very far into it yet, but it's possible I might try to do something like that at some point. Mostly photography satisfies a different need I think. There are some issues of overlap, because I work on philosophy of perception quite a lot and sometimes when you're doing photography it forces you to think about how the camera is representing the world. So perhaps it can help a little bit in thinking about how the mind is representing the world.

J: One last question. As was asked to Marcus Rossberg in *Aporia's* first issue, what is your favourite bar in St Andrews.?

S: Favourite bar? There are so many to choose from! (*Deliberates for a long time*). I suppose it's Drouthy Neebors probably, though I preferred it before they refurbished it, but there are several others that I like.

Can Modal Agnosticism Save Constructive Empiricism?

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ABSTRACT

In this paper I argue that by adopting modal agnosticism, the constructive empiricist can overcome the scientific realist's main objection. After introducing Bas van Fraassen's constructive empiricism and showing how he can respond to three traditional objections to his view, I consider James Ladyman's recent critique. Ladyman correctly argues that the constructive empiricist needs to distinguish between the observable and unobservable in a non-arbitrary manner. To be able to do so, the constructive empiricist must recognise objective modality in nature, but doing so would be at odds with the position's principle motivation of doing away with inflationary metaphysics and objective modality. I next explain John Diver's modal agnosticism. I argue that the modal agnostic has the resources available for the constructive empiricist to be able to make the distinction Ladyman requires. Since modal agnosticism does not entail an inflationary metaphysics, I argue that it is compatible with, and can thus save, constructive empiricism from Ladyman's challenge.

1. INTRODUCTION

Scientific realists believe that our best, currently accepted scientific theories are approximately true. In his seminal work *The Scientific Image*, Bas van Fraassen criticises the realist for the 'inflationary metaphysics' the position entails and offers in its place a constructive empiricist account of science which aims to do without the latter. "To be an empiricist" argues van Fraassen, "is to withhold belief in anything that goes beyond the actual, observable phenomena, and to recognise no objective modality in nature" (1980, 202).

As I shall explain in Section 2, van Fraassen is able to respond to most of the traditional problems raised against constructive empiricism. In Section 3, I consider James Ladyman's recent critique (2000, 2004). Ladyman argues that because constructive empiricism recommends belief in the empirical adequacy of theories rather than in their truth, the constructive empiricist *must* recognise objective modality in nature in order to allow for a non-arbitrary distinction to be drawn between the observable and the unobservable.

Van Fraassen responds by maintaining that the constructive empiricist *can* circumscribe the observable in a principled manner without appeal to objective modality. Additionally, he argues that if constructive empiricism does in fact need objective modality, being a modal realist would not be incompatible with constructive empiricism. I argue that Van Fraassen's first response is insufficient to counter Ladyman's criticism, and that his second is completely at odds with the empiricist's motivation of doing away with 'inflationary metaphysics'. Thus, as Ladyman concludes, constructive empiricism seems to be an 'untenable' position (2000, 855).

The main aim of this paper is to suggest a way in which the constructive empiricist can avoid Ladyman's objection. After outlining the possible world debate in Section 4, I explain modal agnosticism as developed by John Divers (2004) in Section 5. The modal agnostic, who holds herself as having no warrant for believing in the existence of any possible worlds other than the actual world, aims to secure at least some of the benefits associated with David Lewis' modal realism while avoiding the costly ontology. The modal agnostic does however retain the ability to express, among other things, counterfactual claims.

In Section 6 I argue that by retaining licence to assert counterfactual conditionals, the modal agnostic is able to objectively evaluate observability counterfactuals. This is exactly what the constructive empiricist must be able do in order to draw a principled distinction between the observable and the unobservable. Unlike realism however, modal agnosticism is compatible with the empiricist programme in that it does not entail an inflationary possible world metaphysics. Consequently, after examining a couple of possible objections, I conclude by suggesting that if the constructive empiricist adopts an agnostic view of modality, she may be able to save herself from Ladyman's criticism.

1.1 AN IMPORTANT ASSUMPTION

Before proceeding, I need to clarify an assumption I will hold throughout this paper. A commonly held belief is that only modal realism can analyse modalities *objectively*[1]. My understanding is that the constructive empiricist's *primary* motivation is to do 'without *inflationary metaphysics*' (van Fraassen 1980, 73). Since modal realism entails concrete possible worlds, I believe van Fraassen considers modal realism to be metaphysically inflationary. I assume that this is why van Fraassen consequently makes it part of the empiricist project to 'recognise no objective modality'. As will hopefully become clear, the modal agnostic can analyse many modal notions objectively without entailing an inflationary metaphysics. Consequently, I do not take modal agnosticism to be incompatible with constructive empiricism on the grounds that it can analyse modalities objectively, in spite of what van Fraassen says.

1 See in particular the concluding sections in Ladyman (2000) and (2004), along with Monton and van Fraassen (2003).

2. CONSTRUCTIVE EMPIRICISM

In *The Scientific Image*, van Fraassen criticises scientific realism (SR), which he defines as the position holding that:

> (SR) *Science aims to give us, in its theories, a literally true story of what the world is like; and acceptance of a scientific theory involves the belief that it is true.* (1980, 8, his italics).

In its place, van Fraassen propounds his own antirealist view of the aim of science and of theory acceptance which he calls constructive empiricism (CE). Constructive empiricism is that view that:

> (CE) *Science aims to give us theories which are empirically adequate; and acceptance of a theory involves as belief only that it is empirically adequate.* (1980, 12, his italics).

