point at which the life-world, both as advanced by phenomenologists as well as in how I construe it here, decisively breaks with Chang's quality-centred observability. This point is precisely Chang's insistence on qualities: the 'world reflexively had' in the life-world consists of concrete entities as well as the unbound qualities that he describes. I submit, in defence of the phenomenologists, that Chang's resorting to qualities to defend

[33] This is not to be confused with the contention that the life-world is comprised of statements; emphatically, it is not. We can however describe what it is comprised of in statement *form*, exactly as we did with Franklin above.

his kind of observability is 'philosophical overkill'. It is the case, I think, that I can stop perceiving certain objects and behaving as I am seeing objects *just as much* as I can stop perceiving certain qualities and behaving as if they exist. Or, to put object-ness as an incorrigible quality, 'object-ness here now' like 'black here now', is a quality report I cannot help but ontologically admit regarding, for example, the coffee mug in front of me. Nevertheless, we may still be faithful to Chang's spirit and hold that these entities may fall short of right and true (or may have alternatives as I will show in the upcoming chapters) in the exact same way that Chang holds the perceived incorrigible qualities open to falling short of right and true. Chang wants to untie constructive empiricism and observability from admitting the doubtless reality of objects when he resorts to qualities but I can see no reason why he (we) cannot do this at the level of objects, especially since he does not seek to redeem qualities as free of being theory laden. Which of Chang's desired effects does one need to do away with should one refer to object-ness as an incorrigible yet fallible quality? None, I claim. It does, then, seem to me unreasonable to reject what appears to be a quality of maximum incorrigibility.

Regarding Dicken and Lipton, I take them, as I explained in the last chapter, to have adequately answered all of Musgrave's extant and hypothesized contentions to the observable except the one mentioned above here, save for the pathway they leave open in a case of a property-based definition of observability (as I have explained, I follow no such notion here). Moving on to Musgrave, I believe that his point has been amply answered: one is not able to infer electrons as belonging to the observable. They do not appear as an incorrigible entity (something that is putatively their tracks does) in one's life-world. To put the same point in other words, van Fraassen is right when he holds that observing *something that something else has putatively left behind* does not equal observing *that very something*. To address Musgrave's objection more directly, the chief difference between the mouse, the yeti, and the electron which he discusses is the following. I (or members of the human race) have had phenomenological experience of the mouse (or members of its kind) adequate to admit it as a potential member of my (our) life-world. Inferring the mouse's existence in the wainscoting does not occur solely from the available evidence pointing to it when I hear the noise but also, crucially, from these previous phenomenological experiences. This kind of experience is available neither with the yeti nor with the electron. Last, it is hard to overstate the importance of declaring that van Fraassen's and Musgrave's mouse is not a part of my life-world upon hearing noise in the wainscoting either. I may

reasonably infer the existence of the mouse as well as the existence of the electron and whether the latter inference is reasonable is the question of scientific realism. What separates the two is not the certainty or impossibility of existence in the world but, rather, the mouse's *previous* existence in one's life-world and the electron's lack thereof.

Coming to the causal (interaction-information) account of observability, though important in the literature, I will not be taking it into account. Here is why. Kosso gives us a set of reasons to conclude that a certain entity 'has been observed' that, in my view, conflate belief that something has been observed with belief that something *exists*. In so doing, the causal account of observability fails to pay adequate attention to the 'inner sanctum' of the empirical level; it fails to separate those admittances which are necessary to conduct science versus those for which we may have ample evidence but are still there for the optional taking (I will expand on this in the next section). That observation and existence are conflated in the causal account of observability is evident from several angles, the most striking being that Kosso's continuum of observability includes things that are *unobservable in principle*, the prime example of these being the colour of quarks. Admittedly, Kosso acknowledges this and finds that it need not trouble him much; after all he wishes to work out a notion of observability that has to do more with epistemic reliability rather than observation itself. However, one cannot help but wonder: what, in this notion of probable observability, its probability increasing by the fulfilment of Kosso's four dimensions of a putative observable, is not already covered by the notion of probable existence? I think Kosso does not realise how close the two predicates run, and this becomes evident in his contention that one can even draw out some conclusions about the scientific realism debate based on his notion of observability: if I have indeed been passed information from something accurately, he tells us, it is almost a tautology to say that this something exists. This, however, only happens because his flagship observability criterion, (in)dependence of interpretation, is one and the same with the flagship criterion for the corroboration of a scientific theory or entity. There is no contradiction in wanting to run these notions in parallel. However, if we claim both electrons and tables observable by different degrees, how is this not repeating Maxwell's argument about the continuum of observation? How can we draw a non-arbitrary line along this continuum, which Kosso himself does not see the need for drawing, thus completely circumventing Maxwell's cornerstone objection? If we cannot, then Kosso's argument can be subsumed under Maxwell's, and the replies to the Maxwell argument, including van Fraassen's, Chang's,

and mine to be presented below apply to Kosso's argument as well. Finally, and very importantly, Kosso (1988, 466) states that his account of observability is the best epistemological foothold should we consider that we have no 'prior information on the ontology of the physical world'. This I find entirely inadmissible: if we had no such information, science, and indeed any project of theory and praxis, would not have an object of occupation to begin with. Echoing Husserl cited above, and pending further demonstration in section 3.5, I claim that it is not the case that one may hope to dispose with this 'prior ontology', and that this is precisely the central point of the life-world.

Thus, it is shown, I claim, that the life-world elegantly combines what we want to consider from the analytic account of the observables, the worthy material we were left with the task to handle at the end of chapter two. It incorporates the best intuitions (observation continuum, observability as vague predicate, incorrigibility as the chief shaping factor) and it answers the most powerful protestations (arbitrary separation of the observables from the unobservables, inference to the best explanation) on behalf of the analytic literature regarding observability. Emphatically, however, the life-world does more than just combine, for it also expands. As I noted above, the dynamic nature of perception and its part owed to the perceiving subject are mentioned rarely and in passing in the analytic literature. Further, the analytic discussion remains oriented towards observability as some or other direct contact with the world. The life-world, as I have defined it here, casts its net wide to capture *all that partakes of doing science which is seemingly irremovable from the process*. Elements falling under this principle are perceived as[34] of many kinds: world entities, world qualities, world metaphysics, subject cognition, subject proprioception. All the above, the dynamic, subjective, wide dimensions of perception reflected in the life-world, are going to be *precisely* the points of observability's featuring in the scientific realism debate from angles practical and theoretical in the upcoming chapters. This is an unfortunate omission on the analytic literature's behalf, a prime example of which is, perhaps ironically, the title of van Fraassen's (1980) work on realism and empiricism, *The Scientific Image* (notice the *image* part). Even he, a philosopher who fights on the observables' side and upholds their importance, nonchalantly dismisses their

[34] I am saying 'perceived as' rather than 'are' to indicate the phenomenological principle that even what seems as an external item in fact 'constitutes itself in our perception' in the way we explored above.

complexity in a single period when discussing issues of realism and antirealism. "When the hypothesis is solely about what is observable … empirical adequacy coincides with truth" van Fraassen (1980, 72) tells us, without offering much argument for the contention.

I want now to turn to an important obstacle that stands in the way of connecting the observable level to the life-world and offer a final criterion for what constitutes the *scientific* life-world. Should one pay close attention to the discussion in chapter two one will notice that the observable level has been treated as unproblematically unique, that is as one and the same for all involved with it. This treatment of the observable level as having no situatedness, as 'the view from nowhere' to employ Thomas Nagel's terminology, juxtaposed with the myriad life-worlds of which there are at least as many as there are people[35], amounts to a problem: how can a concept pluralistic by nature such as the life-world possibly specify a concept so monistic as the observable level in the analytic philosophy of science? What sense does such a substitute make?

To answer this question, I will employ a strategy of bringing both concepts, which *prima facie* stand in stark contrast, towards the middle. First, I will demonstrate that the life-world has an intersubjective character: it may be the same, or shared, across subjects, and it very often is. Second, in chapter four, I will argue, via the avenue of alternative conceptual schemes, that the observable level, taking a cue from the life-world, should not be construed as the unique 'view from nowhere' but as a view of the world brought about and filtered by specific capacities (be these capacities biological, cognitive, social, socially contextual et cetera).

Let me now, for purposes of the first pull, turn to Husserl (1913/1983, 55-56) himself on the issue of the presence of others in one's life-world:

> I take their surrounding world and mine Objectively as one and the same world of which we are conscious, only in different modes … For all that, we come to an understanding with our fellow human beings and together with them posit an Objective spatiotemporal actuality.

[35] Or people (or possibly organic beings) with consciousness. This follows from the prior definition of the life-world.

This is an early statement, which Husserl maintained more or less loosely throughout his philosophical career, as Føllesdal (2010, 40) shows. As he writes in a later work (Husserl 1936/1970, 161-165), "Thus in general the world exists not only for isolated men but for the community of men; and this is due to the fact that even what is straightforwardly perceptual is communal."[36]. How can one then make peace between the life-world as has thus far been described and its intersubjective dimension ushering in, between the previous plural and the now proffered singular dimension? Føllesdal crystallises the antithesis by putting together two of Husserl's quotes (Føllesdal 2010, 41-42):

> We do not share the same life-world with all people, not all people 'in the world' have in common with us all objects which make up our life-world and which determine our personal activity and striving, even when they come into actual association with us, as they always can (to the extent that, if they are not present, we come to them and they to us).
>
> The world, on the other hand, does not exist as an entity, as an object, but exists with such uniqueness that the plural makes no sense when applied to it. Every plural, and every singular drawn from it, presupposes the world-horizon.

Føllesdal claims that this *prima facie* contradiction is in fact no contradiction at all. In his reading, there is indeed one world which *causes*[37] all life-worlds to come into existence (metaphysical realism). You and I are standing next to one another and are similarly directing our attention but may still be seeing substantially different things because of our biological capacities (I may have cataracts) and social training (you may not have the

---

[36] There is some philosophical debate about whether Husserl meant for the life-world to have a truly intersubjective dimension, to admit the external world and other beings in it as real and not a manifestation of consciousness or, in terms of phenomenology, the 'transcendental ego'. I remind the reader that since this is not a Husserl studies dissertation, it is also not my purpose to settle this debate here.

[37] Or, to be more precise, goes into the causal relation. This qualification is needed to account for the observer's input in the shaping of a given life-world.

social training to conceptualize what you are seeing in a similar way as I) but this does not mean there is nothing where we look. "Our conceptions of the world may differ, and in this sense we all live in *different* life-worlds" writes Føllesdal (2010, 42). Thus, on the one hand, the existence of the external world and the possibility of overlap between our life-worlds are affirmed. On the other hand, our life-worlds *can* be shared if we share the same, e.g., ontology, metaphysics, semiotics, or emotions. You and I look in this room and incorrigibly see tables and chairs which give out a cosy feeling. We sit down and read the same text, we discuss it even. On the basis of this external world, and if we are also similarly inclined in our perceiving capacities, we may share the life-worlds 'constructed' out of the world – sharing incorrigible admittances. Further, it is not the case that another's life-world must align a hundred percent with ours for us to 'follow' it, establish some common ground and work in collaboration. These last issues are issues I will press in the upcoming chapters.

Two final notes: first, the above is Husserl's position (where indicated as elaborated by Føllesdal) and mine. The issue, however, of whether it may withstand philosophical scrutiny is vast. Among others, Putnam and the internal realism scholars, and Donald Davidson have offered invaluable and complex positions on the matter. Along with the internal realism material I postpone this discussion until chapters four and seven. This is both due to space limitations here and because these matters necessitate, as I have already noted, a more concrete elaboration of my own position. Second, as I noted in section 3.1, there is within phenomenology another, and deeper, sense of intersubjectivity, which denotes that our perception and world-experience is deeply fused with the perception and experience of others. How we view and navigate the world is a *collective* endeavour. Beyond seeing the same things, having similar patterns of thinking, ascribing to the same semiotics et cetera, the *way* in which we perceive is shaped by the way others perceive. In section 3.1 I brought the example of the sun, and how we may perceive the sun through the collective history of humanity: as a tool of navigation, as fused with religious and mythological meanings. Or simpler still, how we may view someone as taller than they are or more handsome than they would normally appear to us due to peer opinion about that said someone. Now, this notion of intersubjectivity has been discussed at length both by Husserl that can be found in various volumes of the *Husserliana* (especially 1905-20/1973). It has also been discussed by contemporary phenomenologists and even analytic philosophers and sociologists (see Zerubavel 1997), who appreciate the notion as holding

metaphysical and epistemological weight, in for example constituting the objectivity of objects. While the topic is fascinating in and of itself, and could enhance this dissertation both here and in the case-study of autism spectrum conditions that follows in later chapters, I will restrict myself to the more 'shallow' level of intersubjectivity. This is because the topic itself is vast, and figuring out how intersubjectivity would feature both into the constitution of the observable level *and* in a clinical environment are two subjects that cannot, even individually, be accommodated in the range of this dissertation. I will leave these topics on the side for a future work, and I will restrict myself to the simpler sense of intersubjectivity (simply sharing perceptions), enough to establish the life-world as the observable level of the sciences.

3.5 The Significance of the Intersubjective Life-World for the Sciences

A vital task, the last of this chapter, now remains to be completed: that of explicating how the intersubjective life-word is indispensable for the sciences. Above, in reviewing the cloud chamber experiment, we singled out several life-worlds elements, both in the beginning of the experimental-inferential chains leading to the conclusion that the electron has been observed (electricity, pollen grain dance), as well as in every subsequent link (radioactivity et cetera). These elements are *sine qua non* for observing the electron (or 'observing' it per the life-world approach) in the cloud chamber case as we conduct and understand it. Obviously, we would not, for example, be able to infer that the 'white here now' marks the trajectory an electron has carved if were not at all able to see the 'white here now'! Of course, it is not that *these particular* life-world elements we surveyed above are the only possible way to the electron. We could, for example, for some evolutionary peculiarity, have been unable to witness the colour white incorrigibly, and have developed the ability to 'see' it with other, technical means – much in the way we capture colours beyond the infrared and the ultraviolet light wavelengths with special glasses. However, our confidence in these technical means would *again* be able to be traced back to the life-world, like our confidence in radioactivity was able to be traced back to the life-world in section three above. Repeating this particular tracing back task here would not have much merit, for my point is that, generally speaking, we *always* need an incorrigible substratum to lean on to while conducting science.

To strengthen this point, following others from several fields and traditions, I will here argue that the intersubjective life-world from which a certain scientific practice is launched

and in which it is verified *may not be regarded as illusory, erroneous or fictitious within that same practice*. To 'take away' a certain scientific practice's intersubjective life-world, that is, would be to take away the reasons for believing in its maxims, and if its maxims include that this life-world is a fiction, then they themselves crumble. Thus, per the original spirit of Husserl, I will argue, we are stuck with the concrete quality of the life-world regardless of how many layers of reality we pose below, within, or on top of it.

Let me once again turn to Husserl as a departure point:

> The life-world, for us who wakingly live in it, is always there, existing in advance for us, the 'ground' of all praxis, whether theoretical or extratheoretical. The world is pregiven to us, the waking, always somehow practically interested subjects, not occasionally but always and necessarily as the universal field of all actual and possible praxis, as horizon. To live is always to live-in-the-certainty-of-the-world. (Husserl 1936/1970, 142-143)

> All opinions, justified or unjustified, popular, superstitious, scientific, all relate to the already pre-given world… All theory relates to this immediate givenness and can have a legitimate sense only when it forms thoughts which do not offend against the general sense of the immediately given. No theorizing may offend against this sense. (Husserl 1905-20/1973, section 196, 22-34)

What Husserl tells us here I believe is, and here I am just making explicit and concise what I have demonstrated above, three things. First, that science does not begin in a vacuum: it is always looking at, theorizing about, and acting on the basis of some phenomena given to it by life itself. It should be evident now that the admittances of these phenomena *are a matter of the incorrigible admittances of the scientific life-world*. I perceive an apple falling, a plate being clumsily thrown off the edge of the table and breaking. I have intuitive and as far as I can see inescapable grasp of these concepts: the apple, the plate, the falling. I perceive the phenomena they pertain to as similar and then begin to speculate and experiment about gravity scientifically.

Second, per the original logical empiricist spirit, that scientific statements are meaningless without minimally impinging upon the edges of the life-world. This should be far from a heretic point. If scientific entities, mechanisms, narratives do not connect to

the pre-scientific world somehow then they become idle, if not completely meaningless. What would a story of electrons be without any application of electricity in experiments and from there to home and industrial equipment? It would have no explanatory value, it would bring to the fore no purported causal relations, it could not be utilised to bring about desired results.

Third, that scientific theories are, in more or less direct ways, justified in the life-world, as we saw in great detail in section 3.4. Here is where phenomenology aligns with Ian Hacking's (1982) experimental realism, which we were familiarised with in the first chapter. One has, however, to tread carefully to sidestep the pitfalls entity realism initially fell in. What phenomenology claims, and what I claim here, is not that there are certain entities that can be detached from their surrounding theoretical context and be given ontological credence because of their instrumentality in a non-theoretical environment. What is claimed is that scientific *practices and theories* get their validation in terms of the incorrigible admittances from which they begin. In the words of Husserl (1936/1970, 123-125) "an opinion is justified by being brought into 'reflective equilibrium' with the *doxa* of our life-world". Some of his analytic commentators such as Føllesdal (2010, 45) hold this level to be the level of beliefs, expectations and acceptances that "we ultimately fall back on [that] are unthematized, and in most cases, have never been thematised". Non-thematised is here to be understood in the way of a 'silent horizon': as these assumptions and convictions one does not think about while one is engaged in a certain practice due to their incorrigibility – tacit assumptions. Is it the case, however, asks Føllesdal that an appeal to such an unsophisticated and non-reflective court is reasonable? To which he replies by providing a quote from Husserl (*The Crisis of the European Sciences and Transcendental Phenomenology*, paragraph 34e), echoing the spirit of Chang, that *this is all one has*:

> What we accept, and the phenomenon of acceptance itself, are integral to our life-world, and there is no way of starting from scratch, or to evade the issue here through a preoccupation with aporia and argumentation nourished by Kant or Hegel, Aristotle or Thomas [Aquinas].

This is all there is, "there is nothing more that can be sensefully inquired for, nothing more to understand" (Husserl 1929/1969, section 96b). There are contentions against this

trio of necessities. Simply put, objectors of the ilk that interests us here claim that if one does science correctly then one will arrive at the same destination no matter where they start from. If this is indeed so then the difference between the apparent worlds (the significance of which is to be explored in the next chapter) is merely epiphenomenal. It does not matter how different the apparent world/observable level/life-world may be between subjects, cultures, and practices, our hypothetical objector would maintain: the apparent world is a veil hiding the real, to be pierced through by scientific means.

My reply to this objection is that taking away the life-world immediately implies taking away all reasons to believe in maxims about any 'deeper reality' about some level of reality 'realer' than the observable. The moment one admits a deeper level of reality, not as an elaboration but as a displacement of the life-world, I claim, is precisely the moment when one pulls the rug under the life-world displacement argument's feet. I turn to *The Fantasy of Third-Person Science*, a paper by Vallor (2008), which brings the present point to the fore very elegantly. Vallor begins her paper by criticising Daniel Dennett (2007), a philosopher of cognitive neuroscience who holds that, at least in his field, first-person reports should be entirely discarded as empty fictions, favoring an ontology of neurological and chemical processes instead. His project is as reductionist as they come: Dennett takes first-person reports to be an attempt at theorizing and telling the truth about the phenomena, only with extremely handicapped and unsophisticated means. Of course, one cannot hope to get to the matter of fact via such means. Dennett is wrong, Vallor holds. His tenet is based on the conflation of two distinct kinds of claim: a subject's claim about *what is going on in* her, and a subject claim about *what it is like* to be her. Vallor calls upon Husserl (1913/1976, 213) for whom first and foremost these are two completely different things, referring to two quite distinct types of conscious experience. The first relates to the *reale*; the factual psychological state of an individual (e.g. infused with this much adrenaline and endorphins), while the second relates to the *reell*, which is the subject's conscious experience from a first-person point of view. One should expect the *reale* – the factual psychological state – of the matter at hand to be subsumed exactly under the kind of inquiry that science is. The *reell*, however, is entirely a matter of phenomenology.

Vallor bolsters this point by employing a causal account against common-sense displacement. She notes that an individual's phenomenal states are the explananda of neuroscience, while the theoretical stories neuroscience provides are attempted accounts (causal stories) of the explananda on a more micro-level than the phenomenal. Note that

the micro-macro level does not presuppose a dual reality, only one where neurochemical brain states are manifest in individuals as mental states. To generalize this point, it is not the case that one needs dualist metaphysics if one wants to maintain that there are electrons within things.

How the present case study reinforces the point even further should be readily evident: if neuroscience is about explaining the explananda (and changing them – changing one's life-world – I would add, as it does, for example, in taking away the pain), and the explananda are first-person states, then if one takes away the explananda the causal story becomes useless, for there is nothing to explain and change! I put it directly and somewhat crudely: scientists believe in neurochemistry because they correlate what they observe via its means with how their test subjects feel. If how we feel is to have no epistemic significance then the correlations responsible for believing in neurochemistry correlate the latter with *nothing significant*, and neurochemistry immediately becomes nonsense itself. *Take away the life-world, and you end up with no subject matter for science*, we may put it succinctly. We see now that the demand for displacing our 'unsophisticated', 'naïve', immediate grasp of the world via means scientific gives out more of an unwarranted obsession with 'ultimate anchors' rather than a goal epistemically sound to strive towards. I will come back to this point in chapter seven, where I discuss precisely Putnam's urging us to embrace this so-called naïvete.

I will come back to the life-world's necessity and, beyond necessity, instrumentality in conducting good science in chapters five and six in much more depth. There, I will investigate the autism spectrum conditions case and the life-world of people with autism spectrum conditions diagnoses. For now, let me conclude this chapter and move to the next one, where I argue that we should not speak of life-world singular but of life-worlds *plural*.

Conclusion

In this chapter I have conducted the following work. First, I presented the philosophical backdrop against which the notion of the life-world arose as well as the phenomenological conceptions which it sought to encapsulate (e.g. noema/synthesis and filling/anticipation) and the larger theoretical project in which it was embedded (common experience-preserving science). Following, I defined one's life-world as the realm of incorrigible admittances one adopts regarding the world at a given time and suggested that

the life-world serves as the best construal of the observable level of the sciences. I organised the life-world's contents along four axes (ontological, metaphysical, semiotic, emotional) and I showed how these elements come together to form a special empirical realm for the sciences. This realm is special in the sense that it sets the scientific 'point zero': that which, while not real, true, certain, non-theoretical or given, serves as the basis for launching, conducting, and confirming the scientific endeavour. It is comprised of these things we cannot 'un-see', 'un-hear', 'un-feel', and all the incorrigible ways in which we function to combine information, to pass it on to others, more generally to ascribe meaning to things, of all the incorrigible ways we are stuck with according to which we extract meaning from the world and act towards it.

All this was demonstrated in practice via the example of the putative observation of the electron in the cloud chamber. I showed how the elements of the life-world are situated at the bottom level of every inferential chain leading up to the inference of the electron's existence and, moreover, along every step of the way (albeit not as synthesized final information – e.g. the electron is not part of the life-world). Following, I addressed the problem of how the life-world, a subjective concept, can play the role of the observable level's specification, which is by default an 'outer' view of the world, a view from no particular set of eyes or other perceiving apparatus. I solved this problem by highlighting the intersubjective level of the life-world and by promising to challenge the monistic and unique status of the observable level in the following chapters. Last, I offered an in-principle for why the intersubjective life-world is indispensable for the sciences and I explored reductionist arguments to the opposite conclusion, which I found to be incoherent. The sciences, I argued following Husserl, *must* be based on an incorrigible ground that is treated as true to get off the ground and be conducted, and any attempts to take this ground away will also belie the reductionist conclusions themselves.

In the next chapter I am going to discuss issues of the life-world's alterability as well as the possibility of (radically) different life-worlds (or, as I will show, in the language of analytic philosophy, conceptual schemes). I am then going to argue that, because one's (and one's species) life-world is dependent on several factors that are contingent (biological, social, et cetera) and because science irreducibly depends on the life-world, a different kind of science follows a different life-world. The case study of autism spectrum conditions will help to demonstrate this in practice. In the last chapter I will tie this whole

theoretical and practical discussion directly back to the scientific realism-antirealism debate.

4. Alternative Conceptual Schemes and Life-Worlds

Introduction

This dissertation began with a call to examine the observable aspects of the world as a crucial point of interest for the scientific realism debate. Following, we set out to find the best construal of the observable level. I proffered that Edmund Husserl's life-world, construed as the realm of incorrigible admittances that science launches from, is conducted via, and returns to for validation, is the best way to treat the observables. The life-world was shown to play this role via its intersubjective dimension – the life-world-sharing capacity of subjects.

In this chapter, I plunge into the subjective character of the life-world. I argue that, beyond intersubjective, the life-world may also be plural and that life-worlds may be radically different from each other. I address this mainly by presenting radically different life-worlds in opposition to Davidson's influential attack on the very idea of a conceptual scheme. Davidson, adopting a purely linguistic construal of conceptual schemes, took the possible extent of conceptual scheme difference to be rather minimal. In this chapter, I argue against this conclusion. Further, I claim that acquiring a wider understanding of concepts and conceptual schemes *beyond* their linguistic facet, i.e. as embodied by conceptual scheme *users*, enables us both understand the extent and importance of possible conceptual scheme difference for science, and to extend the conclusions drawn from their investigation to life-worlds.

Thus, the present chapter is dedicated to arguing for life-world pluralism. However, as noted, for most of its course I will be discussing whether there can be more than one – and radically different from each other – *conceptual schemes*. This may strike as odd to the more continentally-oriented reader, plausibly unfamiliar with work on the matter (Davidson's included). In this dissertation, however, I try to walk a fine line between the analytic and the continental philosophies (mostly of science – though this chapter's material is leaning more towards the philosophy of language). In this vein, any analytic crowd will be rightfully bewildered if, in the frame of arguing for any pluralism related to science's central points of reference, I do not mention the related work on conceptual schemes. Indeed, Davidson's arguments may require some work to be mapped onto life-worlds. However they certainly, and to the extent that the scientific life-world is conceptual, may not be ignored in discussing science-related life-world pluralism. Thus, carefully and

methodically lifting Davidson's prohibitions regarding conceptual scheme plurality will counter-act the negative-theoretical arguments that could arise against life-world pluralism.

To make the above contention more explicit: as we saw in the last chapter, a life-world is much more than a set of concepts, a sum of linguistic repositories for capturing things in the world. It may be argued (as I will show in section 4.3), that a life-world may be entirely vacant of concepts. Thus, it is *prima facie* not entirely clear why I should engage with conceptual schemes here, or that the arguments against conceptual scheme pluralism should apply as arguments against life-world pluralism. However, as I discuss below, we should minimally cover the case of conceptual life-worlds, especially seeing as science is, indubitably, one of the most concept-heavy endeavours ever known to humanity. Thus, in section 4.3, I take care to cover three cases: conceptual life-worlds, non-conceptual life-worlds, life-worlds that are part conceptual and part not (this is, in my view, the most ordinary life-world case). In the conceptual life-worlds, Davidson's arguments apply, and thus apply my counter-arguments developed herein. In the non-conceptual life-worlds one has to look at empirical non-conceptual cases, I argue, and this is what I do in some of the upcoming chapters regarding autism spectrum conditions. I find that life-worlds can there vary wildly too. Last, in the mixed case, I argue that since both conceptual and non-conceptual life-worlds vary, so can mixed-parts life-worlds, by virtue of their containing parts that may vary.

The present chapter is structured as follows. In section 4.1 I present the historical and conceptual backdrop against which the notion of a conceptual scheme surfaces and I give it a rough initial definition. Further, I examine Davidson's paper *On the Very Idea of a Conceptual Scheme*, widely cited and considered the most important contribution to the relevant literature, which claims that the notion of alternative conceptual schemes is vacuous. Davidson, in a verificationist manner, contends that the very idea of a conceptual scheme does not make sense because of the impossibility of providing a neutral content necessary to support it, and also because of the impossibility of recognising an alien conceptual scheme as such – these I call Davidson's two structural points. In section 4.2 I give conceptual schemes a clearer and more detailed definition by arguing for a specific Neo-Kantian construal of them.

In section 4.3 I conduct a literature review of empirical and conceptual arguments against the prohibition of conceptual scheme pluralism. First among them is applied

relativism, based mainly on ethnography documenting cultural differences. Following, I put forward arguments from internal realism, this time in favour of a particular version of conceptual relativity – conceptual cosmopolitanism. After this I examine two more crucial conceptual arguments against prohibiting conceptual scheme pluralism; the argument from extrapolation and the pragmatic argument. I find, often following others, that these attacks are modest in that they do not defeat both of Davidson's structural points.

In section 4.4 I deal with the first of the two structural pillars of Davidson's attack against conceptual schemes, the one claiming the impossibility of the existence of neutral content. I submit that the notion of neutral content in the way Davidson means it – effable and theory-neutral – is indeed nonsense but that alternative conceptual schemes do not need such a strict notion of neutral content to support their existence. Further, following and extrapolating from all the above material, I make my case for the very idea of a conceptual scheme and of alternative conceptual schemes. I concede conceptual cosmopolitanism's point against extreme conceptual relativism, a point which I will revisit in chapter seven.

In section 4.5, I connect conceptual schemes to life-worlds by using the Neo-Kantian conception of conceptual schemes of section 4.2. I submit that, the above material in hand, we may argue for life-world pluralism no matter how much conceptual content is involved in life-worlds.

4.1 (Alternative) Conceptual Schemes: Backdrop and Davidson's Attack

Immanuel Kant and Willard Van Orman Quine have offered the most influential, and quite divergent, approaches regarding what a conceptual scheme is. For reasons of simplicity, the discussion of the structure and content of a conceptual scheme will be withheld until a more detailed analysis in section 4.2. I will, for the moment, abstract from the extant definitions and offer one which is adequate both to get the conversation of this chapter off the ground, as well as acceptable for common-sense and philosophy alike: a conceptual scheme is a set of concepts which we use to categorise things in the world (by whichever interpretation of 'the world' we abide).

The subject that has sparked the most interest and controversy within analytic philosophy regarding conceptual schemes is whether there can be more than one; the question, that is, of whether there can be *alternative conceptual schemes*. Lynch (1997, 408) puts it that "the history of conceptual schemes begins with Kant" and Rorty (1972, 649-

650) adds that Kant put forward the two distinctions necessary to promote the idea of alternative conceptual schemes: that between a neutral content and a conceptual apparatus which shapes it, and that between a concept which the mind cannot do without and a concept which is there for the optional taking. These two distinctions are putatively (as in Brons 2011, 223) necessary for advancing the doctrine of alternative conceptual schemes. The first distinction is thought to be *sine qua non* because of its introducing a neutral, pre-conceptual notion of reality: if we are to pose alternative schemes then there must be a common material which they all carve differently. The second distinction, between conceptual necessity and optionality, introduces the possibility that many important concepts along the lines of which our life unfolds could have been – indeed could be – different. In analytic philosophy of science two competing scientific theories before and after a scientific revolution, such as those of phlogiston and oxygen, are most often thought to comprise alternative conceptual schemes, with several scholars such as Thomas Kuhn (1962) and Paul Feyerabend (1975/2010) often insisting that these theories compare as *radically different* conceptual schemes. In this view, the truth value of a statement becomes relevant to the context of its articulation: from the point of view of the theory of oxygen, the maxims of the theory of phlogiston are neither true nor false: they are *nonsensical* because of deviations in meaning. In this way, conceptual schemes become immune from external criticism since criticism can only be articulated within their own environment of meaning. Thus, conceptual schemes have come to be regarded as of chief relevance for the relativism discussion, and the case in their favour is often read as a foundation doctrine for relativism (Baghramian & Carter 2003/2016, paragraph 1).

In his *On the Very Idea of a Conceptual Scheme* (1974) Davidson launches an attack not on the view that there can be many alternative conceptual schemes *per se*, but rather on *the very idea* of a conceptual scheme as one should be careful to distinguish. The difference is that between disputing the claim that the animal goat exists and disputing that there are different kinds of goat. Those two kinds of claim are not quite the same thing, and as Davidson (1974, 5) writes himself, his endeavour goes past the attack on *alternative* schemes: "Even those thinkers who are certain there is only one conceptual scheme are in the sway of the scheme concept; even monotheists have religion". Davidson's line begins with an endorsement of Quine's now predominant assumption, which identifies conceptual schemes with languages. Davidson's thinking is the following: if two conceptual schemes are different, so must be the languages that accompany them.

However, speakers of different languages can ascertain their shared ontological commitments by translating their languages into one another. Therefore, inquiring into the criteria of translation (of when another language is translatable) is a way of knowing when a conceptual scheme (another language) is the same as ours in an ontological respect. If translation is possible then the conceptual schemes have the same underlying ontology; if not, they are in conceptual disagreement. Conceptual disagreement does supposedly come in degrees and Davidson sets out to explore two possible cases of such disagreement: partial and full. A full conceptual disagreement (and thus total failure of translation) occurs when there is no or no significant conceptual overlap between two schemes, while partial disagreement occurs when a significant range of concepts is the same and another significant range is different[38].

Davidson makes a series of interrelated points, starting with the case of possible full failure of translation. Speech, he writes, minimally requires beliefs and intentions. However, to ascribe to someone complex beliefs and intentions is hardly at all achievable without translating their words into ours. To even interpret something as speech behaviour requires translation; if we cannot translate it, Davidson contends, then we do not recognise it as speech behaviour. Remember now that, if such translation is at all possible, then the conceptual schemes involved have been shown to be in fact one and the same. Thus, Davidson contends, the same ontology underlies all possible speech behaviour and languages that we can recognise as such.

Subsequently, Davidson discusses Kuhn's view that scientists operating in different paradigms use conceptual schemes that carve the world so differently as to be living 'in different worlds' and finds little force to it. This is so because the claim requires the Kantian distinction already discussed here: that between a neutral content and a conceptual apparatus which shapes it. However, ever since Quine, Feyerabend, and even Kuhn himself, Davidson tells us, we ought to give up all hope of such a distinction. In his *Two Dogmas of Empiricism*, Quine (1951) famously argued that analytic truths, truths solely in virtue of meaning, are just those truths that are harder to give up than the synthetic

[38] The question of exactly how much range is a significant range, while largely untouched by Davidson, has been discussed quite extensively, mainly by his critics and friends of conceptual schemes. It will be explored in section three of the present chapter and over the three following chapters.

ones, not qualitatively different ones. In other words, there are *no* analytic truths in the traditional sense, and thus there is no given apparatus with which to neutrally construct the empirical scene. It is contradictory that the same Kuhn who talks about 'different worlds' also urges us not to think that this neutrality is attainable, for there is no way to stay out of entanglements of meaning that each language comes with and still be able to speak, Davidson says. Not only that but, most often, Kuhn writes in a quote that caught Davidson's eye, a theory we are used to working within may differ wildly from their competitors:

> Philosophers have now abandoned hope of finding a pure sense-datum language … but many of them continue to assume that theories can be compared by recourse to a basic vocabulary consisting entirely of words which are attached to nature in ways that are unproblematic and, to the extent necessary independent of theory. Feyerabend and I have argued at length that no such vocabulary is available. … Successive theories are thus, we say, incommensurable. (Kuhn 1970, 266-267)

Thus, Davidson infers, it seems that neither analytic truths as a reservoir of meanings nor a theory-neutral reality can provide an adequate ground for recognising two conceptual schemes as alien to one another (Davidson 1974, 17).

The case of extreme conceptual disagreement has been approached by Tim Button (2013, 197-208) whom we may remember from chapter two. Button starts by offering the following metaphor for the world before schemes cut it up (owed to Hilary Putnam), a line:

How many conceptual ways are there to cut this line/world in? Infinitely many, Putnam answers. Are there any grounds on which we may claim that some are *tout court* better than others? Evidently not: since the line is a stand-in for pre-conceptual reality there is no way to argue – in the absence of concepts – for a certain conceptual distribution of the world over others: arguments are dependent on concepts and may come about only after a basic conceptual array has been provided with which to articulate them (we are here reminded of the life-world's primacy). If the metaphor works, then, have we

established extreme relativism? No, for this is too quick Button (2013, chapter 18) notes. One object is here not relativized: that of the single line, or the single world. For, however we may cut the line, the parts we end up with are *parts of the line*. To be is to be a part of this line, to be is to be a part of the world. This is the famous 'behind the schemes' argument. We survey the scene of schemes; we see a line and different ways to organise it, thus the line is always there. This runs very close to one of Davidson's own arguments against extreme conceptual relativism:

> We cannot attach a clear meaning to the notion of organizing a single object (the world, nature etc.) unless that object is understood to contain or consist in other objects. Someone who sets out to organize a closet arranges the things in it. (Davidson 1974, 14)

Recall now that all the above regards extreme conceptual disagreement. Perhaps, then, there is hope for a more modest difference. Alas, Davidson contends, if we are to translate this sentence into a belief that differs from ours, this must happen against a background of general agreement. He advances an example like this: suppose you and your friend are sitting on a porch and a dog passes by. Your friend exclaims: "What a beautiful cat!". If the conditions for their having seen the cat under a sober mind obtain then you will most likely conclude that they use a language very much like yours, in which they name the animal you know as a dog with the word 'cat', and not that they believe that what passes by *is* (what you know as) a cat. "We do this sort of off the cuff interpretation all the time, deciding in favour of reinterpretation of words in order to preserve a reasonable theory of belief" Davidson (1974, 18) writes. His thinking runs along familiar lines: to ascribe languagehood one needs to ascribe beliefs and to ascribe beliefs is to interpret words. The *only way* to get out of the underdetermination that comes with interpreting words is to anchor them in the speaker's largely true (from our point of view) beliefs. This is called the Davidsonian *principle of charity* in interpretation. Should translation fail, even with this principle, we conclude that what we have in front of us is not a language at all rather than ascribing significant conceptual disagreement or false beliefs. "We make maximum sense of the words and thoughts of others when we interpret in a way that optimizes agreement (this includes room, as we said, for explicable error, i.e. differences of opinion)", Davidson (1974, 19) writes, highlighting that, in his view, the heap of agreement in beliefs and

concepts that is needed to establish local disagreement is as big as to leave no room for serious talk of importantly differing conceptual schemes, even partially.

To sum up, there are two rhetorical lines for Davidson. The first is that alternative conceptual schemes, and the very idea of a conceptual scheme, are inextricably bound to the idea of the content-concept distinction, which is in turn largely untenable. The second line has broadly to do with the claim that it's impossible to recognise something alien as such, be that something a conceptual scheme or a true belief. To be able to complete translation a translator is compelled to concede two points: that there is significant conceptual overlap between the two languages of translation and that the foreign speaker holds mostly true beliefs.

One must be careful here. While Davidson has been amply clear in restricting the scope of his argumentation to the *indescribability* of a neutral content and to *non-recognisability* of alternative conceptual schemes, the relevant literature very often overestimates this scope. Many of Davidson's readers, even those who prove to be his critics, tend to describe him as having *proven* that there are no conceptual schemes (as in Edward 2015), as having proven that conceptual schemes *alien to ours* do not exist (as in Nevo 2004, 318), and so on, if his argument works. This much should be clear from the preceding: abolishing the possibility of *recognising as such* for X (from within a Y) is quite a different thing than abolishing the possibility of existence for X, which is something that some of Davidson's most careful readers such as Rorty (1972, 654-655) take very good notice of when commenting on him. Of course, if one is a verificationist/empiricist, one (maybe rightly) can infer that arguments against recognition are also arguments against belief in existence. In any case, my point is that an admissible form of argument against Davidson's is, besides bringing to the table an admissible X (neutral content, alternative conceptual scheme), also arguing that that X is, after all, describable.

