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ABOUT

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Contents

Outline of an Adverbial Theory of Colour

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Abstract

The theory of colour defended in this paper might equally well be called a *nihilism* about colour, for I take it to be the case that nothing is coloured, and that properties such as *being red* are never exemplified. We might call the latter sort of property a *colour property*, and I will try to argue here that no such properties have exemplars. However, I hesitate to call my view 'nihilistic', because I also hold that there is an important species of property that does the theoretical work of colour properties, and whose members *do* have exemplars, these examples being human beings (more generally: sensing subjects). Furthermore, I call the view *'adverbial'* because these properties, I take it, are such properties as *sensing in a red fashion,* which are often named by the use of adverbs in the literature (i.e. the property of '*sensing redly*'). Here I shall offer some positive arguments for my view, before addressing an especially pressing concern, this being the question of how statements concerning coloured objects can be true if colours do not exist.

1   A Qualified Nihilism about Colour

To fix some key terms, let us call *realism about colour* the view which says that colour properties are instantiated. That is, realists assert that some things really are red. Among realists then are those who think that facts about these coloured beings *qua* coloured beings are dependent on facts about human beings, and there are those who think that they are not. Let us call these respectively *subjectivists* and *objectivists* about colour. Note that, under this taxonomy, subjectivists are still very much *realists* about colour. The only difference between objectivists and subjectivists concerns the dependence or independence of colour on *us*. In contrast to realists of both stripes, the *nihilist* claims that no colour properties are instantiated. That is, the nihilist denies that there really are any red things. Here I should like to argue in favour of nihilism.

It should be briefly noted that this way of dividing up the positions on offer is somewhat idiosyncratic. It cuts across divisions made by Maund, for example, in his survey of the field (Maund 2012, §1.4). The distinction which Maund makes between realists and *eliminativists* is not quite the same distinction which I make between realists and nihilists, since even some theories which Maund tends to call 'eliminativist,' such as projective theories of colour, still have something of a realist bent to them, at least insofar as they are compatible with colour properties being instantiated by private objects such as sense-data, and thus with a certain form of what I have called 'subjectivism'[2]. My sense of 'realism' is in this way broader than is perhaps usual, and by 'nihilism' I therefore mean something more specific than 'eliminativism'.

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[2] Compare, for instance, the broad formulation of projectivism given by Averill & Hazelett (2011) in their article "Color objectivism and color projectivism". The authors follow Shoemaker (1990) in distinguishing between a realistic 'literal' projectivism, which

So how might one go about arguing for nihilism? Well, if colour properties are instantiated, then we are surely acquainted with some of their exemplars in our sensory experience. If anything is red, in other words, then this snooker ball, that flower, and this shirt (alternatively: this colour-patch, that afterimage) are most certainly red. If *these* things are not red, then nothing is. Now, realists will surely differ in their opinion concerning the identity of coloured objects. Some will say that they are material beings, such as cars and curtains. Others will say that certain psycho-sensory entities, that is 'sense-data,' are the things which are *really* coloured. If realism is true, then it seems to me that one of these views must be right. If there are coloured objects, then they are either inhabitants of the internal world of experience, or of the external world of material. The following argument for nihilism will therefore be two-pronged, attacking both a realism which takes colour properties to be exemplified by sensory objects, and a realism which takes colour properties to be exemplified by material objects.

1.1   Against Sense-Data

Among philosophers at least, it seems as if sense-datum theories of perception have fallen out of favour during the last few decades. Thus, one may prudently argue against the sort of realism which says that there exist coloured sense-data by arguing against the existence of sense-data *tout court*. So here is just one argument against the existence of sense-data, which I take to be quite compelling.

One quality of sense-data which is problematic is the spatiality of so called 'colour-patches,' that is, visual sense-data. They have shapes and they have positions relative to one another, and thus must have locations. But are sense-data spatially related to material beings? If they are, then certain very odd questions become legitimate. Questions which appear at once both necessary to ask and impossible to answer. How big are sense-data? Are sense-data located inside the brain, or behind the cornea, or outside of the body entirely? If they are outside the body, then why can we perceive them and not colocated material bodies which are also external to us? If they are internal to the body, then why can we not also perceive some of our colocated internal, material body parts? In order to avoid granting substance to such questions, one must deny that sense-data *do* spatially relate to material beings. Yet if we deny that sense-data are spatially related to material beings, but assert that they possess locations, then we must conclude that they inhabit an entirely different spatial realm to material beings[3].