The key difference between scientific realism and van Fraassen's constructive empiricism is the difference between literal truth and empirical adequacy. According to van Fraassen's 'preliminary explication', a theory is empirically adequate if "what is says about the observable things and events in this world is true – exactly if it 'saves the phenomena' " (*Ibid*, 12). More precisely, the theory is empirically adequate if it has at least one model that *all* the actual phenomena fit inside. Here, 'all' for van Fraassen is not exhausted by the phenomena already observed, or even those observed at a certain time, past, present or future, but by those which are observ*able*.

2.1 THREE COMMON CRITICISMS OF CONSTRUCTIVE EMPIRICISM

Critics of constructive empiricism have concentrated their attacks on three main points. Following Ladyman (2000, 840), these can be summarised as follows:

i) *Constructive empiricism grants ontological significance to an arbitrary distinction* because the line demarcating the observable from the unobservable is vague, prone to change over time and is an artefact of accidents of human physiology.

ii) *Constructive empiricism is incoherent* because the constructive empiricist accepts that the observable world is described using terms that refer to unobservables and also accepts that all language is theory laden to some extent.

iii) *The constructive empiricist is an arbitrarily selective sceptic* because all present data underdetermines which theory is empirically adequate just as much as it underdetermines which theory is true. Therefore, constructive empiricism is just as vulnerable to scepticism as scientific realism is, and the underdetermination of theory by evidence does not entail support for constructive empiricism as van Fraassen argues.

Though these arguments initially seem problematic for van Fraassen's position, the constructive empiricist can respond to each.

2.1.1 OBSERVABLES AND UNOBSERVABLES

The criticism that the constructive empiricist grants *ontological* significance to the arbitrary distinction between the observable and unobservable 'misses its mark' once it is recognised that van Fraassen's claim is an epistemological rather than metaphysical one (Ladyman 2000, 840). Van Fraassen explicitly states that "[…] observability has nothing to do with existence […] [it] is, indeed, too anthropocentric for that […]" (1980, 19). Constructive empiricism never claims that unobservables *don't* exist.

Van Fraassen argues that it is legitimate to attribute an *epistemological* significance to the observable/unobservable distinction. He recognises that the question of where to draw the sharp line demarcating observables from unobservables cannot be defined in a non-arbitrary manner. What follows from this is that 'observable' is a vague predicate. Van Fraassen argues that "[…] predicates in natural language are almost all vague, and there is no problem in their use; only in formulating the logic that governs them" (1980, 16).

Though meant only as a 'rough guide' to avoid fallacies, van Fraassen characterises what counts as observable as: "X is observable if there are circumstances which are such that, if X is present to us under those circumstances, then we observe it" (1980:16). What we can or cannot observe is a direct consequence of the fact that:

> The human organism is, from the point of view of physics, a certain kind of measuring apparatus. As such it has certain inherent limitations – which will be described in detail in the final physics and biology. It is these limitations to which the 'able' in 'observable' refers – our limitations, *qua* human beings (1980: 17)

For example, the moons of Jupiter which we observe when we look through a telescope are a clear case of observation since our best current scientific theories say that *were* someone to get close enough to them, then they *would* observe them. On the contrary, our current theories do not tell us that we can directly observe particles in cloud chambers. Van Fraassen draws an analogy with a jet's vapour trail (1980, 17). When we observe a vapour trail, we do not observe the jet directly but rather *detect* it. If our current theories are correct in saying that positrons exist for example, then we detect them by means of observing their tracks in a cloud chamber. However, since we can *never* directly experience subatomic particles (as we can jets), empirically equivalent but incompatible rival theories which deny the existence of positrons are always a possibility. So, concludes van Fraassen, it is legitimate to attribute an epistemological significance to the observable/unobservable distinction.

2.1.2 THEORETICAL LANGUAGE

The claim that the constructive empiricist is incoherent because he accepts that the observable world is described using terms that refer to unobservables and that all language is theory laden to some extent, is a criticism which van Fraassen pre-empts early on in *The Scientific Image*. Accepting a theory, he says, "clearly involves more than belief" in the theory's empirical adequacy (1980, 12). This is so because a scientist is never confronted with a complete theory. Consequently, in accepting an incomplete theory the scientist involves himself in a research programme – one that could have been very different if he had accepted another empirically adequate, but rival, theory. For non-scientists, acceptance still involves a certain commitment to "confront any future phenomena by means of the conceptual resources of [the] theory". "Thus", concludes van Fraassen,

"acceptance involves not only belief but a certain commitment" (1980, 12).

Consequently, van Fraassen concedes to the realist that the constructive empiricist often has to use the language of science understood literally. In fact, sometimes there is 'no other way' to describe the world and the objects in it, such as microwave ovens or VHF receivers. But, he says:

> From this it does not follow that I believe that the concept of very high frequency electromagnetic waves corresponds to an individually identifiable element of reality. Concepts involve theories and are inconceivable without them […] [b]ut immersion in the theoretical world-picture does not preclude 'bracketing' its ontological implications (*Ibid*, 81).

Immersing oneself in the world described by scientific theories is thus necessary, but, as Ladyman notes, van Fraassen maintains that this only ever provides *pragmatic* support for a theory's theoretical commitments. While the language of science should be understood literally, "there is no need to believe good theories to be true, nor to believe *ipso facto* that the entities they postulate are real" (van Fraassen 1980, 11-2). Using the theoretical language of a theory remains consistent with withholding belief in the truth of the theory. Thus, van Fraassen counters criticism (ii).

2.1.3 UNDERDETERMINATION AND SELECTIVE SCEPTICISM

Ladyman calls the third criticism of van Fraassen's scepticism about unobservables 'the most popular realist response' – it is also the most problematic for the constructive empiricist. Ladyman characterises the underdetermination problem as follows (2000, 842):

> […] all the facts about observable states of affairs will underdetermine theory-choice between T_0, a full realistically construed theory, and T_1, the claim that T_0 is empirically adequate. However, all the evidence we have available now will underdetermine the choice between T_1 and T_2, the claim that T_0 is empirically adequate before the year 2001. Furthermore all the facts about all actually observed states of affairs at all times will underdetermine the choice between T_1 and T_3, the claim that T_0 describes all actually observed events.