I will now move to evaluating the Davidsonian arguments. This will require some preliminary steps. First among them is to address the question of *what* conceptual schemes *exactly are*. Are they indeed to be associated with languages? If not, what is their content and structure?

4.2 Models of Conceptual Schemes

To pose the question of whether conceptual schemes are indeed to be identified with languages, and if not how exactly we are to think about them, I will draw on post-

Davidsonian literature on conceptual schemes. My main reference in this section will be the work of Michael Lynch (1997). Lynch distinguishes different models of conceptual schemes according to how they answer the questions below:

1. What are the primary components of a conceptual scheme?
2. What are the criteria of identity for a conceptual scheme?
3. Are conceptual schemes committed to an analytic/synthetic distinction?
4. Do conceptual schemes have a foundational structure?

The first notion of conceptual schemes answering these questions is Kant's (Lynch (1997, 409-410). Put briefly, Kant contends that concepts are products of the faculty of understanding, which organize raw experience, and that the *reflections* of these concepts are to be found in language; concepts are not themselves linguistic components. Further, for Kant, two conceptual schemes are identical if they share the same fundamental concepts (the necessary ones), and there is of course a distinction to be made between analytic and synthetic truths; truths which are true by virtue of the concepts alone, and those which are true by virtue of the world. Finally, the Kantian conception of schemes has a foundationalist structure: at its heart sit necessary concepts and analytic truths as preconditions for any other conceptual activity (1997, 410).

Influential as it has been, the Kantian picture is now overcome by that of Quine, Lynch (1997, 411) writes. Lynch says that the catalyst for this development was that ideas as expressed in language are public and may be dissected and analysed, contrary to the mystical inner workings of the human mind. Further, the more and more pervasive idea that thought is one and the same with language. "By 1950 we find Carnap, for example, talking naturally and reflexively about *linguistic frameworks* or languages, in much the same way an earlier philosopher (or a later one) might discuss conceptual frameworks", he (Lynch 1997, 412) writes. In Quine's (1980, 42) picture, conceptual schemes are webs of sentences that mutually support one another. None are more central to the scheme than others intrinsically; being more central is reducible merely to 'harder to give up'. Thus the Quinean picture answers Lynch's four questions: first, conceptual schemes are languages, composed of sentences accepted as true; they are totalities of systems of beliefs. Second, the criterion for scheme identity is intertranslatability like we have already seen in Davidson. Third, the idea of a conceptual scheme is in no way committed to the

analytic/synthetic distinction, as per Quine's famous attack on the latter. Meaning is inevitably contaminated with theory and a conceptual scheme is a language relating to the world as a whole. Finally, the structure of conceptual schemes is *coherentist* as per Quine's (Quine & Ullian 1970/2009) famous coherence theory of truth. Davidson's attack on the very idea of a conceptual scheme, Lynch (1997, 413) writes, targets exactly this Quinean picture. This should be unsurprising seeing as many of Quine's assumptions are Davidson's own, most centrally those of conceptual schemes being identified with languages and of collapsing the analytic-synthetic distinction.

Lynch (1997, 415) expresses doubt about how well Davidson's arguments work in devastating schemes in their Quinean conception but agrees with his conclusion: the Quinean notion must go. Put succinctly, the reasons are the following. First, a language is not a list of sentences; a language is way richer and more ambivalent. Second, a language consists of, beyond declarative sentences, also of sentences used, for example, to question and command. Given that concepts are associated with declarative sentences in the Quinean picture, a language exceeds a conceptual scheme, although a conceptual scheme is part of a language. Third, Lynch, continues, declarative sentences are *used* in expressing propositions structured by a conceptual scheme, but they are not one and the same with them; concepts are, so to speak, the building blocks of declarative sentences and propositions but not declarative sentences and propositions themselves. Fourth, it does not obtain that people who speak the same language share the same scheme. Lynch puts it that "A Hinduist and myself may 'assign the same extension' to the term 'cow' and yet have radically different *concepts* of a cow" (Lynch 1997, 415). Last, a language contains many contradicting sentences, and by extrapolation Quine's equivocation dooms conceptual schemes to be riddled with contradictions as well.

For an alternative to the two defective pictures, Kant's and Quine's, Lynch turns to Ludwig Wittgenstein (1969) and Putnam (1981), who try to strike a balance between the idea that there is a distinction to be made between the concept of X and beliefs about X. Wittgenstein parallels analytic truths (and necessary – now 'basic' – concepts) with the bed of a river here, which gives shape to and contains the flow of water but is nonetheless itself amenable to change (albeit considerable force – or time – would be required to effect that change):

> … the river-bed of thoughts may shift. But I distinguish between the movement of the waters on the river-bed and the shift of the bed itself; though there is not a sharp division between one or the other. (Wittgenstein 1969, 15)

The point, Lynch (1997, 417) explains, is that, at any given time, we make an operative distinction between those concepts we are firm believers in and those we are on the fence about. We can distinguish between what something *is* and what we *believe about* it, not on the basis that every description is not a belief but on the basis that we *treat* some descriptions as widely, intersubjectively shared, established beliefs (bells pointing to the life-world's incorrigible admittances have already began to ring). We need not think of this difference as innate and built into the language – just as in Quine, these better anchored concepts and beliefs are the ones that inquiry is leaving presently alone. Lynch (1997, 418) then presents his own, 'Neo-Kantian, broadly Wittgensteinian' model of conceptual schemes, which gives the below answers to the four defining questions:

1. A conceptual scheme is a web of concepts "used in the propositions we accept in language and thought" (Lynch 1997, 418). To have a concept is to be able to use a concept; "to be able to pick out trees from non-trees" (Lynch 1997, 418). This functional view does not come bound to any particular ontology of what concepts are and is compatible with many (concepts may be abstract entities, dispositions, general terms et cetera).
2. Schemes are identical if, and only if, they share the same basic concepts – with the same extensions – those that function as the bed of the river in the metaphor above.
3. A fuzzy analytic-synthetic distinction is maintained, which is based on how deeply given concepts are entrenched in a conceptual scheme. Analytic truths, in this picture, are truths in virtue of the aforementioned basic concepts.
4. Conceptual schemes are 'contextually foundationalist' (Lynch 1997, 419). Some concepts (basic) play the role of the foundation but this foundation is contextual and may be altered.

I will adopt this conception of conceptual schemes for the rest of this chapter, and employ it to criticize Davidson. This is for two reasons. First, I think Lynch's arguments make sense. Languages have, indeed, way more content than concepts and the categories

with which we approach the world are not necessarily systems of declarative sentences. To be sure, this disentanglement of concept from conception will need to be made on the tentative basis that Lynch puts forward, but this is still an operative distinction, necessary for many important operations such as translation. The second reason for adopting this framework, quite independent from the first, is that, as has already been declared, I aim to use conclusions from the discussion on basic conceptual schemes and apply them to life-worlds. Lynch's treatment of basic conceptual schemes and the riverbed metaphor bears a striking similarity to my proposed treatment of the observable level, depending on a distinction that has more to do with incorrigibility and the instrumentality of concepts than an innate, essential or analytic, clear-cut distinction. This fortunate coincidence of orientation will prove indispensable in building the bridge across from a life-world to a (basic) conceptual scheme. Last before we move onto the next section, a warning, which I will elaborate into a full-fledged argument in the coming sections: life-worlds will turn out to go far beyond conceptual schemes. Although I will apply the arguments from conceptual scheme difference to defend life-world difference, this does *not* mean that the two notions are interchangeable.

4.3 Literature Review: Empirical and Conceptual Critics of Davidson

We are now moving into allied, pro-conceptual pluralism territory. This section explores three angles of attack against Davidson: applied relativism, Buttonian cosmopolitanism, and Rortian lines. As we will see momentarily, applied relativism is an empirical critique of the Davidsonian argument; Buttonian cosmopolitanism argues that some difference between schemes is plausible and tries to explore the kind and extent of this difference, while Richard Rorty attempts to reintroduce all-out extreme conceptual relativism to the discussion. These three theses become progressively less modest. Applied relativism pertains more to partial conceptual relativism (which, it argues, may often be anything but unimportant as Davidson would have it); Button concedes the world at large as a non-relativizable object (due to the behind-the-schemes argument we showcased above); Rorty concedes nothing (or perhaps just a little something – this issue will be resolved in chapter seven).

Applied relativism (term found in Brons 2011) is an empirical critique to the Davidsonian arguments. That is, applied relativism examines two or more candidates of what are thought to be alternative conceptual schemes, finds that they indeed are

alternative conceptual schemes according to given criteria, and then proclaims that if Davidson's theory argues against their existence then so much the worse for it. One suchlike argument I will examine comes from David Henderson (1994). Henderson begins by discussing the example that Davidson himself employs in his thesis, that of the conceptual scheme the Native American tribe Hopi uses and which he borrows from the American linguist Benjamin Whorf (1936/1956). Whorf extracts relativist conclusions from studying the Hopi: he concludes that the Hopi use a different conceptual scheme to the North Americans. We have already seen that, per Davidson, this would make translation impossible, and thus Davidson takes Whorf's viewpoint to be that translation between Hopi and English is impossible. Henderson (1994, 3) challenges Davidson by noticing that Whorf never claimed the Hopi language to be untranslatable to English: in fact, he pointed out a few manoeuvres that, if properly executed, would bring about adequate translation. Thus: Whorf's study works against rather than for Davidson, Henderson says, seeing as he evinces conceptual difference that is present despite translation being possible.

Henderson also notices that Kuhn and Quine spoke of translation as a process during which conceptual differences *come out*, not as a mechanism by which to evince conceptual identification. Further, Quine argued that once we identify a system as giving out plausible messages, the extent to which we must make *intricate reconstructions* to make these messages intelligible *is itself* a measure of conceptual difference (Henderson 1994, 5). Thus, Henderson introduces the notion of *reconstructive translation*. Reconstructive translation necessitates coining new words or distorting the meaning of old ones to convey the content of a language across to another. Henderson also picks out an example parallel to that of the Hopi: translating the language of the Azande (plural of 'Zande') people, an ethnic group in North Central Africa, to English (as carried out in Evans-Pritchard 1937). There are many concepts in the Zande language that do not have a ready counterpart in English but can nonetheless be expressed periphrastically and even coined into a new word in English, slightly altering an English one. One-to-one translation, which is impossible in the above two cases, is the kind of translation that ensures ontological identification, *not* translation in general, Henderson contends. Further, this – one to one translation – does not obtain in the case of translating the Zande language into English. However, it is *not* that we cannot understand what the Azande say or that we cannot say it ourselves.

What should this tell us? First, in the spirit of applied relativism, Henderson proclaims that the above picture amounts to a problem for Davidson: we have in front of us a conceptual scheme that we readily recognise as such and can even translate into English with seemingly great results. Most importantly, this conceptual scheme is *amply different* to ours or at least different enough to be considered an alternative conceptual scheme, Henderson says. He hastens to add, however, that he is fully aware that friends of Davidson will proclaim this victory only a hollow one for the camp of alternative conceptual schemes. This is because of the wide translational background of agreement before we reach disagreement, which is wide enough in this case as well. Davidson would thus insist that the differences showcased are (and in principle can be) only very partial and uninteresting.

It is true that by Davidson's definition of partiality in disagreement, that is by judging the significance of the disagreement only proportionally to the related agreement, this case seems, too, to produce only differences of minimal importance. Davidson's definition, however, argues Henderson, is unduly constraining and, what is more, flies in the face of empirical ethnographic work. Indeed, we are not bound to any disagreement evaluation that is proportional to the agreement if we want to make sense of conceptual schemes. According to Henderson, Davidson unjustly makes it look like proof of deep and extensive differences between conceptual schemes is needed if one is to speak about alternative conceptual schemes at all. Further, wrongly again, Davidson portrays friends of conceptual schemes as arguing for such deep and extensive differences, which he then finds cannot in principle exist, thus allegedly demolishing the 'alternative conceptual schemes' camp. However, it is not only that many friends of conceptual schemes never argue for such a chasm in translation for their own purported theoretical version of different conceptual schemes. It is also the case that extant differences that are points of departure for friends of schemes make up a body of ethnographic work, which gives out conceptual differences deep and important in their own right, as well as equivalent differences in beliefs. Henderson, following Clifford Geertz (1973), notes that understanding a people's culture exposes their normalness *without reducing their particularity*. That is, different groups of people may fail to share our theories and concepts, and when this comes out during translation it makes translation awkward, thus we must seek reconstructive methods of translating. This is all we need to make sense of alternative conceptual schemes and this just shows the redundancy of Davidson's criterion, who has

overestimated the level of difference needed to make sense of alternative schemes. This is, in a nutshell, Henderson's argument.

There are a few other applied relativists who run close to this point. The aforementioned Brons (2011) contends that intertranslatable schemes may in fact be amply different. He states that no chemist, for example, from the early oxygen era would claim that the phlogiston theory is incomprehensible to them. They would perhaps claim that it is wrong and preposterous but this would be the most: they would be perfectly in a position to *understand* it. Isaac Nevo (2004) brings to the fore an example, purportedly characteristic of many others, of two conceptual schemes that are radically different but are nevertheless operating *within the same language*: mental and physical descriptions of the same events. We do not need to look as far as different languages, he says, for there are ample conceptual differences that run deep at home (2004, 317).

A more abstract but even less concessive (to Davidson) line of relativism is conceptual cosmopolitanism, owed to the aforementioned Button. Here, Button (2013, 212) follows the Quinean construal of schemes. To this he hastens to add the qualification that, *contra* Davidson and following Putnam, two or more languages *can* express different conceptual content even though they may be intertranslatable (as the Whorf case above, per Henderson, purportedly shows). This happens when such languages appear to be *contradictory to metaphysicians*: when they make incompatible conceptual claims. Button gives an example involving two people, A and B. A recognises a pointillist ontology of the infamous line (recall the world metaphor above) that organises it in simple dots, while B recognises a summative ontology which organises the line in chunks of smaller lines that sometimes overlap. A metaphysician may, as we do now, be able to 'zoom out' and even translate statements between the two conceptual schemes but the opposition remains: if the basic units of an ontological system are non-reducible lines, then the basic units cannot also be dots. Someone, then, who is equally at home between two schemes of different ontology, is a conceptual cosmopolitan. Even if an overarching scheme may arise that has both schemes in view (in the 'zoom-out' sense), that someone can dig their feet in the ground and refuse to give up all or either schemes in favour of the overarching one. That is, the 'behind the schemes' argument may succeed in saving the world (from the point of view of metaphysicians) but not much more than that, for it has nothing on the conceptual cosmopolitan. A fleshier example can be made out of comparing Hopi and the English language or Euclidean and Lobachevskian geometries. One can 'zoom out' and conclude

that two given Hopi and English speakers are conceptually carving the same world-material but one cannot, by utilising this metaphysical observation, extinguish the differences that arise therein. Similarly for two geometries, realising that two mathematicians are analysing the same surfaces with different geometries does not make such geometries incompatible – in such a hypothetical case, Euclidean and Lobachevskian geometries would remain strictly incompatible.

Before I give the third line, let us take stock. With this analysis in hand we have now arrived, I believe, at a point where Davidson is at least partially forced to retreat: alternative conceptual schemes abound, although they are not (yet) cashed out in terms of radically different languages. It is now time to venture forth to a more radical critique of Davidson's contentions. For this, I will follow Rorty's 1972 battleship paper *The World Well Lost*. Initially, Rorty suggests that the anti-Davidsonians may conjure an image of alternative schemes without getting too caught up in experimental results and details – without, that is, describing the alien scheme 'from within' or translating it, thus ending up in self-defeat. In this vein, he puts forward the argument from extrapolation. Consider the past two thousand years – an infinitesimally small drop in the ocean of human history. However small, this interval has accommodated enough change to put us in doubt about whether we, the moderns, are translating the Ancient Greeks correctly. We may extrapolate, Rorty's argument is, and see how hypothetical conceptual universes may change radically without us being able to know them 'internally'. Thus, the skeptic's Rorty-reconstructed argument goes, even though we may never read literature produced by a Galactic civilization's one billion years into the future, we are legitimized in concluding that they must have concepts completely alien to ours. As regards beliefs, Rorty (1972, 657) writes, a Galactic traveller may come along and enthusiastically try to translate our language only to be frustrated by the subsequent failure of translation due to the purported 'falsity' (for them) of our beliefs, upon which they will conclude, per Davidson, that we are not speaking a language at all. We are now in a further predicament, argues Rorty, for we realise that the *current* world may be filled with persons we do not recognise as such, who emit and receive signs of full-fledged languages. Perhaps "the inclusion of this last possibility may suggest that something has gone wrong", writes Rorty,

> … however, I see nothing wrong with the proposed extrapolation and I do not see what 'known in advance not to be a person' could mean when applied to the butterfly save that the butterfly does not seem human. But there is no particular reason to think that our remote ancestors or descendants would seem human right off the bat either (Rorty 1972, 657).

To put the argument in more fleshy terms, Rorty gives the hypothetical example of the Patagonians recognising only half of our poets as poets, the aborigines recognising some of our astronomy as astronomy, and the inhabitants of the planet Mongo recognising only some of our ethical principles[39]. Can we ever decide whether these people possess some poetry, astronomy, ethics, albeit *different* ones, or none of them at all? More radically we may ask, says Rorty, after which point of loss of overlap are they starting to be considered not persons at all? For Rorty these questions, as well as the question "Can there be alternative conceptual schemes?" are not the important ones to ask, for they cannot, in principle, be answered. On the one hand the skeptic's extrapolation is held to be valid but on the other hand it is true that no evidence can be brought to the fore for the existence of a particular scheme. The question that matters, the question that we can indeed answer is, for Rorty, the one pertaining to the capacity of *our own creation* (translation) *to control and predict the behaviour of the beings who use a putatively alien scheme*. This is a question that pertains to *us* (the translators) and not so much to the possibly alien scheme. There is really no other stone to base our translation and conceptual scheme recognition upon, says Rorty, except the pragmatic coping of translation with its objects and aims delineated by our own conceptual scheme. This is *all* we have when examining a particular scheme and trying to decide if it is a scheme indeed and if it can be brought to our own level.

Rorty's critique of Davidson may be summarised in the three following points. First, a way to show that alternative conceptual schemes can materialise is to advance one possible story of how this can happen. Second, this story can be provided by an argument from extrapolation from known piecemeal differences between conceptual schemes.

---

[39] Rorty, like others, is here problematically supposing that 'our' ethical principles are somehow the same for all who are 'we'. As I did above, I will also let this slide for purposes of the economy of the present conversation. I will pick the thread up and develop it along the course of the following two chapters.

Third, translation may only be judged as a pragmatic tool for the translator, and cannot play the role of a guarantor to the truth and ontological commonality between the inter-translated languages.

4.4 Neutral Content and the Case for Alternative Conceptual Schemes

We have now seen three ways to resist Davidson: applied relativism, conceptual cosmopolitanism, and the angle from Rortian extrapolation. Victories attained through applied relativism may seem pyrrhic since they concede Davidson's structural points – and argue that, within them, there is ample space for conceptual difference. Button's and Rorty's lines cut deeper, arguing that a story of alternative conceptual schemes may indeed be provided, but they still left untouched the first of Davidson's two argumentative cornerstones: that of neutral content and its supposed non-existence, which is also purportedly a necessary precondition for the existence of alternative conceptual schemes. I will now tackle this cornerstone myself and, following, I will make my own case for alternative conceptual schemes.

The hunt for neutral content gives a sense of despair in the offing. Quine, Kuhn, and others are seen to have demolished the notion of raw data. I have also, following Husserl, argued for the noematic (non-given) dimension of the life-world in the previous chapter. Add to this that raw data is perceived to be the material that alternative conceptual schemes fit and/or organise. If there is nothing to be organised, or more precisely if the *something untouched by theory* to be organised cannot be made any intelligible sense of, then neither, it is thought, can there be made anything intelligible out of the idea of conceptual schemes that organise this very something. On this front, things look grim for friends of schemes.

Once again, the argument is not so much about difference *qua* difference, but about the ascertainment of difference. We must know that we are cutting the same thing with our (each with their own) concepts to know that we are cutting it differently, but that 'same thing' can only be neutral content, since it is pre-conceptual. Sadly, neutral content is *kaput*, therefore we cannot know we are ever cutting the same thing differently – thus no alternative conceptual schemes. This is the gist of Davidson's argument. The lingering metaphor here is a surgical one: concept users with different concepts enter the operating theatre and cut up a neutral, indeterminate 'thing', which is then held to not exist, therefore the whole operation is shown to be a false fantasy *à la reductio ad absurdum*.

(Un)fortunately, Davidson is too caught up in his own metaphor, for we do not need a ready-made 'thing', in the way theory-ladeness would prohibit, in order to ascertain conceptual difference. I explain: imagine that we are in a room, having consumed psychoactive drugs. Imagine that we are hallucinating[40] about wildly different things that our brain is projecting at the same spatiotemporal co-ordinates. What do we need to ascertain difference? Much less than a given 'thing' or entity of any sort, we need: a basic sense of subjectivity (mine and yours); a similar sense of time and space; a way to communicate that what we are seeing and hearing is different (*not* a way to tell each other *what* we are seeing and hearing). One may now ask: are not these commitments communal theoretical commitments? Do they not preclude conceptual difference? To which the answer should be emphatically: yes and no, respectively. I think the imaginable extent of our hallucinations' variety in the above example demonstrates amply the capacity for conceptual difference that the above preconditions leave open. A sense of subjectivity, a sense of orientation, and a sense of communication are very much theoretically imbued, but they do not at any rate bank on any important sense of commonality about things in the world. I ask the reader to lean on this thought experiment for now to observe the theoretical point I am going to develop regarding neutral content. In the next couple of chapters, while elaborating the autism spectrum conditions case study, I am going to provide applied examples to the same effect.

We may extend from this and claim that Davidson's comments on neutral content do not have his desired effect. The point should bring to mind Bas van Frassen's point from chapter two regarding observability from within a theory: from that theory is always present when we organise the world, from that the effort to find raw data is futile, it does *not* follow that there is no material which alternative conceptual schemes organise. From the fact that we cannot perceive or articulate it without mediation, from the fact that we are well within a theory the moment we utter anything whatsoever (Rorty 1972, 663) it does not follow that there is *nothing* or not an intelligible *something* there before us. Not, at least, intelligible in the sense of supposing its existence, which is the minimal notion of neutral content needed to support the putative existence of alternative conceptual schemes.

[40] Note that by hallucinations here I do not necessarily mean made up, concrete stuff, but also different ways to fuse together stimuli from the environment that are already there, accentuate some and ignore others, thus creating a unique sense of reality.

This is crucial: to suppose that alternative conceptual schemes 'sit' on something we merely need to have plausible reasons to suggest that this something exists. These reasons do *not*, I submit, need to include us being its impartial and direct witnesses and delineators, exactly like the people in the room of my hypothetical experiment need not take off their glasses to hold that there is *something* in the middle of the room (which they perceive as such and such on different occasions). Admittedly, we cannot 'rise above' our own concepts and see what the world might be like without any concepts at all. However, this amounts to little more than saying that we cannot conceptualize the world except with concepts – a point which hardly justifies thinking that there is nothing in the world besides concepts. That would be analogous to saying that nothing exists since there is no way to experience the world concept-less. That would be saying that only words exist because we cannot describe without them.

The move I have carried out above has been described as 'posing the ineffable' for the notion of neutral content. There is a known philosophical problem with utilising the ineffable, which Button (2013, 137-139 for example) takes very good notice of. This is that utilising the ineffable sounds a lot like a metaphysical article of faith. The use of the ineffable, argues Button, usually comes with dropping all empirical arguments on behalf of the one who is utilising it, and thus runs them into unacceptable philosophical territory. I deny that this – the wholly non-empirical – is the only definition of the ineffable we may operate under. The ineffable is not necessarily what we can never reach. I submit that it may also be something which we may reach *in equally good ways*. In chapters five and six I will provide a case study of different ways of accessing reality, none of which may be regarded as a more privileged means than the other. For the present abstract theoretical purposes, the above observers-glasses-rock example will do. We now understand how we may give an empirical sense to the notion of ineffable by *over-determining it*; by giving it *too many empirical senses*.

After investigating Davidson's attack itself (there are no conceptual schemes), the defence against this attack on behalf of applied relativism (empirical work gives out conceptual differences), Button's conceptual cosmopolitanism (that one can bring into view two competing conceptual systems does not imply that one may eradicate these differences), and Rorty's line (extrapolating from piecemeal conceptual differences can bring about extreme conceptual relativism), we have just hopefully shown that the notion of neutral content does not present such a big problem for alternative conceptual schemes.

I will now complete my attack on Davidson's attack by attempting to demolish the second of Davidson's pillars, namely the one purporting that recognition of a conceptual scheme as such requires vast concept and true belief overlap with the home scheme. I will do so by advancing the three following claims in the remainder of this section:

1. There are untranslated languages, which we take to be languages anyway. Thus, translation is not necessary to evince a conceptual scheme as such (even if we construe a conceptual scheme as a language).
2. Following William Berriman (1978): most of us acquire at least one conceptual scheme, namely our first, not via translation but via other means. This shows, too, that translation is neither the only way into, nor is it necessary for access to, a scheme.
3. There are at least two possible stories that satisfy Rorty's criterion for showing Davidson wrong and showing how (radically) alternative conceptual schemes can come about: one from the angle of extrapolation, another from the angle of reconstructive translation.

To substantiate the first claim, I cite a few examples of untranslated language: Linear A of ancient Athens, Cretan Hieroglyphics, Mexican Olmec writing, Rongorongo of the Rapanui, the language in which the Rohonc Codex of Hungary is written. There are two things these all have in common. The first is that they remain undeciphered and the second is that they are all regarded to be (instances of) full-fledged languages. Right in the offing, then, we have five counterexamples to Davidson's claim: it is not the case that for something to be recognised as a language, it needs to be translated[41]. There are, I submit, ample *external cues* to languages, things that humans take to be evidence that what they are looking at is a language. One is the knowledge that beings importantly like us wrote it in a language-seeming way (words divided by spaces or what appear to be representational symbols) and were probably using it in such a way as well. The details of what comes into

[41] This is also the reason why these languages were not included in the applied relativism section: unlike the ones mentioned in the previous section, this set of languages remains without translation to English.

languagehood are not important here: what is important is that, clearly, as human practice shows, translation is *not* a necessary condition for languagehood.

Maybe the Davidsonians would now like to claim that these five languages are wrongly considered languages, but for that they would have to present an independent argument. Davidson's original argument is clear: *nothing* could be brought to the fore as evidence of language except concept-and-truth-overlap translation they tell us; how *else* are we supposed to know languagehood, they ask. The above, I believe, shows exactly how else. However, this argument from history and human practice is enough to force the Davidsonians to, at minimum, reshape their claims and adjust to the attack, but it is not quite decisive. For one, the Davidsonians could present an argument for why these five above languages are not in fact languages at all, and make their descriptive argument into a normative one by claiming that only translation *should* be taken as evidence of languagehood instead of that only language *is* taken to be so.

To bolster my argument that no translation is necessary for the recognition (and as I will show now, the acquisition) of a language as such, I will borrow an argument from Berriman (1978). Berriman tackles the problem directly. He asks: does intelligibility depend on translation? Most definitely not, he answers (1978, 230), for humans routinely learn their first language without *any* translation involved whatsoever. It is not the case that to learn a language one needs to translate it into English (or another home one). What one needs to do is to temporarily shed one's own language and observe the other one in practice. From that one cannot obtain a vantage point where all conceptual universes have been abolished it does not follow that one cannot temporarily shed one's own language, Berriman (1978, 231) contends. To put the same point in other terms and in a Wittgensteinian spirit, he offers that translation is observing in use and using correctly much more than sentence-for-sentence translation. *This much* should be enough to create immense problems for Davidson's camp, for it clearly shows how languagehood is not wedded to translation. Nor would any normative argument work: to argue that languages not acquired through translation should not be considered languages would here amount to saying that, for example, when an infant is speaking English some years after their birth they are not in fact speaking English because they did not acquire the scheme through translation. This would be patently absurd.

I will now finish my attack against Davidson Rorty-style and tell a story of how two conceptual schemes can come about, have the same ambit, and differ wildly[42]. For this I ask the reader to bring the mechanism of extrapolation, again from Rorty, back to mind. Imagine a conceptual scheme (N_1) very similar to ours (N_0) but with some piecemeal differences to it. Subsequently, imagine another conceptual scheme (N_2) with equally considerable local differences to N_1. Then imagine another one (N_3) with equally considerable local differences to N_2. Furthermore, imagine that with each step the conceptual scheme we get moves further and further away from our home conceptual scheme, the one we began from. It is then possible that at some point N_n we will be met with a conceptual scheme that will be completely different to ours. Little by little, local by local, hypothetically, an all too familiar conceptual scheme *can* turn into a completely alien one. What is surprising about this hypothesis is that Davidson had considered it himself in his original paper:

> It is sometimes thought that translatability into a familiar language, say English, cannot be a criterion of languagehood on the grounds that the relation of translatability is not transitive. The idea is that some language, say Saturnian, may be translatable into English, and some further language, like Plutonian, may be translatable into Saturnian, while Plutonian is not translatable into English. ... This exercise does not, I think, introduce any new element into the discussion. For we should have to ask how we recognized that what the Saturnian was doing was translating Plutonian (or anything else). (Davidson 1974, 8)

Davidson contends that we would hasten to conclude that our translation of "I am translating Plutonian into my language" is in fact erroneous because of our inability to recognise Plutonian as a language. This sentence, he says, would *not make sense* to us, for there would be nothing we would recognise as Plutonian in the absence of a translation of Plutonian into English. Davidson, I think, is being quite inattentive here, and his statement is decisively wrong. First of all, as we saw not too far above, we can have external cues to a language: the Plutonians could be like us and their language could look like a language

[42] This is still theoretical for it is abstract argumentation that concerns me here; the extant example of autism spectrum conditions is to follow in the upcoming chapters

from the outside despite our total inability to translate it due to zero conceptual overlap. However, we need not go that far: by Davidson's own measure this surprising utterance ("I am translating Saturnian") would (and should) be very far from prompting us to abandon a whole *system* of translation. It could very well be a local difference in an otherwise pragmatically pristine system of translation. The discrepancy presented, which, as we saw, we can explain away as a non-discrepancy with the help of external cues to a language, is in and of itself a disagreement even Davidson himself would allow if everything else fit. Thus, we know that the Saturnian is indeed translating Plutonian if everything else is in place. This goes to show, then, that the argument from extrapolation, in which a small crack becomes a deep and unabridged conceptual chasm is, in fact, valid[43].

Before bringing this section to a close I would like to offer an overarching comment serving as an explanation of why Davidson makes the mistakes his critics and I have held him to make. The root of the problem, I think, lies with the analytic, broadly Quinean tradition Davidson writes within, and which blinds him to certain features of conceptual schemes or rather of their bearers. Recall Lynch's three models of conceptual schemes and that our era is characterised by the transition from the more Kantian idea of conceptual schemes to a more linguistic one, which takes statements to be the simple units of a conceptual scheme. This is a transition that characterises analytic philosophy of science more broadly ever since the advent of logical empiricism: the unit of analysis for science is thought to be the scientific theory and the statements included therein as if they were

[43] The observant reader will now ask: hold on, what becomes of the Buttonian credo in non-world relativization in the extrapolation story? Are we indeed theoretically free to relativize *everything* per Rorty? To address this issue properly necessitates elaborate metaphysical development, which will take place in chapter seven. The short answer is: *we*, who are evincing this difference, are not free to relativize everything (for the Buttonian reasons shown above). Subjects partaking of the conceptual schemes we examine are conceptually free to roam, but if cease to recognise them as subjects *and* their language as a language we (always we) will fail to detect their conceptual scheme *qua* conceptual scheme. Davidson's arguments do not here regain full strength because we have a tellable story of how a completely alien scheme may come about, though we will most probably never recognise it *qua* scheme.

disembodied, articulated from no-where and by no-one. This fantasy has been shaken a significant bit from a range of thinkers from Kuhn to Bruno Latour to Steven Shapin both in philosophy of science and science and technology studies. Shapin's 2010 book title *Never Pure: Historical Studies of Science as if It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* is abundantly characteristic of the direction less statement-centred views take: to examine science as a (largely practical) endeavour undertaken by humans for humans, from certain positions and with certain goals.

I advocate for a similar turn in the discussion about conceptual schemes (the move from schemes to life-worlds is itself in this direction, as I will show in the next section and chapters). Davidson, writing in the 1970s and adopting a Quinean view, only goes into *sentential relations*; the relations that must obtain between *sentences* for them to constitute alternative conceptual schemes, constitute a language for one another et cetera. Of course, the latter statement may only be metaphorical: a bunch of sentences does not constitute a language for another bunch of sentences but only for a subject who may employ the latter bunch. Davidson, that is, examines language recognition, translation, and schemes *as if human beings were blind to anything else but pieces of language*. Davidson fails to see *everything else* that is relevant to conceptual schemes but is not, strictly speaking, language. This is the reason that he fails to see, for example, that, even in the model that wants conceptual schemes to be languages, the main cues to a conceptual scheme are *not* pieces of language. To put the point in more fleshy and theoretical terms: if we follow Davidson's thinking literally and to its logical extreme then we will never be able to learn any other language than our own. For, before we begin translation, we have, of course, zero translated utterances. From zero translated utterances, Davidson tells us, only the conclusion that the object under investigation does not constitute a language can follow. We would thus need… translation to achieve translation, which is quite obviously a demand impossible to meet! The fact that we *do* break out of this vicious circle and learn foreign languages attests to the conclusion I have pushed for above: there is more to conceptual schemes than language.

4.5 Conceptual Schemes and Life-Worlds

It is now time to execute the last and arguably most crucial task of this chapter. I will take the conclusions of the discussion on alternative conceptual schemes and apply them

to the discussion on the theoretical difference between two or more life-worlds – the practical difference pending the next chapters. A tricky question sits at the foundation of such a task: how are life-worlds interconnected with conceptual schemes? To ask differently, given the central role of perception within the life-world, is the content of perception conceptual? This question has been amply discussed in the philosophy of mind (e.g. Byrne 2005; Crane 1992). Here, I will claim that life-worlds may very importantly differ between them *no matter* the extent to which they involve concepts.

Let us take the one extreme: that perception does not involve concepts *at all*. Take the case of, for example, people who speak *no* language. In this case, the position that life-worlds may radically differ requires very little argumentation. Evidently, people with no language have a life-world; they act within a horizon of things they take for granted. This life-world of theirs is also dependent on *something*, i.e. their biological capacities. Should these capacities be different, so would their life-world. On a general note, what is 'blocking' a life-world difference is Davidsonian arguments in case that life-worlds *are* conceptual schemes. This is evidently inapplicable here: Davidson's argument and all its possible derivatives are inescapably based on the assumption that conceptual schemes are languages, or minimally something language-like. Beyond this theoretical argumentation, and for a positive case of non-conceptual life-world scheme difference, I ask the reader to await until the next two following chapters.

Take now the second extreme, in which life-worlds *are without remainder* cashed out in terms of concepts. In this case, life-worlds align with the Wittgenstein-Lynch model of conceptual schemes I am adopting in this chapter. Life-worlds (incorrigible admittances) *are* in fact basic conceptual schemes, those that form the foundation and horizon of all other conceptual activity. They comprise in this case, if you will, the 'inner core' of a conceptual scheme since a life-world a) can be shared, b) is incorrigible and c) acts as the founding stratum and as the final stop of every practice and inquiry. Regarding the analytic-synthetic distinction and the contextually foundationalist character of conceptual schemes in the Lynchean-Wittgensteinian model, the connections are here also readily available. The life-world was shown to be alterable so long as the incorrigible admittances which comprise it change. In the big picture, however, they typically remain fairly the same for a given subject, and considerable force would be required to alter them. Thus, the life-world is contextually foundationalist as well.

We have seen the two extremes, a life-world being not conceptual at all and utterly conceptual. Regarding the 'mixed case' scenario whereby life-worlds include concepts and non-concepts, the answer is ready for the taking. Their non-conceptual part may importantly differ *and* their conceptual part may importantly differ for the reasons showcased above. Thus, life-worlds may importantly differ here too.

A last point: while life-worlds may (in some reading that is not mine) be conceptual schemes, conceptual schemes are certainly not life-worlds. This is because many concepts in conceptual schemes are generally far from incorrigible. They may include things the idea of existence of which we can easily do away with, both observable and unobservable, material and immaterial. Lavoisier's conceptual scheme including oxygen and other postulates and Einstein's conceptual scheme pertinent to the general theory of relativity are, as discussed in the previous chapter, *far* from incorrigible. The situation gets worse for conceptual schemes that are tentatively put forward like the conceptual scheme centred around supersymmetry in particle physics, so it goes.

Summarily, we have now made the case for conceptual scheme pluralism and extrapolated from it to life-world pluralism.

Conclusion

In this chapter I have covered the following ground. In section 4.1 I presented the historical and conceptual background amidst which the notion of conceptual scheme surfaced and gave the notion an initial definition, thus familiarising the reader with the concept and its (mainly relativistic) uses. In this section, I also presented Davidson's attack on the very idea of a conceptual scheme. Davidson was found to contend that the notion of conceptual schemes is nonsense due to two reasons. First, because a working notion of neutral content is necessary to support it and no such notion can be found ever since the work of scholars like Kuhn and Feyerabend (Button was also shown to attest to this). Second, because to recognise a conceptual scheme as such we would first need to be able to translate it, and translation presupposes concept and true belief overlap between the home scheme and the alien one, thus rendering the latter not alien at all. This argument was highlighted to be a verificationist one.

In section 4.2 I started setting the ground for launching the attack on Davidson's point. I explored the extant proffered models of conceptual schemes and I concluded that the Neo-Kantian, broadly Wittgensteinian one proffered by Lynch is both the one that makes

the most sense and that helps the most with connecting conceptual schemes to life-worlds. This is because Lynch's model allows for treating a conceptual scheme as something having a foundation that is not *a priori* true, valid, and objective, but one that is hard to do away with (incorrigible), and the basis for any further conceptual activity. This is homoeomorphic with how I defined the life-world to be the observable level, comprised of similarly incorrigible ontological assumptions from which science launches, is conducted via, and to which it returns.

In section 4.3 I surveyed the main empirical and conceptual counter-attacks to Davidson from the extant literature. I presented applied relativism: examples of conceptual schemes from empirical work that show striking and important discrepancies between them. This attack was called moderate because it still grants Davidson his two structural points: the conceptual disagreement was indeed found to take place in front of wide agreement of concept and true belief overlap. It was argued that, even having conceded these points, ample space remains for important conceptual discrepancy. I proceeded to examine Button's point in favour of conceptual cosmopolitanism, which is conceptual relativism minus world relativization. I completed the literature review of Davidson's rivals with Rorty. Rorty was seen to argue that a working argument against Davidson can be provided and that the only criterion of evaluation for a given translation is pragmatic – whether it enables the translators to predict and control the behaviour of those who bear it or not.