If this is so, and we are thus led to a 'two-space' view of perception, wherein material and sensory beings are entirely cut-off from one another, then the simple question arises of *where* the subject is located. She could either be an inhabitant of the space of material beings, or of sense-data, or of neither[4]. Any answer to this question, it seems to me,

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says that colour-properties are instantiated by sense-data, and a nihilistic 'figurative' projectivism, which denies that colour-properties are instantiated anywhere.

[3] Such a view has been stated most recently to my knowledge by John Smythies in his paper "Space, Time and Consciousness' (Smythies, 2003)

[4] I maintain that she cannot be spatially related to both, under a two-space view, for the following reason. Two beings x and y are spatially related if and only if one is some distance away from the other (even if this distance is of zero meters, in the case of x and itself). But the relation of '… being some distance away from…' is plausibly both symmetric and, more importantly, transitive. If x is a distance from y, and y is a distance from z, then x is some distance from z, this being *via y*. Thus, if the subject

results in absurdity. If the subject is not spatially related to sense-data, then sense data themselves consequently fail to do the theoretical work they were posited to perform. For some sense-data seem to be positioned relative to the subject. Sounds can be *to the right* or *to the left*, for example. Therefore, if sense-data are not spatially related to the subject, then sense-data can fail to be as they seem to be. This is catastrophic as far as the sense-datum theorist is concerned, for consider the argument from illusion, the most historically salient argument for the existence of sense-data.

(1) It appears as though there is some *F* thing here.
(2) No material thing here is in fact *F*.
(3) But I must be directly aware of *something* which is *F*, else it would not appear that way.
(4) Therefore, the *F* thing of which I am directly aware is a non-material entity.

The crucial premise here is of course (3) since (1) and (2) are simply posited to be true on at least some occasions, such as when a straight stick appears bent in water. But what becomes clear upon reflection over this argument is that sense-data, being posited to account for the possibility of illusions, must always *actually* be as they appear to be, for otherwise we might run an argument as follows:

(1') It appears as though some sense-data of mine is *F*.
(2') But none of my sense-data are in fact *F*.
(3') But I must be directly aware of *something* which is *F*, else it would not appear that way.
(4') Therefore, the *F* thing of which I am directly aware is not a sense-datum.

But the conclusion of this argument contradicts the sense-datum theories of perception entirely. So it seems that the subject must indeed inhabit the sensory realm. But, then, since the subject cannot spatially relate to both sense-data and material under the two-space view, spatial relations to sense-data preclude spatial relations to material beings, and so the subject herself becomes cut-off from the material world. It seems to me that such a view collapses into a form of idealism in everything but name, but more importantly, if the subject of perception is cut-off from the material realm, then how is she to perform actions within that realm? For example, I am currently typing up this paper. But if I am also a perceiving subject, it follows that I am not spatially related to my computer, or its keyboard, and so on. So how can it be true that *I* am typing? Surely, it must mean that either I, or some part of me, is pressing the keys of the keyboard, and so must inhabit the material realm. But if I then inhabit both the spatial realm and the sensory realm, then the two are *not* cut-off from one another as we had supposed[5].

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were related to both material and sensory ones, then material beings would be spatially related to sensory ones, contradicting the view.

[5] It cannot be retorted that the subject herself does not wholly inhabit both spaces, but only has *parts* that wholly inhabit both spaces, but only has *parts* that wholly inhabit each space. This response cannot work because (i) the 'is some distance from relation' is, again, symmetric and transitive, and because (ii) a sum of spatially located beings must itself be located at least partially where each of its parts are. Thus, there cannot be a sum of inhabitants of totally cut-off spatial realms. If c is the sum of x and y, then some composite has a spatial part which wholly inhabits some space, then all of the composite's spatial parts also inhabit this space, and so the composite itself wholly inhabits that space.