Thus, even the judgement that T_0 is empirically adequate is underdetermined by the available evidence. The realist at least may argue that *inference to the best explanation* (IBE) warrants belief in T_0 and breaks the underdetermination (*Op Cit*), but van Fraassen cannot since he rejects IBE by saying:

> [A person] becomes irrational […] if he adopts it as a rule to [use IBE], and even more so if he regards us as rationally compelled by it (1989, 142).

In place of IBE, van Fraassen advocates what he calls 'voluntarism' in epistemology, according to which ampliative inferences are not irrational so long as constraints of consistency (e.g. such as those imposed by probability theory) are not violated (1989).

The constructive empiricist needs an ampliative principle to support the move from the extreme sceptical hypothesis that the world looks *as if* it exists to the view that the world *does* exist. Michael Devitt (2005) argues however that the same principle could be used to accept abduction to the existence of unobservables. Since van Fraassen nevertheless refuses to believe in the existence of unobservables, his scepticism must be arbitrary and selective concludes the realist (Ladyman 2000, 845).

2.2 A POSITIVE ARGUMENT FOR CONSTRUCTIVE EMPIRICISM

Van Fraassen acknowledges that even in endorsing a simple perceptual judgement, and certainly in accepting a theory as empirically adequate, he is "sticking [his] neck out". But, he argues, "[t]here is no argument there for belief in the truth of the accepted theories, since it is not an epistemological principle that one might as well hang for a sheep as for a lamb" (1980, 72). That is to say, if belief in empirical adequacy is sufficient to account for the aims and practices of science, then, despite the fact that the ampliative inference used to move away from extreme scepticism could be used to support the realist's claim as well as the empiricist's, going further than empirical adequacy would amount to taking an unnecessary epistemic risk for no extra empirical gain.

On the other hand, realists such as Psillos claim that at least realism can offer *explanations* for the observable phenomena and claim that science has "push[ed] back the frontiers of ignorance" (Psillos 1996, 42). However, as Ladyman notes, van Fraassen is content to argue that *empiricists* should be constructive empiricists rather than scientific realists because, from an *empirical* point of view, "the extra strength of the realist position is illusory" (2000, 844).

So, van Fraassen rejects realism and advocates constructive empiricism, not because he thinks the former is irrational, but because the latter "makes better sense of science […] than realism does and does so *without inflationary metaphysics*" (1980, 73, my emphasis).

Despite this, Ladyman thinks that constructive empiricism has no normative force for a non-empiricist, and as such, a stalemate has been reached. In (2000), Ladyman presents the most troublesome argument yet against van Fraassen in an attempt to give positive grounds for rejecting constructive empiricism.

3. LADYMAN'S OBJECTION TO CONSTRUCTIVE EMPIRICISM

Ladyman begins by analysing van Fraassen's various (inconsistent) writings on modality[2], and concludes that there are several viable interpretations of van Fraassen's views. None of them however, particularly van Fraassen's modal nominalist position, involve the belief in objectively construed (theory-independent) modal statements, which Ladyman argues the constructive empiricist needs (in order to circumscribe the observable in a principled way), but explicitly rejects[3].

For van Fraassen, observable phenomena need not actually be observed. Rather, a phenomena is observable "if there are circumstances which are such that, if [the phenomena] is present to us under those circumstances, then we observe it" (1980, 16). For example, van Fraassen recommends that we should believe in dinosaurs and the moons of Jupiter because were circumstances to obtain such that they were present to us (e.g. if we were standing on the latter), then we would observe them. Ladyman identifies two consequent questions about the claim that entity X is observable (2000, 850):

a) Is X's observability a theory-independent fact?
b) If so how can we know such a fact?

Ladyman considers b) first. Recall that van Fraassen describes the 'able' in 'observable' as referring

2 See in particular (1979, 412), (1980, 197) and (1989, 213).
3 Recall what van Fraassen says: "To be an empiricist is to withhold belief in anything that goes beyond the actual, observable phenomena, and to recognize *no objective modality* in nature." (1980, 203, my emphasis).

to our limitations as measuring devices, described by the 'final physics and biology'. On this account, science determines what is or is not observable. However, scientific theories concern themselves not only with actual, but also with *possible* observations. But, argues Ladyman, "how can van Fraassen rely upon theoretical science, which he does not believe to be true, to determine the limits of his scepticism?" (2000, 850).

If observability was a theory-dependent matter, then whether certain phenomena were observable or not would depend on which theory was used to describe them. Were this the case though, then the observable/unobservable distinction would have "no epistemic significance and constructive empiricism could not be sustained" (Ladyman 2000, 850). Van Fraassen concedes this much:

> To find the limits of what is observable in the world described by theory *T* we must inquire into *T* itself […] This might produce a vicious circle if what is observable were itself not simply a fact disclosed by theory, but rather theory-relative or theory dependent. […] I regard what is observable as a theory-independent question. It is a function of facts about us *qua* organisms in the world (1980, 57-58).

Therefore, van Fraassen must answer a) with an affirmative: if X is observable then it *is* an objective fact that if it *were* present to us then we *would* observe it.

The problem arises when we recall that the circumstances necessary for the observation of certain observable phenomena never *actually* obtain: they are *counterfactual*. For van Fraassen to be able to demarcate these *as* observable, he must believe at least some counterfactuals implied by scientific theories such as 'if a dinosaur were presented to us in the appropriate circumstance, then we would observe it'. Furthermore, van Fraassen must take such modal facts to be objective. Otherwise, his epistemic attitude "will depend upon a distinction that is entirely arbitrary" (Ladyman 2000, 851).