The rest of the chapter was devoted to making my own case that there can be alternative conceptual schemes. In section 4.4 I initially argued that alternative conceptual schemes do not need the notion of a neutral content to stand on that Davidson suggests but merely the notion of the existence of a non-conceptual one, which can be easily provided via utilising the concept of the over-determined ineffable, which has empirical content. Subsequently, I made the following claims. First, that there are untranslated languages, which we take to be languages anyway. Thus, translation is not necessary to evince a conceptual scheme as such. Second, that most of us acquire at least one conceptual scheme, namely our first, not via translation but via other means. This shows too that translation is neither the only, nor necessary for access to a scheme. Third, that there is indeed one possible story that satisfies Rorty's criterion for showing Davidson wrong and showing how alternative conceptual schemes can come about from the angle of extrapolation. Combining these claims, I established that the very idea of a conceptual

scheme and of alternative conceptual schemes is valid. Finally, in section 4.5 I linked conceptual schemes with life-worlds, arguing that life-worlds may radically differ (the case of the Buttonian extreme-prohibiting proviso pending) no matter whether perception is wholly conceptual, not conceptual at all, or part conceptual and part non-conceptual.

For a comprehensive view, below follows a table mapping Davidson's claims and what became of them during my argumentation. In the next chapter, a practical examination of life-world difference via the case autism spectrum conditions awaits.

Points	**Davidson's claim**	**My claim**
i.	We need a notion of neutral content to support the idea of alternative conceptual schemes. This notion cannot be provided.	The notion of the over-determined ineffable can be provided as the notion of neutral content able to support the notion of alternative conceptual schemes. This notion has an empirical sense.
ii.	Conceptual schemes are languages.	Conceptual schemes are Wittgensteinian webs of concepts. A language contains much more than concepts.
iii.	For language recognition, we need concept and true belief overlap.	For language recognition, we need behavior codifiable in our own scheme (following Rorty).
v.	For language recognition, we need translation.	For language recognition, we need external to translation cues to conceptual schemes: we recognize a language before we translate it.
vi.	No story is tellable regarding how alternative conceptual schemes may come about.	Such stories are tellable. Applied relativism points to extant piecemeal but important differences between conceptual schemes, and the story from extrapolation are convincing stories of deep differences between conceptual schemes.
vii.	(Synthesizing the above) the very idea of a conceptual scheme, and of alternative conceptual schemes, are all untenable.	(Synthesizing the above) the very idea of a conceptual scheme, and of radically alternative (minus world relativization) conceptual schemes, are tenable.

5. Different Life-Worlds in Autism Spectrum Conditions

Temple Grandin ... spoke not only for herself, but for thousands of other, often highly gifted, autistic adults in our midst. She provided a glimpse, and indeed a revelation, that there might be people, no less human than ourselves, who constructed their worlds, lived their lives, in almost unimaginably different ways.
-Oliver Sacks (Grandin 1995/2006, xiii)

Introduction

We are by now far into the open sea, having completed two major theoretical circles. First, we conducted an inquiry into the relevance of observables for the scientific realism debate and set out to find the best construal of observability. Second, we defined the observable level to be phenomenology's life-world and we carved an extensive trajectory, cutting through the field of conceptual schemes, to show that, theoretically and to an extent practically (applied relativism), and despite the life-world's intersubjective dimension, there can be different life-worlds.

In this chapter and the next I investigate the subjective situatedness of the life-world as evinced through scientific practice. I conduct a historical and conceptual survey of cognitive theories of autism spectrum conditions (ASCs), treatment approaches, and testimony from people with ASCs diagnoses[44]. Based on this material I argue that people with ASCs diagnoses are generally best seen as people operating in life-worlds[45] importantly different to the typical ones – though some of them might be quite

[44] I will be using the term 'people with ASCs diagnoses' versus the term 'autistics' or 'people with ASCs' for two reasons. First, to indicate that there is, as will be demonstrated below and even in the mainstream medical approach, a diffuse confusion about what autism is, *if* it consists a unitary thing at all. Second, to observe the ASCs-related activist community's doubts with how autism is diagnosed and if the extant diagnoses indeed correspond validly to an individuated human condition.

[45] I will be using the term life-worlds (plural) since, as will be demonstrated below we have strong reasons to believe that people with ASCs diagnoses do not all share a life-world. That the typical life-world is in fact plural I take to be self-evident; 'typicality' is to be characterised by a variation in emotional reactions and meaning synthesis at the very least.

neighbouring the neurotypicals, or even more neighbouring the neurotypicals than other autistic life-worlds. I claim that the idea of the life-world most adequately captures the nature of this difference *contra* conceptually and empirically more austere approaches such as the plainly behavioural one.

This chapter aims to present a case of applied life-world relativism – that of autism spectrum conditions – in detail and recognise it as such. The purpose of this is two-fold. First, it will serve to show that, far from being a purely analytical and theoretical exercise, the case of different life-worlds presents itself in many real subjects in the here and now. How we should think of science's truth claim under the prism of different life-worlds is, I argue, not merely via very limited extant cases, projections and hypotheticals but exists in the flesh and is pertinent to human beings around us. Second, more importantly, chapter five serves as a prerequisite for chapter six. There, I turn to the clash between the mainstream ASCs treatment approach (Applied Behaviour Analysis – ABA) and the political movements, consisting of people with ASCs diagnoses and allied activists that protest behavioural treatment, claiming that ABA is in serious breach of human rights and therapy consent ethics. I will argue that examining the debate through the life-world lens and treating the autistic[46] life-worlds as 'real', as valid modes of experiencing the world, necessitates planning therapy *in their terms* and opting for increasing happiness of ASCs 'patients' likewise. Finally, in chapter seven I will tie the overall conversation conducted in this dissertation back to the scientific realism debate.

The present chapter is structured as follows. In section 5.1 I present the historical and conceptual backdrop of ASCs and I give the reader a sustained overview of them. I explain that the condition is behaviourally diagnosed and defined as a spectrum. I highlight researchers' doubts that the spectrum is a unitary disease and I particularly stress the yet unknown causes behind the spectrum, its many facets and manifestations. In section 5.2 I go into the cognitive theories of ASCs, which are, I will argue, the royal road to how people with ASCs diagnoses perceive and experience the world. I present the Mind Deficit (MD) theory, which contends that people with ASCs diagnoses have difficulties

[46] I will be using the term 'autistic life worlds' versus the term 'the life-worlds of people with ASCs' diagnoses' both for reasons of literary economy and because the autistic life-world is not necessarily to be had by all those who are diagnosed with an ASC (see the unreliability of diagnosing below and in the next chapter).

attributing mental states to themselves and others properly; the Executive Function (EF) theory, which contends that people with ASCs diagnoses have trouble maintaining appropriate problem-solving behaviour towards certain goals; and the Weak Central Coherence (WCC) theory, which suggests that people with ASCs diagnoses' cognition is much more 'neighbourly' than the typical cognition. In section 5.3, based on the life-world definition, an analysis of the preceding cognitive section, and testimony from people with ASCs diagnoses (and sometimes their peers such as caretakers and family), I establish that people with ASCs diagnoses can indeed be seen as operators of different life-worlds.

Before I proceed to the content of the chapter, a disclaimer. In this chapter and throughout this dissertation, I use the word 'condition(s)' rather than the most often used 'disorder(s)' when referring to autism. This is to observe the related political movements' objections and to indicate a resistance in characterising autism as something necessarily and exhaustively defective. Arguments for this will be provided throughout the next chapter.

5.1 Autism and Autism Spectrum Conditions

The history of the concept of autism begins in 1943 when, almost simultaneously, Leo Kanner (1943) and Hans Asperger (1944) described certain patterns of behaviour they observed in children patients. They both used the word 'autism' to describe the condition, taking a cue from the Greek word αυτός (self) to emphasize the obsession with the self. The two accounts were different in their details but displayed large general overlap (Wing 1997, 13). Kanner described a group of young children who were either mute or displayed echolalia (senseless repeating of heard words and phrases) and idiosyncratic speech, and were extremely resistant to change in their surroundings and routines. Asperger presented observations on a group of older children or adolescents, who did not comply with the social standards of interaction, had poor intonation and body language, and were fixated on a narrow collection of interests[47]. The people studied were of every intelligence group (though Kanner's were mostly of low intelligence) and were in possession of good speech, although they used it for monologues or for their own special interests. Following these

[47] Here, and for the rest of my brief historical expeditions in sections one and two of the present chapter, I am and will be writing from the perspective of scientists *at the time*, to accurately convey the development of autism and theories around it.

and similar studies numerous attempts were made at defining subgroups. The acclaimed British psychoanalyst James Anthony commented that, though there were substantial differences, the conditions overlapped to a great extent and that "there were not enough symptoms to go 'round among all the authors who wanted to name a syndrome" (as quoted in Wing 1997, 15). Disagreement in classification and confusion about what autism actually abounds from the beginning.

Today, autism is understood as a spectrum of conditions[48]. The spectrum is considered a family of neurodevelopmental disorders disrupting fundamental processes of socialization, communication, and learning (Klin 2006, 3; Rapin and Tuchman 2008, 1129-1130; Wolff 2004, 201). ASCs diagnoses appear in 1 every 200 or so individuals (Dover & Le Couteur 2007, 540) with a male to female ratio close to 3:1 (Loomes *et al.* 2017). They have the strongest genetic component out of any developmental condition (Klin 2006, 9; Rapin and Tuchman 2008, 1130-1131; also see next paragraph of this section). Beyond limited sociability, communication, and learning abilities, people with ASCs diagnoses display restricted or stereotypical patterns of behaviour and interests (Klin 2006, 9). Most people with ASCs diagnoses score low in the IQ range although this percentage is diminishing due to the widening of the definition of ASCs to include more individuals, greater awareness of the condition and better detection of cases with high IQ (Klin 2006, 5). There is no epidemiological crisis as it is often suggested in public opinion (Baird *et al.*, 2003). It is well documented that the increase in ASCs diagnoses is owed to the aforementioned factors (Baird *et al.* 2003, 489; Klin 2006, 5). Further, contrary to a recently spread myth, there is no correlation of ASCs diagnoses with measles, mumps, and rubella (MMR) vaccines (Chaste & Leboyer 2012, 287; Freitag 2007, 5; Rutter 2005, 8-13). Finally, ASCs have a high comorbidity rate with developmental disorders and mental health disorders (Baird *et al.* 2003, 492; Dover & Le Couteur 2007, 541).

In ASCs symptomatology is used as a means for diagnosis, which is to say that no one is sure what the underlying causes of the conditions are. In medical terms ASCs are thus

[48] Asperger Syndrome was a slot along this spectrum, commonly used as a replacement to autism in individuals with normal or superior IQ scores (Klin 2006, 9). For reasons that fall beyond the scope of the present dissertation the diagnosis is no longer listed in the Diagnostic and Statistical Manual of Mental Disorders (since 2013) and thus not officially used anymore.

behaviourally defined (Baird *et al*. 2003, 488; Rapin & Tuchman 2008, 1129) with a specific medical cause being found in as low as 6-10%[49] of the population. Epilepsy occurs more commonly than usual in people with ASCs diagnoses, which, together with the probability of concordance ASCs being 60% in monozygotic twins, are the main known markers for ASCs being neurobiological conditions first and foremost (Baird *et al*. 2003, 488; Wolff 2004, 204). No specific gene candidates have yet been confirmed although ASCs are associated with mutations in chromosomes 2q, 7q, 16p, and 19p (Baird *et al.* 2003, 488). Beyond genetics, ASCs cannot be detected via brain scans (Rapin & Tuchman 2008, 1135-1137) for no consistency of diagnostic markers has been shown in the field. This situation means that, as noted above, although the disorder is widely agreed to have an organic and genetic basis, the diagnostic criteria have been derived through symptom examination rather than being organically based: there exists no biological test for ASCs (Baird *et al.* 2003, 489; Rapin and Tuchman 2008, 1139) and there does not exist any pharmacological way of 'reversing' the condition[50]. In addition to being behaviourally defined, *there is no standard behaviour or set of behaviours that can be used as an ASC diagnostic criterion*, and whether a person is diagnosed with an ASC or not is based largely on consensus and expert opinion (Baird *et al.* 2003, 491; Dover & Le Couteur 2007, 540). When attempting to reach a diagnosis professionals utilise, among others, a multiagency assessment, the purpose of which is to undertake a thorough assessment of the child's and the family's functioning, and to indicate the number of symptoms associated with ASCs an ASC-candidate displays. These symptoms include, but are not limited to, delay of development, a lack of pointing, poor eye contact, failure to follow gaze, poor use of gestures, repetitive play, oversensitivity to household noises, and motor mannerisms (Dover & Le Couteur 2007, 541). Again, there is not much that is standard and mechanistic here: academic and medical experts emphasize that *no one component is to be used in isolation to reach a diagnosis* and that the multi-agency assessment should not be carried out by non-professionals (Dover & Le Couteur, 541-542).

---

[49] Depending on the study (Baird *et al.* 2003, 488).

[50] Many children with ASCs take pharmacological supplements such as vitamins (Wolff 2004, 205), especially in the U.S., but this is for symptom management rather than condition reversal.

The main reason why there can be no standard cause identified or standardized process of diagnosis for ASCs is thought to be that many aspects of ASCs are continuous with neuro-typicality[51] and likely have differentiated causes. Isabelle Rapin and Roberto Tuchman (2008, 129) write that ASCs have "fuzzy borders that overlap normality at one extreme and profound intellectual impairment with other evidence of severe brain malfunction at the other". One or more ASCs symptoms can be found in an individual that is not considered a person with an ASC. It is only upon several symptoms befalling an individual that they qualify for having an ASC, though it is underdetermined what this set of symptoms must be. Generally speaking it suffices for a positive diagnosis that the symptoms induce severe difficulties in learning, communicating, and socializing, and that a tendency for adherence to strict routines is displayed. Francesca Happé *et al.* (2006) have argued that the different facets of ASCs may in fact have no single unitary (genetic or cognitive) explanation but be stemming from different sources: the triplet of ASCs-related behaviours (learning, communicating, socializing) may each have its own root in the brain and cognition. "Twin data suggest largely nonoverlapping genes acting on each of these traits. At the cognitive level, too, attempts at a single explanation for the symptoms of autism have failed", Happé *et al*. (2006, 1218) write. Their recent work suggests very little indication of ASCs traits clustering in the general population. It was found that children who displayed one of the three key aspects of ASCs were of relatively low risk of displaying another or the two others, emphasizing the separability of the traits and thus increasing the possibility of differentiated causes. This separability was backed up at the genetic and neurocognitive level as well[52]. The implication is that what we call ASCs may be the presentation of all three traits (limited sociability and communication, learning disabilities, restricted or stereotypical patterns of behaviour and interests) in an individual, likely because that is when an individual is the most 'cut off' from society and they and their caretakers face severe difficulties owing to the condition. However, it remains an open

[51] This and its derivatives are 'playful' terms used by the ASCs community to characterise people with standard neurological function and stress its typical, rather than its 'normal', dimension, much in the same way much of the LGBTQI+ community uses the word cis- to characterise non-trans people.

[52] For a more detailed analysis see next section, and for a thorough presentation of related evidence see Happé *et al*. 2006, 1219.

question why the three features of ASCs co-occur at an above-chance rate (Happé *et al.*, 1219).

5.2 Cognitive Theories of Autism Spectrum Conditions

Whatever the biological manifestations and aetiologies of ASCs may be, they are both unclear at this point and certainly beyond the scope of the present dissertation. As stated in the introduction I intend to focus on how people with ASCs diagnoses perceive the world: on what the world of their immediate experience is like and how it differs from a standard neurotypical one. I will examine, that is, whether people with ASCs diagnoses can be understood as operating in a different life-world, and how this difference is and should be navigated in scientific practice.

Cognitive theories of ASCs seem to be the prime medium for attaining this goal seeing as they engage precisely with how people with ASCs diagnoses perceive the world, both in terms of basic perceptions and their synthesis – as opposed, for example, to genetic and brain ones, which do not go into the phenomenological experience of people with ASCs diagnoses. This refers to the four components of incorrigible admittances: what the basic objects of perception are, how they 'hang together', what they mean and how they feel[53]. As will be shown, in every related scientific approach people with ASCs diagnoses are held to perceive a world quite different to that of the neurotypicals, not so much in basic object perception (most people with ASCs diagnoses presumably see and recognise chairs, tables, and other things neurotypicals see and recognise et cetera), but in how they synthesize these perceptual parts as coherent wholes, and how they sensually and emotionally relate to these wholes. As we will see momentarily, people with ASCs diagnoses are likely to be living in a world much more 'fragmented' than the standard neurotypical one and may possess basic functions to navigate this world that are quite different to the homologous functions of the neurotypicals.

There are three basic cognitive theories of ASCs predominant in research: the theory of Mind Deficit, the Executive Dysfunction theory, and the Weak Central Coherence

[53] Reminder from previous chapters: this is not to promote a theory-free/theory-laden distinction, but only a distinction between objects of perception and how they combine to synthesize meaning. Both these aspects of incorrigible ontological admittances are theory-laden.

theory (Rajendran & Mitchell 2007). Their history can be traced back to early perceptual research into ASCs, the working assumption of which was that people with ASCs diagnoses involve under- and/or oversensitivity to both visual and auditory stimuli. However, related empirical studies produced mixed findings (Prior *et al*. 1976), which shed doubts on this hypothesis. Further, pioneer researchers like Uta Frith pointed out that these sensitivities were not unique to ASCs (Wing 1969) and that they may stem from a more primary issue of selective attention. Memory related research at the time also suggested that children with ASCs diagnoses' auditory memory was better than their visual one, but this was later shown to be owed to an individual's intellectual ability rather than to ASCs *per se* (Rajendran & Mitchell 2007, 225). However, Beate Hermelin and Neil O'Connor (1967) also observed that children with ASCs diagnoses found recalling coherent sentences (like "The goat eats some grass") no harder than recalling random word strings (like "Goat, goat, grass, pineapple, sea, horse"). As we will see below this points to a recurring explanatory theme around ASCs until today. The above elements and observations were to compose central parts of cognitive theories or of their explanatory ambits, beginning at approximately around 1985[54]. I will now move to briefly present these theories and examine their evidential groundings to avoid theorizing on speculation. In this presentation, I will be following several studies, most closely among which Gnanathusharan Rajendran's and Peter Mitchell's comprehensive 2007 study *Cognitive Theories of Autism*.

Theory of Mind Deficit

The theory of Mind Deficit (MD), the first explicitly cognitive and largely influential theory of ASCs, surfaced in the mid-1980s. In summary, the theory conjectures that people with ASCs diagnoses fail to correctly attribute mental states to themselves and others. The most widely used relevant test is a story enacted through dolls, whereby two dolls are placed in an initial condition of knowing where a certain object is. Following, one doll leaves and the other moves the object to a different location. When asked where the first doll will look for the object when it returns, 80% of the participants with an ASC diagnosis failed to give the most likely correct answer (the first place), and said that the doll would

[54] Unsurprisingly, it was the dawn of the cognitive era that produced the first explicitly cognitive theories of ASCs (Rajendran & Mitchell 2007, 226).

look in the location where the object actually was instead (Wimmer & Perner 1983). MD's biggest problem is its lack of universality (Happé 1994); the 20% that passed the test gave the theory a serious evidential challenge. This problem remained after adjusting the problem hypothesis from a mind deficit to a mind delay[55]. It was instead found that the deficit is highly related to verbal mental age rather than ASCs diagnoses *per se* (Rajendran & Mitchell 2007, 227). Subsequently, researchers devised tests specifically for this population and came up with a number of findings. Most important among them were: (a) that subjects with ASCs diagnoses, irrespective of verbal mental age and whether or not they correctly attribute a mental state, fail at giving a correct explanation for their attribution, (b) that even very high functioning people with ASCs diagnoses have difficulty comprehending nonliteral language, and (c) that any deficit in attributing mental states in people with ASCs diagnoses likely comes in degrees rather than being present or absent in an absolute sense (for all the above see Dennett 1978; Baron-Cohen *et al*. 1997; Jolliffe & Baron-Cohen 1997; Wimmer & Perner 1983, and for a summary of relevant research Rajendran & Mitchell 2007, 227-231).

A recent reconceptualization of MD (Enactive Mind – Klin *et al*. 2003) argues that people with ASCs diagnoses, unlike those in a neurotypical cognition, to not be constantly prepared to interpret social meaning, and instead to look for meaning in terms of physical properties[56]. The many controversial empirical results and the inability to settle on a non-vague definition and universal theoretical underpinning after twenty years of research implied that the theory is now largely waning as an explanatory mechanism (Rajendran & Mitchell 2007, 231). However, its legacy remains unquestionable in that it brought to the fore something we now take for granted about people with ASCs diagnoses: that they often face severe difficulties in understanding their own and others' mental states as the neurotypicals understand them. Not only that, but it has recently been argued (see for example Milton 2012), quite convincingly, that this is a two-way street empathy deficit: like people with ASCs diagnoses cannot understand the neurotypicals' minds, so the

[55] For a full-fledged presentation of the development of the theory against evidence see Rajendran & Mitchell 2007, 226-227.

[56] For neurotypicals, shapes often have 'social meanings' or associations, while people with ASCs look for meaning solely in terms of physical properties. For more on the issue see Klin *et al.* 2003.

neurotypicals cannot understand the minds of people with ASCs diagnoses, which have their own rationales and processes. To expect what is to come below, this should already provide a cue to life-world divergence regarding people with ASCs diagnoses as people with different life-worlds. The above, that is, gives us the opportunity to see how people with ASCs diagnoses may attribute meaning differently to the neurotypicals, which evidently pertains to the semiotics dimension of the life-world.

Executive Dysfunction Theory (EF)

The Executive Dysfunction (EF) theory was born out of the observation that many of the non-social symptoms of people with ASCs diagnoses, which could not be explained by the MD account, were similar to those associated with brain injury (Rajendran & Mitchell 2007, 231). These symptoms relate to the need for sameness and the lack of impulse control, which are, in people without ASCs diagnoses, associated with frontal lobe damage (Baddeley & Wilson 1988). Thus, compared to MD, EF is more neurological and function-centric (Denkla 1996), and refers to a potential inability to maintain "an appropriate problem-solving set for attainment of a future goal" including "behaviours such as planning, impulse control, inhibition of prepotent but irrelevant responses, set maintenance, organized search, and flexibility of thought and action" (Ozonoff *et al*. 1991, 1083). Ulrich Müller and Philip Zelazo (2002) point out that definitions of EF are often compilations of symptoms rather than a theoretical story, which often circle around planning, decision-making, judgement and self-perception (Tranel *et al*. 1994). An investigation of ecological validity of EF (Burgess *et al*. 1998) labelled three dimensions for it: lack of inhibition (the ability to supress a habitual response), lack of intentionality (the ability to handle embedded rules), and lack of executive memory (the ability to shift attention between stimuli). As is hinted here, the subcategories systems of EF are many and diverse, and there is generally no wide consensus about them (Rajendran & Mitchell 2007, 223).

Despite some inconsistency in results and partial failure to replicate findings (Pennington & Ozonoff 1996), EF generally fares well evidence-wise. Many of its traits (deficits in EF tasks performance) appear to be present in very high percentages of people with ASCs diagnoses (96% in, for example, Ozonoff *et al*. 1991). In another sense, however, challenges are present: EF appears to be neither universal, nor unique to ASCs. That is, in studies reporting individual variations rather than group differences, the

prevalence of EF has been as low as 50% (Rajendran & Mitchell 2007, 233). Studies attempting to differentiate disorders based on performance on EF tasks have been largely unsuccessful, and ASCs do not present a distinct profile through EF (Rajendran & Mitchell 2007, 234). Moreover, it is hard to create tests for isolated aspects of EF owing to the theory being multifaceted and its aspects interwoven (Rajendran & Mitchell 2007, 237). A last issue here is the Executive Dysfunction-Mind Deficit connection: the question of how one is to wed deficits apparently explained by MD to EF and *vice versa*, especially since the two are of different ambits. Some researchers (e.g. Russell *et al.* 1991) have proposed that people with ASCs diagnoses attribute mental states wrongly because they cannot resist going with an instinctual attribution, which in turn springs out of EF's inhibition facet. Other researchers (e.g. Perner *et al.* 2002) have countered this argument and turned against EF by claiming that executive abilities related to EF are needed for MD to obtain. Finally, due to its great ambit, EF is the only theory that can in principle account for both the cognitive and motor, social and non-social characteristics of ASCs, the various criticisms levelled against it notwithstanding. As we saw above MD pertains mainly to the social dimension of ASCs (via postulating a particular attribution of mental states). As we will see below WCC regards mainly meaning ascription associated with ASCs, and not so much the motor profile ASCs present.

Weak Central Coherence Theory (WCC)

The Weak Central Coherence theory (WCC), originally put forward by Uta Frith, is the latest development in the cognitive theories of ASCs and is based on the premise that people with ASCs diagnoses are internally predisposed to process single bits of information rather than to synthesize them in larger wholes (Frith 1991; Frith & Happé 1994). This obtains on both the physical and the social/linguistic levels. An alleged manifestation of this, for example, is that children with ASCs diagnoses appear to be able to detect small target shapes within a context of a larger shape composed of potentially confusing lines (Witkin *et al.* 1971). More generally, they are less susceptible to visual illusions that attempt to trick the viewer by virtue of the context of something making that something seem different than it actually is (Happé 1996). Complementarily, children with ASCs diagnoses also seem to be unable to take in context or non-immediately neighbouring elements to synthesize meaning in linguistic environments. Many more children with ASCs diagnoses than their neurotypical experimental counterparts failed to

take context into consideration to determine a certain word's pronunciation and meaning (see for example Booth & Happé 2010; Jolliffe & Baron-Cohen 1999). For example, when presented with the sentence "Hunting with a knife and…", children with ASCs diagnoses tend to fill the gap with words like 'fork' or 'spoon' rather than, say, 'rifle'. Interestingly, however, people with ASCs diagnoses seem also to be able to 'go global' in information processing when specifically instructed to do so (Milne *et al.* 2002), contrary to the neurotypicals, for whom the global mode appears mandatory[57]. This has led Happé (1999) and other proponents of WCC to argue for ASCs as a different 'cognitive style' rather than a *de facto* deficit[58].

WCC has a few variations purporting to explain ASCs cognitively in terms of either 'reduced generalisation' or 'hierarchization'. Reduced generalisation theory (Plaisted 2001) argues that ASCs phenomena stem out of a reduced processing of the similarities between stimuli or situations and that people with ASCs diagnoses will indeed 'go global' if these differences are more salient (which would not be the case in the original WCC). Hierarchization theory (Mottron & Burack 2001) offers that both the 'local' and the 'global' processing are intact in people with ASCs diagnoses, and what is in fact affected is the preference for the local (they do not know which mode to employ for a specific purpose on their own). Evidence-wise there is support as well as mixed results for all WCC and its main variations (Plaisted *et al.* 1998; Mottron & Belleville 1993; Rajendran & Mitchell 2007, 237-244) and the theory has not been crystallised in one or the other form. However, mainly negative results have forced WCC proponents to delineate the boundaries of the theory's scope of explanation more carefully (Rajendran & Mitchell 2007, 244). First, WCC is now viewed as superior local, rather than inferior global, processing. Second, WCC no longer seeks to explain all aspects of ASCs but only one cognitive side of them (ibid.). Last, considering its relation to other cognitive theories of ASCs, it has been concluded that WCC can be reduced neither to MD, nor to EF, and it

[57] This footnote is to highlight this phenomenon as a potential difference between life-worlds. Following this observation, it may be argued that, in the neurotypical's world, the 'global' cognitive style appears as an incorrigible substratum. Suchlike differences and life-world elements and their juxtapositions will be discussed later in this chapter.

[58] Save for the fact that central coherence is sometimes thought to be a non-unitary cognitive style, composed of multiple elements (Rajendran & Mitchell 2007, 243).

is also the case that it cannot explain what they purport to explain, which amounts to a restriction of the theory's scope. This is because neither the MD and EF ASCs-related characteristics are explained via the tenets of WCC (e.g. altered motor skills may not be explained by postulating a weak central coherence), nor are the WCC ASCs-related characteristics explained via the tenets of MD or EF (for more on the matter see Rajendran & Mitchell 2007, 243).

Multiple-Deficit Account, Summary, and Limits of Cognitive Approaches

To recapitulate, Mind Deficit (MD) was the first major cognitive theory of ASCs to appear and is now considered sort of a legacy theory. Its two successors and main competitors between them, Executive Dysfunction (EF) and Weak Central Coherence (WCC) (or rather their many instantiations), explain different aspects of ASCs. They both run simultaneously due to the irreducibility of one to the other, their different explanatory ambits, and because evidence, as shown above, remains inconclusive regarding the prevalence of one over the other. Thus, the current cognitive picture of ASCs is differentiated, reflecting a multiple-deficit account of the condition (Rajendran and Mitchell 2007, 244-246). Liz Pellicano *et al.* (2006) make one of the strongest cases for such an account, arguing that the domains not only of EF and WCC but also of MD are distinct and unrelated to each other. Multiple-deficit accounts typically do not assume a hierarchal relationship between the explanatory mechanisms they engulf. They maintain the advantage of encompassing a wide range of explanatory mechanisms and of accounting for the fact that two individuals with the same ASC diagnosis may present different symptoms and require different treatment. As Rajendran and Mitchell (2007, 247) write, each theory retains its distinct benefits and there is no fully integrated account of all, and this may be owed to 'autism' possibly being a non-unitary disorder. If this proves to be true theoreticians may have to withdraw any grand claims and unitary explanations seeking to explain autism in one fell swoop. As already mentioned in the beginning of this section and demonstrated by Happé *et al.* (2006) this position is also supported by recent genetic data. Thus, this multi-profile/multiple cause cognitive account is in keeping with the more general contemporary understanding of ASCs.

This is, in compressed summary, what thirty years of cognitive exploration of ASCs have brought us. As a final word, it should be stressed that cognitive theories are, of course, neither a necessary nor the only guaranteed correct pathway into ASCs. As Rajendran and

Mitchell write (Happé *et al*. 2006, 248) theories of ASCs have been barometers of psychological trends: from psychoanalysis to behaviourism and then to the cognitive era, psychology has fed ASCs approaches accordingly, resulting in the current trend of cognitive theories: MD; EF; WCC; their variations. As a general rule, the way we think about ASCs is all but static. Various authors showcase changes in approaches to ASCs over time (Geschwind 2009; Rajendran & Mitchell 2007; Rutter 2005; Steyaert & Marche 2008), with the most important ones having been mentioned above (not exclusively low IQ conditions, not necessarily disorders but conditions, not necessarily unitary). As I pointed out in the introduction, all these I mention not just as generic historical and conceptual information but as limits to my own work, which focuses on the cognitive theories of ASCs. Complementarily, I would like to remind the reader that the purpose of this case-study is not to uphold any one theory of ASCs but to argue that people with ASCs diagnoses can be seen as operating within a different life-world than the neurotypical one, and that this matters for scientific practice. I believe that the summary conducted herein will do for this purpose.

Let us then now venture forth to the argument that, according to the prevalent cognitive theories of ASCs and ASC-related testimony, people with ASCs diagnoses indeed operate on a different life-world than the neurotypical one.

5.3 People with ASCs Diagnoses as People in Different Life-Worlds

In this section I argue that people with ASCs diagnoses can be convincingly understood as people operating in different, compared to the neurotypicals, life-worlds. In making this claim, besides the above material from science, I am also going to address testimony from people with ASCs diagnoses and their peers (mainly family, caretakers, and various therapists). In the next chapter, I will claim that actually viewing people with ASCs diagnoses as operators of different life-worlds – versus, for example, as bearers of plainly behavioural differences – would make for better ASCs-related treatment. As this whole line of argumentation is unfolded, more testimony corroborating the 'different life-worlds' claim will be added.

A reminder and a methodological consideration are in order before considering how the autistic life-worlds differ to those of the neurotypicals. The reminder is that the life-world was, in chapter three, defined to be the realm of incorrigible admittances, cashed out as the produce of synergy between the perceiving subject and the world. The life-

world's contents were organised along four axes: the ontological (what the subject takes to exist); the metaphysical (the properties and relations of the world that the subject takes to hold); the semiotic (the way in which the subject synthesizes meaning out of various signifiers); the emotional (the way the subject perceives their own and others' emotions). Thus, I will also map the ways the autistic life-world differs to the neurotypical life-world along these four axes. The methodological consideration is that we cannot assume that the autistic life-world is homogeneous. Below, I infer autistic life-worlds from certain elements from the cognitive theories of ASCs and testimony of people with ASCs diagnoses and their peers. Not all these elements obtain across the whole spectrum – e.g. not all people with ASCs diagnoses display a weak central coherence or receive auditory stimuli in a much more intense fashion than the neurotypicals. Granted, this obtains for the neurotypicals *as well*: given the life-world definition it would be patently absurd, for example, to claim that the neurotypicals all feel the same way towards other people and things and situations, or synthesize meaning in the same manner. I will, therefore, as noted above, be using the terms 'autistic life-worlds' and 'neurotypical life-worlds', plural.

To begin the task of the present section, I would like to invite in an overarching and extremely vivid piece of testimony pertaining to what being one with an ASC diagnosis is like. What follows is an extract from David Mitchell's introduction to Naoki Higashida's first book (*The Reason I Jump*, 2013). Mitchell is an outspoken member within the ASCs community, himself the father of a child with an ASC diagnosis, while Higashida is probably the most famous and influential nonverbal author with an ASC diagnosis alive. *The Reason I Jump*, a work purporting to give a foray into the first-person experience of ASCs, is a New York Times bestseller and a Sunday Times bestseller in the United Kingdom, and has been translated to over thirty other languages (Best Sellers – The New York Times; Rosie 2013). In his text, which I will keep referring to throughout this section, Mitchell writes:

> The thirteen-year-old author of this book invites you, his reader, to imagine a daily life in which your faculty of speech is taken away. Explaining that you're hungry, or tired, or in pain, is now as beyond your powers as a chat with a friend. I'd like to push the thought-experiment a little further. Now imagine that after you lose your ability to communicate, the editor-in-residence who orders your thoughts walks out without notice. The chances are that you never knew this mind-editor existed, but now that he

or she has gone, you realize too late how the editor allowed your mind to function for all these years. A dam-burst of ideas, memories, impulses and thoughts is cascading over you, unstoppably. Your editor controlled this flow, diverting the vast majority away, and recommending just a tiny number for your conscious consideration. But now you're on your own.

Now your mind is a room where twenty radios, all tuned to different stations, are blaring out voices and music. The radios have no off-switches or volume controls, the room you're in has no door or window, and relief will come only when you're too exhausted to stay awake. To make matters worse, another hitherto unrecognized editor has just quit without notice — your editor of the senses. Suddenly sensory input from your environment is flooding in too, unfiltered in quality and overwhelming in quantity. Colours and patterns swim and clamour for your attention. The fabric softener in your sweater smells as strong as air freshener fired up your nostrils. Your comfy jeans are now as scratchy as steel wool. Your vestibular and proprioceptive senses are also out of kilter, so the floor keeps tilting like a ferry in heavy seas, and you're no longer sure where your hands and feet are in relation to the rest of you. You can feel the plates of your skull, plus your facial muscles and your jaw; your head feels trapped inside a motorcycle helmet three sizes too small which may or may not explain why the air conditioner is as deafening as an electric drill, but your father — who's right here in front of you — sounds as if he's speaking to you from a cell phone, on a train going through lots of short tunnels, in fluent Cantonese. You are no longer able to comprehend your mother tongue, or any tongue: from now on, all languages will be foreign languages. Even your sense of time has gone, rendering you unable to distinguish between a minute and an hour, as if you've been entombed in an Emily Dickinson poem about eternity, or locked into a time-bending SF film. Poems and films, however, come to an end, whereas this is your new ongoing reality. Autism is a lifelong condition.

… [F]or those people born onto the autistic spectrum, this unedited, unfiltered and scary-as-all-hell reality is home. The functions that genetics bestows on the rest of us —the "editors" — as a birthright, people with autism must spend their lives learning how to simulate. (Higashida 2013, 1-3)

Our life-world detectors should have started beeping already. Let us then start mapping the above material from cognitive theories of ASCs and Mitchell's testimony, as well as the material from testimony that is to follow, to specific life-world categories. The order will be: semiotics, emotions, metaphysics, ontology. This is because evidence for the semiotic and emotional differences of the autistic life-worlds stems directly from claims of scientific theories as well as from testimony itself. I will thus begin by showcasing differences along these two axes and then move to purported metaphysical and ontological differences, for which my claims will be more speculative, based more on reconstructions – rather than direct claims – of theory and testimony compared to the first two categories.

Semiotics and Emotions

As a general comment on semiotics, let us bring in Jim Sinclair, among other things an ASCs-involved activist, who, in his influential article *Don't Mourn for Us*, which we will also get to explore thoroughly in the next chapter pertaining to ASCs treatment, calls us to imagine a parent trying to communicate with their child with an ASC diagnosis and not getting an 'appropriate response' back. He says:

> That does not mean the child is incapable of relating at all. It only means you're assuming a shared system, a shared understanding of signals and meanings that the child in fact does not share. It's as if you tried to have an intimate connection with someone who has no comprehension of our language ... You're going to have to give up your assumptions about shared meanings ... each of us who manages to reach out and make a connection with you, is operating in alien territory, making contact with alien beings. (Sinclair 1993, n.p.)

Indeed, evidence from both cognitive science and testimony is ample to infer that people with ASCs diagnoses synthesize meaning in a different manner to that of the neurotypicals. On the scientific end, Weak Central Coherence theory (Frith 1991; Frith & Happé 1994; Milne *et al*. 2002) may be shown to point in this direction via two observations. First, people with ASCs diagnoses are often perceiving objects and entities in a much more neighbourly fashion than the neurotypicals do – their perception is much more 'zoomed in' in whatever they are directing their attention towards. This is, the WCC theory argues, what explains empirical results such as people with ASCs diagnoses being

less susceptible to falling prey to visual illusions that exploit the more 'zoomed out' perceptual synthesis of the neurotypicals. Second, this localized coherence holds also for linguistic meaning synthesis. We saw how people with ASCs diagnoses often fail to take context into consideration when determining a certain word's pronunciation and meaning, and how children with ASCs diagnoses tend to fill the 'word gaps' in quizzes by choosing words that are only relevant to elements immediately neighbouring to the gaps. Moreover, the reduced generalisation theory (variation of WCC – Plaisted 2001) suggests that people with ASCs diagnoses usually display a reduced processing of the similarities between stimuli or situations thus displaying ASCs-related phenomena.

The Mind Deficit theory (Rajendran & Mitchell 2007, 226-231) also points to a different meaning synthesis on behalf of people with ASCs diagnoses. It does so via its purported explanations for empirical phenomena such as the reactions of people with ASCs diagnoses to the doll story situation[59] (section two above). MD's explanation is that people with ASCs diagnoses fail to synthesize a sequence of hypothetical events to arrive at a conclusion about the mental states of the people involved that would typically correspond to a neurotypical's conclusion. Moreover, MD is the theoretical response to the fact that people with ASCs diagnoses very often fail to interpret nonliteral language *qua* nonliteral, ascribing a different meaning to it than the neurotypically intended. Further, work on the theory of Enactive Mind (variation of MD – Klin *et al.* 2003) generated a lot of empirical evidence that people with ASCs diagnoses often look for meaning in terms of physical rather than immaterial, symbolic, or metaphorical properties in their environment.