The argument summarised goes like this. Either sense-data are spatially related to material beings or they are not. If they are, then certain unanswerable questions seem to present themselves, questions which have no good answer. But if sense-data are not spatially related to material beings, then absurd consequences follow[6].

1.2 Coloured Material

If one accepts a form of realism in which colour properties are taken to be properties of material beings, one is faced with a further choice. Either colour properties are reducible to other properties of material beings, such as macrostructural properties or reflective dispositions, or else they are fundamental or basic properties that are not to be understood under any more basic terms. The latter view, which might be called a *primitivism* about colour, is difficult to accept. If colours are indeed properties of material, then it seems that they must have certain causal powers, or else must endow their bearers with causal powers. If not, there would be no connection between an object's being red and our seeing it to be red. Its being red must in some way *cause us* to take it to be red. Thus, if colours are truly primitive properties of material, then their associated causal powers cannot merely be reducible to the causal powers associated with the other properties of the material. For otherwise the same problem arises: if it is the microstructure of the material which causes us to take a material to be red, say, and not the *redness* of the material, then colour properties are theoretically superfluous. But if these primitive properties are associated with certain primitive causal powers, then we seem to posit new primitive causal influences in the universe. Might a physicist be able to test for the presence of colour, as opposed to microstructure, or wavelength, or reflective disposition? Would a physical theory that did not posit each colour as a theoretical primitive be in some way defective?[7]

So consider the alternative, that colour properties are reducible or identical to certain other properties of materials, such as microstructure or reflective dispositions. Under such a view, it might be true to say that, for example, to be red just is to have a microstructure of type R, and that the property of being red *just is* the property of having a microstructure of type R. Against this view, and to end this section, I have two arguments. I am more confident in the second, since it does not rely on the doctrine of adverbialism, though in my mind both have merit.

     i. Since sense-data do not exist, no object is perceived in cases of hallucination. Thus, sensation must be characterised in a way that does not require every act of sensation to have an object, thus the so-called 'act-object' distinction is faulty, and adverbialism in some form is correct. Now, if the property of being red were identical with the property of having a microstructure of type R, for example, then the property of *sensing in a red fashion* would be identical with the property of *sensing in a microstructure of type R fashion*, which is nonsense. Thus, since sensing in a red fashion is not the same thing as sensing in a microstructure of type R fashion, being red is not the same thing as having such a microstructure.

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[6] For a sustained argument against 'two-space' causal realism along the above lines, refer to Bevan (2017).

[7] I borrow this sort of argument from C. L. Hardin, see: *Colour for Philosophers* (Hardin, 1979, 61)

ii. Say that a quality *q* is an item of indirect perception if there exists a quality *q** such that we perceive *q via* a perception of *q**. Then, say that perceived quality *q* is an item of direct perception if there is not such a quality *q**. To my mind, if colour properties are items of perception, then they must be items of direct perception, for what directly perceived properties could play the role of being those properties we perceive colours *through*? It seems clear to me that there are no suitable candidates. So, if colour properties are identical to microstructural properties, or reflective dispositions, or wavelengths, then it must be true that *if* we perceive colour, then we *directly* perceive colour, and so we must also directly perceive microstructure, or reflective disposition, or wavelength, which is not the case. Therefore, if we perceive colour, then it must not be identical to microstructure, reflective disposition, or wavelength.

1.3 An Adverbial Proposal

Human beings can have many different sorts of sensation. Let us call the sorts of sensation such as 'sensing redly', 'sensing bluely' and so on, *colour-sensations*. We humans very often have colour-sensations, but it is clear that having a colour-sensation is not the same thing as having a colour-property. I can sense redly without myself being red. Just so, there are many properties of material beings which are relevant to colour-sensation. Some of these are micro-structural properties, wavelengths, and reflective dispositions. Broadly, material objects have many features which dispose them to cause us to have colour sensations. However, the point which I have wanted to stress here is that none of these properties are identical with colour properties. So, the proposal which I now wish to put forward is that colour sensations, and dispositions to cause colour sensations, are *all we need* for a complete theory of colour. There is no theoretical need for an additional sort of property, the colour property, nor is there any theoretical room for such a class of property. Colour properties are not types of microstructure, reflective dispositions, or dispositions to cause colour sensation, nor are they identical to colour sensations, or otherwise predicated of colour sensations (for sensations are not substances, like sense-data, that may be coloured in this sort of way).