It seems then that the constructive empiricist must engage in some objective modal metaphysics in order to sustain his epistemic attitude towards science. However, if van Fraassen were to recognise an objective modality (say, by becoming a modal realist) and consequently allow objective modal facts to determine the truth value of counterfactuals, this would be 'totally incompatible with constructive empiricism' argues Ladyman. Recognising an objective modality would be at odds with the empiricist's disdain for modality and would undercut van Fraassen's chief positive argument for the constructive empiricist position; namely that it can do away with metaphysics. Hence, "in the face of these problems" concludes Ladyman, "[…] constructive empiricism is untenable as a philosophy of science" (2000, 855).

3.1 VAN FRAASSEN AND MONTON'S REPLY TO LADYMAN

In 'Constructive Empiricism and Modal Nominalism' (2003), Bradley Monton and van Fraassen attempt to clarify various aspects of the constructive empiricist position in face of Ladyman's argument, by addressing whether the objectivity of the observable requires there to be objective modal truths. They argue that this is not the case and that counterfactuals relating to the observability of unobserved phenomena *can* be objectively true because observability is an objective, *non-modal* property. That is to say, the "status [of] observability […] is not different from that of […] 'made of brick' or '75 feet long' (2003, 413).

Monton and van Fraassen argue this point by means of an example: To determine whether gun flashes would be visible under certain conditions, a scientist determines the properties of these flashes such as their duration and intensity. If successful, he would conclude that a certain range of

values for certain measurable parameters pertaining to the flash would be 'jointly necessary and sufficient for visibility under certain conditions' (2003, 413). So, without involving any modality, the scientist is able to determine whether a gun's flash would be observable or not under certain conditions. Monton and van Fraassen propose that "what goes here for the visibility of gun flashes […] goes equally for observability in general of any sort of object, event or process" (2003, 413). Therefore, generalities about actual facts determine what is observable. No objective modalities are needed to account for the epistemic attitude of the constructive empiricist.

3.2 LADYMAN'S REBUTTAL

In response to Monton and van Fraassen's claim that what is observable will follow from certain generalities about actual facts, Ladyman correctly argues that unless we consider generalisations in the form of scientific laws to have correctly latched on to objective features of the world, generalisations about what actually happens to as-yet-unobserved phenomena will not be enough to determine anything about what would happen if such phenomena were present to someone (2004, 762). Since van Fraassen must reject the first premise (since accepting it would amount to becoming a scientific realist), Ladyman concludes that science could never be used to determine whether something was objectively unobservable or just as of yet unobserved.

Indeed, even if observability was an objective non-modal property, the connection between observability and counterfactuals could not be 'sundered', for as Ladyman rightly argues, "in the case of observable entities like unicorns and dragons, it is the truth of the counterfactual claim that if they had been present to us we would have observed them which assures us that there are no such things" (2004, 763).

3.3 CONCLUDING REMARKS

In the last section of their paper, van Fraassen and Monton seem to partly cave in to Ladyman's critique by suggesting that it may be easier for a modal *realist* to be a constructive empiricist than for a modal antirealist. They suggest that adopting modal realism would not 'vitiate' the arguments that make constructive empiricism plausible. While adopting modal realism *would* amount to embracing some inflationary metaphysics admits van Fraassen, he concludes that other motivating arguments still exist for constructive empiricism that 'do not depend on modal metaphysics' and allow constructive empiricism to make the best sense of science (2003, 421).

I think that van Fraassen's concluding remarks are inappropriate and unnecessary. Giving an account of the aims and practices of science without appeal to inflationary metaphysics has traditionally been one of constructive empiricism's greatest strengths and principle motivation, and it should not be given up so easily. In what follows, I argue that by adopting modal agnosticism, the constructive empiricist can overcome Ladyman's objection while remaining true to his programme's original rationale. To motivate my claim, I will first need to locate modal agnosticism in the wider possible world debate and explain the position in detail.

4. AN INTRODUCTION TO POSSIBLE WORLDS

Our everyday use of words such as 'possibly', 'might', 'could', 'necessarily', 'must' and so on, lays bare our intuition that some but not all things could have been otherwise. Questions about such matters are questions about *modality*. These modal notions should be distinguished from *epistemic* possibilities. Consider the statement "for all we know, there may or may not be a solution to the 'N

vs. NP' problem". Epistemically, either option is possible, but whatever the answer proves to be, it could not have been otherwise (it is necessary in a modal sense).

Modal notions are most commonly interpreted through talk of possible worlds. For such talk to be philosophically useful, we need to know what it means and what is gained by its application. This depends on the view one takes of possible worlds. The traditional debate is conducted by the realist, committed to the view that a plurality of possible worlds exists, and the antirealist who denies this.

4.1 GENUINE REALISM

The most infamous type of realism about possible worlds is David Lewis' genuine realism. The theory's salient ontological theses include (Divers 2002, 45-6):

(OC1) An infinite plurality of possible worlds exists.
(OC2) Possible worlds differ only in content, not in kind, to our own.
(OC3) 'Actuality' is indexical - from the standpoint of each world, that world is itself 'actual', and all other worlds non-actual.
(OC4) Possible worlds are spatiotemporally and causally isolated from every other world, except from itself, or part of a world.
(OC5) Individuals are world-bound in that they don't wholly exist in more than one world.