Heidi LoStracco (2014), a speech language pathologist, augmentative and alternative communication consultant and co-owner of Speak for Yourself[60], argues that it is often the case that the standard sets of words and expressions acquired through typical ASCs

[59] Recall the doll story scenario (Wimmer & Perner 1983): two people are sitting in a room, knowing a doll is at a certain place. One of them leaves the room, the other moves the doll to a different location. The question of this scenario is: where will the first person look for the doll when they come back in the room? In most cases, people with ASCs diagnoses claim that this person is going to look for the doll in the second place.

[60] Speak for Yourself is an application by speech-language pathologists that work exclusively with clients who are functionally nonverbal.

treatment *have no function in the patient's life, or feel insubstantial*. In the next chapter, I will contend that much of the failure of the typical treatment for ASCs is due to not considering the differences of the autistic life-worlds to the neurotypical ones, one of the key aspects of this being that the mainstream treatment tries to enforce behaviour that makes no meaningful sense in the autistic life-worlds.

Last on semiotics, Mitchell's testimony puts it that the mind's typical 'editor in residence', responsible for ordering one's thoughts, has departed in the cases of people with ASCs diagnoses, thus resulting in a meaning-extraction environment that is much more chaotic to that of the neurotypical. Recall the passage:

> A dam-burst of ideas, memories, impulses and thoughts is cascading over you, unstoppably. Your editor controlled this flow, diverting the vast majority away, and recommending just a tiny number for your conscious consideration. But now you're on your own. ... your mind is a room where twenty radios, all tuned to different stations, are blaring out voices and music ... (Higashida 2013, 1-2)

In Mitchell's account, a person with an ASC diagnosis is often bombarded with thoughts from their own brain, something which adds a layer of difficulty in filtering out and ordering some of these thoughts. No less important is Mitchell's highlighting the case of nonverbal people, those who do not comprehend any language. As the neurotypicals extract meaning chiefly in linguistic terms this is also a massive difference in the process of ordering and signifying things between people with ASCs diagnoses and the neurotypical.

Let us now move to emotional differences of the autistic life-worlds. We recall that Sinclair (1993, n.p.) states that "autism colours every emotion". Indeed, it is very well documented that people with ASCs diagnoses feel very differently towards a multitude of situations compared to the neurotypicals. Higashida (2013) and numerous others such as the highly-acclaimed Mark Haddon (2003 – writer of *The Curious Incident of the Dog in the Night-Time*) explicate many of the emotional intricacies related to ASCs. For example, the protagonist of Haddon's book feels very happy or very sad depending on what the colours of the cars he sees during his day are. This is amply evinced on the scientific side of things: EF, for example, highlights people with ASCs diagnoses' need for sameness, for steady

routines and surrounding patterns, negative emotions befalling them whenever these are disrupted.

Professionals in ASCs-specialized education often take notice of this aspect of the autistic life-worlds. Valerie Paradiz, founder of the School for Autistic Strength, Purpose and Independence in Education complains to *The Guardian's* Emine Saner (2007, n.p.) that:

> In most schools, kids with Asperger syndrome are placed in settings that are either overwhelming in a social or sensory way, or underwhelming in an intellectual way and many adolescents end up struggling with profound isolation and depression.

It is readily evident in Paradiz's words that a difference in immediate world intake leads to emotional instability when matched with an inappropriate environment. Once again, we may add Mitchell's testimony: people with ASCs diagnoses occasionally experience unpleasant emotions just from being in their own body, their organs feeling too big or otherwise causing discomfort:

> Relief will come only when you're too exhausted to stay awake ... You can feel the plates of your skull, plus your facial muscles and your jaw; your head feels trapped inside a motorcycle helmet three sizes too small ... (Higashida 2013, 2)

Moreover, relatedly, the below state of affairs is not framed as particularly pleasing:

> Your vestibular and proprioceptive senses are also out of kilter, so the floor keeps tilting like a ferry in heavy seas, and you're no longer sure where your hands and feet are in relation to the rest of you. (Higashida 2013, 2)

The above considerations establish a difference in reflexive emotions on behalf of people with ASCs diagnoses. However, it is purportedly not the case that these differences regard only unexpected – pleasant and unpleasant, happy and sad – emotions when faced with given situations. In the next chapter, particularly in the case of Oliver Sacks' 'twin savants' we will move to see how people with ASCs diagnoses may relate differently to others, or to different things than the neurotypicals do, displaying a peculiar emotional

world the richness of which goes beyond the binary of being happy or sad with different things: presumably, for the case we will investigate, Sacks' twins maintained a particular kind of *companionship* with numbers.

Metaphysics and Ontology

There is a manifold of other ASCs-related differences, many of which may be argued to be differences in life-world metaphysics. Here, I do not adopt the notion of analytic metaphysics but a broader and looser definition. The life-world dimension of metaphysics, recall, pertains to what the perceived properties of things are and to how various pieces of the life-world's contents relate to one another – how the world *appears to be and relates*. The ASCs-related differences I list below can, I claim, be thus construed as different properties and relations in life-world content. However, since construing empirical data as life-world differences is weaker and more speculative here than it was for semiotics and emotions, my claim is also weaker: I do not assert a definitively different metaphysics for people with ASCs diagnoses; I simply argue that we have reason not to assume such a unitary metaphysics for them, shared with the neurotypicals.

Since we were just on Mitchell, I would like to begin this section by referring to his pieces of testimony from above. Recall that Mitchell pinpointed issues of 'thought bombardment'; out of kilter vestibular and proprioceptive senses; altered sense of time passage. Ideas, memories, impulses, and thoughts, he tells us, are hitting the autistic consciousness with much more intensity than in the neurotypical conditions, becoming intrusive. Further, people with ASCs diagnoses often lack a sense of balance and the sense of their body parts' whereabouts – the vestibular and proprioceptive senses. These properties of the self are, if not absent, then surely different in their manifestation to their neurotypical counterparts. Last but of course not least is the issue of how time is perceived to flow, which is tilted in the way Mitchell describes, lacking the relative linearity it displays for the neurotypicals. These are perceived *properties* of *thoughts*, *the body*, *time*, I claim, which are different to the neurotypicals. They shape a different world for the people with ASCs diagnoses' navigation, and thus can plausibly be construed as differences in life-world metaphysics.

Further, it is well corroborated since early scientific research into ASCs that the spectrum involves under- or oversensitivity to both visual and auditory stimuli (Rajendran & Mitchell 2007, 225). That is, compared to the neurotypical perception, certain stimuli

of this kind may be overbearing or barely noticeable. There is a difference in the *intensity* of such perceptual intakes. Mitchell once again captures the phenomenology of this vividly:

> … your editor of the senses is also gone. Suddenly sensory input from your environment is flooding in too, unfiltered in quality and overwhelming in quantity. Colours and patterns swim and clamour for your attention. The fabric softener in your sweater smells as strong as air freshener fired up your nostrils. Your comfy jeans are now as scratchy as steel wool. (Higashida 2013, 2)

People with ASCs diagnoses often have an auditory memory that is better than their visual one and an equal ability of recalling coherent sentences and random word strings (Hermelin & O'Connor 1967). This situation may be the result of auditory memories having *a more vivid quality* than the visual ones, and random word strings having an *equal mnemonic vividness* to what neurotypicals would perceive as coherent sentences (thought this is now my own speculation). More vivid quality and equal mnemonic vividness are plausibly construed, I suggest, as perceived differences in life-world metaphysics in that they denote, again, different *perceived properties* of memories and word strings.

Let us now consider the Executive Function theory (Anderson *et al*. 1994; Denkla 1996). Recall that people with ASCs diagnoses have a potential inability to maintain an appropriate problem-solving set for the attainment of a future goal including behaviours such as planning; impulse control; inhibition of prepotent but irrelevant responses; set maintenance; organized search. Following such processes does not 'come naturally' to them, as opposed to the neurotypical people, who normally find themselves maintaining problem-solving sets towards future goals before they even realise it. These are, again, different to the neurotypicals' properties of the *self*, experienced phenomenologically. Moreover, according to EF, at least some people with ASCs diagnoses display a lack of flexibility of thought and action. Thought and action, that is, lack or have less of a *property* that normally obtains with the neurotypicals – thus underlining a plausible metaphysical difference.

Last, a few words about ontology. According to WCC (Witkin *et al*. 1971), people with ASCs diagnoses process more distinct bits of information on the physical level. This can be argued to change their sense of what there is in the way that synthesizing perceptual

stimuli changes our sense of what there is in the Jastrow's duck-rabbit case (see section 3.1): organising a material differently produces different distinguishable units. My eye may be receiving the same lines and dots on a paper but, as we recall from the noematic dimension of the life-world, this is not enough to denote either a duck or a rabbit on the paper: entities are the production of active – albeit mostly unconscious – synthesis on behalf of the perceiving agent. This, it seems, is different in the people with ASCs diagnoses' life-world. Michelle Dawson (2004, n.p. – for more on Dawson see below) speaks of people with ASCs diagnoses as operating under a different 'organising idea' compared to the neurotypicals. It is true, however, that science and testimony refer to differences in 'what there is' in the autistic life-world much more sparsely than 'what obtains of what is' and 'what it feels like'.

This concludes the demonstration of the differences between the autistic and the neurotypical life-worlds – at least for now, for the topic is to be taken up again in the next chapter when yet more relevant will be added. Before concluding this section, I would like to take the chance to make some summarizing comments on the differences between autistic and neurotypical life-worlds, and also comment on the inter-relatedness of elements of the autistic life-worlds. Upon reviewing the above findings, we may claim the following of the autistic life-worlds. Regarding semiotics: first, meaning in the autistic life-worlds in at least many cases is synthesized in a much more local fashion than the neurotypical, both in physical and in linguistic terms. Second, the mental states of others are often misattributed or, if you will, attributed in a different manner than the neurotypical. Third, linguistic meaning seems to be extracted from a more chaotic environment to the neurotypical, characterised by a bombardment of thoughts.

On the front of emotions, there is a well recorded wide difference of emotional response to a variety of situations. We may safely conclude, first, that most people with ASCs diagnoses display a consistent need for sameness in their surroundings and routine in their lives. Second people with ASCs diagnoses are often distressed when put in overloading environments and faced with auditory and visual stimuli that may not be a disturbance to the neurotypicals. Third, recalling Mitchell's testimony, the bodies of those with ASCs diagnoses often feel overbearing or tiresome. Pending demonstration in the next chapter, I also noted that the autistic life-worlds are plausibly worlds of much richer emotional difference to the neurotypical than being happy and sad and uncomfortable with different things.

Metaphysics is also presumably the locus of important differences though the connection requires a charitable, wide construal of metaphysics to be made. First, thoughts appear to have a more intense quality and the self is lacking its proprioceptive and vestibular senses. Moreover, actions appear to have a reduced flexibility, impulses being harder to control. Second, there is an increased or decreased sensitivity to visual and auditory stimuli. Third, the sense of time is tilted, lacking the relative linearity it displays for the neurotypicals. Fourth, the processes of maintaining an appropriate problem-solving set for the attainment of a future goal and other EF-related characteristics do not as naturally come to an individual with an ASC diagnosis as a neurotypical one.

The differences in ontology *strictu sensu* that we saw above appear to be very limited, relating mostly to the synthesis of different stimuli in larger wholes. We may, however, find ontologically-flavoured elements in many of the ASC-related differences we surveyed above and which we did not classify as ontological. Take, for example, the case of oversensitivity to visual or auditory stimuli: not even noticing such stimuli in the environment that the neurotypicals would normally notice, or noticing the existence of some that would be practically non-existent to the neurotypicals, may be argued to amount to a different ontological picture in an autistic life-worlds sense. Not even noticing something is in fact quite the perfect negation of it being an incorrigible admission in one's life-world. Not that this point is only true of ontology: above, we amply understood that an ASCs-related difference may pertain to two or more elements of the autistic life-world (the bombardment of thoughts alters meaning extraction but also facilitates different, to the neurotypicals, emotions in different situations).

One could at this point focus future work on disentangling the elements of the life-world and finding a neat categorization system for the autistic life-worlds so that every observed difference falls in a distinct category. I think that would be mostly missing the life-world's point. First, the life-world is an analytical tool tailored to encapsulate the world of ordinary experience as it is incorrigibly (the self included). It is true of experience that it often does not come neatly cut into categories: many experiences are packing organically entangled elements of different kinds. I see something in front of me that appears to be in such and such ways, and this makes me feel in a certain way, and I also extract a meaningful observation. For example, if I am lost and thirsty, roaming the desert, and I find a roughly made sign pointing me to the nearest oasis, I will at once perceive something, ascribe a meaning to it, and feel grateful that I probably will not die of thirst.

The four categories of the life-world are meant to pick elements of perception and experience apart towards certain theoretical (e.g. philosophical analysis towards locating science situatedness – I will expand on this in chapter seven) or practical purposes (here mainly ASCs treatment – see next chapter), *not* to provide an elegant solution to the problem of the classification of such phenomena as an end in itself. The life-world and its elements are *not* worked around necessary and sufficient definitions exactly to accommodate the intricacies of the multifarious, complex processes that experience and perception are. The material presented herein, even if the reader finds themselves objecting now and again to certain classificatory manoeuvres, should be able to demonstrate what is important: the autistic life-worlds differ to the neurotypical ones, importantly so at that.

No sooner should we point out this conclusion than highlight that evidence is not always of the same strength in evincing this difference. I have noted this in the opening of this section but after reviewing the material in detail it is sensible to repeat it here mainly via two statements. First, for those conclusions derived from the cognitive theories of and empirical work on ASCs such as more localized meaning process, lack of impulse control, different attribution of mental states et cetera, we should note that the evidential hardships the theories face obviously and proportionately get in the way of our confidence in the conclusions we extract from them here. We should keep in mind, that is, that the theoretical conjectures of cognitive and other theories are one thing, and the evidence we rely on to evince life-world difference is another. For example, not all people with ASCs diagnoses display lack of impulse control, some of them do in fact fall prey to visual illusions, and of course it is not the case that only people with ASCs diagnoses display a below than typical ability to maintain a proper problem-solving attitude towards the attainment of a future goal. Second, regarding testimony included herein and in the next chapter, the obvious limitations apply: testimony does not consist sustained and rigorous scientific research, especially so in testimony presented in literary form (e.g. Mitchell's), Further research on the testimony of people with ASCs diagnoses and their peers is likely to find further disagreements – but I have already denoted we should not expect a unitary autistic life-world. Arguably, however, excluding the people with ASCs diagnoses' testimony is a far, far worse alternative. As we will see in the next chapter – especially in the Sacks-twins story – much of the attempted reconstruction of the autistic life-worlds remains speculative. I will underline, however, that, equally importantly, this is so because the ASCs treatment industry appears *to not be interested* in this process. This is wrongly so,

I will claim: the autistic life-worlds reconstruction process is in fact invaluable if we prioritize people with ASCs' well-being and should be the cornerstone of treatment.

Last, we must add the necessary life-world ingredient. If we are to enumerate a number of differences between people with ASCs diagnoses and the neurotypicals and proclaim that they operate in different *life-worlds*, then it is necessary that these differences be *incorrigible*. This will be work conducted mainly in the next chapter, where these differences are continually pinpointed as being the irreversible setting for people with ASCs diagnoses (see mainly Sinclair and Dawson in the next chapter). There, it will be shown that the 'failure' of ASCs treatment showcases precisely the immutability of the life-world differences I listed above. Expecting this development, allow me here to bring up Sinclair's words once again:

> Autism isn't something a person has, or a 'shell' that a person is trapped inside. There's no normal child hidden behind the autism. Autism is a way of being. It is pervasive; it colors every experience, every sensation, perception, thought, emotion, and encounter, every aspect of existence. It is not possible to separate the autism from the person – and if it were possible, the person you'd have left would not be the same person you started with. ... Autism is a way of being. It is not possible to separate the person from the autism. (Sinclair 1993, n.p.)

It is interesting to see how closely (and unwittingly) Sinclair's account follows the definition of the life-world. Autism colours every sensation, perception, thought, emotion and encounter, *every aspect of existence*. What the person perceives, how it hangs together, the emotional relation to the world, how meaning is derived from it: ontology, metaphysics, semiotics, emotion: the four categories of one's life-world. These things are *different* in people with ASCs diagnoses; their life-worlds are different. Further, these differences consist a way of *being*: they are so incorrigibly glued to the person that it is *impossible to separate the person from the autism*.

Like Sinclair, Dawson has written quite extensively on ASCs. Having a diagnosis herself, Dawson is an academic researcher on ASCs, affiliated with a number of academic and medical institutions in Canada. In her famous, for reasons that we will explore thoroughly in the next chapter, 2004 article *The Misbehaviour of Behaviourists* Dawson argues that the problem with behavioural treatment relating to ASCs is that behaviourists

do appreciate how people with ASCs diagnoses are differently structured, what autistic intelligence is and how it functions. What is important presently is that, across her article, Dawson speaks of central differences and different 'organizing ideas' (see ontological differences above) in people with ASCs diagnoses that shape autistic intelligence and navigation of the world differently than the neurotypical, and argues that ASCs should be taken seriously as different ways of being rather than a collection of symptoms, something which is very much in accord with Sinclair's account. As is perhaps to be expected, Mitchell is quick to agree with their account of the autistic 'home setting':

> ... [F]or those people born onto the autistic spectrum, this unedited, unfiltered and scary-as-all-hell reality is home. The functions that genetics bestows on the rest of us —the "editors" — as a birthright, people with autism must spend their lives learning how to simulate. (Higashida 2013, 3)

With this statement, I think, the conclusion is ripe for the taking: the immediate, incorrigible experience of the world for people with ASCs diagnoses is very different to that of the neurotypicals. As we saw and we will continue to be seeing in the next chapter, most theoreticians, clinicians, activists and outspoken agents in the ASCs community, whether they have an ASC diagnosis or not, may be shown to be in stellar agreement with this life-world account. This is admitted quite often in explicit language ('their' world and ours), which is nonetheless narrated by theoreticians and therapists who have not, presumably, engaged with German philosophers obscure in the English-speaking world and in the professions around ASCs, and equally obscure continental philosophy notions. Especially by the end of the next chapter there will remain, I believe, little doubt that people with ASCs diagnoses can be reasonably characterised as people of different life-worlds.

Conclusion

In this chapter, I have covered the following ground. First, in section 5.1, I presented a historical and conceptual view of ASCs, and provided the reader with a, within space limits, comprehensive summary of the condition and concepts surrounding it. Second, in section 5.2, seeking to understand how people with ASCs diagnoses perceive the world, I explored all major cognitive theories of ASCs and their evidential backing in some detail,

and analysed their main varieties. Last, in section 5.3, I attempted to establish that people with ASCs diagnoses can be seen as operating in different life-worlds to the neurotypical ones. I did this by mapping conclusions from the cognitive research into ASCs and testimony from people with ASCs diagnoses and peers to the categories of the life-world as defined in chapter three. My claim of life-world differences is to find even further confirmation in the next chapter, where even more testimony and arguments from all ASCs-related camps (such as therapists and activists) will be reviewed.

The larger subject of the next chapter is ASCs treatment. There, I will investigate the heated ethico-political controversy around the mainstream behavioural treatment for ASCs and argue that the life-world can provide directions for a resolution. Seeing people with ASCs diagnoses as operators of different life-worlds prompts us to see, I will claim, that treatment should be tailored to their life-worlds, thus reconsidering many key aspects of behavioural treatment and calling for more phenomenological approaches to treatment.

6. Autism Spectrum Conditions Treatment and the Life-World

Introduction

In the first two chapters I called for a direct conceptual examination of science's claim to the truth via the observables. Following this, I defined the observables as the incorrigible admittances of the life-world. After this, in chapter four, I argued, mostly theoretically, that the life-world is not unique and universal but pluralistic. In the previous chapter (section 5.3) I showed how people with autism spectrum conditions (ASCs) diagnoses are best understood as operators of life-worlds different to the neurologically typical ones. This shows that the issue of different life-worlds transcends the boundaries of philosophical speculation and special cases: if more than 1% of the population is shown to operate in life-worlds importantly different to the neurotypical ones from ASCs alone then my pluralistic life-world contentions are decidedly demonstrated.

In this chapter I want to consider the significance that this life-world difference has and should have *for* scientific practice and its societal aims – specifically ASCs research and treatment. That is, it is not only the case that people with ASCs diagnoses occupy a different life-world: what treatment is to *do* with this life-world (try to alter it; discard it as problematic; attempt to recreate and navigate it in its own terms), I claim, proves to be an issue at the heart not only of which treatment method to follow and how, but also of political debates and activist claims around the issue of ASCs treatment. I argue that we should construe the political activists around ASCs as claiming that autistic life-worlds are different to the neurotypical ones, *and* that these life-worlds should be considered valid modes of being, not considered objects of attempted change or *de facto* problematic. In this way, I hope to provide a philosophical framework and an array of conceptual tools to help adjudicate the heated political debate within ASCs communities. My own adjudication will be that the autistic life-worlds should be accepted as valid modes of being and have a privileged position in orienting the course of ASCs treatment.

The above issue is not only of political and humanitarian interest; it cuts at the heart of the plan that this dissertation has for the scientific realism debate. My related recommendation, in chapter seven, will be to move beyond issues of capital-t Truth, radical scepticism, and other related big metaphysical questions, to focus instead on how what we take to be true *shapes lives*. What follows demonstrates that this question indeed

matters: that human lives are indeed severely affected by what we think of others' validity of experience, especially in matters scientific, double in matters of mental health.

The present chapter is structured as follows. In section 6.1 I first provide a historical overview of treatment approaches to ASCs. Following, I explore what the current picture of the treatment field is and point out certain connections to its past as pervading tropes which are important for the discussion. In section 6.2 I summarize the political history of neurodiversity, the activist movement which proclaims that ASCs should be considered different, legitimate, non-defective modes of being, and calls for very specific or little to no intervention. In section 6.3 I conduct a more thorough presentation of the movements, how they articulate their political goals and contemporarily operate through characteristic examples. In section 6.4 I go into the specifics of the contemporary 'gold therapeutic standard' in ASCs, Applied Behaviour Analysis (ABA). I explain what methods ABA uses and investigate findings of a meta-study of ABA's evidential basis compared to that of other methods, which will be used in the comparative evaluation of methods to follow.

In section 6.5 I turn to what I call the 'anti-ABA' front, which accuses ABA of breaching human rights and consent in ASCs treatment, not respecting its patients' mode of being, thinking, and feeling. In section 6.6 I attempt to provide a general arbitration of the debate, offering some tentative suggestions about how the anti-ABA versus ABA controversy is to be resolved. I do this by showing how the debate can be best understood in terms of the autistic life-worlds and divergent approaches to it. I grant the activists' argument that the autistic life-worlds are to be respected and propose a general method regarding ASCs treatment: filtering ABA according to the autistic life-worlds and taking other, phenomenologically-oriented treatment methods seriously. In section 6.7 I close by providing some general limitations to this method and by consequence to how deeply science can intervene in a life-world that is decidedly different to the one from which it is launched.

Seeing as this chapter is unusual within the dissertation, I would now like to address several methodological considerations. First, this is the only chapter in the present dissertation that covers speech and action which are directly political – those from the ASCs-related activism and movements. This calls for a handling of a particular bibliography, which extends in some ways beyond standard academic sources used in other chapters. For these reasons about half the literature cited in this chapter will consist of first-hand accounts from people with (and without) ASCs diagnoses, who take part in

relevant political movements, and related articles in acknowledged media. Second, this bibliography is vast and is impossible to keep track of all of it here. Instead of glossing over a large number of testimonies I have chosen to rather go in depth with some that are either the most influential and/or the most characteristic on the issue they examine. Third, the issues discussed in this chapter raise two difficulties regarding their examination in the present dissertation: a) they often fall under the scope of disciplines like therapy ethics, handling of difference within mental health practices, and even political philosophy, and thus off the scope of my own field strictly speaking, and b) they are vastly complex, and would take a doctoral dissertation in its own right to comprehensively discuss and evaluate them in their entirety. To overcome these issues, I narrow the questions I ask and the answers I give accordingly: what I claim is that, with conceptual aid from the life-world, we can understand the political debate around ASCs in a richer light, and draw some suggestions and directions of thought about how to navigate the discrepancy – I do not, say, purport to solve the issue of difference, widely construed, within the mental health sciences.

6.1 Treatment Overview

Medically speaking, falling within the autism spectrum is considered being ill, both physically and mentally (Klin 2006, 4; American Psychiatric Association 2013), and this has been so since the advent of the concept of autism. Therefore, since 1920, specialized branches of various professions have sought to find out treatments or cures for ASCs. In its early days, treatment was almost perfectly mapped to theories of ASCs. This one-to-one relationship seems now to be decidedly a trend of the past. This is because theories of ASCs were initially much more ambitious, purporting to explain the whole spectrum in one go and to encompass all its social, non-social, physical, mental, and cognitive dimensions. As was mentioned in the last chapter and demonstrated through the presentation of cognitive theories of ASCs, this is no longer the case: it is generally accepted not only that ASCs do not constitute a unitary category ('autism') but also that, however useful, any and every theory of ASCs can provide only a piecemeal picture of the spectrum. Therefore, a fusion of a number of theories of ASCs is usually what explains a given instantiation of the spectrum most convincingly.

In large part, the shift in treatment approach has mirrored the above transition in the conjectured reasons and theories behind the spectrum. ASCs are now understood to form

a continuum with overlapping symptomatology behind which lies a complex web of genetic and environmental factors. This was not always the case; as discussed in the previous chapter, understanding of ASCs has ranged quite a bit since their early attribution to unemotional mothers from psychoanalytic theories before settling on the current multi-layered situation. Below follows a short timeline and narration of ASCs treatment (as synthesized by referring to Bender *et al.* 1962; Elder *et al.* 2006; Lichstein & Schreibman 1976; Masi *et al*. 2006). This timeline will be instrumental in seeing how the debates around ASCs treatment today are vitally connected to its past.

Timeline: Major Historical Developments in the Treatment of Autism

1920s: Electroconvulsive therapy and dietary restrictions emerge as the first mainstream treatment methods for autism[61].

1940s-1950s: Autism is considered chiefly an emotional disorder owed to unemotional mothers. Parentectomy, the approach of cutting children away from their parents, is employed as a treatment method.

1970s: Shock therapy and aversive punishment emerge and become the mainstream treatment approach.

1987: Ivar Lovaas, from the University of California, Los Angeles, develops what is still considered the gold standard for autism treatment: the Applied Behaviour Analysis (ABA) method, which has become the subject of great controversy.

1997: Special education programs for children with autism emerge.

2013: Autism becomes the Autism Spectrum Disorders (ASD) spectrum in definition (what I call ASCs throughout the present dissertation to observe activists' anti-disorder claims).

Below follows a short summary of the main treatment methods sketched in the timeline.

Electroconvulsive Therapy (ECT)

[61] In this chapter, when speaking historically, I will be switching back to 'autism' from the term 'ASCs'. This is to indicate the given period's understanding of the spectrum in order to be more historically accurate.

The observant reader will have noticed that treatment methods date before the concept of autism made its appearance by Leo Kanner and Hans Asperger. This is because a diagnostic category for children with autism (who were subsequently diagnosed with autism) existed then, only it, as we saw in the last chapter, was labelled childhood schizophrenia until the 1940s. Therefore, it is no surprise that the main treatment method for it was the main treatment[62] method for schizophrenia, ECT. The main idea behind ECT is that the brain receives brief seizures via electricity, which are hypothesized to change its chemistry in a way that alleviates ASCs symptomatology. ECT is now largely obsolete and thought to be surpassed in efficacy by behavioural methods, though there are some who still examine its potential efficacy (for more see Dhosse & Stanfill 2004).

Dietary Restrictions

This treatment method emerged around the same period as ECT (1920s), and the main idea behind it was that one could treat or even 'cure' ASCs by removing certain toxins from a dietary routine. No substantial evidence has come to the fore in favour of this treatment method, which is today thought to be largely ineffective (Hyman *et al.* 2016).

Aversive Punishment

The idea behind aversive punishment is the same as in every 'negative' behavioural modification, including the infamous dog training method by Ivan Pavlov: punish a subject after displaying behaviour you want to see gone and you will see this behaviour gone. In the 1970s, when this approach was at its historical peak, no genetic factors were thought to facilitate ASCs. ASCs were instead seen as centrally behavioural – as a collection of symptoms. Therefore, children with an ASCs diagnosis received, for example, electric shocks when displaying ASCs-related behaviour (this time not to change the brain chemistry but as punishment). While this method seemed to be effective in terms of stopping children from displaying ASCs-related behaviour it is now largely forbidden from practice. An example is the U.S. Federal Drug Administration, which proposed and passed a ban of this treatment method in 2016 because of ethical reasons (Department of Health and Human Services 2016). Indeed, there is much controversy around how

[62] The history of ECT is well known and notoriously controversial (for a detailed account see, for example, Shorter & Healy 2007).

efficiency should be measured in terms of mental health improvement, and whether getting a child to stop displaying a certain behaviour can be taken as a measure of treatment success, or as an ethical measure of treatment success.

Pharmacological Therapies

After shifting the focus to genetics, mainly via twins and siblings studies, it was believed that ASCs are better treated with medications. Psychotropic substances such as lysergic acid diethylamide (LSD), which were trending in recreational and countercultural use and psychotherapy during the 1970s, were employed in ASCs treatment (DeFilippis & Wagner 2016). These therapies, however, ceased to take place since psychotropic substances were ruled out of therapy soon thereafter. There are, however, FDA-approved medications that are provided to people with ASCs today to alleviate some of their symptoms. These are mainly neurotransmitters that are antagonists to serotonin and dopamine receptors (they increase the concentration of serotonin and dopamine in the brain) and typical and atypical (second generation) antipsychotics such as Risperidone, Aripiprazole, Clozapine, and Haloperidol (Masi *et al*. 2017). It is very important to note here that *in no way do these medications address the core causes of autism:* they just keep the symptoms at bay. The counter to this treatment method is that these medications often have serious side effects (as seen, for example, in Üçok & Gaebel 2008).

Applied Behaviour Analysis (ABA)

In 1980, infantile autism was separated from childhood schizophrenia for the first time, in the Diagnostic and Statistical Manual of Mental Disorders III (DSM III – American Psychiatric Association 1987). This change was accompanied by a move beyond pharmacological intervention backed up by the increasing emphasis on the genetic basis of ASCs (Wolff 2004). This marked the start of a cognitive-behavioural era for ASCs and ushered in the establishment of special education programmes complemented, among others, by speech and language therapy, psychotherapy, and occupational and physical therapy (ibid.). Moreover, the admittance of a spectrum meant that, to a significant degree, therapy had to be individualized.

Applied Behaviour Analysis (ABA) was established by Lovaas. The basic idea behind ABA was the same one behind most behavioural approaches: reinforce positive and discourage 'negative' behaviour, and teach children important new skills with these

means. In his 1987 paper, *Behavioural Treatment and Normal Educational and Intellectual Functioning in Young Autistic Children*, Lovaas presented a study in which a group of children received 40 hours a week intensive behavioural therapy for two to six years. The results were reportedly striking, with more than 90% of the children showing significant improvements in symptoms and, allegedly, in social and cognitive competence.

Having this overview in mind, let us now turn to how the ASCs community and related political movements have reacted to issues around therapy.

6.2 The Ransom Notes Controversy and Early Neurodiversity

On December of 2007 people around New York were met with 'ransom notes' of several kinds, posted on large billboards and construction sites. The aim of these notes was to raise awareness about various childhood mental disorders, in which ASCs were included (Kras 2010). The notes were also posted in influential American magazines like *Newsweek* and *New York Magazine*. The ones regarding ASCs read:

Autism

> We have your son.
> we will make sure he will
> not be able to care for
> himself or interact socially
> as long as he lives.
>
> This is only the beginning.

Asperger's Syndrome

> We have your son. We are destroying his ability for
> social interaction and driving him into a life of complete isolation.
> It's up to you now.

These notes were posted by the New York University Child Study Center (NYU CSC) in the frame of a *pro bono* public service campaign. The campaign, however, was not to be long-lived: it was soon met with an avalanche of reactions from *ad hoc* huge grassroots internet protests, and was eventually shut down. One of the key figures behind this

movement was Ari Ne'eman, then 20 years old and with an Asperger Syndrome diagnosis, now president of the Autistic Self Advocacy Network (ASAN). As described by Joseph Kras in his 2010 article *The 'Ransom Notes' Affair: When the Neurodiversity Movement Came of Age*, ASAN's complaints were threefold and related to these points:

(a) The stigmatization of people with disabilities.
(b) The conveying of inaccurate information about disabilities and the potential strengths that accompany them.
(c) The discouragement of 'doomed' disabled children and of their caretakers.

As one can find out in Kras' article and in numerous other sources, including a feature article by the *New York* magazine (Solomon 2008), this was the incident that solidified the cause of neurodiversity, and which gave it the shape of a massive, organised movement. The spirit of the movement, acceptance of mental 'illness' as legitimate difference, definitely had predecessors, both in the general realm of mental illness[63], and in (what was then called) autism specifically. The oldest out of the most central points of reference specifically for ASCs is Jim Sinclair's 1993 *Don't Mourn for Us*. In this article, Sinclair argues that the grief associated with ASCs is not a produce of the condition itself but of various socially relevant factors, like how society sees people with ASCs, and the parents' mourning over the loss of a 'normal' child. Contrary to NYU CSC's ransom note message Sinclair argues that people with ASCs diagnoses not only find themselves in an irreversible condition but also that purporting to change it is a cruel act of rejection.

> Autism is a way of being. It is not possible to separate the person from the autism.
> Therefore, when parents say, "I wish my child did not have autism", what they're really saying is, "I wish the autistic child I have did not exist, and I had a different (non-autistic) child instead."
> Read that again. This is what we hear when you mourn over our existence. This is what we hear when you pray for a cure. This is what we know, when you tell us of your fondest hopes and dreams for us: that your greatest wish is that one day we will

[63] See, for example, Mad Pride (Reid 2009).

cease to be, and strangers you can love will move in behind our faces. (Sinclair 1993, n.p.)

What is necessary for a neurotypical to connect with a person with an ASC diagnosis, Sinclair continues, is to modify their own intuitions and preconceptions about how relationships and bonding work. When a neurotypical parent tries to communicate with a child with an ASC diagnosis they do not get back a response they would consider appropriate. However:

> That does not mean the child is incapable of relating at all. It only means you're assuming a shared system, a shared understanding of signals and meanings, that the child in fact does not share. It's as if you tried to have an intimate conversation with someone who has no comprehension of your language. Of course the person won't understand what you're talking about, won't respond in the way you expect, and may well find the whole interaction confusing and unpleasant. (Sinclair 1993, n.p.)

What is Sinclair's proposed remedy to this? It is a recommendation to the neurotypicals: to do some work of translation and reconceptualization, to try and observe the world through the eyes of one who is fundamentally different and relates fundamentally differently, and to try to enact relationships that make sense in their [*life-*]worlds.

> It takes more work to communicate with someone whose native language isn't the same as yours. And autism goes deeper than language and culture; autistic people are 'foreigners' in any society. You're going to have to give up your assumptions about shared meanings. You're going to have to learn to back up to levels more basic than you've probably thought about before, to translate, and to check to make sure your translations are understood. (Sinclair 1993, n.p.)

Still, however, the result will not be an imagined ideal. It will be cashed out in terms in-between: in-between two different systems of meanings, concepts, beliefs. This is Sinclair's submission, followed by a wish for inclusiveness.

> And the outcome, if you succeed, still will not be a normal parent-child relationship. ... The ways we relate are *different*. ... Yes, that takes more work than relating to a non-autistic person. But it can be done--unless non-autistic people are far more limited than we are in their capacity to relate. We spend our entire lives doing it. Each of us who does learn to talk to you, each of us who manages to function at all in your society, each of us who manages to reach out and make a connection with you, is operating in alien territory, making contact with alien beings. We spend our entire lives doing this. And then you tell us that we can't relate.
>
> ... This is what I think autism societies should be about: not mourning for what never was, but exploration of what is. We need you. We need your help and your understanding. Your world is not very open to us, and we won't make it without your strong support. ... The tragedy is not that we're here, but that your world has no place for us to be. (Sinclair 1993, n.p.)

Before I conclude this section, I would like to offer a disclaimer about the way I use the 'neuro-' terms here, such as neurotypicality, neurodiversity, and their derivatives. As some scholars have convincingly argued (e.g. Verhoeff 2014), the received over-focusing on the 'neuro-' side of things in ASCs, bypassing elements of the conditions that seem to be lodged in aspects of the self beyond the brain, is problematic. Moreover, in lack of empirical evidence, one should avoid essentializing ASCs to simply alterations in the neural circuit based on the blank check that ASCs will one day be fully reduced to the brain and its functions. While these are points I am sympathetic towards, I have decided to maintain the binary, neuro-focused language. This is for two reasons. First, visibly everyone involved in the neurodiversity debate, including the activists themselves, employs the binary neuro-language. I thought it vacuous to deconstruct the debate's basic terminology when approaching it with a new point, creating an additional distance between potential professional ASCs readers and my own, philosophical work. Second, and equally importantly, I felt that such a potential life-world critique of the neuro-discourse does not bare directly on the argument I want to make. Briefly put, I want to argue that ASCs are characterised by different, here-to-stay life-worlds, and that this should matter for and inform treatment. Whether this deep difference is lodged in the 'neuro-' is a secondary consideration. In summary then, trying to deconstruct the neuro-discourse here would take up sizeable and valuable space, would create distance between

some of the readers and myself, while at the same time not conferring a discernible important gain.

In summary, the ASCs branch of the neurodiversity movement claims that ASCs consist their own mode of being, which should be considered valid and legitimate, and not a product of dysfunction. This mode of being, it is argued, is hard-wired and not separable from its bearers. For neurotypicals and people with ASCs diagnoses to exist in harmony, what should be done, Sinclair argues, is to bring about an understanding of this deep-seated difference and try to communicate with it in its terms. Let us now move to survey contemporary forms of the ASCs branch of the neurodiversity movement, as well as to explore the claims of those who oppose it.

6.3 The ASCs Neurodiversity Movement in Its Current Form, and Its Critics

More than 25 years have passed since Sinclair's powerful reflection on ASCs-mediated relationships and it has now been more than a decade since the ransom notes incident. Opposite camps have been formed, issue-specific slang has been established and several contemporary approaches to ASCs have been filtered through the debate. Nevertheless, Sinclair's original spirit has remained largely intact. The term neurodiversity was put forward as a label for the movement by Judy Singer, who has a mother and brother with an Asperger Syndrome diagnosis, and is on the spectrum herself. "I was interested in the liberatory, activist aspects of it — to do for neurologically different people what feminism and gay rights had done for their constituencies", she tells the *New York Magazine* (Solomon 2008, 1), and indeed one can find several such analogies being made by neurodiversity activists. These people want to establish that ASCs are simply alternative (to 'normal') ways of being, that should be respected and not considered things to 'fix'[64].

Kathleen Seidel, who owns and operates the website neurodiversity.com, has a spectrum diagnosis herself, as do her father and child. She agrees with Sinclair on what reminds us of the incorrigibility of the autistic mode of being. "There's a kind of polish that I'll never have, and that's just built into the wiring" she tells the *New York Magazine* (Solomon 2008, 2). She has found neurodiversity helpful and liberating: "I encountered the word neurodiversity, and it just sang to me. I thought, what a beautiful word, that

[64] For a more elaborate official summary see *The Autism Rights Movement* (n.d.).

encompasses the reality that God has many different ways to build a brain" (Solomon 2008, 2). Not that there is no challenge wedded to this different mode of being. However, in her view, the challenges are there to stay. The point, however, is to move past that. "I wanted to figure out what my child needed. I wanted to figure out what my child needed to thrive, for fulfilment." (Solomon 2008, 2).