4.2 GENUINE REALISM'S INTERPRETATION OF POSSIBLE WORLDS

Genuine realism interprets possible world talk differently depending on whether it involves *de dicto* or *de re* modality. For the purposes of this paper, modalising *de re* will be understood as modalising about a specific object or thing, such as David Attenborough, while modalising *de dicto* is modalising about a proposition, such as 'blue swans exist'. Following John Divers (2002, 43), in a straightforward case of *de dicto* possibility, we start with a claim in English (DD1), move to a neutral possible world claim (DD2) and then to the genuine realist interpretation (GR1):

(DD1) There could have been blue swans.
(DD2) There is a possible world at which there are blue swans.
(GR1) $\exists x \exists y(Wx \,\&\, Pyx \,\&\, By \,\&\, Sy)$ [4]

As interpreted by genuine realism, a world ('Wx') is construed as possible by virtue of its unrestricted existence ('$\exists x ... (Wx ...)$'), and the existence of blue swans ('By & Sy') at the world is construed as the world having such things among its parts ('Pyx').

In the case of *de re* possibility, we start with a claim in English (DR1), move to neutral PW claim (DR2) and then to the genuine realism interpretation (GR2):

(DR1) David Attenborough could have worked for Channel 4.
(DR2) There is a possible world at which David Attenborough works for Channel 4.
(GR2) $\exists x \exists y(Wx \,\&\, Pyx \,\&\, Cyd \,\&\, Hy)$ [5]

(GR2) is interpreted as before, but additionally, for the world to represent David Attenborough as

4 Where Wx = x is a world, Pyx = y is a part of x, By = y is a blue and Sy = y is a swan
5 Where Cyd = y is a counterpart of d, d = David Attenborough and Hy = y works for H and H = Channel 4.

working for Channel 4, it needs to have as a part a *counterpart* of David Attenborough ('Cyd'), where that counterpart works for Channel 4 ('Hy').

As shown, Lewis' system offers a "system of analyses of the family of modal concepts in which no modal concept is taken as primitive, and which underwrite the practise of conducting our modal reasoning in the medium of ordinary first-order quantificational logic" (Divers 2004, 660). While Lewis believed that his realism was credible on a cost-benefit analysis (1986), the theory has struck many as simply too ontologically extravagant and epistemologically indefensible.

4.3 ERSATZ MODAL REALISM

Before proceeding, I wish to briefly distinguish Lewis' genuine realism from what he calls 'ersatz modal realism'. Ersatzists think a plurality of possible worlds exist, but that these are abstract rather than concrete entities. Only one of these ersatz worlds represents the concrete world correctly: it is the actualised ersatz world. All of the other ersatz worlds remain unactualised. Like the modal antirealist, the ersatz realist tries to derive the benefits of genuine realism from a more 'safe and sane' ontology. Unfortunately, it is beyond the scope of this essay to consider ersatz realism in further detail. I point the interested reader to Lewis (1986) or Divers (2002), both who argue against ersatzism, for a fuller treatment.

4.4 MODAL ANTIREALISM

Modal antirealists wish to benefit from talking *as if* possible worlds existed without being committed to the genuine realist's ontology. They must adopt an interpretational stance of possible world speak that avoids commitment to the following three-part conjunction: (a) declarative sentences involving possible worlds are truth apt, (b) some are true and (c) some have a semantic structure that validly entails the existence of a non-actual world (Divers 2002, 22).

In the following sections, as space is limited, I will only briefly introduce modal expressivism and modal fictionalism so as to be able to develop the error-theoretic and agnostic modal positions in greater detail.

4.4.1 DENYING TRUTH APTNESS: MODAL EXPRESSIVISM

There are three different strategies the antirealist could adopt. The most radical is to deny the first conjunct (a) and hold that possible world sentences are *never* truth-apt. A parallel can be drawn with Blackburn's Expressivism about moral judgements. Expressivists maintain that when we make moral judgements, we do not refer to a moral fact. Rather, we say something that is reflective of an attitude we hold. For example, when someone utters the sentence "murder is wrong", the expressivist account interprets them as saying "Boo! to murder" rather than "the statement 'murder is wrong' is true". While space does not permit me to do so, Blackburn has indicated how and why a modal antirealist might appeal to such a strategy (1984, 213-6).

4.4.2 DENYING APPROPRIATE SEMANTIC STRUCTURE: MODAL FICTIONALISM

Alternatively, the antirealist could deny conjunct (c) and adopt a 'structure-based antirealism' (Divers 2002, 23), refusing to accept that possible world sentences have the necessary semantic structure which permits valid inference to the existence of non-actual worlds. The most discussed

version of such a strategy is known as modal fictionalism.

The typical modal fictionalist claims that possible worlds are merely fictional entities: there is no actualised possible world in which blue swans literally exist. Rather the literal truth is that *according to the fiction of Genuine Realism*, there is a possible world in which blue swans exist. On this account, possible world talk such as "there is a possible world in which blue swans exist" should be understood in the same way as talk about paradigmatically fictional objects, such as "there is a brilliant detective at 221b Baker Street" (Rosen 1990). Unfortunately, formal proofs have recently been developed showing that modal fictionalism is self-refuting. In particular, I point the reader to Stuart Brock's paper (1993).

4.4.3 DENYING TRUTH: MODAL ERROR THEORY

Lastly, the antirealist could grant that declarative possible world sentences are truth-apt and that they mean what they appear to mean, but deny conjunct (b) by refusing to assent to the truth of any possible world sentence. Divers calls such strategies 'Factualist Antirealism' and identifies two strands: error-theoretic and agnostic.

The characteristic claim of the stronger error-theoretic position is that all sentences of PW discourse are false. Again, a parallel can be drawn with moral theory, where J. L. Mackie has proposed an error theory about moral properties. Mackie holds that moral claims ascribe moral properties (such as wrongness) to items (such as murder). Moral claims are true when they actually have the properties ascribed to them and false otherwise. However, Mackie argues that because moral properties would be queer if they existed, moral claims are *always* false because moral properties do not exist.

The ontology of the error-theoretic possible world theorist is that no world apart from the actual world exists. Subsequently, any sentence of possible world discourse which entails the existence of a non-actual world is false. As Divers notes, this position has a direct impact on our modal commitments, for "error theory about possible-worlds, when allied with Lewisian analyses, generates a collapse of the *de dicto* modalities"[6] (Divers 2004, 667). To see this, consider the following Lewisian interpretations of possibility, impossibility, necessity, and contingency:

(LP) It is possible that X iff there is some world at which X.
(LI) It is impossible that X iff there is no world at which X.
(LN) It is necessary that X iff at all worlds, X.
(LC) It is contingent whether X iff there is a world at which X and a world at which not-X.

Since the actual world is the only world that exists according to the error-theorist's ontology, all and only that which is true *de dicto* of the actual world is true of some and all worlds. Hence, all that is true *de dicto* of the actual world is *necessarily* true and all that is not true is *impossible*; the existence of donkeys is necessary, and the existence of blue swans impossible. Furthermore, since contingency requires the truth of X at one world and the falsity of X at a *different* world, error theory rules out what contingency requires (namely, the existence of a plurality of worlds). It seems then that error theory causes the collapse of more modalities than is desirable.

6 The error-theorist is entitled to assert certain de re modalities without contradiction. As this is also true of the agnostic position which we shall cover later (see section 5.3) an error-theoretic account of de re modalities will not be considered here.

Let us now turn to the weaker of the two factualist antirealist strands, modal agnosticism, which promises to partly prevent such a collapse.

5. MODAL AGNOSTICISM

In "Agnosticism About Other Worlds: A New Antirealist Programme in Modality" (2004), Divers introduces modal agnosticism. Like van Fraassen who wants the benefits of micro-physical theory without commitment to unobservables, the modal agnostic wishes to secure at least some of the benefits associated with genuine realism without committing to the genuine realist's ontology. The characteristic commitment of the modal agnostic is that she holds herself as having no warrant for believing in the existence of any possible world other than the actual world. The modal agnostic should not assert any sentence which entails the existence of a world beyond that of the actual world, even though for all they know, *some may be true* (2004, 668).

5.1 RADICAL OR MODERATE?

Two types of agnosticism are worth differentiating: moderate and radical. Both the moderate and the radical agnostic are agnostic about the existence of any possible world other than the actual one, but where the moderate agnostic's agnostic beliefs may give way to *dis*belief in light of characterisations which would make the world an impossible one (where the world instantiates Q and not-Q simultaneously for example), the radical agnostic would remain agnostic about the existence of such a world (Divers 2004, 669).

The distinction between moderate and radical agnosticism is significant, for just as the error-theorist cannot prevent the collapse of many modalities, if the agnostic adopts a radical stance, she will be unable to prevent becoming comprehensively agnostic about modality. Such an approach would be highly undesirable as none of the benefits associated with genuine realism could be salvaged. On a Lewisian cost-benefit analysis, it is unlikely that radical agnosticism would fare well.

5.2 MODERATE AGNOSTICISM

The moderate agnostic on the other hand can 'forestall retreat' as she does *not* need to be comprehensively agnostic about modality (Divers 2004, 669). The moderate agnostic (hereafter simply 'agnostic') can thereby retain the expressive power afforded by genuine realism to many modalities, including claims of necessity, impossibility, *de re* possibilities and counterfactuals.

5.2.1 NECESSITIES AND IMPOSSIBILITIES

The agnostic can warrantedly claim to know things[7] as long as they do not posit or require belief in a possible world beyond the actual world. With this in mind, recall the Lewisian interpretation of impossibility (LI) and necessity (LN):

(LI) It is impossible that X iff there is no world at which X.

This can be expressed as:

(LI*) $\neg \Diamond X \leftrightarrow \neg \exists y(Wy \,\&\, P \in y)$[8]

(LN1) It is necessary that X iff at all worlds, X.

7 At least in as much as the genuine realist has a warrant to claim to know the matters in question.

8 Where Wy = y is a world.

By principles of first order logic, (LN1) can equivalently be interpreted as:

(LN2) It is necessary that X iff there is no world at which not-X.

And this can be expressed as:

(LN2*) $\Box X \leftrightarrow \neg \exists y(Wy \,\&\, P \notin y)$

Unrestricted negative existential claims do not posit the existence of a world ('$...\neg \exists y(Wy...)$' as in (LI*) and (LN2*) above) beyond the actual, and hence, the agnostic retains licence to assert them[9]. Therefore, the agnostic can express claims of necessity and impossibility such (LI) and (LN1).

5.2.2 COUNTERFACTUAL CONDITIONALS

In addition to necessity and impossibility claims, Divers (2004) argues that the modal agnostic also has grounds for claiming modal knowledge of counterfactual conditionals of the form:

(CF) $A \,\Box\!\!\rightarrow C$ iff there is no selected world at which (A-and-not-C)[10]

According to Divers, the realist has to earn the right to assert a counterfactual by "making the case that the satisfaction of the selection condition […] presents grounds for believing that there is no world which is an A-and-not-C world *and a selected world*" (2004, 672). The three conditions Divers outlines which are needed for this to happen are:

i) Contextual factors and factual considerations about the actual world do enough to constrain an appropriate selection relation to fill out the truth condition of the counterfactual
ii) The pragmatic, linguistic and factual knowledge of the speaker combine to determine the value of the truth-condition
iii) The realist speaker has justification for believing that the truth-condition is satisfied.