The list of known people with ASCs diagnoses (and without) that stand on neurodiversity's side goes on and on. One of the most outspoken and influential stars on the issue is a 37-year-old woman with an ASC diagnosis, Amanda Baggs. Baggs has made an 8-minute long video called *In My Language* (Baggs 2007), which provides an insight into her life and aims to shatter the view that people with ASCs diagnoses are locked into a world unreachable and full of suffering. Emine Saner, a *The Guardian* reporter writes (2007, n.p.): "Although she [Baggs] finds it impossible to communicate verbally, she is able to type very quickly and her blog shows that she is articulate and fun". However, this endeavour is not without difficulty in being heard and breaking through stereotypes around ASCs. In another interview, this time for *Wired*, Baggs claims she is often misheard: "I've said a million times that I'm not trapped in my own world ... Yet what do most of these news stories lead with? Saying exactly that" (Wolman 2008, n.p.)

The neurodiversity approach is also gaining institutional foothold. As we saw in the last chapter, Valerie Paradiz (Asperger Syndrome diagnosis), has founded the School for Autistic Strength, Purpose and Independence in Education (Aspie). Let us recall her claiming that:

> In most schools, kids with Asperger syndrome are placed in settings that are either overwhelming in a social or sensory way, or underwhelming in an intellectual way and many adolescents end up struggling with profound isolation and depression ... I actually see educational access issues for these kids as something very similar to wheelchair access ... Autism is not a pathological condition or a disease, but a way of life that possesses a culture and history all its own. (Saner 2007, n.p.)

Academics working around ASCs are neither strangers to nor (by and large) hostile towards the movement. Saner, *The Guardian*'s reporter, got the following statement from Simon Baron-Cohen, one of the most acknowledged researchers of ASCs working at the Autism Research Centre at the University of Cambridge.

> I do think there is a benefit in trying to help people with autism-spectrum conditions with areas of difficulty such as emotion recognition ... Nobody would dispute the place for interventions that alleviate areas of difficulty, while leaving the areas of strength untouched. But to talk about a 'cure for autism' is a sledge-hammer approach and the fear would be that in the process of alleviating the areas of difficulty, the qualities that are special - such as the remarkable attention to detail, and the ability to concentrate for long periods on a small topic in depth would be lost. Autism is both a disability and a difference. We need to find ways of alleviating the disability while respecting and valuing the difference. (Saner 2007, n.p.)

There are many others, and they often tackle the same issue from different angles. Notably, these authors, like those cited above, are not marginal but very often (like Baron-Cohen) well-versed in the mainstream and well-funded research into ASCs. Meredyth Goldberg Edelson (2006), a professor of psychology at Willamette University, reviewed 215 articles linking ASCs to low IQ (the term used in the scientific literature is 'in the mentally retarded range') published since the advent of the concept of autism. She found that most of them (74%) did not have the data to back up their own assertions. As much as 39% of the articles were not based on any data and those who did were using questionable, per Goldberg Edelson, measures of intelligence. We practically do not know if the majority of people with ASCs diagnoses are 'mentally retarded', she claims. Mike Merzenich, a professor of neuroscience at UC San Francisco, says that the notion that 75% of autistic people are mentally retarded is "incredibly wrong and destructive" (Herbert & Weintraub 2012, 150).

How is this relevant to the current discussion? As Merzenich claims, inquiry into difference (and its potential uses) is far outweighed by inquiry into treatment and cure when it comes to ASCs – and low intelligence is a 'problem' framed for a cure. One researcher told him, he says (Wolman 2008, n.p.), that "there's no money in the field for looking at differences in the autistic brain. But if you talk about trying to fix a problem — then the funding comes". A last comment on this, from someone who we will get to know thoroughly in the next section of the present chapter. In 2007, the peer-reviewed journal *Psychological Science* published an article called *The Level and Nature of Autistic Intelligence*, lead authored by Michelle Dawson. Therein, Dawson argues that autistic intelligence has

been severely underestimated because the tools for assessing it are ill-suited to people with ASCs diagnoses. Dawson argues that, in fact, controlling for IQ should be a precondition for good research. This adds to the wave of criticism of the standardized measure of intelligence, IQ (see for example Hampshire *et al.* 2012).

As one would probably expect, the ASCs neurodiversity movement has faced severe criticism, both as part of the wider neurodiversity movement and in its own right. As a matter of fact, in the above cited *New York Magazine* article Andrew Solomon reports that it was not since his early days reporting in the Soviet Union that he found himself so bullied about what he should and should not be mentioning (Solomon 2008, 4). The critics are, however, not characterised by a uniform degree of intensity, and often do not criticise the same facet of the movement. First, there are the vaccine activists, who believe that ASCs are a result of vaccine poisoning[65]. They therefore believe that by removing the agents of poisoning from the environment, ASCs, that are, as the result of poisoning, clear deficits in an organism, will vanish. Solomon got in touch with Lenny Schafer, editor of the prominent Schafer Autism Report, adoptive father of a child with an ASC diagnosis, and a vaccine activist, and obtained this quote from him:

> Please don't write about them … It's a handful of noisy people who get a lot of media attention but do not represent a broad swath of the autism community. Best for them to be ignored. They want to redefine autism as something nice that Einstein and Bill Gates had. They're trivializing what autism really is. It's like stealing money from the tin cup of a blind man when you say that it's not an illness. (Solomon 2008, 4)

There are more sober critics of the neurodiversity movement, albeit they often do not target its general goals *per se* but what they see as extreme positions against treatment and pursuing a cure. Larry Arnold, the first person with an ASC diagnosis to join the board of the National Autistic Society (NAS), thinks the Aspies For Freedom's[66] campaign against looking for a cure is naïve (Saner 2007, n.p.). He does, however, subscribe to the idea that

---

[65] I mentioned this theory in the previous chapter, along with satisfactory evidence that it is, by all measures, a debunked and by now conspiracy theory.

[66] AFF is a twenty thousand-member organisation about Asperger Syndrome in the United Kingdom.

autism, as he calls it, should be a part of neurodiversity and attributes many of the difficulties that people with ASCs diagnoses face to society rather than the condition itself. Here is what he said to *The Guardian*'s Saner:

> It's all part of the societal construction of disability, it's seen in negative terms and is portrayed in negative, pitying advertising by organisations raising funds for research which wants to eliminate us from the planet. That's a very American style of campaigning and I'm seeing it coming over here. I would like us to have a greater say in organisations that purport to speak on our behalf. People say 'it's all right for you, you can talk and you were able to get a university degree, whereas our children can't do this, that or the other'. But I'm for valuing every level on the autistic spectrum, it doesn't matter how able or unable you are to carry out 'normal' functions that are dictated by society. I think there is something of an autistic culture developing in this country and worldwide. (Saner 2007, n.p.)

The aforementioned David Wolman (2008) of *Wired* reports concerns from an academic standpoint. After all, being able to plan your meals for the week or ask for directions bespeak important forms of intelligence, he says. He goes on to quote Fred Volkmar, director of Yale's Child Study Center (quoted in Wolman 2008, n.p.): "If you pretend the areas that are troubled aren't there, you miss important aspects of the person". The autistic brain is perhaps reasonably characterised as flawed, Wolman says, in a level-headed and well cited article. He quotes the aforementioned University of California San Francisco's Merzenich, who, despite articulating a critique of intelligence measuring tools, still thinks that severe ASCs are characterised by 'grossly abnormal' brain development, which oftentimes lead to a 'catastrophic end state' (I presume that Merzenich is referring to inclinations towards self-harm and violent tantrums here). Wolman writes that Yale's Volkmar goes as far as to liken extreme neurodiversity activists' prerogatives to urging a physically disabled person to walk without a wheelchair. "Meanwhile parents, educators, and autism advocates worry that focusing on the latent abilities and intelligence of autistic people may eventually lead to cuts in funding both for research into a cure and services provided by government. "As one mother of an autistic boy told me, there's no question that my son needs treatment and a cure", Wolman (2008, n.p.) writes.

We have now concluded surveying the overarching tendencies in favour and against the ASCs-related neurodiversity movement. In the next section, we will start exploring ASCs treatment, chiefly the mainstream method, Applied Behaviour Analysis. In so doing, we will see that the claims in favour and against neurodiversity have a direct bearing on what different groups of people think of ABA: the pro-neurodiversity claims will be translated into criticisms towards ABA, while the against-neurodiversity claims will highlight its efficacy. This conflict will be shown to make for a heated ethico-political debate within ASCs communities. In section 6.6 I will try to adjudicate this debate using the life-world toolkit.

6.4 Applied Behaviour Analysis (ABA) and Its Evidential Basis

Let us now turn our attention to ABA, the sovereign treatment method for ASCs, rapidly gaining popularity[67]. I will first reiterate what ABA is and go briefly back to its origins, elaborating on my initial presentation of it in the first section of this chapter. I am going to show that, faithful to its name, ABA approaches ASCs solely behaviourally and, in this spirit, tries to modify behaviours related to ASCs. Following, I am going to examine ABA evidentially so as to have in hand the material necessary to adjudicate the ABA versus anti-ABA debate in section 6.6.

In 1987 Lovaas published results of the application of a (then) new, behaviourally based treatment method for ASCs. A follow-up study by Lovaas and colleagues came in 1993. These two articles reported *recovery* of almost half of the experimental group (very young children with ASCs diagnoses) using Lovaas' method. This development marked a potentially huge change in thinking about ASCs: effectively, it was suggested that ASCs are behaviourally based, and thus more 'plastic' than initially thought. With the appropriate intervention, they could even be 'gone', or so Lovaas and colleagues put forward (Rogers & Vismara 2008, 8). The articles and their promoted doctrines did not stay at the academic level. On the contrary, they had tremendous impact on how ASCs

[67] In the U.S. in particular, the situation is largely that the health system funds only ABA therapy for people with ASCs. If you want to go another way, you must provide the funds from your own pocket (National Conference of State Legislatures 2017). Considering the costs of ASCs related therapy, this makes ABA effectively the only option for all but the wealthy.

were handled on the social and individual level, ushering in an era of treatment markedly different to treatments of other developmental disorders. This development put more coal to the fire of parents who hoped for a cure for their children with ASCs diagnoses and prompted many of them to spend hundreds of millions of dollars and pounds and hundreds of thousands of hours to follow ABA, which is a time-intensive, time-extended and extremely expensive therapy (Rogers & Vismara 2008, 8).

Let us take a closer look. What does one do when one does ABA? As mentioned above, the main underlying principle is the reinforcement-discouragement duo. ABA sessions focus either on skills to be acquired or on behaviours to be eradicated. Let us hypothesize, for example, that I am an ABA therapist and that I want a certain child with an ASC diagnosis to reply with their actual name when asked what their name is and to stop rocking back and forth every so often. I then proceed to reward the child's answering their name to my repeated questions (possibly with candy or whatever else the child may find pleasing) and to withhold reward when they start rocking back and forth[68]. Note that the near abolishment of punishment is a contemporary evolution of the original Lovaas method, which included, among other things, hitting the children. Whether the results of this method are substantially beneficial, and whether these results remain when the hitting ceases, much more to the point of 'curing' ASCs, is a matter of great contention to be explored soon below.

Before this, let us take a broader evidential look on ABA. In 2008 Sally Rogers and Laurie Vismara returned to the ever-important question of what empirical evidence there is supporting the efficacy of early intervention for young children with ASCs diagnoses. They conducted a meta-study, collecting and evaluating studies on treatments that targeted children ages five or younger, which had to be comprehensive – here defined as targeting all the core deficits of ASCs: the language, social, cognition, and play dimensions. They did not include studies that did not say *which specific* factor they were targeting and they also eliminated studies that were not published in peer-reviewed journals. They looked into various kinds of studies. Of interest to us at this moment are studies that partially or fully replicated Lovaas' treatment approach (that is, those that

[68] For a description of ABA from official sources see *Applied Behavior Analysis* on the Autism Speaks (n.d.) website; for an example of a therapy session see the online video *Autism Therapy – ABA* (Myrtle Beach International 2008).

aimed to test the efficacy of ABA[69]), ranging from 1998 to 2005. What they found is of particular interest to treatment connected to ASCs in general and to the subject matter of this chapter (Rogers & Vismara 2008, 30-32).

First, there were very few Nathan and Gorman Type 1 studies, and randomised control trial (RCT) studies. This means that there are still ways to go before any claims relating to a sturdy evidential basis for ABA can be substantiated. However, RCT studies show that young children with ASCs diagnoses demonstrated accelerated developmental gains in response to focused daily interventions, chiefly regarding an increase in language and communication abilities, an increase in IQ, and a reduction in the severity of ASCs symptoms. Second, *contra* the original spirit of Lovaas, there is no evidence thus far from a Type 1 study that recovery can come about by means of treatment. There are two Type 2 and Type 3 studies[70] (Howard *et al.*, 2005; McEachin *et al.*, 1993; Sallows & Graupner, 2005) that report recovery on a significant proportion of the treated subjects. However, we will not know how often recovery occurs until multisite studies with an adequate number of subjects emerge. Third, all substitutes to ABA are under-examined: there is a lack of strong designs and independent replications, and no peer-reviewed published data at all regarding other well-known and applied ASCs treatments. There is also a lack of comparative studies, which leaves us in the dark concerning which treatment approach is the best for young children with ASCs diagnoses.

It is important to keep this meta-study in mind, for it will now be shown to corroborate the neurodiversity (and specifically autism rights activism) proponents' claims in two ways: first, even in a strictly behavioural sense, evidential support for ABA is limited. Second, all alternatives to ABA are severely under-discussed and under-researched. After

---

[69] These are: Jocelyn *et al.* 1998; Drew *et al.* 2002; Aldred *et al.* 2004; Smith *et al.* 2000; Sallows & Graupner 2005; Eikeseth *et al.* 2002.

[70] Nathan and Gorman Type 1 studies are studies that utilise state of the art investigative methods such as clear inclusion and exclusion criteria; blinded assessments; adequate sample size; statistical methods. Nathan and Gorman Type 2 studies are studies like Type 1 but lacking some of Type 1's elements, and Type 3 studies have different aims than Type 1 and Type 2 studies such as providing pilot data and retrospective data collections (Herschell *et al.* 2010; Nathan and Gorman 2007).

reviewing ABA's critics and critiques momentarily, I will proceed to investigate the treatment debate via the life-world.

6.5 ABA's Critics and Critiques

ABA has faced severe criticism over the years, most of which is in keeping with the neurodiversity spirit. The most influential relevant piece, and one that most accurately encapsulates people's problems with ABA, is perhaps the aforementioned Dawson's 2004 article *The Misbehaviour of Behaviourists*. Dawson is an ASCs researcher, and she has had a diagnosis herself since 1993. Dawson has also opposed ABA in court, taking legal action challenging its medical necessity for people with ASCs diagnoses in the Supreme Court of Canada in *Auton Versus British Columbia* (Judgements of the Supreme Court of Canada 2004). She is affiliated with the Autism Specialized Clinic of Hôpital Rivière-des-Prairies in Montreal, Canada, working on the team of Laurent Mottron, a full professor at the University of Montreal. Mottron himself is a quite acclaimed ASCs researcher, holding the Marcel and Rolande Gosselin research chair on cognitive neuroscience in autism at his university, and having his research funded by the Canadian Institutes of Health Research since 1997, publishing some hundred articles on ASCs and cognitive neuroscience.

In her famous and well-cited article Dawson claims that ABA was born out of the parents' and society's desire to reduce ASCs related behaviours that are stressful to *them* – not to people with ASCs diagnoses. In the discrepancy between society and a person with an ASC diagnosis, she says, Lovaas and colleagues thought it would be impossible to change society but possible and desired to change the person, even if that involved spanking and hitting said person (Dawson 2004, n.p.). Fortunately for Dawson, nowadays more and more people notice that presuming to transform the nature of non-consenting (e.g. because they are children or adults who actively resist such transformation) people through behaviour interventions must be challenged from an ethical point of view. For example, this is especially so in areas other than ASCs: trans- and homosexual people's consent and participation in whatever decision is made that pertains to their gender and sexuality's recognition and related intervention is now thought to be essential.

Dawson further argues that behaviourists base their program on entirely false assumptions: that people with ASCs cannot communicate, that they are incapable of learning and that their behaviours are almost unanimously useless and harmful to them.

While there have been radical changes in the understanding of ASCs, which encompass cases of normal to high intelligence and ample communication, there have been no commensurate adjustments to how the mainstream treatment, ABA, approaches ASCs, she says. ABA therapists do not seek to understand how a person with an ASC diagnosis functions and what purpose each of their behaviours serve: instead they want to eradicate every autistic trait invariantly. What is interesting to note here, a claim which I will elaborate in the upcoming section, is that Dawson's accusation sounds a lot like stating that ABA does not take into account the life-worlds of people with ASCs diagnoses. ABA is held to fail to recognise what the immediate intake of the world is for people with ASCs diagnoses, how they navigate the world and what importance and purpose certain conditions and behaviours hold for them.

Unfortunately, Dawson (2004, n.p.) says, this is much the same for most of the well-known opposition to ABA. The medical opposition to ABA has attacked Lovaas' 1987 study and 1993 follow-up on grounds of external validity; selection bias; statistical regression; outcomes measures; the problem of replication and others, but they have failed to concern themselves with ethics. Frank Gresham, a major critic of Lovaas, a doctor and, like Dawson, a witness in the *Auton* trial, has claimed that he himself is *the biggest supporter of ABA anywhere*. "He is just locking horns with Dr. Lovaas over who is the better scientist", Dawson (2004, n.p.) says. "Dr. Gresham also found the idea of autistics being involved or consulted in legal, research, or treatment decision absurd – like consulting the mentally retarded, he said" (ibid.).

It is only a short step from ignorance to unjustified aggressive intervention, Dawson argues. ABA would not have become such a successful industry in the absence of Lovaas' 'cured' 47%. Since Lovaas' initial study, however, Dawson argues, it has been found that in the absence of aversives, improvements in behaviour are rather insignificant. Lovaas, Dawson writes, has been the first to admit this himself:

> In a confluence of poor ethics and dishonest science, the autism-ABA industry has downplayed and even denied the importance of aversives in achieving the famous 47%. Dr Lovaas' 1987 study in fact emphasizes the importance and effectiveness of aversives … Lovaas' own position remains the same as in the 1987 study. In the Clarifying Comments paper, the recent illegality of aversives (in many jurisdictions, including

California) and their consequent withdrawal from ABA are cited as reasons his 1987 results have not been replicated. (Dawson 2004, n.p.)

Why this is a problem should be readily evident: even if ABA 'worked' (I will return shortly to what 'worked' should be taken to mean here), it seems that the component which made it work is the one now forbidden by law. What is the appropriate course of action in the face of this? Dawson argues that there is only one ethical choice: stop using the 47% to promote ABA and base its promotion on other studies, which test the results of practices that are now used legally. This, however, should only be the beginning, merely a step towards stopping 'cheating on the benchmarks', so to speak. Dawson's deeper problem is with what these benchmarks *actually measure*, and with which goals should be considered ethically and reliably as ASCs treatment goals. She admits, however, that, as intensive intervention, ABA is agreed to be efficacious (Dawson 2004, n.p.). Dawson concedes that there is certainly evidence that people with ASCs diagnoses can acquire new skills through it, skills that may be crucial to their happiness and independence (ibid.). Where ABA needs scrutiny is the part where it is used to remove odd, ASCs-related behaviours, which may actually be *useful and necessary* to people with ASCs (beneficial in their life-world's terms, I will argue), and to replace them with predictable behaviours, which may be detrimental to a person with ASC's physical and mental well-being. Dawson makes special mention of the 'terrible ruckus' typically following the first weeks of ABA therapy:

> The terrible ruckus of the first weeks of ABA is not credibly the result of autistics being dragged out of our supposed private worlds. All the crying and screaming and running away are more plausibly the noise and uproar of a child repeatedly forced to give up her strengths. (Dawson 2004, n.p.)

Dawson concludes her article by urging for people with ASCs to get ethical consideration in science and society. ABA supporters' claim that good ethics and good science are incompatible in the case of ASCs[71] is entirely unfounded, she says.

---

[71] Here Dawson refers to a 1999 report by the Association for Science in Autism Treatment's (ASAT – a non-profit ASCs organisation).

> There is no way to know what would happen if autistics were treated ethically in the area of consent, because, in the ABA research and treatment ASAT promotes, this has not happened yet … The autism-ABA industry has never come to grips with the serious ethical issues that arise whenever powerful behaviour therapies are imposed on clients who can't consent. Until this happens, it remains equally valid to propose that ethical standards might improve not only the outcome for autistics, but the state of the science. (Dawson 2004, n.p.)

For Dawson, it is a matter of fact that people with ASCs diagnoses have not been considered human beings with human rights within the ABA practice, mainly due to issues of breaching consent. People with ASCs diagnoses, she says, should not have to prove that they are human. Standing by her, Mottron, her superior at the University of Montreal, says that the dominant view is that people with ASCs diagnoses must be reeled back to normalcy (Wolman 2008). After his first few weeks on the job, he decided that such theories were, in his words, 'crap'. "These children were just of another kind," he says, echoing the autistic life-world contentions of the previous chapter. "You couldn't turn someone autistic or make someone not autistic. It was hardwired" (Wolman 2008, n.p.). Instead, he set out to exploit the different cognitive (and other) styles of people with ASCs diagnoses he worked with, with remarkable results. In 1986, he began working with a man who would later become known in the scientific literature as 'E.C.'. 'E.C.' could rotate objects in his mind and make technical drawings without the need for a single reversion, and thus could do related work that neurotypicals could not. This, of course, is not here to imply that exceptional ability should be a precursor to granting one's human rights, but rather to show that people with ASCs' skills can be employed in many ways if not approached as apples in a wholly rotten basket.

Dawson and Mottron are among the most influential and academically-oriented of such advocates but they are certainly not the only ones. Anti-ABA campaigning has assumed similar measure to that of the neurodiversity movement with major American and European press covering related issues. Elizabeth Devita-Raeburn (2016) of *The Atlantic* recently wrote a piece on the issue, citing the story of a child whose family decided to stop ABA because of both its cruelty and dubious generalisation of skills acquired through it. Heidi LoStracco (2014), a speech language pathologist, augmentative and

alternative communication consultant, and co-owner of Speak for Yourself[72], also makes the case for ABA being a mechanism that enforces compliance over independence, "drilling programs into heads that don't want it" (LoStracco 2014, n.p.). Again, the life-world connection is strong; the programs do not make sense in the people with ASCs diagnoses life-world. She makes the point that, in her experience, it is often the case that standard sets of words and expressions acquired through ABA *have no function in the patient's life, or feel insubstantial* (ibid.).

On the parent front, a telling tale regarding the 'against ABA' front is that of Court Alice Thatcher (2015). Thatcher argues for her stopping most of her ASC-diagnosed son's therapies. She cites the story of an ABA therapist visiting her home, an instance which she found particularly infuriating:

> [W]hen she arrived, A. was happily playing with a whisk he carried everywhere with him. He was flipping the light switches on and off quickly and laughing. It was one of his favourite games. The therapist frowned and took out her notebook then began to write. She said to me "We can get rid of that". I was floored and quite honestly offended. I told her I didn't want to "get rid of" something my child found fun that was hurting absolutely no one. (Thatcher 2015, n.p.)

In Thatcher's (ibid.) view, ABA is just a process to make people with ASCs diagnoses "like everyone else".

Overall, we now know that there are people who attack ABA in two ways: one that pertains to what the attackers consider a weak evidential basis, and one that pertains to purported meaningless of its affected changes to people with ASCs diagnoses. On the other hand, we have the pro-ABA camp, which supports that ABA provides people with ASCs diagnoses with life-changing, necessary skills. Thus, we now have in hand all we need to proceed to reviewing the political debate at the heart of ASCs via the life-world lens.

6.6 Framing the Debate Through the Life-World

[72] Speak for Yourself (SfY) is an Augmentative and Alternative Communication (AAC) application that was created by speech-language pathologists.

In the last chapter (section 5.3) I showcased the differences of the autistic life-worlds to the neurotypical ones. In this section I argue that the political claims of ASCs-involved activists are best understood as arguments for taking the autistic life-worlds to be legitimate modes of being – not defective conditions – and, further, to adjust treatment to these life-worlds' terms. I side with these activists' claims and argue that adjusting ASCs treatment to the autistic life-world necessitates both filtering ABA to leave profitable – in the autistic life-worlds' terms – ASCs-related behaviours be *and* looking towards other, phenomenologically oriented and alternative to ABA, treatment methods. I provide an example of a phenomenologically oriented treatment approach to ASCs via examining one of Oliver Sacks' recorded cases

We now have in our hands even more testimony from people with ASCs diagnoses, their peers, and ASCs-involved activists, not only further corroborating the suggested life-world difference of the last chapter, but also arguing against ASCs' mainstream treatment, ABA. I submit that we may legitimately construe these claims as arguing for the significance that the autistic life-worlds should have in ASCs treatment. Let us take a few examples. Recall Paradiz's (in Saner 2007, n.p.), statement that, in most schools, children with ASCs diagnoses are placed in settings that are either sensory and socially overwhelming or intellectually underwhelming for them, thus resulting in profound isolation and depression. She recommends adjusting the school settings people with ASCs diagnoses are put in based on what intellectual and emotional effects such settings have on them, adding that autism, as she calls it, is not a pathological condition to be done away with but a way of life that possesses a culture and history all its own. In the previous chapter, I argued extensively that the overwhelming sensory and social experiences that people with ASCs diagnoses display may be construed as metaphysical and emotional life-world differences respectively. What Paradiz is arguing for, in my analysis, is *taking this life-world into account* in people with ASCs' education, *not* simply seeking to normalise such people by placing them in 'normal' settings that they find overbearing on the off-chance that they become 'like everybody else'.

Something analogous may said for every person and argument we recounted in this chapter, such as Baron-Cohen (in Saner 2007, n.p.) worrying that "the remarkable attention to detail, and the ability to concentrate for long periods on a small topic in depth" – i.e. the autistic-particular life-world semiotics – "would be lost" in a sledge-hammer approach that would seek a cure for ASCs. This line of criticism culminates, as we saw, in

Dawson (2004), heralding an attack on those who seek to eradicate every autistic trait invariantly. Behaviourists, she tells us, understand ASCs as surface conditions, as collections of symptoms. They do not understand that under the symptoms' surface lie whole worlds with their own 'organizing ideas' and that autistic behaviours often correspond *to these worlds exactly*: the 'terrible ruckus' often following the first weeks of ABA treatment is plausibly, Dawson says (2004, n.p.), the noise and uproar of a child repeatedly forced to give up her strengths. Thatcher (2015) also blamed ABA for, in her view, attempting to make people with ASCs diagnoses 'like everyone else', ignoring that, e.g. unusual games – like her son's quickly turning the lights on and off – may resonate very well for them. Thatcher's story prompts us to think about the emotional axis in life-world difference proffered in section 5.3; her son's preference for the game points to a non-typical emotional reaction to a given situation. In this example, ABA seems to either ignore this, in my terms, life-world difference or not much care for it, bundling it up with the rest of the ASCs-related characteristics to be done away with during treatment.

We now understand that ASCs-involved activists are blaming ABA for trying to normalise people with ASCs diagnoses. We also get a first sense, to find further confirmation below, that these accusations are best understood in terms of the life-world: ABA, the general claim seems to be, either does not capture the deep-seated differences in how people with ASCs diagnoses perceive the world and themselves, or does not care for such differences. We may now ask: how, in this frame of thinking, is treatment to be adjusted? As I have noted above, with the life-world I approach I recommend two things: leaving beneficial behaviours be and look towards more phenomenologically, ASCs-lifeworlds oriented methods of treatment. Let us take the first point.

Above, Dawson (n.p.) mentioned that ABA wrongfully makes people with ASCs diagnoses give up their strengths. What strengths may these be? We recall, as an example, her supervisor's (Laurent Mottron) approach. Realising that "these children were just of another kind" and that "you couldn't turn someone autistic or make someone not autistic" (Mottron cited in Wolman 2008, n.p.), Mottron set out to understand his patients' different cognitive styles – plausibly a difference in life-world metaphysics, I argued in section 5.3 – and put them to appropriate use. We saw just above that, while working with patient 'E.C.', who could rotate objects in his mind and make technical drawings much easier than a neurotypical person could, Mottron assigned 'E.C.' with work related to this exceptional ability.

We should not, however, look for beneficial ASCs-related behaviours only in the realm of what the neurotypicals consider exceptional abilities. ASC-related behaviours may be beneficial simply in the sense of helping people with ASCs diagnoses navigate a world that is *anything but* tailored to the autistic life-worlds. An example of such a behaviour may be as simple as rocking back and forth to self-regulate and manage stress. Lisa Jo Rudy, mother of a young adult with an ASC diagnosis, recently published an article on the health website verywellhealth.com, reviewed by Joel Foreman, M.D., associate professor of paediatrics and environmental medicine and public health at Mount Sinai School of Medicine, New York. The topic of her article is autistic 'stimming'. Rudy writes:

> The term 'stimming' is short for self-stimulatory behavior and is sometimes also called 'stereotypic' behavior. In a person with autism, stimming usually refers to specific behaviors that include hand-flapping, rocking, spinning, or repetition of words and phrases. ...
>
> People with autism stim to help themselves to manage anxiety, fear, anger, excitement, anticipation, and other strong emotions. They also stim to help themselves handle overwhelming sensory input (too much noise, light, heat, etc.). There are also times when people stim out of habit, just as neurotypical people bite their nails, twirl their hair, or tap their feet out of habit. (Rudy 2018, n.p.)

Rudy is in principle sympathetic to stimming, with some qualifications. She continues below:

> There's really no good reason why flapping should be less acceptable than nail-biting (it's certainly more hygienic!). But in our world, the hand flappers receive negative attention while the nail-biters (at least to a certain degree) are tolerated.
>
> Some stims can be quite extreme and are legitimately upsetting or even frightening to typical people. For example, some autistic people stim by making loud noises that can sound threatening or scary. Some hit themselves with their hands, or even bang their heads against the wall. These types of stims are obviously problematic for a variety of reasons. (Rudy 2018, n.p.)

We should note here that how compensatory strategies by people with ASCs diagnoses work is *itself* an understudied and poorly understood topic. A recent study by Lucy Anne Livingston and Francesca Happé (2017) tries to shed light on the issue, claiming, among other things that "the construct of compensation is poorly understood and has no agreed definition" (Livingston & Happé 2017, highlights).

Again, my claim here is that, save for harm-conducive behaviours such as those that Rudy talks about above, ABA should leave alone those that prove to be helpful to people with ASCs diagnoses and make sense in their life-worlds. We should, I submit, look more towards adjusting the environment to their life-worlds rather than eradicating their compensatory strategies altogether. An example of such an attempt may be found in the case of Sesame Place. Sesame Place in Pennsylvania, United States, is the world's first autism-certified theme park (Sesame Place n.d.). The park's staff have received specialized training regarding how to interact with people with ASCs diagnoses, meaning that they have become aware of the children's sensory and emotional awareness (we are again reminded of the life-world's metaphysical and emotional axes). Moreover, the park has been structurally tailored to accommodate people with ASCs diagnoses. For example, since many people with ASCs diagnoses are overwhelmed by noisy theme parks, Sesame Place offers noise-cancelling headphones and calmer areas for children who want to relax by themselves.

Recall that my life-world oriented contention is not simply that people with ASCs diagnoses perceive stimuli and the relations between things differently or that they feel differently to the neurotypicals towards stuff and take them to mean different things. In and of itself, this would not amount to much of a directive for ASCs treatment. Someone with arachnophobia or a pathological fear of getting into media of massive transportation also feels differently to most towards things, but it is generally the case that these phobias become the object of psychological treatment, largely behavioural at that – see cognitive behavioural treatment (e.g. Cognitive Behavioral Therapy Los Angeles n.d.) – and effectively without any political controversy involved. What the different *life-world* notion introduces is the idea that this state of affairs is *inalterable* for people with ASCs diagnoses. The life-world analytical tool is so gloriously applicable here because it reflects philosophically what is so persistently present throughout the people with ASCs diagnoses' and the neurodiversity activists' testimony: that the conditions are 'built into the wiring'; that 'there is no normal person behind the autism'; that this state of affairs is

'home to you'[73]; that what the neurotypicals perceive as meaningful and functional people with ASCs diagnoses often can only mimic in a mechanistic and complying way in order to fit in. Not that this is always a successful endeavour: we recall the unanimous admittance that ASCs are incurable – even assuming the conditions call out for a cure and even if this cure pertains only to symptomatology – and the critiques of the evidential basis of ABA, seriously challenging the confidence we may have in it, even in its own terms of apparent behavioural change.

The point is: the autistic life-worlds are here to stay. The best analogy, then, between a condition typically behaviourally treated, say arachnophobia, and ASCs, would be the case in which behavioural treatment did not make the fear of spiders go away and just partly managed to effect a fear camouflaging in the treatment recipient. Due to the delicate nature of the issue, I would now like to stress once more that the suggestion here is *not* that ABA should be abolished. Evidently, it is hard not to sympathise with a parent who wishes to be able to take their child through the necessary daily routines without this needing an exhausting effort and even more so in the case of parents who wish to stop their child from repeatedly harming themselves. The topic, of course, of whether this result can be brought about by means other than ABA, will remain a mystery or a private issue until the now understudied alternatives to ABA are properly studied and the results available to the public. To conclude the life-world-ABA dialectic then, the life-world approach calls for everyone involved in ASCs treatment (doctors, therapists, caretakers, families) and the wider society to engage in better understanding the autistic life-world *and to become comfortable with the harmless coping that people with ASCs diagnoses conduct* as well as their different ways of being, feeling, and relating. Consistently and carefully mapping how people with ASCs diagnoses perceive the world – such an attempt was made in general terms in section 5.3 of the last chapter – is obviously a necessary step towards realising this goal.

We have now seen how the debate around ASCs treatment may be seen as life-world based and how my life-world approach criticises and suggests a filtering of ABA, but we have not seen the new elements it calls for in the field of ASCs treatment. Although it may be a crucial function, we should not restrict the life-world analysis' role to filtering ABA.

---

[73] The particular expressions, it is reminded, are from David Mitchell's introduction to Naoki Higashida's (2013, introduction) book from the last chapter, section 5.3.

After all, ABA is a behavioural, third-person method and the life-world is a phenomenological tool of approaching perceptual and experiential difference if there ever was any. The life-world prompts us to examine new directions of ASCs treatment that are phenomenologically based. Sadly, again, as we took occasion to see above, treatments alternative to ABA are seldom funded and tested. This is not without exception. I would now like to present the case of Sacks' 'twin savants', a case in which, I will claim, a life-world oriented treatment was starting to materialise, later unfortunately interrupted. Many of Sacks' claims remain speculative and thus this case consists in its entirety far from sturdy evidence which we should base treatment directions on. However, there is also a strong empirical component, mainly pertaining to the intricate ways people with ASCs diagnoses may relate to one another and to the neurotypicals. At any rate my purpose here is not to proffer a specific method of treatment, but to paint the picture of what a life-world oriented treatment would *look like*.

In his 1985 book *The Man Who Mistook His Wife for a Hat*, Oliver Sacks, one of the most famous neurologists in the world, dedicates his twenty third chapter to Charles and George, a pair of twin autistic 'idiot savants' (an academic presentation of the case can be found in Horwitz *et al*. 1965). 'Idiot savants' was at the time the medical term for people with an otherwise low IQ score but with exceptional ability in some respect, here regarding calendar related calculations. Sacks notes that, despite there having been detailed reports of the twins' state both in scientific and literary form, close to none of these reports bothered to disentangle itself from the obvious, testable surface of events from the point of view of neurotypical scientists and doctors. Charles and George were people of a low IQ score who could have told you when Easter is in forty thousand years from now and that was it. Sacks writes (italics mine):

> One indeed gets no hint of any depths unless one ceases to test the twins, to regard them as 'subjects'. One must lay aside the urge to limit and test, and get to know the twins – observe them, openly, quietly, without presuppositions, but with a full and sympathetic *phenomenological openness*, as they live and think and interact quietly, pursuing their own lives, spontaneously, in their singular way. (Sacks (1985/2011, 205)

Trying to go below this mysterious surface, Sacks tried 'simply living' with the twins for a period, during which he observed their peculiar obsession with numbers: they would often sit in a corner all by themselves, saying numbers to one another for hours on end. Of the second time he did that, he writes:

> This second time they were seated in a corner together, with a mysterious, secret smile on their faces, a smile I had never seen before, enjoying the strange pleasure and peace they now seemed to have. I crept up quietly, so as not to disturb them. They seemed to be locked in a singular, purely numerical, converse. John would say a number – a six-figure number. Michael would catch the number, nod, smile and seem to savor it. Then he, in turn, would say another six-figure number, and now it was John who received, and appreciated it richly. They looked, at first, like two connoisseurs wine-tasting, sharing rare tastes, rare appreciations. I sat still, unseen by them, mesmerized, bewildered. *What* were they doing? (Sacks 1985/2011, 211):

Sacks started noting these six-figure numbers and, over a period, figured out that they were all *prime* numbers. He decided to take his experiment one step further and to join them with a book of recorded primes in hand the next time they played this game – and even chime in a prime himself. Here is what happened next:

> There was a long pause – the longest I had ever known them to make, it must have lasted a half-minute or more – and then suddenly, simultaneously, they both broke into smiles. ... They drew apart slightly, making room for me, a new number playmate, a third in their world. Then John, who always took the lead, thought for a very long time – it must have been at least five minutes, though I dared not move, and scarcely breathed – and brought out a nine-figure number; and after a similar time his twin, Michael, responded with a similar one. And then I, in my turn, after a surreptitious look in my book, added my own rather dishonest contribution, a ten-figure prime I found in my book. (Sacks 1985/2011, 212-213):

Based on more clinical observation and dialogue with the twins, Sacks went on to conjecture what the twins' relationship to numbers may be. The below passage makes it

evident that Sacks is into business of trying to recreate their life-world while engaging with them.

> I believe the twins, seemingly so isolated, live in a world full of friends, that they have millions, billions, of numbers to which they say 'Hi!' and which, I am sure, say 'Hi!' back. But none of the numbers is arbitrary – like 62 squared – nor (and this is the mystery) is it arrived at by any of the usual methods, or any method so far as I can make out. The twins seem to employ a direct cognition – like angels. They see, directly, a universe and heaven of numbers. And this, however singular, however bizarre – but what right have we to call it 'pathological'? – provides a singular self-sufficiency and serenity to their lives, and one which it might be tragic to interfere with, or break. (Sacks 1985/2011, 219)

This is fascinating to read but, especially since it is, as admitted by Sacks, speculation, it is not of weighted importance here: what *is* of such importance is that, through trying to understand their perception 'from within' like no one else had done before, Sacks succeeded in establishing an accommodating relationship with the twins who were thought about as being beyond any attempt at therapy, locked off in their far-away world. Much to his own dissatisfaction, however, he found out, ten years later, that the twins had been separated because it was opined that "for their own good", their 'unhealthy communication together' should be interrupted, and they should "face the world ... in a socially appropriate way" (Sacks 1985/2011, 219-220). The serenity mentioned above went with that separation. Sacks writes:

> Both have been moved now into 'halfway houses', and do menial jobs, for pocket money, under close supervision. They are able to take buses, if carefully directed and given a token, and to keep themselves moderately presentable and clean, though their moronic and psychotic character [sic] is still recognizable at a glance. ... This is the positive side – but there is a negative side too (not mentioned in their charts, because it was never recognized in the first place). Deprived of their numerical 'communion' with each other, and of time and opportunity for any 'contemplation' or 'communion' at all – they are always being hurried and jostled from one job to another – they seem to have lost their strange numerical power, and with this the chief joy and sense of their

> lives. But this is considered a small price to pay, no doubt, for their having become quasi-independent and 'socially acceptable' ... [On a similar case] Nigel Dennis comments: 'We are left with a genius who has had her genius removed, leaving nothing behind but a general defectiveness. What are we supposed to think about such a curious cure?' (Sacks 1985/2011, 219-220)

What are we to learn from this story in a life-world sense? The fruit, I think, is ripe for the taking. It is abundantly clear that Sacks' difference to that of the other therapists was that *he tried to recreate the twins' life-world*, to get a sense of their emotional state, their relation to numbers, which he understood was totally different to that of his – and more generally to a neurotypical one. The peculiar characteristics of the twins that he mentions and conjectures – their 'direct cognition', their emotional relationship with numbers; the ways in which they communicate with one another via numeric mediation – may easily be mapped onto categories of the life-world: cognition to metaphysics, the meaning they ascribed to the numbers to semiotics, how numeric communion made them feel to emotions.

Sacks, is my point, did not suppose that their autistic traits and practice were de facto a bad thing to do away with, and in so doing he managed to establish an interactive relationship with them where others failed. It is a pity that chance did not permit for his therapeutic way to come through and see what would have become if it came to maturity but his last conclusion is too tempting to resist: if the twins indeed lived in this world of numbers, and if they had found a way to gain serenity through their and their "imaginary friends'" community, is that all worth giving up for the skill to take the bus and do menial jobs under close supervision? I do not claim to be able to answer this resolutely. The most important thing that this case shows, however, I submit, is that *these* are the right kind of questions to ask in the frame of ASCs treatment: how much should a person be stressed to fit in society? More structurally and importantly than this: before prescribing treatment, are we sure we have understood what treatment (and life) means to people with ASCs diagnoses, how it is cashed out in their terms?

In this section, with the initial theoretical considerations and the subsequent example of the calendar savant twins, I aimed to outline how the life-world prism can provide a philosophical framework for navigating ASCs treatment. By realising that people with ASCs diagnoses occupy a different life-world to that of the neurotypicals, which is

characterised by an incorrigibly altered structure and function, we can simultaneously understand that any related treatment should be adjusted to this life-world's needs. This does not by any measure imply *tout court* that things should be left as they are. The conclusive point is that there should be a differentiation of targeted autistic traits between those that facilitate dependability and exclusion to an unacceptable extent and those that are relatively 'innocent', and which help people with ASCs diagnoses navigate the world while maintaining a certain quality of life. Last, I turned to, besides ABA, an extant phenomenologically oriented process of treatment. Let us now turn to certain limits of applicability that we should admit regarding these life-world directions.

6.7 Limits of General Applicability

Before I draw this chapter to a close I would like to zoom the picture out a bit and consider some limits of applicability regarding the method proposed herein. Is there perhaps a limit to the life-world oriented process, regarding the projections from our own life-world that we must unavoidably and invariantly make to recreate that of the other's? In chapter four we defended the theoretical possibility of alternative conceptual schemes. We did so by shooting down Davidson's arguments and by transcending the linguistic turn's obsession with language and translation when evincing conceptual differences. In chapter five we saw that people with ASCs diagnoses may be validly construed as people of different life-worlds to the neurotypical ones. In this chapter, we saw that people with ASCs diagnoses *should* be understood as people of different life-worlds – and that those life-worlds should be respected and taken seriously in ASCs treatment orientation. Now we may ask: *how far away* are our case study's life-worlds from the neurotypical life-worlds? Generalising from and extending this question: is there a limit after which the distance of a life-world from another makes it impossible for the two to be in creative communion? We have demonstrated that the life-world concept is meaningful, helpful, purportedly even necessary in the neurotypical-autistic communication, especially in the frame of treatment. How much of a role does the potential neighbourliness of the neurotypical-autistic life-worlds play in this? Is it perhaps a necessary condition? In the remainder of this section, I will address this question. I will claim that, while the theoretical possibility of close to no overlap between life-worlds and conceptual schemes is open, we *need* to make impositions and projections from our 'home' life-world if we seek to communicate with alien life-

worlds. The communication between the life-worlds of neurotypical scientists and people with ASCs diagnoses is no exception to this rule.

Recall now Sacks' (1985/2011, 205) statement that one should approach the twins 'without presupposition'. Despite my sympathy towards Sacks' approach, I find this claim entirely inadmissible. Sacks himself did approach the twins with *a whole lot* of presuppositions. Take an example: he took their smiles and laughter to mean that they were happy, as signs that he was beginning to establish a meaningful relationship with them. Sacks *needed* this assumption, as he did many others, such as: that the twins had a sense of their self as separate entities from the rest of the world; that they recognised numbers and one another; that they were less happy when placed in halfway houses. He needed these assumptions το evaluate his method of treatment comparatively to the previous one and to suggest that the phenomenological way of approaching the twins would have been better. These assumptions evidently stem from Sacks' life-world and, more generally, from the intersubjective neurotypical life-world, whereupon it is admitted that e.g. certain reactions as smiles and laughter are translated into a subject's happy condition.

In chapter four we pushed the limit of conceptual scheme difference. We did so rightly: had we gone in to investigate the ASCs case adopting the Davidsonian, language-focused line and with only the weapon of translation in hand, we would have crucially failed to grasp the depths of the autistic differences. However, at this point we must also recognise that the life-worlds we seek to understand from our (given) own must also display some conceptual neighbourliness to our own – or rather we must suppose they do. Theoretically, the possibility is always open that, for example, in the twins' case, their smiles and reactions when Sacks communicated his primes to them *did not* mean that they were happy. In section 4.4 I argued extensively for deep conceptual differences. The only thing that stood as potentially unrelativizable was the outside world at large – therefore a smile and laughter are completely in the range of relativizable concepts. Thus, a particular kind of Cartesian angst looms in every interpretation of the other's life-world: have I constructed it faithfully or am I imposing the categories of my own life-world on it? How do I know which one it is? Here, we are reminded of Richard Rorty and his pragmatic criterion for the dependability of translation: a translation is dependable, Rorty put it, if we *can do things with it*. Sacks argued that he could do things with his own, deeper, phenomenological recreation of, in my terms, the twins' life-world. Was he correct? We

may not know. We may know only that, *always from within* a certain life-world (here the neurotypical), Sacks' approach to the twins plausibly made more sense compared to previous and antecedent approaches.

The moral from this is that we always impose in seeking to communicate with the other, and that we are never warranted absolute confidence in our interpretations. Sacks sought to maximize the twins' happiness. Perhaps 'happiness' made no sense whatsoever in their life-worlds. However, if our goal is to maximize the other's happiness there seems to be no other way to achieve this goal *but* to assume they have *some* sense of happiness. In the work conducted in this chapter and in the previous two, I have tried to show that we may, by overcoming the linguistic-behavioural obsession expand, *from* the neurotypical life-world, the ways in which we understand the *how* of happiness: understand that a person with an ASC diagnosis may be happy switching the lights on and off, rocking back and forth, secluding themselves from social contact and certain stimuli the neurotypicals may find pleasurable. Surely, we established that, theoretically, conceptual difference and life-world difference does not warrant such a supposition. However, theoretically pondering potential conceptual scheme and life-world difference is one thing, and being in creative and treatment-oriented communication with others' conceptual schemes and life-worlds is another. We may keep the theoretical interest of our conclusions and admit humbly that, to 'build' something with another we must admit a series of necessary, Davidsonian-flavoured assumptions on behalf of the other. Nay, we must even admit such sanctions in knowing that the other *is* another.

It is therefore essential for meaningful science to progress that a commonality of goals is established in terms that can be followed to also work towards this goal: a doctor must understand what it is like to be *another* (a patient), and what the patient would want to be like and how they should feel, but this should – can only – be done in terms able to also produce science, if science is to be the medium to work towards these goals. Again, I do not wish to state that neurotypical science as we know it today is or can be the *only* such medium. The focus here is not so much on science as we know it today, but on the method of inquiry and goal-pursuing: to change something, we must understand it in a way that, first of all, allows us to recognise it, and also that allows us to change it. This is little more than tautology.

A last note: ascertainment of commonality does not necessitate commonality of language and at no rate do I want to support this here. It was argued in the last chapter

that a life-world is more than a linguistic entity and we do not need to stray far from the path of everyday neurotypical life to see this. A toddler cries and we interpret this sign as wanting water or food. In saying that meaningfulness requires commonality I do not say that meaningfulness requires (shared) language. Regarding the ASCs case, we interpret e.g. the distress of nonverbal people finding themselves in overbearing stimuli as giving out a different kind of life-world, and Davidson and the linguistic turn approach would presumably miss it supposing that they would be on the hunt for statements to evince difference. What *is* unavoidably needed is some kind of interpretation (hopefully the correct one), and this is a problem we must humbly accept, leaving universal aspirations to one side. I will expand on and generalise from this point in section six of the upcoming chapter.

Conclusion

Let us now zoom out and summarily take stock of what has happened over the span of the whole discussion on ASCs. In chapter five I presented ASCs in their historical and conceptual environment and, based on this presentation, argued that people with ASCs diagnoses must be seen as people operating in a kind of life-world importantly different to the neurotypical one. I made this argument juxtaposing scientific discourse around ASCs (mainly from cognitive theories) with the definition of the life-world. This, I will argue, is an excellent point from which to survey the scientific realism debate in a new light, concerning this time the observable aspects of the world, the many alternative ways of accessing them, and the immense consequences of what we take to be *true* for human lives. The examination of this issue will take up the better part of the final chapter. By this point, and if my argumentation is correct, I have shown that not only are importantly different life-worlds a theoretical possibility but also that there is a real-life situation to which this applies.

Before moving on to this task, a note about chapter six's importance. I believe that chapter six is possibly the most important of the present dissertation. This is because it moves *beyond* the theoretical discussion of truth and how we may think of truth by looking at different people and takes a step into *why this is important for the quality of treatment and overall quality of life of real people*. In the present chapter I tried to show that the issue of a different life-world, and what credence we give to this difference, is not only of interest to those seeking to bolster or deconstruct science's status as the divine holder of sacred truths.

How we treat at first the possible reality of a different view and function, and subsequently their *validity* seems to be all that the political debate around ASCs treatment revolves. It is important to note here that one does not even need to have a deeply thought out position on the 'real' ontology of the world to reasonably situate themselves towards this ongoing debate: that a certain view of the world, and a certain function that goes with it appear to be incorrigible and hardwired, is a point of much more importance, and reference to the 'real' ilk of the world and its joints seems to be redundant for the case in point. This highlights something that I have pointed out throughout this dissertation and will continue to discuss in the chapter to come: that, oftentimes, the question of whether something appears to the best of our knowledge and feeling to be incorrigibly, for the foreseeable future unavoidably, so and so is oftentimes a question far more crucial than whether it is *Real*.

To arrive at the above conclusions, I followed the trajectory below. In section 6.1 I provided a historical overview of ASCs treatment, mainly to show how some patterns of the present are intimately connected to the past and the criticisms this past raised. In section 6.2 I presented the early neurodiversity movement along with commentary from its main proponents and influential neurodifferent people, as well as the argument they converge on: claiming neurological difference to be a valid form of life. In sections 6.3 to 6.5 I followed contemporary proponents of neurodiversity and anti-ABA activists in particular, and juxtaposed a characteristic collection of their opinions with the scientific discourse around what ABA is, what it aims and seems to achieve, and how. Having provided an evidential check of related claims through a meta-study on early intervention, in section 6.6 I tried to provide a general arbitration of the debate as it is seen through the life-world prism, and I tentatively suggested that at least the most central activist points on therapy should be granted. I closed with a note of limitation regarding what we can hope and not hope to achieve, in the ASCs case and others, through the proposed arbitration method.

7. Pluralistic Incorrigible Realism

Introduction

In the beginning of this dissertation I argued against taking science and truth to be wedded until a historical counter-example prompts us to think otherwise. I called for a deeper investigation of what kind of truth science may bring us, and I claimed that this investigation is best carried out by way of the observables. Following, I submitted that the best definition of the observables is the life-world. As I demonstrated, the life-world is the product of a synergy between the perceiving agent and the world, and plural and conditioned by a given perceiving agent's faculties and capacities. In the last two chapters I engaged with the autism spectrum conditions (ASCs) case and I argued for two things. First, that people with ASCs diagnoses are best understood as operators of different life-worlds to the neurologically typical ones. Second, that how we treat these life-worlds in scientific practice matters for the well-being of people with ASCs diagnoses, and that employing the life-world toolkit to prioritize people with ASCs' perception of the world in treatment would make for better treatment.

In this chapter I will tie the whole discussion on life-worlds' plurality and ASCs back to where it all began from: the scientific realism versus scientific antirealism debate. First, I hereby name my thesis pluralistic incorrigible realism (PIR). Second, I will explicate the limits my thesis puts upon the notions of truth and reality, allowing that a statement be intersubjectively (versus universally) incorrigibly true, and an entity intersubjectively incorrigibly real, at most. Third, I will explain what my thesis contributes to the scientific realism debate. Pluralistic incorrigible realism's contributions will be organised under two main motivations regarding the debate: the call to go beyond the linguistic analysis of science and the call to pay more attention to scientific practice. I will argue that philosophers of science should set aside metaphysical questions pertinent to truth and reality *tout court*[74], which are largely owed to approaching science plainly as a linguistic set of theories, and pay more attention to how insights from the scientific realism debate may be utilised in science's humanitarian orientation. Last, I will address some issues of self-reflexivity and of how pluralistic incorrigible realism grounds meaning.

[74] Henceforth universal, unconditional, *tout court* truth/reality will be referred to as Truth/Reality.

The present chapter is structured as follows. In section 7.1 I provide an overview of PIR as the sum of theses formed over the course of this dissertation. PIR is effectively the sum of three theses: that science crucially depends on the life-world, that the life-world is a construction owed to the world and the subject and that it can be intersubjectively shared, and that there are many and importantly different life-worlds which are characterised by different ontologies, metaphysics, emotions, and semiotics. PIR's main claim is that a given science's truth-claim and description of reality are contingent on the life-worlds it is articulated from.

After I have my thesis and its main claim in view, in sections 7.2 and 7.3 I will outline PIR's contributions to the traditional analytic scientific realism debate. These contributions I will organise along two axes: the move beyond language and the move into practice. The move beyond language demonstrates the richer understanding of science that we achieved when considering extra-linguistic elements that pertain to science's situatedness upon given life-worlds. Moreover, the move beyond language highlights that we should likewise go beyond language when looking for life-worlds that may be divergent from the typical, in the way that we did in the ASCs case study.

The move into practice explains how PIR alters the traditional orientation of the scientific realism debate. By conditioning science's claim to truth and reality to given life-worlds, PIR side-lines the debate's focus on truth and reality as viewed from nowhere, conducted via the unobservables. Instead, through PIR's highlighting of the importance of the observables for science, the move into practice proffers that we should focus on *how what we take to be real shapes scientific practice*. For example, the ASCs case study demonstrates that when we take the autistic life-world to be real we end up carrying out a different, arguably better, ASCs-related science.

In sections 7.4 and 7.5 I address PIR as realism and antirealism; examining what kind of belief in truth and reality it warrants and what it forbids. First, I argue that any notions of Truth and Reality should go. Second, I submit that the notions of 'truth' and 'reality' should be taken to denote statements that appear to be incorrigibly true in given life-worlds, and entities and relations that appear to be incorrigibly real in given life-worlds respectively. I naturally allow apportioning our belief in corrigible entities and relations' existence to the evidence we have for them – but always conditioning them to certain life-worlds. I also comment on how PIR connects with contemporary forms of scientific realism. I find that PIR has a lot in common with entity realism and with perspectival

realism – and that it also does justice to many of the analytic writers' maxims we reviewed in chapter two.

Finally, section 7.6 addresses issues of self-reflexivity and meaning grounding on behalf of PIR. I admit that what I have written herein also stems from a certain life-world (mine, which happens to be close to the typical), and I also submit that my work in this dissertation may be construed not as evincing different life-worlds *per se*, but as showing the capacity of *the typical life-world* to interpret alien life-worlds *qua* alien life-worlds. Last, I note that while the way PIR grounds meaning – via phenomenological intentions – leaves open Hilary Putnam's feared scenario of sliding into solipsism and subjective idealism, we should not worry too much about such a possibility.

7.1 Thesis Overview

In this section I provide an overview of pluralistic incorrigible realism as the sum of theses developed throughout this dissertation. I also articulate and develop its main claim: that scientific truth and description of reality are contingent on the life-worlds from within which they are articulated.

The first thesis of PIR is that science crucially depends on the life-world. We recall the arguments for this from section 3.5 demonstrating that science does not begin from and is conducted and justified in a vacuum – it is always theorizing about and acting based on phenomena given to it by the life-world. Incorrigible perception provides the individuated phenomena which science studies; bodily, cognitive, and other human tropes dictate how it may be carried out; evidence for its justification is found back in the world of incorrigible perception. In the cloud chamber case of chapter three we took occasion to argue for these claims. Perceiving the sealed glass container and the radioactive material as separate entities (individuation); 'holding' the sequence of experimental events in the 'fore' of our mind and synthesizing them towards the conclusion that an electron has been observed (cognition); perceiving the white tracks incorrigibly (justification), all these are life-world elements that are *sine qua non* conditions of possibility for the cloud chamber experiment as we know and understand it.

The second thesis of PIR is that the life-world is not plainly a construction of the perceiving subject or of the world but the product of a *synergy* between them. We recall from section 3.1 that Edmund Husserl was, in modern analytic philosophy terms, doubtlessly a metaphysical realist and that he defined the life-world exactly as the mind-

independent world filtered through each subject's perceiving capacities. Since this is not a Husserl studies dissertation, however, and Husserl's definitions may not be enough, I will also provide my own arguments in favour of metaphysical realism in the life-world context in section five of the present chapter.

The third thesis of PIR is that we should not speak of the life-world singular but of life-worlds plural: each subject has their own life-world. It is also true that life-worlds may be shared; they have an intersubjective dimension, which obtains when incorrigible experience is the same for two or more subjects. Fighting the Davidsonians forbidding any conceptual scheme difference and then applying the pro-variation arguments to life-worlds in chapter four gave us the theoretical confidence that different life-worlds may exist. Chapters five and six convinced us that not only is life-world divergence a theoretical possibility but that an important percent of the extant human population – roughly one percent are diagnosed with ASCs – can be said to operate in life-worlds importantly different to the typical ones. Moreover, we showcased that this life-world divergence is very significant for the quality of human lives. In the ASCs case, we may either take the autistic life-world to be a valid experiential state and work alongside its terms trying to provide meaningful treatment or view ASCs at large as a defective behavioural diversion and seek to correct it.

In summary, chapter three defined the life-world and established its crucial role for science; chapter four demonstrated the theoretical possibility of different life-worlds; chapters five and six showed us that different life-worlds exist, and that how we treat this difference in scientific practice matters for human well-being. As noted in the introduction, the main claim of PIR is that scientific truth and description of reality is contingent on the life-world from within which it is articulated. I will now develop this claim.

Taken in conjunction, the statements that the life-world is crucially involved in science and that a life-world is crucially contingent on a perceiving subject prompt us to think that a different life-world would make for a different science. This is indeed my claim here, but with qualifications. Imagine any two modern physicists conducting the cloud chamber experiment we reviewed in chapter three. No matter how much they are alike, one out of our imagined pair is bound to react emotionally differently to the other upon encounters with certain things, and likewise synthesize meaning differently when faced with certain signifiers. Nevertheless, the way they will conduct the experiment and the scientific conclusions that they will extract from it will presumably be the same. This scenario

highlights that not all life-world differences are science-important. One's e.g. general fear of bees will have no impact on the cloud chamber experiment's outcome. What is crucial for a given science's sameness across scientists is that the part of the life-world that is important *for that* given science is similar enough across scientists.

This applies, too, across *communities*: if we have a community of scientists with their own, science-important, intersubjective life-world, and another community with a counter-part intersubjective life-world that is different, *then* the sciences the two communities will produce will be different. In fact, addressing the scientific communities' life-worlds allows us to see that sometimes the intersubjective life-world may override the personal in the frame of science. This is elegantly brought out by the case of the 18th century case of Nicholas Saunderson, a blind professor of optics. For Saunderson, even his primary phenomenon of investigation, light, was not incorrigibly present in his life-world. He was, nevertheless, able to become a world-renowned expert in optics. This should highlight the life-world's intersubjectivity, but it should under no circumstances lead us to think we can do away with incorrigible admittances. First, because Saunderson employed other types of incorrigible admittances (plausibly mainly cognitive) in order to comprehend and 'borrow' the others' life-world. Second, because we are here talking exactly about the others' *life-world*; luminous situations were incorrigible admittances of, again, someone else's life-world. What matters mostly in science, therefore, is the *intersubjective* life-world: those entities, qualities, cognitive tropes et cetera, that act as the incorrigible substratum of the 'collective body and mind' if you will, of a scientific group. Here is then why intersubjectivity matters so much for science; the community's *collective* incorrigible assumptions shape the ground for science's departure, conduction, and justification. Even though the white tracks are not a part of the blind physicist's life-world, being convinced by others – presuming of course they *can* communicate with others – that they exist makes the blind physicist act and conduct science *as if* the white tracks were an incorrigible item of perception for them as well.

Thus, different life-worlds make for different science, all the above provisos included: if physics was not related to a life-world that would prompt physicists to ontologically individuate the equipment necessary to set up the cloud chamber experiment, or lacked capacities with which to see the white tracks of electrons, or lacked the cognitive capacities to process meaning from the related events to extract the conclusion that electrons have been observed, then the related experiment would not even have been able to get off the

ground. There is always the possibility, of course, that these capacities could be developed with theoretical and technical means. This, however, does not take away the importance of the life-world for science: if these capacities attained the status of incorrigible tools of perception (as, we recall from section 3.2, with the case of eyeglasses, that we incorrigibly take to correct sight) then they would *themselves* be part of the life-world. If not, our reasons for believing in their reliability would be able to be traced back to the life-world. In section 3.3 we unpacked the scientific notions involved in electron observation, like radioactivity and electricity, and we were able to trace them back to life-world elements.

To be sure, the above does not preclude wild life-world difference *within* science. The 'stabilisation' of an intersubjective life-world in science is an ordinary phenomenon, but it is not conceptually necessary. As I develop it, pluralistic incorrigible realism is absolutely open to the possibility that beings with totally different life-worlds from our ordinary ones construct their own physics in their life-worlds' terms. My position is at no rate a monistic realist one. To put it simply, the realism in PIR is meant to encapsulate simply that a lot of people seem to be stuck with the same specific perceptions and systems to process these perceptions, and that we necessarily base our science on *some* such perceptions and means (usually the most common ones). Last, it is certainly not the case that the intersubjective life-world stabilisation in science is always a good thing. I think the autism spectrum conditions case speaks for itself, as a case of science *intended for* people with different life-worlds. It is no problem to assume a life-world with light featuring in it when one constructs a physics for the many, but it *is* a problem to construct a life-world with universal meanings for all behaviour when one constructs treatment for the few.

So far, we have established that life-worlds that are importantly different in the right way would make for different science. Sciences stemming from a very different parsing of reality than the typical, sciences conducted via different cognitive tropes or life-worlds synthesizing the meaning of events and signifiers in the environment differently, would well deliver a different picture of the world to those who operated in them. If my remarks about how crucial the life-world is for the sciences throughout this dissertation are correct, then we could even make a speculation, a conjecture towards a pessimistic meta-induction on the level of *species*: our evolutionary progenies, equipped with a wholly different perception, will possibly not even recognise the same things in the world that we do and

would not think in the way that we do, thus arriving at wholly different scientific descriptions[75] (I will expand on this point in section 7.3 below).

This, however, does not readily amount to the relativization of what current science claims to be real and true. The argument could be made that some life-worlds are more fit to the cause of producing true statements and of describing reality than others. That importantly different life-worlds in the right way amount to different sciences may be true, a hypothetical thinker may now say, but perhaps the typical life-world is somehow superior and *can* make a case for deserving truth for its statements and an 'as is' clause for the reality it presents. Or perhaps good old science *can* pierce through the 'veil' of the life-world and deliver to us the world's contents and relations as they are, no matter which incorrigible admittances we may start from, which incorrigible admittances may in turn be just a façade of a deep-seated reality. To the first objection, my reply is that the burden of proof lies with the interjector, who, it seems to me, would have a very difficult job proving that one life-world is somehow better to do science from than the other. For, *from which life-world would this judgement be articulated*? The way in which we have defined the life-world it is obvious that it is the life-world that provides the materials with which to articulate judgements – categories of the world and of thought. A judgement *presupposes* a given life-world's validity; there is no pre-life-world judgement in any sense. To make a loose analogy, to discard a life-world from within another would be like trying to discard a system of geometry with certain axioms from within another system with incompatible axioms; it would be like trying to defeat the geometry of Euclid with Nikolai Lobachevsky's non-Euclidean geometry. Recall the autism spectrum conditions case: what would legitimize the neurotypical in telling one with an ASC diagnosis that their own life-world is somehow superior for inquiry? Seemingly, nothing. The second, objection pertaining to science 'piercing through' the veil of observables, I have already answered in section 3.5: the life-world is so, in the ways we saw above, 'built into' science that rejecting it in favour of some more deep-seated description of the world would automatically take away exactly our reasons for believing in this 'deeper', 'truer' description of reality, thus pulling the rag under the objector's feet. In Husserl's (1905-20/1973, section 196, 22-34) words, nothing may offend against the life-world sense.

[75] We could even conjecture that 'science' as we understand it is bound to be importantly changed or replaced as a category of inquiry – and so for even the notion of inquiry itself.

These are, in summary, PIR's main theses about science and its claim about scientific truth. In the remainder of the present chapter, I am going to tie PIR to the scientific realism debate. In so doing, I am going to argue more extensively for the above and address the following questions. First, what does PIR contribute to the scientific realism debate as it is typically conducted and how does it reframe the debate? Second, what does PIR make of reality – should we think of the incorrigible as somehow real, and how should we think of the incorrigible? An analogous question will be asked about truth. Third, what are the philosophical limits of PIR-proffered plurality, mainly regarding truth and reality? Fourth, are there any self-reflexive and meaning grounding issues with PIR?

7.2 Moving Beyond Language

This and the next section are devoted to explaining how PIR challenges and aspires to re-orientate the way the analytic scientific realism debate is typically conducted. I organise my contribution to the debate along two axes: the move beyond language and the move into practice.

The first place where the move beyond language took effect in this dissertation is my suggestion on how we should treat the observables as put forward in chapter three. Therein, I tried to show that the observable level, construed not as a static image captured by vision but as a set of incorrigible admittances, extends far beyond a mere sum of observation statements. First, as Husserl's original insights compelled us to see, it is not that we take what see, hear, smell, feel et cetera to exist *tout court*: things must appear under a certain perceptual profile to be admitted as extant. Second, there are not only starting visual, auditory, et cetera points that science departs from and returns to for validation but also guiding *ways*, we may put it, that science crucially depends upon, and which are owed to the subject conducting science. Examples of such ways are cognition and proprioception. This duo shapes our life-world not, of course, by virtue of its members being properties of the external world, but as faculties of the perceiving subject. While conducting a cloud chamber experiment, for example, a neurotypical physicist may synthesize complicated information on a large scale to extract the conclusion that electrons have carved a path within the chamber. This process typically involves, for example, the utilisation of the physicist's meaning ascription to certain events (radioactive decay), ontological individuation of certain objects (radioactive materials), and so on. As a general classification, the life-world's contents were arranged along four categories: the

ontological (what there is); the metaphysical (how it is and relates); the semiotic (what it means); the emotional (how it feels). This is of course not to imply that we may understand the four elements necessarily in this order. As we saw in section 5.3 the elements of the life-world are entangled and not separately parsed in perception. For example, an experience of an event's 'how-ness' often fires up emotions in us, as we took occasion to see in the case of autism spectrum conditions, with e.g. the bombardment of thoughts giving rise to undesired emotions.

Thus, the analysis of science merely as a theoretical language unfairly turns a blind eye to the multifarious non-linguistic elements pertinent to its situatedness. The linguistic turn, for which scholars like Rudolf Carnap and Willard van Orman Quine are responsible in the analytic tradition, made a lot of sense at its time of articulation as it established a publically testable, easily shareable locus for science. The pursuit of unification and public testability, however, runs the risk of making for an unfairly monistic idea of the perceiving subject and ignores the life-world plurality. We saw how analytic giants of the field such as Bas van Fraassen (1980, 72) took it for nothing to claim that science is self-evidently true about the observables, claiming that "When the hypothesis is solely about what is observable ... empirical adequacy coincides with truth". Others did not really address the issues of the observables, likely exposing a similar thesis as an underlying assumption: in Grover Maxwell, Alan Musgrave, Peter Lipton and Paul Dicken, and with the occasional exception of Putnam, who defends conceptual pluralism in the abstract, it is rarely the case that the perceiving subject is interrogated in the context of the observables. What we usually find is a picture of statements organising the world and seeking to correspond with it, presumably launched on behalf of the same subject always – the One True Man. In this picture, the stake is most often the unobservables, thus the modern scientific realism debate, which pretty much assumes that everyone everywhere shares an ontology, metaphysics, semiotics, and probably considers emotions irrelevant.

We have by now amply seen that this assumption is unfounded; it is not the case that everyone operates in the same life-world. This brings us to the second place of application for the move beyond language: examining extra-linguistic elements was one of the most crucial parts of evincing life-world difference. We saw that people with ASCs diagnoses do not just use a different language – oftentimes they do not use a language at all – or necessarily adopt different systems of beliefs and different statements compared to the neurotypicals. People with ASCs diagnoses are plausibly different *subjects* in a wider sense,

with different world perceptions incorrigibly bestowed upon them. Take the example we have been over a few times now: that of children with ASCs diagnoses being distressed in environments of overbearing stimuli and calming down when given, for example, noise-cancelling headphones. There, the emotions relating to distress are often expressed in non-linguistic terms – unavoidably so in the case of nonverbal people. The Quine-Davidson conception of schemes faces some serious challenges here, for it would probably render our catering to the needs of people with ASCs diagnoses in such situations incomprehensible. As we saw in section 4.1 the Quine-Davidson line finds that understanding the other is strictly rooted in language, and in the case of different languages, translation. Thus, if we are to be strict Quineans-Davidsonians we might be compelled to think that since there is no language and translation involved in the case of distressed children then there can also be no understanding of what they are expressing. Since people with ASCs diagnoses often do not use language or use it very differently, the linguistic line would plausibly be that, in such cases, we are to throw our hands in the air and exclaim total ignorance regarding what claims, needs, desires, states of emotions they are expressing. This would be therapeutically and ethically catastrophic, a humanitarianly unacceptable corollary of the confinement to language. The post-linguistic fixation life-world circumvents this impairment.

In summary, when the current linguistic focus prevents us from asking: "Who is perceiving?" we cannot completely grasp cases such as the ASCs-related, and then the focus becomes an obsession. Such obsessions obscure the variety of elements that situate a knowledge project such as science and, for that matter, obscure its contingencies. Getting a better grip on such contingencies allows us both to be more humanitarianly apt in approaching people of divergent life-worlds, and to see science's relation to truth and reality more adequately. This is PIR's contention.

7.3 Moving into Practice

PIR, I showed in the above section through the move beyond language, shows us that the observables should not be construed as purely linguistic observation statements, and that evincing different life-worlds necessitates likewise removing language from its analytic pedestal. In this section, I claim that PIR's demoting language from being the sole item of interest in the analysis of science also prompts us to re-orientate scientific *practice.* Below, through the move into practice, I, through PIR, demonstrate my second major

contribution to the scientific realism debate: showing that new questions related to the scientific realism debate should replace the old, and somewhat stale, big metaphysical questions about Truth and Reality. I claim that these questions should pertain to how what we take to be real when conducting science affects human lives.

To start appreciating this point, let us first pull up the three theses the scientific realism debate revolves around from section 1.1:

- **The Metaphysical Thesis**: There is a mind-independent world, which has a mind-independent structure.
- **The Semantic Thesis**: Scientific theories should be interpreted literally and have a truth-value[76]. If a scientific theory is (approximately) true then the terms regarding unobservables in it refer to actual things in the world.
- **The Epistemological Thesis**: Mature (in some way predictively successful) scientific theories provide descriptions of the world that are at least approximately true.

These are the central theses of the scientific realist[77]. The scientific anti-realist, it is reminded, is one who denies these theses[78]. What is important for us here is that the debate leaves without mention the situatedness and conditioning of the perceiving subject, and that the focus on theories is very much in accord with the focus on language when analyzing science (theories are solely expressed through language). Take the epistemological thesis: mature scientific theories provide descriptions of the world that are at least approximately true *for whom*? No subjective or intersubjective agent is ever mentioned along the traditional scientific realism debate; whatever conclusions are extracted from it, it seems, may apply to all. Thus, we see that the debate concerns itself with Truth and the Real *tout court*; with whether scientific statements are true in the

[76] At least for the most part – see below for scientific theories as 'approximately true' according to scientific realism.

[77] As we saw in sections 1.1 and 1.4, a scientific realist may hold only one or two of these theses and/or for some certain parts of science – not necessarily whole theories.

[78] As we saw in section 1.1, a scientific antirealist may deny only *certain combinations* of these theses.

absolute and whether scientific theories provide an 'as is' picture of reality with all its entities and relations. Further, this investigation is carried out solely via the unobservables: if they exist as science describes them then science is thought to deliver this (approximately) faithful to reality picture of the world. In a nutshell, the main questions of the analytic scientific realism debate are "Are (certain) scientific claims true *simpliciter*?" and "Are (certain) unobservable entities science describes real *simpliciter*?". A positive answer to the second question is taken to imply a positive answer to the first.

On the contrary, we saw above, in the life-world-PIR view, an entity or a relation can only be real-for-a-given-life-world, and a statement can only be true-within-a-given-life-world. Thus, seeking the transcendental Reality of things and Truth of statements makes no sense within the life-world picture – a different parsing of reality; a different trope of thinking; a different categorisation of the world's relations; a different life-world make for an environment where previous statements are simply inapplicable. How can a statement like "Thing A will fall off this table if I push it." be true or thing A be real in a life-world that does not include the concept of thing A or falling? As we saw above, we cannot pose the typical life-world as superior to the one that does not recognise 'falling'; 'things'; the linear passage of time; meaning in long-winded statements – the argument in favour of any life-world's primacy showed us this. Further, even if we did recognise the typical life-world as superior, I will claim in this chapter's section five, we would still not be warranted realist conclusions.

Thus, PIR makes the following comments on the central theses of the traditional scientific realism debate:

- **Comment on Metaphysical Thesis:** There is no mind-independent perception of the world by any given subject. The world and its structures are always-already observed through one's life-world.
- **Comment on Semantic Thesis:** Scientific theories and other scientific claims should be interpreted as articulated from within a life-world.
- **Comment on Epistemological Thesis:** Mature (in some way predictively successful) scientific theories and other scientific claims provide descriptions of the world that can at best be 'true for that given life-world'.

Theoretically, these comments imply that science should aim to and can at best describe things as they appear incorrigibly to and corrigibly from given life-worlds. The next two sections will explore what this means in detail. Beyond, however, the situatedness of truth and reality claims as I have described them above, the highlighted importance of the observables on behalf of PIR brings to the fore additional focal points for the scientific realism debate. Specifically, the ASCs case showed us that philosophical forays into the peculiar connection between science and truth can and *should* be utilised to address thorny and, beyond epistemological, ethico-political issues arising in the frame of science in practice. The related material I presented demonstrates the importance of the position we take regarding issues of truth and reality in the ASCs case via an important fork in treatment approach. The overarching comment was that if we take the autistic life-world to be equally *real* and legitimate to its neurotypical counterpart from within which science is conducted we should also move, to put it simply, more towards increasing well-being and less towards normalising. Let us recall a quote from Oliver Sacks (italics mine) on his twin patients.

> One indeed gets no hint of any depths unless one ceases to test the twins, to regard them as 'subjects'. One must lay aside the urge to limit and test, and get to know the twins—observe them, openly, quietly, without presuppositions, but with a full and sympathetic *phenomenological openness*, as they live and think and interact quietly, pursuing their own lives, spontaneously, in their singular way. (Sacks 1985/2011, 205)

In the story we were familiarised with at the end of the last chapter, Sacks' method, reportedly successful in establishing a meaningful relationship with his patients, was that of attempting to work treatment out bearing in mind *their own* points of importance, namely their special relation to numbers and to each other. This method sits well with the calls of ASCs-involved activists, especially the more modest anti-ABA ones. We recall Kathleen Seidel, parent of a person with an ASC diagnosis saying to the *New York Magazine*: "I wanted to figure out what my child needed. I wanted to figure out what my child needed to thrive, for fulfilment" (Solomon 2008, n.p.). We recall testimony from people with ASCs diagnoses themselves: "This is what I think autism societies should be about: not mourning for what never was, but exploration of what is." (Sinclair 1993, n.p.), and neuroscience specialists like Merzenich, who articulated to *Wired*'s David Wolman

(2008, n.p.) complaints with the fact that no money goes the way of ASC-related difference exploration while 'fix the problem' approaches get every penny. This camp strikes a prime conflict with a more 'third-person', God's eye point of view approach, which, as we saw, would evaluate the twins' behaviours from the outside and not 'from within', as if they do not occupy a different life-world in which their treatment should make sense. We recount that when Sacks found out, ten years after his interaction with the twins, that they had been separated, it was much to his dissatisfaction. Their serenity and skill had gone away and was replaced with anxiety of separation, Sacks wrote. All this for facing the world in a socially appropriate way. "What are we to think of such a curious cure?" to echo his closing remarks (Sacks 1985/2011, 219-220).

My point here is not so much to defend Sacks' particular approach as much as it is to state that these are issues of realism and antirealism arising in scientific practice and that they have crucial implications for human lives, here pertaining to the trajectory one's treatment and one's well-being, is to take. Generalising to ASCs, if we adopt the analytic scientific realism debate's typical agonising we will start to occupy ourselves with the question of whether the ASCs-related or the neurotypical life-worlds are real: are things in the world like the neurotypicals perceive them, do they relate to one another how the neurotypicals take them to relate and do they mean what the neurotypicals take them to mean? Or is the autistic description of the world the true state of affairs? Which reality should have primacy? PIR's invaluable contribution to this stalemate is to interject by insisting: *we do not need to decide*. The world is filtered through subjects and perceived incorrigibly as the life-world. When subjects are different, we get different life-worlds. Depending on who you ask, *both* the neurotypical and autistic perceptions of the world are real – I will expand on the sense of the 'real' here below. PIR maintains that we should maintain both life-worlds *in parallel*.