The crucial point, concludes Divers, is that at no point is the modal agnostic deprived of this story, and so can legitimately claim grounds for asserting counterfactual conditionals.

The fact that the agnostic is not deprived of such modal knowledge can be further elucidated by expressing (CF) formally:

(CF*) $(A \,\Box\!\!\rightarrow C) \leftrightarrow \neg \exists y(Wy \,\&\, S_A y \,\&\, C \notin y)$

where the world selection condition $S_A y$ is such that world y is a selected world only if A holds at y:

(CFS*) $S_A y \rightarrow A \in y$

As with (LI*) and (LN2*), at no point does (CF*) formally entail the existence of a possible world

9 In fact, the agnostic can assert unrestricted negative existential claims whenever her logic presents them as logical truths, such as 'it is impossible that there is something that is Q and not-Q' (Divers 2004, 670).

10 This is the counterfactual form preferred by Lewis (1986, 20-2). As Divers notes (2004, 671), counterfactuals expressed in a positive existential form would render any counterfactual with an impossible antecedent such as (Q & ¬Q) $\Box\!\!\rightarrow$ R as false rather than true, as no selected world would exist at which Q & ¬ Q and R, (since such a world would be impossible).

(‘$\exists x...(Wx...)$’). Therefore, “in so far as the realist is in a position to assert the intuitively true counterfactuals, so is the worldly agnostic” (Divers 2004, 673). As I shall argue in section 6, this ability is key in overcoming one of the major objections facing van Fraassen’s constructive empiricism.

5.3 THE AGNOSTIC’S DEFICIT

As we have just seen, the modal agnostic need not be comprehensively agnostic about modality. However, despite the agnostic’s entitlement to certain claims of necessity and impossibility, she must remain agnostic about certain modal claims of possibility and contingency.

To illustrate the deficiency, recall the Lewisian interpretations of possibility and contingency:

(LP) It is possible that X iff there is some world at which X.
(LC) It is contingent whether X iff there is a world at which X and a world at which not-X.

The agnostic must remain agnostic about the right hand sides of the biconditionals in (LP) and (LC), entailing an agnosticism about the left hand side of the biconditionals as well. To understand why, consider an arbitrary biconditional, P iff Q. If one does not want to be agnostic about P, then one must hold P to be true or false. If the biconditional is to be true however, P must be true, and hence on pain of irrationality, Q must be held to be true also. However, holding Q to have a truth value is contrary to being agnostic about Q. Hence, agnosticism about the right side, Q, of a biconditional entails agnosticism about the left side, P, and vice versa.
For example, reconsider the familiar statement:

(DD1) ‘There could have been blue swans’.

As we have shown previously, the statement on a Lewisian interpretation becomes thus:

(DD2) There is a possible world at which there are blue swans.

Reformulated as a biconditional, (DD2) becomes:

(DD3) It is possible that there are blue swans iff there is some world at which there are blue swans.

Here then, the agnostic wants to remain agnostic about the right side of the biconditional ‘there is some world’, forcing the agnostic to remain agnostic about the left side: the possibility of there being blue swans.

5.3.1 LIMITING THE DEFICIT

This example of *de dicto* possibility may be misleading however, as the modal possibility and contingency deficit facing the agnostic need not be as comprehensive as the analysis initially seems to suggest.

In section 4.4 of *On the Plurality of Worlds*, Lewis discusses his theory of representation of *de re* possibility, stating that “[p]ossibilities are not always possible worlds” (1986, 230). To illustrate what he means, Lewis imagines that he himself could have been someone else, namely Fred, who

exists in the actual world. Lewis argues:

> [Fred] is even a possible way for me to be. He is my counterpart under an extraordinarily generous counterpart relation, one which demands nothing more of counterparts than that they be things of the same kind. […]. The possibility in question is a possibility for me, not for the world. It is not some other world, differing haecceitistically from ours, which represents *de re* of me that I am Fred; it is Fred himself, situated as he is within our world (Lewis 1986, 232).

The modal agnostic may take great solace in Lewis' theory of *de re* representation, for armed with it, she no longer faces an assertibility deficit of *de re* claims of the type 'possibly X', when it is false that X but an appropriate this-worldly counterpart is X in the actual world. So, the agnostic can assert as confidently as the realist that "It is possible that Attenborough could have worked for Channel 4", because a counterpart of Attenborough exists in the actual world who *does* work for Channel 4. This account appropriately captures the contingency of Attenborough's employment with the BBC, rather than making it necessary.

Therefore, as Divers summarises, the agnostic faces assertibility deficits only over claims of the type 'possibly X' where i) she has no warrant to assert that there is no world at which X and ii) no warrant to assert that at the actual world X (2004, 674).

6. SAVING CONSTRUCTIVE EMPIRICISM: MODAL AGNOSTICISM

Recall the constructive empiricist's dilemma: if constructive empiricism is to be a coherent position, observability needs to be accounted for in a principled, non-arbitrary manner. Since van Fraassen has not done enough to show that observability can be construed objectively yet non-modally in all circumstances, the distinction between observables and unobservables can't be drawn without recognising an objective modality in nature by accepting modal realism. Yet in spite of what van Fraassen says, doing so would amount to undermining the main motivation for being a constructive empiricist.

Ladyman's objection need not spell the end of constructive empiricism as a tenable position however. I think that if the constructive empiricist were to become a modal agnostic, she *could* circumscribe the observable/unobservable distinction in a principled manner without entailing an inflationary metaphysics, thereby avoiding Ladyman's objection altogether.
Recall van Fraassen's 'rough guide' to what counts as observable:

> (O1) "X is observable if there are circumstances which are such that, if X is present to us under those circumstances, then we observe it" (1980, 16).