Since we typically conduct science from the neurotypical life-world, the point is to build bridges across to the autistic one. It is to stop seeking the one true version of human affairs and put emphasis not on adjudicating whether truth of beliefs and correct picture of reality lies with one life-world or the other but on maximizing the well-being for those whom science regards. This is quite the opposite of what the purely behavioural approach does in the ASCs case, looking past life-worlds and locating difference in behaviour only. By unwittingly maintaining a monistic life-world picture, ABA often fails to regard the autistic life-world as real and naively tries to calibrate what is already perfectly calibrated

to its frame of reference. The benefits of this approach shine in the example of the Sesame Place of section 6.6. As we saw, the park's staff have received specialized training regarding how to interact with people with ASCs diagnoses. Such places are structurally tailored to accommodate their needs: the people with ASCs diagnoses visiting Sesame Place are given noise-cancelling headphones to counter-act the environment's unbearability when/if it arises. Nonverbal people with ASCs diagnoses are no exception to this. This service may plausibly be attributed to an implicit life-world reconstructing process of which there should be more: one sees people with ASCs diagnoses as expressing emotions of suffering in noisy environments (if they do) and one proceeds to counter-act this predicament.

PIR's situated perception-focused approach amounts to a re-characterisation of the scientific realist's traditional theses and is quite antithetical to some of them in spirit. Regarding the metaphysical thesis, a mind-independent world may exist (we will see below why and how) but it surely has no mind-independent structure. In the course of the preceding chapters we saw that different perceiving subjects may and do perceive quite different structures in the world, and that the means by which to investigate the structure of the world further – science – are, too, unavoidably based on and shaped by the situated perception of a given subject. Thus, the structure of the world is *always* filtered by one's life-world and derived by methods wedded to one's life-world. Regarding the semantic thesis, scientific theories and scientific statements may only have a truth-value for given life-worlds since, given arguments for conceptual scheme and life-world variation from previous chapters, there are no statements which make sense in *all* life-worlds. This holds the same for the epistemological thesis; scientific theories and other claims may deliver a picture of reality as it is *only for* certain life-worlds at best. I will expand on what PIR makes of truth and reality in the sections below.

This approach described above opens a whole new field of study for scientific realism, ushered in mainly by two questions: "What should we take to be true and real in scientific practice?" and "How are we to reconstruct divergent life-worlds?". Thus, contrary to the picture of the scientific realism debate we surveyed in chapter one holding the observables to a secondary role, we see that the observables present ample theoretical interest but mostly *urgent practical interest* for science in practice. This connects well with recent moves within philosophy of science, which seek to re-establish a connection with scientific practice (see as a representative sample the recent philosophy of science in practice as

represented in Ankeny *et al*. 2011). I wholeheartedly ascribe myself to this movement in declaring: less about theory and unobservables, more about practice and the observables. Or plainly just more about practice and the observables. Last, as a methodological limitation to my project, I must here admit that I have fallen short of offering an exhaustive method for reconstructing a life-world.

Before I close this section, I must say that I hope my recommendations are received in a renewing spirit for the analytic scientific realism debate, one which is admittedly urgently needed. As Anjan Chakravartty (2011, section 4.5), one of the most informed scholars about the debate, notes, the debate is more and more thought to be in a state of 'dialectical paralysis', whereby nothing more sensible or substantial may be said about it. Alison Wylie cited in Chakravartty notes that:

> [T]he most sophisticated positions on either side now incorporate self-justifying conceptions of the aim of philosophy and of the standards of adequacy appropriate for judging philosophical theories of science. (Wylie 1986, 287 cited in Chakravartty 2011, section 4.5)

This dialectical paralysis, it seems to me, could be lifted not by solving the gargantuan issues of science's relation to Truth and Reality, but by realising the absurdity of such notions as disembodied and universal and of side-lining them in favour of a more practical approach.

This is, in summary, my PIR's contribution to the scientific realism debate, organised under two axes. One, leaving the obsession with language to one side to look to real and rich life-worlds and subjects for real and rich differences in world experience and conceptualization. This broadens out the debate and facilitates a more nuanced treatment of the notions of truth and reality as relevant to given life-worlds. Two, of looking for repercussions of truth and reality claims in actual scientific practices, orientating such practices towards purposeful ends, often, hopefully, benefitting human lives. Moreover, of, while so doing, resting content with the non-answerability of the Big Metaphysical Questions such as what there Really Truly exists and paying more attention to the existence of what there appears incorrigibly to be, to us as well as to others we aspire to be in creative and therapeutic communion with.

Over the remainder of the present chapter, I will provide a more specific and in-depth analysis of pluralistic incorrigible realism *qua* realism and antirealism. I will be occupying myself with questions such as: what kind of beliefs in truth and reality does PIR facilitate and what does it forbid? Especially pertaining to alien life-world reconstruction: when are we, if ever, legitimized in saying we have arrived at its 'true' reconstruction? How does our own life-world, our home conceptual scheme, arrest such interpretations? How is meaning ascribed to things in the frame of the life-world?

7.4 Pluralistic Incorrigible Realism Qua Realism: The Incorrigible

Above, we saw that any notion of truth that may arise in pluralistic incorrigible realism is internal to certain life-worlds, and that all descriptions of reality are contingent on certain life-worlds. Thus, in PIR I adopt an overarching relativist attitude towards any proffered specific picture of the world as *True* and of its contents as they *Really are*. This section and the next expand on the weaker notions of truth and reality that PIR adopts, as we saw briefly above. We may not say that a statement is True and that a given description captures Reality, but could we maybe consider the contents of our incorrigible and corrigible perception to be, their unavoidable situatedness granted, somehow real? Could the statements systematically organising this content be somehow conditionally true? I will address these questions in the context of PIR and I will conclude that, once we get clear on the philosophical content of PIR, how we answer the above questions is mostly a matter of semantics. In this process, I will deny several antirealist and relativist claims, with the degree of their extremity mostly being proportionate to their degree of rejection.

Let us first take the issue of the external world at large. In section one above we recalled that Husserl articulated the concept of the life-world as subscribing to metaphysical realism. His precise words (as quoted in Føllesdal) are:

> [P]henomenological idealism does not deny the factual existence of the real world (and in the first instance nature) as if it deemed it an illusion … Its only task and accomplishment is to clarify the sense of this world, just that sense in which we all regard it as really existing and as really valid. That the world exists … is quite indubitable. Another matter is to understand this indubitability which is the basis for life and science and clarify the basis for its claim. (Føllesdal 2010, 32-33)

Scientific metaphysical realism, as we saw in the above section, maintains that the world exists *and* that it has a subject-independent structure. PIR, through life-world pluralism, certainly denies the latter statement. The former, however, in agreement with Husserl, is not denied. Thus, my comment on the metaphysically realist thesis that there is no mind-independent perception *of the world* by any given subject. For plural life-worlds to exist, they must be plural versions of the same thing – the world. Notice here that this *does not mean* that the concept of the world is included in every possible life-world. It only means that, from PIR's standpoint, we cannot *but* admit the world as existing *tout court*. The life-world from within which PIR is articulated, we may put it, incorrigibly admits the world. The alternative is nonsensical; we cannot have plural versions of something that may not exist (I will expand further on self-reflexivity issues in section 7.7).

We may find powerful analytic arguments to this effect easily. We recall from sections 2.6 and 4.1 Putnam's (and sometimes Tim Button's) arguments against relativizing the world. First, the infamous brain in a vat argument: that, were I a brain in a vat, my causal relationship to the world would be too messed up to articulate my predicament and, since I can articulate my potential predicament, I am not a brain in a vat. Thus, what I see around me may not be radically fooling me; I *somehow* am in genuine causal contact with the world. This wards off extreme scepticism but does not defend any specific categorization of the world as non-relativizable and it does not show *what kind* of access I have to the world (e.g. via sense-data; qualia; phenomena et cetera)[79] as we also recall. Second, the behind-the-schemes argument. The argument, recall, starts by offering a line as a metaphor for the world. No matter how we cut the line, the parts we end up with are always part of that same line/world[80]. Thus, the cutting up the line, here a metaphor for the multifarious ways in which one may parse the world, may not relativize the world – the world is a stable notion across all possible categorizations for them to acquire their very sensibility. Again, this argument precludes *only* extreme relativism: is shows that the world at large is necessary for every conceptual scheme pluralism argument *but*, crucially, not that any of its systems of categorization may not be relativized as e.g. Davidson argued. In the same manner, applied to life-worlds as we saw above, PIR needs the concept

[79] For a comprehensive study of the argument, it is reminded, the reader may look to Button 2013, 115-178.

[80] See Button 2013, 197-208 for more.

of the world at large for life-world pluralism. This may be seen as a fortunate coincidence: Husserl provides the historical motivation and Putnam-Button provide the analytic arguments for why the life-world based PIR owes it to good metaphysics to adopt a realist's attitude about the world.

Therefore, the world appears now to be safe from the relativist's claws. Is everything else up for grabs? This would sound rather like a heady relativist doctrine. While I do not believe this should be considered philosophical anathema in and of itself, I must here examine whether the incorrigibility of one's life-world harbours anti-relativist tendencies. Incorrigible admittances, we know well by now, were defined to be those that we cannot do without, in the sense of the admittances' foreseeable impossibility to be cast away. We have reached the life-world when we can no longer perform the Husserlian *rückfragen* – the inquiring-back from. Incorrigible admittances are not amenable to change; they may not be altered by discursive, social training, and other training that may push towards their lifting.

Let us take some examples. I would normally claim that there is a brown table and a silver laptop in front of me right now. The table feels rather sturdy against my skin, while the laptop's keys feel softer. I am reading and editing my dissertation, and I combine the signifiers on the page extracting several meanings. Now imagine one with an ASC diagnosis in my situation. They also recognise the table and the laptop as real, their colours and the way they feel too. They also happen to be cognitively otherwise disposed and will not, for all the training in the world, extract the meaning out of the screen's pages that I do. Moreover, suppose that our senses of how time passes are very different: mine is linear, theirs nonlinear. We will both, for all the social training and peer pressure in the world, not acquire a different sense of time or be convinced that the table and the laptop do not exist, and similarly we will not be made to adopt each other's meaning extraction processes – that is, each other's semiotics.

We may now perhaps put it that the table and the laptop are *real* (not Real) for the both of us, their colours too. We share an incorrigible ontology. Moreover, we seem to share the same metaphysics: the relation of the keys to our own self is sensually the same. However, our metaphysics and semiotics diverge. For me it is *true* that time passes in a linear manner, and it is *true* that my dissertation means what I intended it to mean. Our hypothetical person with ASCs diagnoses, however, will find, for themselves, other statements to be true of time and my dissertation's meaning. Our life-worlds, we now see,

are similarly oriented in some senses and differently in others. Thus, plausibly, if we want to reflect this state of affairs within PIR, we may be compelled to define: the *real* denotes all these entities and relations that are incorrigibly present in one's life-world. The *true* denotes these statements that are incorrigibly correct in describing one's life-world. Both notions are obviously situated to this life-world.

We are here at a rather semantic crossroads: are we meant to say that certain things are *thus and so* (versus real and true) for some, e.g. neurotypicals' life-worlds, or are we meant to rework the notions of truth and reality and say: that these are the things that are real in these neurotypicals' life-worlds and these are the statements that are true *for them*? Or even perhaps true *simpliciter* by proposing a re-working of the notions of truth and reality to accommodate a *sine qua non* relational element? I do not have very strong inclinations towards any of these solutions since they stem from the same philosophical substance, however I think that the most elegant is the last one. Even within PIR and its anti-ecumenical maxims, the notions of truth and reality are probably worth preserving. They have not been with us since ancient philosophy by accident; they encapsulate a strong phenomenological experience, which is, I opine, that of the incorrigible truth of a statement and the incorrigible presence of an entity or relation. Or if we take the opposites of being true and real – being false and fake respectively – they denote a state of affairs that is not/has not been thus and so incorrigibly (regarding statements) or e.g. illusions (regarding entities). These are distinct and important phenomenological situations – finding thing A to be incorrigibly real or fake or finding statement B to be incorrigibly true or false – that should plausibly be captured by philosophical terminology. Thus, henceforth I will adopt the view that the statements describing how the incorrigible is for given life-worlds are *true* for those life-worlds and that the entities and relations these statements denote are *real*, again, for those life-worlds. An important note follows: this is *not* to say that the true and the real are only relevant to the incorrigible, for they also have a role to play within the corrigible. We will see how in the next section.

This is how I propose, through PIR, not to answer the long-standing questions of realism versus antirealism, but to *transform* the debate by virtue of these situated, more modest notions of truth and reality. Our hands are then free not only to ask more practical questions, but also to accommodate important differences across life-worlds philosophically. Reflection, communicating with others in different situations – and life-worlds – and sustained analysis prompt us to see a theoretical, practical, and even

humanitarian need to recognize that others may find themselves admitting different things incorrigibly; this much has been demonstrated above and in the two preceding chapters. Yet, the strong presence of things in the world makes our life manageable – imagine how unliveable our life would be if the certainty of basic things was not forced upon us without debate and discourse most of the time[81]. Imagine how difficult communication would be without these shared strong impositions – just recall at what pains one must go to reconstruct other life-worlds and throw bridges across them – the case of ASCs not being, of course, an exception. Communication between the neurotypicals and the neuroatypicals is often the hardest thing involved in their interaction – we read testimony and examined evidence about this in chapters five and six. I think we should capture the spirit of this state of affairs with words and I do not see a reason why 'truth' and 'reality' should not be these words.

Will the above sound inadequate as a realist position to the camp of realists? Perhaps so. If so, I think this would be for the wrong reason – why should we be hung up with notions of Truth and Reality, of ecumenical and universal correct views of the ways things are as seen from nowhere? Is relativism that seeks to free ourselves of such restrictions unreasonable or is rather this pursuit of a disembodied Truth and Reality eerily reminiscent of dogma? PIR is realism that abides by the second view; it is realism in that it seeks to maintain the notions of truth and reality as outlining the incorrigible and, as we will see below, a sort of 'measure' of how corrigible the corrigible is, in the form 'true and real for us and for all that matters' as we saw above.

Bearing in mind the above delineation of the true and the real (always lowercase except for the world) in relation to the incorrigible, an important question is in order: how does PIR connect with forms of contemporary scientific realism? More than any other doctrine presented in chapter one, it flirts with Ian Hacking's entity realism. In entity realism's spirit, PIR contends that incorrigible admittances are not simply a matter of theorizing. PIR demands of a certain something to provide a consistent and persistent profile in a number of senses; tables must, for example, generate a number of images and senses in a particular way as we move around them and interact with them to be given ontological

[81] A similar point is raised by Martin Heidegger in connection not only with practical convenience but also with abolishing the fear of death (see Shariatinia 2015 for more on the issue).

legitimacy (see section 3.1 for more). Entity realism largely privileges causality; PIR considers causality an important factor in evincing incorrigibility: I try to walk through a table and my causal interaction with it reassures me that the table is incorrigibly present to me.

In section 1.4 we saw entity realism's insistence that the entities science purportedly manipulates should be admitted not only as extant, but also delivered to us by experiment rather than theory. Therein, I sided with arguments claiming that any conceptualization of an entity as untangled from theory is decisively hopeless: any description or definition of an entity unavoidably contains parts relating to larger theoretical wholes. Further, in section 3.2 I recalled and demonstrated why the life-world and its contents may not at all be non-theoretical and composed of 'pure' data, one reason being the theory-ladenness of observation, the other Husserl's noematic synthesis of perception on behalf of every given subject. Thus, PIR decisively breaks with entity realism's non-theoretical tenet.

Beyond issues of theory contamination, we should now ask: does PIR admit entity realism's causally active entities as extant? For that matter, does it admit structural realism's predictive structures of preservative realism's predictively active ingredients as real, or certain scientific statements as true? Since these entities, structures and statements pertain to the corrigible, I will address this question in the upcoming section. To expect what will be developed therein, however, PIR apportions belief to these entities' and structures' real existence to the available evidence but it *does* separate them from incorrigible admittances of perception. Something analogous holds for evaluating the truth of statements.

What about the rest of the analytics? As we saw in section 3.4, plausibly they would not be too disappointed with PIR: logical empiricism's primacy of experience is maintained, though experience is cashed out in a much more sophisticated way than observation statements. Van Fraassen would be happy with the primacy of experience, though PIR breaks decisively with his supposed simplicity of the observables. Hasok Chang would also be happy with the sophistication with which PIR treats the observables: vision should not by any means be the ultimate perceptual sense, we recall him stating. Most importantly, I have wholeheartedly embraced his notion of incorrigibility, being, I believe, faithful to the spirit in which it was meant. Last, regarding Grover Maxwell, we may have retained the observable level contrary to his likings, however the life-world can be seen as an explication of his and Paul Feyerabend's 'quickly decidable sentences' –

although far be it from me to fall back to sentences *per se*. We even left a window for technology to sneak into the incorrigible as in the case, for example, of eyeglasses, though this window is not nearly as big as he and Chang would have it. What is incorrigibly observable when I drink coffee is not caffeine; wakedness is. In chapter three and via the cloud chamber example I was at pains to delineate incorrigibility's limits – despite it being a vague predicate.

7.5 Pluralistic Incorrigible Realism Qua Realism: The Corrigible

We have just been through an argument for how we should treat the incorrigible in relation to truth and reality. This dissertation began with the question of whether things like electrons exist: the central issue that circumscribes the contemporary scientific realism debate. We certainly cannot afford to leave the central question of the debate without mention and, since electrons were argued to be rather corrigible admittances, a comment on what pluralistic incorrigible realism makes of the corrigible and its part in reality and truth is in order. Do electrons, then, *really* exist? Minimally, thus far we have established that electrons may not Really exist. In fact, we have established thus far that nothing, save for the world, may Really exist from PIR's standpoint. We are by now agnostics of the Real. Towards the structure of the mind independent-world, we may put it as we did above, we shall remain agnostics.

A traditional scientific realist would have it that electrons exist because we may theoretically infer them from the available evidence. In the cloud chamber case of section 2.3 we saw how: we see the white spots and we infer that they are tracks that electrons have left behind while being emanated from a radioactive material placed in the chamber. How do we know that radioactivity exists? Because the Curies used it to isolate a new element. How do we know it was a new element they isolated? By recording the number of protons in its atomic nucleus. Finally, how do we know what the atom is? Via Brown's 'pollen grain dance', and observing through the microscope – the dependability of which we establish by the relation of the images it delivers to our eyes with the products of our sense of sight. So the story goes, all the way up (or down) to some first link of the inferential chain. We may ask more questions, as we did in section 2.3 with e.g. the atomic structure, and saw a story similar to the above leading back to the inference of electricity.

Now let us consider the same story but from a PIR, life-world based approach. It is basically the same story as the above paragraph's, but with two crucial notes. The first

note is that life-world elements abound both in the beginning (e.g. microscope) and along every link (e.g. radioactivity, cloud chamber experiment) of the experimental-inferential chains. We saw this amply in section 2.3: from the sense of the self and the sequence of events to being able to observe 'white here now' that is plausibly electron tracks and to having the cognitive capacities to synthesize observation into an inferential statement, the experimenter's life-world plays a *crucial* role in setting up, carrying out, understanding the experiment, and communicating it to others. The second note is that, as we have seen many times by now, these life-world elements, via which some conclude that "Electrons have been observed" have very many, importantly different alternatives; alternatives that would not allow for the inference of the electron's existence as we understand it today from the neurotypical life-world. What is more, above we argued that we may not prioritize this electron-seeing life-world against any other that is unable to admit the existence of electrons. Thus, in the PIR version of the story, electrons have not been observed *simpliciter*; they have been inferred via a very specific set of life-worlds elements that make that inference possible.

"Fine, fine. But do electrons really (versus Really) exist, in your terms?" we hear the parties fascinated with the classic form of the debate asking. Let me ask first: what does this question mean? We have already defined the real as cashing out the incorrigible. So we may take this question to mean whether or not electrons could ever attain the status of the incorrigible. This I evidently do not know but, should they somehow do, then they certainly *would* be part of the real. We know that for the moment they do not have a suchlike status. We also know that the notion of the entities has been very useful to various ends. There may be some historical weight pointing to the opposite conclusion *à la* Larry Laudan's pessimistic meta-induction. I rest content with running all these statements in parallel; I do not feel the pressure to go any further. The more evidence surfaces to electrons' defence and the more useful they become to ends we deem worth pursuing, the more reasons I see for using the notion. Is this stance agnostic instrumentalism pure and simple? It may be. But I am ready to, if electrons ever attain the status of the incorrigible, admit them as real *for some given life-worlds*, namely those to which they appear incorrigible.

There is however a very crucial point to follow. If we leave the discussion at this point, stating that the incorrigible is real(-for-given-life-worlds) and that the corrigible is not, stating no further comment, we run a serious risk – that of not doing justice to the rigorous scientific methods, being at pains to map e.g. micro-reality. We have reserved the world

'real' to denote what is incorrigibly present in one's life-world, but we should obviously be careful not to maintain that the entities that scientific theories map, even if conditioned to these theories' life-worlds, have the same claim to real existence such as utterly unsubstantiated proffered entities, which we would call 'utterly metaphysical' in the bad sense of the word (see: astrological entities). At the same time, we do *not* want to include these corrigible scientific entities in the real *per se*, seeing as we want to maintain a separate realm of the empirical as real – recall the whole of chapter three on the 'core empirical' level's importance. We might then strike a middle solution within this dialectic and say that we should *apportion our belief* to such entities' – e.g. electrons' – existence to the available evidence. We might say that, the stronger and more independent evidence we have for an entity's existence (still, always, from within a life-world), the more it *tends towards attaining the status of the incorrigible*. We still, certainly, maintain a hard – but not diachronically immutable – limit between those admittances we may do without and those which we may not. We are thus put back in a Maxwell-flavoured continuum, still maintaining the life-world's incorrigibility border.

We saw what PIR makes of corrigible reality. What about corrigible truth? In the previous section, we saw that e.g. the statement "Time passes linearly" is true for me, a neurotypical person who shares the same relation to time as most. Are statements pertaining to the corrigible equally true? We may extrapolate from what has been said just above to similar conclusions regarding truth. A statement pertaining to corrigible entities and relations, providing descriptions that are non-purely life-world descriptions denoting the incorrigible, may be said to be as true as the evidence supporting it allows for. We may, that is, apportion our belief to e.g. the statement "Electrons exist" to the same degree that we apportion our belief to electrons themselves (seeing as here, the evidence is obviously the same for both entity and statement). The more we cannot *but* admit the truth of a statement, the more it attains the status of the incorrigible, the more we believe in its truth (always true-for-given-life-worlds). Let me here note that evidence is also unavoidably extracted from within a life-world. The same kind of evidence does not obtain across all life-worlds, which is even more reason to condition the belief in the truth and reality of the corrigible to given life-worlds.

Before I close this section, a last note on pragmatism and pluralism as issues pertinent to realism and antirealism. Evidently, in my own position elements of pluralism abound: that life-worlds differ, is plain and simple, life-world pluralism. As for pragmatism, there

is a philosophical tendency trending currently regarding issues of realism, and this is that we should choose our conceptions of things that is best fitting to given purposes. I take no issue with this stance. However, it is true that this cannot be our approach to reality *all the way down*. To articulate aims – our first aims – we need to be able to recognise things around us, to have a life-world *within which aims obtains their significance*. This is decidedly the life-world's business, for there can be no prior aims to which our 'bootstrap' ontology may be adjusted.

7.6 Wrapping Up: Issues of Self-Reflexivity and Meaning Ascription

I have always wanted to close a major work with a Wittgensteinian pirouette. Thus this one begins: what I have written here is also contingent on the typical life-world. Every conclusion, whether scientific, philosophical, or quotidian, is unavoidably the child of a state of affairs that could have been different. The preceding sentence is too. The preceding and this one are as well. So it goes, to infinite regress. What do I have to bring in my defence against the regress that is claimed to be the omnipresent bane of any relativism? This: I have not tried to pull away from my conceptual scheme and life-world and to proffer universal conclusions. I gladly bite the bullet of my limits: I partake of the typical human life-world of our times, of the ontology, metaphysics, emotions, and semiotics associated with it. I am neurotypical and sober while writing this dissertation and this is unavoidably reflected in the outcome. To read this dissertation as intended is impossible for one operating under, for example, weak central coherence; the cognitive trope required dictates that one synthesizes meaning quite globally, across long sentences, and then holds these meanings in mind across chapters.

How can I, while unavoidably speaking from within a life-world, defend life-world pluralism? Certainly, I cannot pull away from all life-worlds and evince the existence of many. What I *can* do, what I have attempted to do in the course of this dissertation, is to show that, still from within a life-world, the extent to which we can recognise the existence of *other*, importantly different life-worlds, is significant. Indeed, good pluralism owes it to itself to recognise that the point from which one evinces plurality is just one point among many – what we believe or do is always based on our interpretative, conceptual scheme and on our home life-world. What I have been doing in the course of the whole dissertation may then be viewed, if you will, not *strictu sensu* as proving that other life-worlds exist but defending that, upon philosophical reflection, my home life-world and conceptual scheme

(which are the typical) force me to grant the existence of other life-worlds and other conceptual schemes. The benefit of this, I have claimed, is that once we realise the existence of other life-worlds we can free ourselves of ascetic, metaphysical attempts at discovering what is Real and True *tout court* and attempt to work fruitfully across other life-worlds towards the betterment of the others' lives and ours (see the ASCs case). The means of evaluating this fruitfulness are, unavoidably, still ours. Yet we can, we are obliged to in the senses elaborated above, refer to others when using these means.

In the beginning of section 7.4 we saw that the external world may not be relativized from a conceptual relativism standpoint; PIR is prohibited from claiming that the world – *not* any of its *specific* pictures – may not exist. To evince that two people looking at something organise it differently, this *something* must be the same across not the conceptual schemes of the two as Davidson would have it but across the *metaphysician's scheme* – the one who evinces they are using different schemes. Thus, the *world* must not be relativized in the frame of a scheme proffering many valid categorisations of it – else what would they be different categorisations *of*? To ground this issue to the ASCs case, when we evince that a certain string of words has one meaning for the neurotypical and another for one with an ASC diagnosis, the 'string of words' is necessary to our interpretative scheme. Moreover, it is not the *only* thing necessary to our scheme. For example, recognising the two people as two distinct subjects is also necessary to evince their meaning synthesis difference. The whole point of this dissertation has been to demonstrate that, still from within the typical life-world and while necessarily based on a life-world and a conceptual scheme, we may find a world of difference much richer than the linguistic line has it. In the ASCs case, and still obviously talking from within the neurotypical life-world, we took occasion to see how deeply and extra-linguistically autistic differences run: the people's with ASCs diagnoses emotional reactions to auditory and visual stimuli are often different to that of the neurotypicals; they often have a different sense of how time passes; in many cases they derive meaning in physical rather than in literary and metaphorical terms. We can recognise this difference so if we go beyond the linguistic line, and there are compelling theoretical and humanitarian reasons for why we should do so.

One may now ask: "Since PIR adopts the metaphysical realist's position about the world, and remains agnostic about the Real, does this mean that the world 'as is' is ineffable?". Yes, it does, though not ineffable in the sense that we cannot say *anything* about it but ineffable in the sense that we can say *too many*, often incompatible things about

it. In chapter four I attempted to give an empirical sense to the ineffable so that Button's anxieties towards the potential void of the notion could be soothed. This was the *over-determined* sense: I defended the notion of a variety of perspectives, all equally valid, which prohibit us from describing an object or an event *tout court*. More empirical and theoretical work is currently being conducted on realism which is yet perspectival – see the philosophical school inspired by Ronald Giere (2006) and proliferated by Michela Massimi's (2018) team in Edinburgh.

A last issue is in line before we conclude, that of how meaning is grounded in PIR. Seemingly, PIR grounds meaning phenomenologically; meaning is synthesized in the subject's life-world – the analytic philosophy of language would call this grounding meaning in *phenomenological intentions*. We recall, however, from section 2.5 that the Putnam-Button camp would vehemently argue against this. In the Putnam-Button line, hiding the world behind a veil of phenomena – which is pretty much what PIR is doing, posing the world as the ineffable delivered to us by subject-filtered phenomena – leads to the perils of subjective idealism and solipsism. To this objection, my reply is: sure enough, the idea of grounding meaning in phenomenological intentions *does not preclude* subjective idealism and solipsism. However, for all I perceive and understand, I share conceptual schemes and life-worlds with so many others around me, and these life-worlds and schemes often outrun my subjective will: the world resists and is seemingly comprised of rules (rules with exceptions). I and so many others, we see the same things, we act towards certain purposes, we help each other out, we perceive ourselves as part of a world that is, *through our own filter*, characterised by such and such independence. We communicate, and this is a point that, following Husserl, I took careful notice to underline when talking about the intersubjective dimension of the life-world. Certainly, the world can be seen in almost radically alternative ways. Sure, what I perceive may all be in my head, and what precludes scepticism from taking my own head too is René Descartes' *cogito ergo sum*. Other people may products of my own imaginations and subjective experiences and so can the world and its phenomenal independence from my own thought, which can be the creation of my own thought. To which I again reply: *so what*? I see no way to check this idea and I have no use for it. Returning to Husserl's phenomenological naiveté from chapter three: this is all we have. The naiveté I recommend here, then, is about our phenomenological experiences, not about direct objects of perception (per later Putnam's natural realism). That is, tables and chairs and whatever else are not directly given to us

as they are, as Putnam's naivete would have it, but it is *our* filtering of the world through perception – one of many – that delivers these incorrigible admittances to our consciousness. We should thus naively believe, per our phenomenological experiences, that ourselves, and others and tables and chairs, and whatever else is incorrigibly received in our consciousness, exists – with the proviso of its situatedness in our life-worlds. If we are radically deceived, then so be it.

Thus, PIR stands in opposition both to the Truth-Reality duo, and to radical scepticism pertaining to solipsism. Not because PIR can and cannot decide what is and is not True and Real or is certain that we are not radically deceived or alone in this world but simply because *it sees no use* for hunting after these notions. On the contrary, leaving these Big Metaphysical Issues to one side, PIR suggests putting the focus of examination of truth and reality to how what we take to be real and true shapes scientific practice, and affects human lives associated with it.

Conclusion

The original work of this dissertation is now complete. In this final chapter I have provided an outline of pluralistic incorrigible realism and summarised my position's contributions to the scientific realism debate. I have urged for a move beyond the obsession with the analysis of language in science and scientific realism approach and called for a richer understanding of the debate, as well as for its application to actual scientific practice. Moreover, I specified the kind of claim to the truth pluralistic incorrigible realism warrants for us: not Truth but truth-for-us, which is understood to mean things that are, to the best of our understanding, indispensable within our parsing of reality. Last, I addressed a number of issues pertaining to PIR's self-reflexivity and meaning ascription.

Conclusion

Over the course of this dissertation, I argued that scientific theory and practice are always conditioned on a realm of subjective, potentially intersubjective, incorrigible admittances; on the life-world. This state of affairs, I claimed, conditions science's claim to truth and reality to a life-world as well. I recommended that philosophers of science should be less occupied with whether science captures any ecumenical notions of Truth and Reality, which are, per the life-world approach, devoid of content. Instead, as I demonstrated through the investigation of the autism spectrum conditions (ASCs) case study, philosophical analysis of science's truth and reality claim is set to better use in investigating how *what we take to be real and true* within a scientific practice shapes the lives of those who this practice aspires to benefit.

I argued for the above in the following order. In chapter one, I surveyed the contemporary analytic scientific realism debate and found that it is unduly fixated with the unobservable aspects of the world. I claimed that an in-depth philosophical analysis of science's claim to truth and reality should pay attention to science's situatedness as it is brought to the fore via an analysis of the observables. Following, in chapters two and three, I set out to conduct this analysis, starting from pondering the best construal of the observables. After surveying the main analytic insights pertinent to the issue, I concluded that there is indeed a legitimate dichotomy to be made between the observables and the unobservables. To best capture the significance that the observables hold for the scientific endeavour, I offered Edmund Husserl's life-world-cum-analytic-tweaks as an encapsulation of the observable level. The life-world's categorisation system that I proffered included four axes: ontological; metaphysical; semiotic; emotional.

Chapters four and through to six engaged with life-world pluralism in theory and in practice. First, I defended theoretical life-world pluralism by resisting Donald Davidson's attack on conceptual scheme pluralism, and then applying the arguments to the life-worlds – henceforth plural. I did this mainly by arguing against Davidson's fixation with language and translation when looking for conceptual difference. Rather, I proposed that looking at conceptual schemes *users* rather than language often allows us to detect rich, extant conceptual differences between subjects. Following, I turned to the case study of autism spectrum conditions. I argued for two main points. First, after examining the cognitive theories of ASCs and testimony from people with ASCs diagnoses and their peers, I

posited that people with ASCs diagnoses are best understood as operators of life-worlds different to the neurotypical ones. Second, that the heated ethico-political treatment extant within the ASCs communities is best understood as a debate about the autistic life-world. Two camps were formed, mainly concerning ASCs mainstream behavioural treatment, Applied Behaviour Analysis (ABA). On the one hand, there are the neurodiversity activists, often critical of ABA, who argue that ASCs should be considered a legitimate mode of being and not a product of a defective condition. Further, ABA should not look to behaviourally normalise people with ASCs diagnoses, seeing as they are *at their core* different people, for whom adopting neurotypical behaviours often makes no sense. On the other hand, the pro-ABA camp defended that ABA helps people with ASCs diagnoses acquire useful skills and maximize their autonomy.

Utilising the life-world concept, I sided mainly with the neurodiversity activists: ASCs seem to indeed be deep-seated conditions, incorrigible, among others, states of perception. Thus, I argued, the claim that ASCs treatment should be tailored to the autistic life-worlds, seeking to maximize the well-being of people with ASCs diagnoses in their own terms, makes sense. Accordingly, I argued that ABA should be 'filtered' through the life-world, aiming to still provide the benefit of useful skills and of increasing autonomy, but leaving behaviours that make sense in the autistic life-worlds be unaltered. Further, I offered that more phenomenologically-oriented approaches to ASCs treatment – which I showed in chapter five to be unfairly understudied – should be advanced. Last but very crucially regarding the ASCs case, I demonstrated the life-world concept's superiority in approaching ASCs. The depth of the concept, incorporating elements beyond language in investigating difference in experience and function, allows us to capture the depth of difference running between people with ASCs diagnoses and the neurotypicals. Had we gone looking for this difference only, as Davidson did, with the tools of language and translation in hand, we would have glossed over issues that are not only of vast theoretical, but also of crucially humanitarian importance.

In chapter seven I summarised the overall philosophical position advanced in this dissertation and coined it pluralistic incorrigible realism (PIR). Summarily, PIR contends the following. First, that science crucially depends on the life-world in the sense that it departs from, is conducted via, and returns to it for validation. Second, that the life-world is not plainly a construction of the subject or of the world but a product of their synergy; the world as incorrigibly delivered to a subject via its perceiving capacities. The life-world

may also be shared, and thus has an intersubjective dimension. Third, that the life-world is not singular but plural, as evinced both by the theoretical anti-anti-conceptual scheme variation arguments and the positive case of alternative life-worlds provided through the ASCs case study. Combining these theses, PIR argues that science's claim to the true description of reality should, at most, mean a description of the incorrigible part of given life-worlds.

The contributions of PIR to the analytic philosophy of science literature pertinent to the scientific realism debate may, I argued in chapter seven, be organised along two axes: the move beyond language and the move into practice. The move beyond language reflects the life-world's adoption of extra-linguistic elements in science analysis and PIR's treatment of science as an activity beyond merely a theoretical endeavour based on observational statements. By adopting such a rich construal of the observable level as the life-world, we can detect extant and important difference where we could not before: this was demonstrated in the conceptual scheme pluralism theoretical case and in the ASCs, scientific practice-related case study. I demonstrated that the language-unobservables focused take on the science's claim to truth and reality misses exactly all these important differences that the analytic literature cannot afford to ignore any longer. With the move into practice I argued for settling the issues of truth and reality by, as noted above, identifying them with 'incorrigible/real-for-X-in-a-given-circumstance' and altogether questioning any ecumenical Truth or Reality. I argued that this allows us to move past certain somewhat stale metaphysical debates and the dialectical paralysis that the scientific realism debate is currently involved in. The space is then free to be occupied by *applied scientific realism* – the credo in employing the insights of reality's conditioning we have obtained through the scientific realism debate to real cases of scientific practice, seeking to benefit our lives and those of others.

With this dissertation, I have found philosophical issues of science to be enmeshed in urgent questions that affect peoples' realities. Embarking from a dual perspective, that includes both immersion in the discipline and fieldwork seeking to map out the range of ACS conditions I have looked to contribute substantially both to the scientific realism debate, and to how people that find themselves in conditions divergent from the typical are treated in the frame of treatment.

Bibliography

'Best Sellers – The New York Times'. *http://www.nytimes.com*. Retrieved on 02-03-2018.

[Cognitive Behavioral Therapy Los Angeles]. *Phobia Treatment: Cognitive Behavioral Therapy*. Retrieved from http://cogbtherapy.com/phobia-treatment-los-angeles/

[Judgements of the Supreme Court of Canada]. (2004, November 19). *Auton (Guardian ad litem of) v. British Columbia (Attorney General)*. Retrieved from: https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/2195/index.do

[Myrtle Beach International]. (2008, January 31). *Autism Therapy – ABA* [Video File]. Retrieved from: https://www.youtube.com/watch?v=NbVG8lYEsNs

[National Conference of State Legislatures]. (2007, June 7). *Autism and Insurance Coverage | State Laws*. Retrieved from: http://www.ncsl.org/research/health/autism-and-insurance-coverage-state-laws.aspx

[Sesame Place]. *The First Theme Park in the World to be Designated as a Certified Autism Center*. Retrieved from: https://sesameplace.com/philadelphia/help/autism-resources/

[Untitled Illustration of Rutherford's Experiment]. Retrieved December 28, 2018 from http://www.radioactivity.eu.com/site/pages/Rutherford_Experiment.htm

A Diffusion Type Cloud Chamber. [Online Image]. Retrieved December 28, 2018 from https://en.wikipedia.org/wiki/Cloud_chamber

Aldred, C., Green, J., & Adams, C. (2004). A New Social Communication Intervention for Children with Autism: Pilot Randomized Controlled Treatment Study Suggesting Effectiveness. *Journal of Child Psychology and Psychiatry*, 45, 1420–1430.

American Physical Society (2016). *This Month in Physics History. August 1827: Robert Brown and Molecular Motion in a Pollen-filled Puddle*. Retrieved from: https://www.aps.org/publications/apsnews/201608/physicshistory.cfm#1

American Psychiatric Association. (1987). *Autistic Disorder, In Diagnostic and Statistical Manual of Mental Disorders* (III-R). Washington DC.

American Psychiatric Association. (2013). Autism Spectrum Disorder. In *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Washington, DC: Cecil Reynolds and Randy Kamphaus.

Ankeny, R., Chang, H., Boumans, M., & Boon, M. (2011). Introduction to Philosophy of Science in Practice. *European Journal for Philosophy of Science*, 1, 303.

Arabatzis, T. (1996). Rethinking the 'Discovery' of the Electron. *Studies in History and Philosophy of Science Part B: Studies in History and Philosophy of Modern Physics*, 27(4), 405-435.

Asperger, H. (1944/1991). Autistic Psychopathy In Childhood. In U. Frith, Autism and Asperger syndrome. Cambridge: Cambridge University Press

Atkin, A. (2006). Peirce's Theory of Signs. In E.N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Summer 2013 Edition). Retrieved from https://plato.stanford.edu/entries/peirce-semiotics/

Autism Speaks. *Applied Behavior Analysis (ABA)*. Retrieved from: https://www.autismspeaks.org/what-autism/treatment/applied-behavior-analysis-aba

Baddeley, A. & Wilson, B. (1988). Frontal Amnesia and the Dysexecutive Syndrome. *Brain and Cognition*, 7(2), 212-230.