If we consider van Fraassen's popular example about the moons of Jupiter, and interpret (O1) in terms of possible worlds, we get:

> (O2) There is no world that is physically possible relative to this world in which the moons of Jupiter are present to us in the right kind of circumstances and we fail to observe them.

Subsequently, (O2) can equivalently be interpreted as a counterfactual conditional:

> (O3) If the moons of Jupiter are present to us in the right kind of circumstances then we observe them (they are observable) iff there is no selected world at which

they are present in the right circumstances and we fail to observe them.

According to Ladyman, this is the type of counterfactual conditional which the constructive empiricist must be able to evaluate objectively in order to sustain a non-arbitrary distinction, but can't without adopting modal realism since the latter is the only modal position which allows counterfactuals like (O3) to be evaluated objectively.

However, if 'the moons of Jupiter are present' = A, 'we observe them' = C and a world y is a selected world (selected by the selection condition $S_A y$) only if A holds at y[11], then (O3) can formally be expressed as:

(O3*) $(A \mathrel{\square\!\!\rightarrow} C) \leftrightarrow \neg \exists y(Wy \,\&\, S_A y \,\&\, C \notin y)$

Notice that (O3*) has exactly the same formal form as (CF*), the formal expression of counterfactual conditionals I argued were expressible by the modal agnostic in Section 5.2.2. Therefore, I think that modal agnosticism could provide van Fraassen with the tools he needs to circumscribe the observable from the unobservable in a principled manner, allowing him to avoid Ladyman's objection all together.

6.1 POSSIBLE OBJECTIONS AND CONCLUDING REMARKS

There are a number of objections that could arise from my proposal. These include:

i) If modal agnosticism can express counterfactual claims objectively, then it must entail, like modal realism, inflationary metaphysics. Therefore, modal agnosticism is incompatible with constructive empiricism.
ii) If modal agnosticism was a natural match for constructive empiricism, then the constructive empiricist would already have adopted it.

Someone objecting that modal agnosticism and constructive empiricism are incompatible on the grounds outlined in (i) could only have misunderstood the modal agnostic project. The very aim of the agnostic programme is to garner as many benefits as possible from genuine realism while avoiding the inflationary possible world ontology Lewis' programme entails.

The realist could reply that *all* possible inflation isn't avoided, since the agnostic, unlike the modal error-theorist, acknowledges that other possible worlds *may* exist, even if she holds herself as having no warrant for believing in their existence. While this may be so, I would reply that the agnostic's epistemic attitude remains entirely compatible with that of the constructive empiricist's; both wish to remain agnostic about the existence of ontologically problematic entities that fall in their domain (possible worlds and unobservable phenomena respectively). Recall that while the constructive empiricist initially seemed to be in trouble for being unable to do without theory-laden language, van Fraassen was able to respond to this charge. I expect that if accused of using possible world laden language, the modal agnostic could respond in kind. Consequently, the parallel in epistemic attitudes further suggests that modal agnosticism is a natural partner for constructive empiricism.

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11 $S_A y \rightarrow A \in y$

In response to (ii), there are various reasons which may explain why the constructive empiricist has not yet adopted modal agnosticism. From a pragmatic perspective, while Divers has published numerous papers developing modal agnosticism, the first of these appeared only after the principle constructive empiricist – realist debate conducted by van Fraassen and Ladyman ended in 2004. Thus, a properly developed version of modal agnosticism was not yet available with which van Fraassen could have responded.

Secondly, modal agnosticism still remains in its infancy. While Divers has worked hard to try and show that the modal agnostic can live with the modal deficit discussed in Section 5.3 (see Divers 2004), future research may reveal that the modal agnostic or constructive empiricist in fact cannot. Alternatively, further investigation may reveal other serious shortcomings with Divers' theory. Consequently, it is no surprise that constructive empiricists like van Fraassen may have been reluctant to adopt modal agnosticism too quickly.

Until shown otherwise however, I think my suggestion is one the constructive empiricist should take seriously. Though it may require the constructive empiricist to 'stick her neck out', I think that adopting modal agnosticism, even at this early stage, is a more promising route for the constructive empiricist to take than for her to abandon the main motivation for her position in light of the realist's challenge.

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How We Each Maintain Our Personal Identity

Mark Pexton

In this essay I will address the broad topic of personal identity. This topic deals with the problem of how we can truly claim that a person is the same person throughout his life or indeed over any period of his life. What is it about a person that means I can refer to him as a continuing entity? I will argue that some traditional approaches to identity miss the real question and propose that identity resides in a self's characteristic interaction with the world.

One's first response may well be that no, a person is never the same from one moment to the next, we refer to people by the same names only for convenience. Our experiences, our environment changes us and also we change ourselves from within. Our body is programmed to change when we grow older. Indeed we are not even the same from moment to moment, we have moods.

And is there even a self to talk about at all? Hume saw us as composed of our experience. We have a perspective but the viewer himself is elusive and indescribable. When we examine ourselves to find our self we find nothing but the present content of our experience.

So when we talk of our own lives what are we talking of, what is it that is born and dies? What is a self?

First let us be clear on some terms. We clearly accept that at no two points is a person identical in body or in mind, 'Maximum similarity within the groupings would limit them to atomic-point-instants. The purpose of the identity notion is wider breadth, but a grouping that included everything would not convey specific information'[12]. But this in my opinion is a different question from that of identity and here the main thrust of this essay differs from the view that, 'the relation of identity is logically one-one: I cannot be identical to two distinct people.'[13] Identity is an abstract

12 Robert Nozick, *Personal Identity Through Time* (pg 108 of *Personal Identity* ed. by Martin and Barresi, 2007)
13 Brian Garrett, *Personal Identity* in *The Shorter Routledge Encyclopedia Of Philosophy,* 2005