Baggs, A. (2007, January 14). [silentmiaow]. *In My Language* [Video File]. Retrieved from https://www.youtube.com/watch?v=JnylM1hI2jc

Baghramian, M. & Carter, J.A. (2003/2016). Relativism. In E.N. Zalta (Ed.), *The Stanford Encycolpedia of* Philosophy (Winter 2017 Edition). Retrieved from https://plato.stanford.edu/archives/sum2017/entries/relativism/

Baird, G., Cass, H., & Slonims, V. (2003). Diagnosis of Autism. *British Medical Journal*, 327, 488-493.

Baron-Cohen, S., Jolliffe, T., Mortimore, C., & Robertson, M. (1997). Another Advanced Test of Theory of Mind: Evidence from Very High Functioning Adults with Autism or Asperger Syndrome. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 38(7), 813–822.

Belousek, D. (1998). Husserl on Scientific Method and Conceptual Change. *Synthese*, 115, 71-98.

Bender, L., Goldschmidt, L., & Siva, D.V. (1962). LSD-25 Helps Schizophrenic Children. *American Druggist*, 146(13), 33.

Berriman, W.A. (1978). Alternative Conceptual Schemes. *Metaphilosophy*, 9(3-4), 226-232.

Bogen, J. (2014). Theory and Observation in Science. In E.N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Summer 2017 Edition). Retrieved from: https://plato.stanford.edu/archives/sum2017/entries/science-theory-observation/

Booth, R. & Happé, F. (2010). "Hunting with a Knife and …Fork": Examining Central Coherence in Autism, Attention Deficit/Hyperactivity Disorder, and Typical Development with a Linguistic Task. *Journal of Experimental Child Psychology*, 107(4-5), 377-393.

Boyd, R. (1989). What Realism Implies and What It Does Not. *Dialectica*, 43, 5-29.

Brons, L. (2011). Applied Relativism and Davidson's Arguments against Conceptual Schemes. *The Science of Mind (精神科学)*, 49, 221-240.

Burgess, P.W., Alderman, N., Evans, J., Emslie, H., & Wilson, B.A. (1998). The Ecological Validity of Tests of Executive Function. *Journal of the International Neuropsychological Society*, 4(6), 547–558.

Button, T. (2013). The Limits of Realism. Oxford: Oxford University Press.

Byrne, A. (2005). Perception and Conceptual Content. In E. Sosa and M. Steup (Eds.), *Contemporary Debates in Epistemology*, Oxford: Blackwell.
Cambridge University Press.

Carusi, A. (2012). Making the Visual Visible in the Philosophy of Science. *Spontaneous Generations: A Journal for the History and Philosophy of Science,* 6(1), 106-114.

Carnap, R. (1936-37). Testability and Meaning. *Philosophy of Science*, 3, 419–71, 4, 1–40.

Carnap, R. (1956). The Methodological Character of Theoretical Concepts. *Minnesota Studies in the Philosophy of Science*, 1, 38-76.

Carnap, R. (1995). *An Introduction to the Philosophy of Science*. New York, NY: Dover.

Cartwright, N. (1983). *How the Laws of Physics Lie*. Oxford: Clarendon Press.

Casscells, W., Schoenberger, A., & Grayboys, T. (1978). Interpretation by Physicians of Clinical Laboratory Results. *New England Journal of Medicine*, 299, 999-1001.

Chakravartty, A. (2011). Scientific Realism. In E.N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2015 Edition). Retrieved from http://plato.stanford.edu/archives/fall2015/entries/scientific-realism/

Chalmers, A. (2011). Drawing Philosophical Lessons from Perrin's Experiments on Brownian Motion: A Response to Van Fraassen. *The British Journal for the Philosophy of Science*, 62(4), 711-732.

Chang, H. (2003). Preservative Realism and Its Discontents: Revisiting Caloric. *Philosophy of Science*, 70, 902-912.

Chang, H. (2005). A Case for Old-Fashioned Observability, and a Reconstructed Constructive Empiricism. *Philosophy of Science*, 72, 876-887.

Chang, H. (2007). Scientific Progress: Beyond Foundationalism and Coherentism. *Royal Institute of Philosophy Supplement*, 82(61): 1-20.

Chang, H. (2012). *Is Water H_2O? Evidence, Pluralism and Realism*. Dodrecht: Springer.

Chang, H. (2017). VI – Operational Coherence as the Source of Truth. *Proceedings of the Aristotelian Society*, 117(2): 103-122

Chaste, P. & Leboyer, M. (2012). Autism Risk Factors: Genes, Environment, and Gene-Environment Interactions. *Dialogues in Clinical Neuroscience*, 14, 281-292.

Crane, T. (1992). The Nonconceptual Content of Experience. In T. Crane (Ed.), *The Contents of Experience.* Cambridge: Cambridge University Press.

Craver, C. (2002). Structures of Scientific Theories. In Machamer, P. and Silberstein, M. (Eds.), *Blackwell Guide to the Philosophy of Science*. Oxford: Blackwell.

Creath, R. (2011) Logical Empiricism. In E.N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2014 Edition). Retrieved from: http://plato.stanford.edu/archives/spr2014/entries/logical-empiricism/

Curie, M. (1904). Radium and Radioactivity. *Century*, January 1904, 461-466.

Curtis, L. (2003). *Atomic Structure and Lifetimes: A Conceptual Approach*. Cambridge: Cambridge University Press.

Damasio, A. (1994). *Descartes' Error*, New York, NY: Vintage Books.

Davidson, D. (1974). On the Very Idea of a Conceptual Scheme. *Proceedings and Addresses of the American Philosophical Association*, 47, 5-20.

Dawid, R. & Hartmann, S. (2018). The No Miracles Argument Without the Base Rate Fallacy. *Synthese*, 195(9), 4063-4079.

Dawson, M. (2004). *The Misbehaviour of Behaviourists*. Retrieved from: http://www.sentex.net/~nexus23/naa_aba.html

Dawson, M. (2007). The Level and Nature of Autistic Intelligence. *Psychological Science*, 18(8), 657-662.

DeFilippis, M. & Wagner, K. (2016). Treatment of Autism Spectrum Disorder in Children and Adolescents. *Psychopharmacology Bulletin*, 46(2), 18-41.

Denkla, M. (1996). Biological Correlates of Learning and Attention: What is relevant to Learning Disability and Attention Hyperactivity disorder? *Developmental and Behavioural Paediatrics*, 17, 114–119.

Dennet, D. (1978). Beliefs about Beliefs. *Behavioural and Brain Sciences*, I, 568-570.

Dennett, D. (2007). Heterophenomenology Reconsidered. *Phenomenology and the Cognitive Sciences*, 6, 247–270.

Department of Health and Human Services. (2016). Banned Devices; Proposal to Ban Electrical Stimulation Devices Used to Treat Self-Injurious or Aggressive Behavior. In *Federal Register*, 81(79), 24384-24418.

Devita-Raeburn, E. (2016, August 11). Is the Most Common Therapy for Autism Cruel? The Atlantic. Retrieved from: https://www.theatlantic.com/health/archive/2016/08/aba-autism-controversy/495272/

Devitt, M. (1983). Realism and the Renegade Putnam: A Critical Study of Meaning and the Moral Sciences. *Noûs*, 17(2), 291-301.

Devitt, M. (2005). Scientific Realism. In F. Jackson and M. Smith (Eds.), *The Oxford Handbook of Contemporary Philosophy*. Oxford: Oxford University Press.

Dhosse, D. & Stanfill, S. (2004). Could ECT Be Effective in Autism? *Medical Hypotheses*, 63(3), 371-376.

Dicken, P. & Lipton, P. (2006). What Can Bas Believe? Musgrave and Van Fraassen on Observability. *Analysis*, 66(3), 226-233.

Dirac, P. (1928). The Quantum Theory of the Electron. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 117(778), 610-624.

Douven, I. (1999). Putnam's Model-Theoretic Argument Reconstructed. *The Journal of Philosophy*, 96(9), 479-490.

Dover, C.J. & Le Couteur, A. (2007). How to Diagnose Autism. *Archives of Disease in Childhood*, 92(6), 540-545.

Drew, A., Baird, G., Baron-Cohen, S., Cox, A., Slonims, V., Wheelwright, S., Swettenham, J. Berry, B., & Charman, T. (2002). A Pilot Randomized Control Trial of a Parent Training Intervention for Pre-School Children With Autism: Preliminary Findings and Methodological Challenges. *European Child and Adolescent Psychiatry*, 11, 266–272.

Dummet, M. (2007). Reply to Putnam. In R.E. Auxier and L.E. Hahn (Eds.), *The Philosophy of Michael Dummett*. La Salle, IL: Open Court.

Edward, T. (2015). From the Myth of the Given to Radical Conceptual Diversity. *Organon F*, 22(1), 3-8.

Eikeseth, S., Smith, T., Jahr, E., & Eldevik, S. (2002). Intensive Behavioral Treatment at School for 4 to 7-year-old Children With Autism: A 1-year Comparison Controlled Study. *Behavior Modification*, 26, 49–68.

Elder, J.H., Shanker, M., Shuster, J., Theriaque, D., Burns, S., & Sherrill, L. (2006). The Gluten-free, Casein-free Diet in Autism: Results of a Preliminary Double Blind Clinical Trial. *Journal of Autism and Developmental Disorders*, 36(3), 413-420.

Ellis, B. (1998). Internal Realism. *Synthese,* 76, 409-434.

Evans-Pritchard, E.E. (1937). *Witchcraft, Oracles and Magic Among the Azande*. Oxford: Oxford University Press

Feyerabend, P. (1975/2010). *Against Method*. London: Verso Books.

Føllesdal, D. (2010). The Lebenswelt in Husserl. In D. Hyder and H. Rheinberger (Eds.), *Science and the Life-world: Essays on Husserl's Crisis of the European Sciences*. Stanford, CA: Stanford University Press.

Forehand, R., & Kotchick, B. (1996). Cultural Diversity: A Wake-Up Call for Parent Training. *Behavior Therapy*, 27, 187–206.

Freitag, C. (2007). The Genetics of Autistic Disorders and Its Clinical Relevance: a Review of the Literature. *Molecular Psychiatry*, 12, 2-22.

Friedman, M. (1987). Carnap's Aufbau Reconsidered. *Nous*, 21, 521–545.

Friedman, M. (2010). Science, History, and Transcendental Subjectivity in Husserl's Crisis. In D. Hyder and H. Rheinberger (Eds.), *Science and the Life-world: Essays on Husserl's Crisis of the European Sciences*. Stanford, CA: Stanford University Press.

Frigg, R. & Votsis, I. (2011). Everything You Always Wanted to Know About Structural Realism but Were Afraid to Ask. *European Journal for Philosophy of Science*, 1, 227-276.

Frith, U. (1991). *Autism: Explaining the Enigma*. Oxford: Blackwell.

Frith, U., & Happé, F. (1994). Autism – Beyond Theory of Mind. *Cognition*, 50(1–3), 115–132.

Gabriel, M. (2015). *Fields of Sense: A New Realist Ontology*. Edinburgh: Edinburgh University Press.

Geertz, C. (1973). Thick Description: Towards an Interpretive Theory of Culture. In *The Interpretation of Cultures*. New York, NY: Basic Books.

Geschwind, D. (2009). Advances in Autism. *Annual Review of Medicine*, 60, 367-380.

Giere, R. (1988). *Explaining Science: A Cognitive Approach*. Chicago, IL: University of Chicago Press.

Giere, R. (2006). *Scientific Perspectivism*. Chicago, IL: University of Chicago Press.

Giere, R. & Richardson A. (1997). Origins of Logical Empiricism. In R. Giere and A. Richardson (Eds.), *Minnesota Studies in the Philosophy of Science (XVI)*. Minneapolis, MN: University of Minnesota Press.

Glaserfeld, E. (1989). Cognition, Construction of Knowledge, and Teaching. *Synthese,* 80, 121-140.

Grandin, T. (1995/2006). *Thinking in Pictures, And Other Reports' from My Life with Autism*. London, New Delhi, New York and Sydney: Bloomsbury Publishing.

Hacking, I. (1982). Experimentation and Scientific Realism. *Philosophical Topics*, 13, 71-87.

Hacking, I. (1983). *Representing and Intervening*, Cambridge: Cambridge University Press.

Haddon, M. (2013). *The Curious Incident of the Dog in the Night-time*. London: Jonathan Cape.

Hall, A. (1996). *Isaac Newton: Adventurer in Thought*. Cambridge: Cambridge University Press.

Hampe, M. (2010). Science, Philosophy, and the History of Knowledge: Husserl's Conception of a Life-World and Sellars's Manifest and Scientific Images. In D. Hyder and H. Rheinberger (Eds.), *Science and the Life-world: Essays on Husserl's Crisis of the European Sciences*. Stanford, CA: Stanford University Press.

Hampshire, A., Highfield R., Parkin, B., & Owen, A. (2012). Fractionating Human Intelligence. *Neuron*, 76(6), 1225-1237.

Hanson, N. (1958). *Patterns of Discovery*. Cambridge: Cambridge University Press.

Happé, F. (1994). An Advanced Test of Theory of Mind: Understanding of Story Characters' Thoughts and Feelings by Able Autistic, Mentally Handicapped and Normal Children and Adults. *Journal of Autism and Developmental Disorders*, 24(2), 129-154

Happé, F. (1996). Studying Weak Central Coherence at Low Levels: Children with autism Do Not Succumb to Visual Illusions. A research note. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 37(7), 873–877.

Happé, F. (1999). Autism: Cognitive Deficit or Cognitive Style? *Trends in Cognitive Sciences*, 3(6), 216–222.

Happé, F., Ronald, A., & Plomin, R. (2006). Time to Give Up on a Single Definition for Autism. *Nature Neuroscience*, 9(10), 1218-1220.

Hempel, C. (1970). On the Standard Conception' of Scientific Theories. *Minnesota Studies in the Philosophy of Science*, 4, 142–163.

Henderson D.K. (1994) Conceptual Schemes after Davidson. In Preyer G. et al. (Eds.), *Language, Mind and Epistemology: On Donald Davidson's Philosophy*, 241, 171-197. Springer: Dordrecht.

Henderson, C. (1970). *Cloud and Bubble Chambers*. London: Methuen Young Books.

Herbert, M. & Weintraub, K. (2012). *The Autism Revolution: Whole-Body Strategies for Making Life All It Can Be*. Cambridge, MA: Harvard Health Publications.

Hermelin, B. & O'Connor, N. (1967). Remembering of Words by Psychotic and Subnormal Children. *British Journal of Psychology*, 58, 213-218.

Herschell, A., Kolko, D., Baumann, B., & Davis, A. (2010). The Role of Therapist Training in the Implementation of Psychological Treatments: A Review and Critique with Recommendations. *Clinical Psychology Review*, 30, 448-466.

Higashida, N. (2013) *The Reason I Jump*. New York, NY: Penguin Random House.

Hoel, A.S. & Carusi, A. (2017). Merleau-Ponty and the Measuring Body. *Theory, Culture and Society,* 35(1), 45-70.

Horwitz, W., Kestenbaum, C., Person, E., & Jarvik, L. (1965). Identical Twin – 'Idiot Savants' – Calendar Calculators. *The American Journal of Psychiatry*, 121(11), 1075-1079.

Howard, J. S., Sparkman, C. R., Cohen, H. G., Green, G., & Stanislaw, H. (2005). A Comparison of Intensive Behavior Analytic and Eclectic Treatments for Young Children With Autism. *Research in Developmental Disabilities*, 26, 359–383.

Howson, C. (2000). *Hume's problem: Induction and the Justification of Belief*.Oxford: Oxford University Press.

Howson, C. (2013). Exhuming the No-Miracles Argument. *Analysis*, 73, 205-211.

Hu, Y., Velho, L. Tong, X., Guo, B., & Shum, H. (2006). Realistic, Real-Time Rendering of Ocean Waves. *Computer Animation and Virtual Worlds*, 17, 59-67.

Hume, D. (1738-40/1888). *Hume's Treatise of Human Nature*, Oxford: Clarendon Press.

Husserl, E. (1905-20/1973). *Husserliana XIII: On the Phenomenology of Intersubjectivity: Texts from the Estate*. Hague: Nijhoff.

Husserl, E. (1913/1983). *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy (One): General Introduction to a Pure Phenomenology*. Dordrecht: Kluwer.

Husserl, E. (1925/1968). *Husserliana IX: Phenomenological Psychology, Lectures from the Summer Semester*. Hague: Nijhoff.

Husserl, E. (1929/1969). *Formal and Transcendental Logic*. Hague: Nijhoff.

Husserl, E. (1936/1970). *The Crisis of the European Sciences and Transcendental Phenomenology*. Evanston, IL: Northwestern University Press.

Husserl, E. (1952/1989) *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy (Two): Studies in the Phenomenology of Constitution.* Dordrecht: Kluwer.

Huurdeman, A. (2003). *The Worldwide History of Telecommunications*. New York, NY: Wiley-IEEE Press.

Hyman, S., Stewart, P., Foley, J., Cain, U., Peck, R., Morris, D., Wang, H., & Smith, T. (2016). The Gluten-Free/Casein-Free Diet: A Double-Blind Challenge Trial in Children with Autism. *Journal of Autism and Developmental* Disorders, 46(1), 205-220.

Jastrow, J. (1899). The Mind's Eye. *Popular Science Monthly*, 54, 299-312.

Jocelyn, L., Casiro, O., Beattie, D., Bow, J., & Kneisz, J. (1998). Treatment of Children with Autism: A Randomized Controlled Trial to Evaluate a Caregiver-Based Intervention Program in Community Day-Care Centers. *Developmental and Behavioral Pediatrics*, 19, 326–334.

Jolliffe, T. & Baron-Cohen, S. (1997). Are People with Autism and Asperger Syndrome Faster than Normal on the Embedded Figures Test? *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 38(5), 527-534.

Jolliffe, T. & Baron-Cohen, S. (1999) A Test of Central Coherence Theory: Linguistic Processing in High-functioning Adults with Autism or Asperger Syndrome: Is Local Coherence Impaired? *Cognition*, 71, 149-185.

Kanner, L. (1943). Autistic Disturbances of Affective Contact. *Nervous Child*, 2, 217-250.

Kinchen, R. (14 July 2013), *Japanese Teenager Unable to Speak Writes Autism Bestseller*, Sunday Times, UK

Kitcher, P. (1993). *The Advancement of Science: Science Without Legend, Objectivity Without Illusions*. Oxford: Oxford University Press.

Klin, A. (2006). Autism and Asperger Syndrome: An Overview. *Revista Brasileira de Psiquiatria*, 28(Supplement I), 3-11.

Klin, A., Jones, W., Schultz, R., & Volkmar, F. (2003). The Enactive Mind, or from Actions to Cognition: Lessons from Autism. *Philosophical Transactions of the Royal Society of London, Series B-Biological Sciences*, 358(1430), 345–360.

Kosso, P. (1988). Dimensions of Observability. *British Journal for the Philosophy of Science*, 39, 449-467.

Kras, J. (2010). The "Ransom Notes" Affair: When the Neurodiversity Movement Came of Age. *Disability Studies Quarterly*, 30(1).

Kuhn, T. (1962) *The Structure of Scientific Revolutions*, Chicago, IL: University of Chicago Press

Kuhn, T. (1970). Reflection on my Critics. In: I. Lakatos, I. & A. Musgrave (Eds.) *Criticism and the Growth of Knowledge*, 4, 231-278. Cambridge: Cambridge University Press.

Ladyman, J. (2014). Structural Realism. In E.N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2014 Edition). Retrieved from: http://plato.stanford.edu/archives/spr2014/entries/structural-realism/

Lakatos, I. (1978). *The Methodology of Scientific Research Programmes*. Cambridge:

Lakatos, I. & Zahar, E. (1975). Why Did Copernicus' Research Programme Supersede Ptolemy's? In R. Westman *Copernican Achievement*, Los Angeles, CA: University of California Press

LaRue, G., Fairbank, W., & Hebard, A. (1977). Evidence for the Existence of Fractional Charge on Matter. *Physical Review Letters,* 38, 1011-1014.

Laudan, L. (1981). A Confutation of Convergent Realism. *Philosophy of Science*, 48, 19-48.

Leplin, J. (1981). *A Novel Defence of Scientific Realism*. Oxford: Oxford University Press.

Letheby, C., & Gerrans, P. (2017). Self Unbound: Ego Dissolution in Psychedelic Experience. *Neuroscience of Consciousness*, 1(1), https://doi.org/10.1093/nc/nix016

Lewis, D. (1984). Putnam's Paradox. *Australasian Journal of Philosophy*, 62(3), 221-236.

Lewis, P. (2001). Why the Pessimistic Induction is a Fallacy. *Synthese*, 12, 371-380.

Lichstein, K.L, & Schreibman, L. (1976). Employing Electric Shock with Autistic Children. Journal of Autism and Childhood Schizophrenia, 6(2), 163-173.

Lipton, P. (1991/2004). *Inference to the Best Explanation*. London: Routledge.

Livingston, L.A. & Happé, F. (2017). Conceptualising Compensation in Neurodevelopmental Disorders: Reflections from Autism Spectrum Disorder. *Neuroscience & Biobehavioral Reviews*, 80, 729-742.

Locke, J. (1690/1894). *An Essay Concerning Human Understanding*. Oxford: Clarendon Press.

Loomes, R., Hull, L., & Mandy W.P.L. (2017). What Is the Male-to-Female Ratio in Autism Spectrum Disorder? A Systematic Review and Meta-Analysis. *Journal of the American Academy of Child and Adolescent Psychiatry*, 56(6), 466-474.

Lostracco, H. (2014, February 22). Would You Accept This Behavior Towards a Non-Autistic Child? *Speak for Yourself.* Retrieved from: http://www.speakforyourself.org/uncategorized/accept-behavior-towards-non-autistic-child/

Lovaas, I. (1987). Behavioral Treatment and Normal Educational and Intellectual Functioning in Young Autistic Children. *Journal of Consulting and Clinical Psychology*, 55(1), 3-9.

Lycan, W. (1988). Judgement and Justification. Cambridge: Cambridge University Press.

Lynch, M. (1997). Three Models of Conceptual Schemes. *Inquiry*, 40(4), 407-426.

Magnus, P. & Callender, C. (2004) Realist Ennui and the Base Rate Fallacy. *Philosophy of Science*, 71, 320-338.

Majer, U. (2010). The Origin and Significance of Husserl's Notion of the Lebenswelt. In D. Hyder and H. Rheinberger (Eds.), *Science and the Life-world: Essays on Husserl's Crisis of the European Sciences*. Stanford, CA: Stanford University Press.

Masi, A., DeMayo, D., Glozier, N., & Guastella, A. (2017). An Overview of Autism Spectrum Disorder, Heterogeneity and Treatment Options. *Neuroscience Bulletin*, 33(2), 183-193.

Massimi, M. (2018). Perspectivism. In J. Saatsi (ed.), *The Routledge Handbook of Scientific Realism*. Oxford: Routledge

Maxwell, G. (1962/2012). *The Ontological Status of Theoretical Entities*. In M. Curd, and J. Cover (Eds.), *Philosophy of Science: The Central Issues*. New York, NY: W. W. Norton & Company.

McDowell, J. (1994). *Mind and World*. Cambridge, MA: Harvard University Press.

McEachin, J., Smith, T., & Lovaas, I. (1993). Long-Term Outcome for Children With Autism Who Received Early Intensive Behavioral Treatment. *American Journal on Mental Retardation*, 97, 359–372.

McGee, V. (2005). Inscrutability and Its Discontents. *Noûs*, 39(3), 397-425.

Merleau-Ponty, M. (1945/2002). *Phenomenology of Perception*. London: Routledge.

Merleau-Ponty, M. (1964/1968). *The Visible and the Invisible*. Evanston, IL: Northwestern University Press.

Millikan, R. (1911). The Isolation of an Ion, A Precision Measurement of Its Charge, and the Correction of Stokes's Law. *Physical Review*, 32, 349–397.

Milne, E., Swettenham, J., Hansen, P., Campbell, R., Jeffries, H., & Plaisted, K. (2002). High Motion Coherence Thresholds in Children With Autism. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 43*(2), 255–263.

Milton, C. (2012). On the Ontological Status of Autism: The 'Double Empathy Problem'. *Disability & Society*, 27(6), 883-887.

Mottron, L., & Belleville, S. (1993). A Study of Perceptual Analysis in a High-level Autistic Subject with Exceptional Graphic Abilities. *Brain and Cognition*, 23(2), 279–309.

Mottron, L., & Burack, J. (2001). Enhanced Perceptual Functioning in the Development of Autism. In J. Burack, T. Charman, N. Yirmiya, & P. Zelazo (Eds.), *The Development of Autism: Perspectives from Theory and Research*. Mahwah, NJ: Erlbaum.

Müller, U. & Zelazo, P. (2002). Executive Function in Typical and Atypical Development. In U. Goswami (Ed.), *Handbook of Childhood Cognitive Development*. Oxford: Blackwell.

Musgrave, A. (1982). Realism Versus Constructive Empiricism. *The Philosophical Quarterly*, 32(128), 262-271.

Musgrave, A. (1988). The Ultimate Argument for Scientific Realism. In R. Nola (Ed.), *Relativism and Realism in Sciences*. Dordrecht: Kluwer.

Musgrave, A. (1996). Realism, Truth and Objectivity. In R. Cohen, R. Hilpinen and Q. Renzong (Eds.), *Realism and Anti-Realism in the Philosophy of Science*. Dordrecht: Kluwer Academic Publishers.

Nathan, P. E., & Gorman, J. M. (2007). A Guide to Treatments that Work. New York: Oxford University Press.

Nevo, I. (2004). In *Defence of a Dogma: Davidson, Languages, and Conceptual Schemes*. Ratio, 17, 312-328.

Nöe, A. (2004). *Action in Perception*. Cambridge, MA: MIT Press.

Nye, M.J. (1994). *From Chemical Philosophy to Theoretical Chemistry: Dynamics of Matter and Dynamics of Disciplines, 1880-1950*. Berkeley, CA: University of California Press.

Ozonoff, S., Pennington, B.F., & Rogers, S.J. (1991). Executive Function Deficits in High-functioning Autistic Individuals: Relationship to Theory of Mind. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 32(7), 1081–1105.

Papineau, D. (1996). *Philosophy of Science (Oxford Readings in Philosophy)*. Oxford: Oxford University Press.

Papineau, D. (2010). Realism, Ramsey Sentences and the Pessimistic Meta-Induction. *Studies in History and Philosophy of Science*, 41, 375-385.

Pellicano, E., Maybery, M., Durkin, K., & Maley, A. (2006). Multiple Cognitive Capabilities/Deficits in Children with an Autism Spectrum Disorder: 'Weak' Central Coherence and Its Relationship to Theory of Mind and Executive Control. *Development and Psychopathology*, 18(1), 77–98.

Pennington, B., & Ozonoff, S. (1996). Executive Functions and Developmental Psychopathology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 37(1), 51–87.

Perner, J., Lang, B., & Kloo, D. (2002). Theory of Mind and Self-control: More than a Common Problem of Inhibition. *Child Development*, 73(3), 752–767.

Plaisted, K. (2001). Reduced Generalization in Autism: An Alternative to Weak Central Coherence. In J. Burack, T. Charman, N. Yirmiya, & P. Zelazo (Eds.), *The Development of Autism: Perspectives from Theory and Research*. Mahwah, NJ: Lawrence Erlbaum Associates.

Plaisted, K., O'Riordan, M., & Baron-Cohen, S. (1998). Enhanced Discrimination of Novel, Highly Similar Stimuli by Adults with Autism During a Perceptual Learning Task. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 39(5), 765–775.

Popper, K. (1935/2005). *The Logic of Scientific Discovery*. London and New York: Routledge.

Popper, K. (1963). *Conjectures and Refutations: The Growth of Scientific Knowledge*. London: Routledge.

Prior, M.R., Gajzago, C.C., & Knox, D.T. (1976). Epidemiological Study of Autistic and Psychotic Children in 4 Eastern States of Australia. *Australian and New Zealand Journal of Psychiatry*, 10(2), 174-184.

Psillos, S. (1995). Is Structural Realism the Best of Both Worlds? *Dialectica*, 49, 15-16.

Psillos, S. (1999). *Scientific Realism: How Science Tracks Truth*. London: Routledge.

Psillos, S. (2000). The Present State of the Scientific Realism Debate. *The British Journal for the Philosophy of Science*, 51, 705-728.

Putnam, H. (1962). What Theories Are Not. In E. Nagel E., P. Suppes, and A. Tarski (Eds.), *Logic, Methodology, and Philosophy of Science: Proceedings of the 1960 International Congress*. Stanford, CA: Stanford University Press.

Putnam, H. (1977). Realism and Reason. *Proceedings and Addresses of the American Philosophical Association*, 50(6), 483-498.

Putnam, H. (1978). *Meaning and the Moral Sciences*. Boston, MA: Routledge and Keagan Paul.

Putnam, H. (1980). Models and Reality. *The Journal of Symbolic Logic*, 45(3), 464-482.

Putnam, H. (1981). *Reason, Truth and History*. Cambridge: Cambridge University Press.

Putnam, H. (1990). *Realism with a Human Face*. Cambridge, MA: Harvard University Press.

Putnam, H. (1994). Sense, Nonsense, and the Senses. *The Journal of Philosophy*, 91(9), 445-517.

Quine, W.V.O. (1951). Two Dogmas of Empiricism. *The Philosophical Review*, 60, 20–24.

Quine, W.V.O. (1980). *From a Logical Point of View*. Cambridge, MA: Harvard University Press.

Quine, W.V.O. & Ullian, J.S. (1970/2009). *The Web of Belief*. New York, NY: Random House.

Rajendran, G. & Mitchell, P. (2007). Cognitive Theories of Autism. *Developmental Review*, 27, 224-260.

Rapin, I. & Tuchman, R. (2008). Autism: Definition, Neurobiology, Screening, Diagnosis. *Pediatric Clinics of North America*, 55, 1129-1146.

Reid, J. (2009). Student Placement – Larning at the Empowerment Council. *Empowerment Report: The Newsletter of the Empowerment Council*, 1(2), 4.

Reimer, M. & Michaelson, E. (2003). Reference. In E.N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2017 Edition). Retrieved from https://plato.stanford.edu/entries/reference/

Resnik, D. (1994). Hacking's Experimental Realism. *Canadian Journal of Philosophy*, 24, 395-411.

Richardson, A. (1998). *Carnap's Construction of the World: The Aufbau and the Emergence of Logical Empiricism*. Cambridge: Cambridge University Press.

Richardson, A. & Uebel T. (2007). *The Cambridge Companion to Logical Empiricism*. Cambridge: Cambridge University Press.

Rogers, L. & Vismara, L. (2008). Evidence-Based Comprehensive Treatments for Early Autism. *Journal of Clinical Child & Adolescent Psychology*, 37(1), 8-38.

Rohlf, M. (2010). Immanuel Kant. In E.N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Summer 2014 Edition). Retrieved from http://plato.stanford.edu/archives/sum2014/entries/kant/

Rorty, R. (1972). The World Well Lost. *The Journal of Philosophy*, 69(19), 649-665.

Rorty, R. (1979). *Philosophy and the Mirror of Nature*. Princeton: Princeton University Press.

Rudy, L.J. (2018, December 20). Overview of Stimming in Autism. *Verywellhealth.com*. Retrieved from https://www.verywellhealth.com/what-is-stimming-in-autism-260034

Russell, J., Mauthner, N., Sharpe, S., & Tidswell, T. (1991). The Windows Task as a Measure of Strategic Deception in Preschoolers and Autistic Subjects. *British Journal of Developmental Psychology*, 9, 331–349.

Rutherford, E. (1911). The Scattering of α and β Particles by Matter and the Structure of the Atom. *Philosophical Magazine*, 6(21), 669-688.

Rutter, M. (2005). Incidents of Autism Spectrum Disorders – Changes Over Time and their Meaning. *Acta Pediatrica*, 94, 2-15.

Sacks, O. (1985/2011). *The Man Who Mistook His Wife for a Hat*. London: Picador.

Sacks, O. (1995/2012). *An Anthropologist on Mars: Seven Paradoxical Tales*, London: Picador.

Sallows, G. & Graupner, T. (2005). Intensive Behavioral Treatment for Children With Autism: Four-Year Outcome and Predictors. *American Journal on Mental Retardation*, 110, 417–438.

Saner, E. (2007, August 7). It Is Not a Disease, It Is a Way of Life. *The Guardian*. Retrieved from: https://www.theguardian.com/society/2007/aug/07/health.medicineandhealth

Schlick, M. (1934/1979). On the Foundation of Knowledge. In H. L. Mulder and B.F. van de Velde-Schlick (Eds.), *Philosophical Papers (II)*. Dordrecht: Reidel.

Shapin, S. (2010). *Never Pure: Historical Studies of Science as if It was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority*. Baltimore, MD: The Johns Hopkins University Press.

Shapiro, S. (1997). *Philosophy of Mathematics: Structure and Ontology*. Oxford: Oxford University Press.

Shariatinia, Z. (2015). Heidegger's Ideas About Death. Pacific Science Review B: Humanities and Social Sciences 2(1), 92-97

Shorter, E. & Healy, D. (2007). *Shock Therapy: A History of Electroconvulsive Treatment in Mental Illness*. Piscataway, NJ: Rutgers University Press

Siegel, E., Wormwood, J., Quigley, K., & Barrett, L. (2018). Seeing What You Feel: Affect Drives Visual Perception of Structurally Neutral Faces. *Psychological Science*, 29(4), 496-503.

Simmel, G. (1912). *Die Religion*. Germany: Rütten & Loening.

Sinclair, E. *History of Autism Treatment*. Retrieved from: https://www.appliedbehavioranalysisprograms.com/history-autism-treatment/

Sinclair, J. (1993). *Don't Mourn for Us*. Retrieved from: http://www.autreat.com/dont_mourn.html

Smith, T., Groen, A. D., & Wynn, J. W. (2000). Randomized Trial of Intensive Early Intervention for Children With Pervasive Developmental Disorder. *American Journal on Mental Retardation*, 105, 269–285.

Solomon, A. (2008). The Autism Rights Movement. *New York*. Retrieved from: http://nymag.com/news/features/47225/

Spanos, A. (2010). Is Frequentist Testing Vulnerable to the Base Rate Fallacy? *Philosophy of Science*, 77, 565-583.

Stanford, K. (2003). Pyrrhic Victories for Scientific Realism. *Journal of Philosophy*, 11, 551-572.

Steyaert, J. & Marche, W. (2008). What's New in Autism? *European Journal of Pediatrics*, 167, 1091-1101.

Tattersall, J.J. (1992). Nicholas Saunderson: The Blind Lucasian Professor. *Historia Mathematica*, 19, 356-370.

Thatcher, C. (2015, November 15). Why We Stopped Most Therapies. *Respectfully Connected*. Retrieved from: http://respectfullyconnected.com/2015/11/why-we-stopped-most-therapies/

The Autism Rights Movement. Retrieved from: http://www.autism-help.org/points-autism-rights-movement.htm

Thomson, J. (1897). Cathode Rays. *Philosophical Magazine*, October 1897, 293-316.

Tranel, D., Anderson, S.W., & Benton, A. (1994). Development of the Concept of 'Executive Function' and Its Relationship to the Frontal Lobes. In F. Boller & J. Grafman (Eds.), *Handbook of Neuropsychology Volume 9*. Amsterdam: Elsevier.

Tversky, A., & Kahneman, D. (1982). Evidential Impact of Base Rates. In D. Kahneman, P. Slovic and A. Tversky (Eds.), *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge: Cambridge University Press.

Üçok, A. & Gaebel, W. (2008). Side Effects of Atypical Antipsychotics: A Brief Overview. *World Psychiatry*, 7(1), 58-62.

Vallor, S. (2008). The Fantasy of Third-Person Science: Phenomenology, Ontology and Evidence. *Phenomenology and the Cognitive Sciences*, 8, 1-15.

Vallor, S. (2009). The Pregnancy of the Real: A Phenomenological Defence of Experimental Realism. *Inquiry*, 52, 1-25.

Van Fraassen, B. (1980). *The Scientific Image*. Oxford: Clarendon Press.

Van Fraassen, B. (2009). The Perils of Perrin, in the Hands of the Philosophers. *Philosophical Studies*, 143(1), 5-24.

Verhoeff, B. (2014). Stabilizing Autism: A Fleckian Account of the Rise of a Neurodevelopmental Spectrum Disorder. *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 46, 65-78.

Vollmer, S. (2000). Two Kinds of Observation: Why van Fraassen was Right to Make a Distinction, but Made the Wrong One. *Philosophy of Science*, 67, 355-365.

Watson, B. (2005). Science Makes a Better Lighthouse Lens. *Smithsonian*, 30. Retrieved from http://www.smithsonianmag.com/science-nature/science-makes-a-better-lighthouse-lens-170677431/?no-ist

Whorf, B. (1936/1956). The Punctal and Segmentative Aspects of Verbs in Hopi. In Carroll, J.B. (Ed.), *Language, Thought and Reality: Selected Writings of Benjamin Lee Whorf*, 51-56. Cambridge, MA: The Technology Press of Massachusetts Institute of Technology.

Wimmer, H. & Perner, J. (1983). Beliefs about Beliefs – Representation and Constraining Function of Wrong Beliefs in Young Children's Understanding of Deception. *Cognition*, 13(1), 103-128.

Wing, L. (1969). The Handicaps of Autistic Children – A Comparative Study. *Journal of Child Psychology and Psychiatry*, 10(1), 1-40.

Wing, L. (1997). The History of Ideas on Autism: Legend, Myths and Reality. *Autism*, 1(1), 13-23.

Witkin, H., Oltman, P., Raskin, E., & Karp, S. (1971). *A Manual for the Embedded Figures Test*. San Francisco, CA: Consulting Psychologists Press.

Wittgenstein. L. (1953/1958). *Philosophical Investigations*. Oxford: Blackwell.

Wittgenstein, L. (1969). *On Certainty*. New York, NY: Harper Torchbooks.

Wolff, S. (2004). The History of Autism. *European Child & Adolescent Psychiatry*, 13, 201-208.

Wolman, D. (2008, February 25). The Truth About Autism: Scientists Reconsider What They Think They Know. *Wired*. Retrieved from: https://www.wired.com/2008/02/ff-autism/

Worrall, J. (1989). Structural Realism: The Best of Both Worlds? *Dialectica*, 43, 99-124.

Worrall, J. (2000). The Scope, Limits, and Distinctiveness of the Method of 'Deduction from the Phenomena': Some Lessons from Newton's 'Demonstrations' in Optics. *British Journal for the Philosophy of Science*, 51, 45-80.

Wylie, A. (1986). Arguments for Scientific Realism: The Ascending Spiral. *American Philosophical Quarterly*, 23(3), 287–298.

Young, H., Freedman, R., & Lewis Ford, A. (2012). *Sears and Zermansky's University Physics with Modern Physics, 13th Edition*. San Francisco, CA: Pearson Addison-Wesley

Zadra, J. & Clore, G. (2011). Emotion and Perception: The Role of Affective Information. *Wiley Interdisciplinary Reviews: Cognitive Science*, 2(6), 676-685.

Zahavi, D. (2001). Beyond Empathy. Phenomenological Approaches to Intersubjectivity. *Journal of Consciousness Studies,* 8(5-7), 151-167.

Zeubavel, E. (1997). *Social Mindscapes: An Invitation to Cognitive Sociology*. Cambridge, MA: Harvard University Press.