This view is indeed a form of nihilism, but again, I am reluctant to *call* it a form of nihilism, since I do not think that the view itself is all that different from certain sorts of realism. The similarity of my view to realist views of colour with respect to view of the semantics of colour-language will be emphasised in a moment, but note for now that there is a certain sense in which my ontology is identical to a certain sort of realist ontology. At least one sort of realist and I both believe in colour sensations, certain dispositions to cause colour sensations, and various properties of material things which endow their bearers with such dispositions (i.e. properties such as microstructure or wavelength). The only key difference is that the realist thinks that some such properties can rightly be called *colour-properties*, and that the property of being red, for example, can be *identified* with properties such as having a microstructure of type R. I merely say that they cannot.

2   A Quasi-Realist Semantics of Colour Ascription

While the main difference between the realist and I just stated may seem minor, it presents a problem when we consider a very basic linguistic question. When is a sentence of the form '*x* is *C*' true, where '*x*' names a material body and *C* stands for a colour term? To use an example, when is it true that a certain ball 'is red'? The realist has an easy answer (at least, the realist who takes colour properties to be exemplified by material objects). She may say that 'the ball is red' is true when and only when the ball possesses the property of being red. Let us label this as follows:

> (**REAL**) '*x* is *C*' is true if and only if *x* possesses the colour-property of being *C*.

Now I cannot adopt **REAL** without being forced to infer that ascriptions such as 'the ball is red' are always false, for I do not believe that there *are* such things as colour properties. Yet I do not want to commit myself to an error theory about colour ascriptions. Surely, some of these sentences are true. I want to say that 'the sky is blue' really is true. So our next task is to suggest an alternative colour semantics, and in doing this, I am drawn to one sort of approach. Recall that there is a certain strain of realism which is very similar to my view. Under this sort of realism, colour properties are to be identified with certain properties of material objects. To take one possible flavour of this species of realism as an example, let us consider the theory, which I will call **STRUCTURE**. Now **STRUCTURE** is a general theory of colour which takes it that colour properties just are micro-structural properties, and so we can consider it to entail the conjunction of a set of schemas of the following form.

> ($\mathbf{S}_C$) *x* has the colour-property of being *C* if and only if *x* has a microstructure of type M_C.

Note that a realist who does not wish to be a primitivist about colour will have to adopt a theory like **STRUCTURE**, that is, they must have a theory of *which* properties colour properties are identical or reducible to. They need not necessarily be micro-structural properties, but they are for this example. Now a realist who adopts **STRUCTURE**, since they will also adopt **REAL**, will draw the following conclusion.

> (**A**) '*x* is *C*' is true if and only if *x* has a microstructure of type M_C.

While I cannot adopt either **REAL** or **STRUCTURE**, I can adopt this conclusion as a correct semantics of colour ascriptions in good conscience, since unlike the previous two biconditionals, it makes no mention of colour-properties. In this way, we can arrive at a nihilist-friendly semantics of colour simply by agreeing *almost* entirely with this sort of reductive realist, stopping just short of calling the property involved in correct colour attribution a colour property.

One problem which makes itself apparent in this approach is the following: while the nihilist can indeed accept **A** if they wish, they seem to lack the same independent justification for doing so that the realist has. The realist is justified in accepting **A** because it is a consequence of **REAL** and **STRUCTURE**, which one may presume they are justified in accepting. But since the nihilist does not accept either of these theses,

the corresponding justification which the theses provide for **A** is consequently unavailable. So why *ought* the nihilist accept **A**, as opposed to some other semantics? In answer to this problem, I am inclined to give the following suggestion. First we ask, from where does the realist get their justification in accepting **STRUCTURE (**or some alternative realist theory of colour)? If we assume that they have such a justification, then presumably this justification is empirical in nature, for it seems that such a theory could not be justified *a priori*. Now such an empirical justification would seem to have to take the following form. In order to justify a schema such as $\mathbf{S}_C$, one would first take many objects for which the colour term C may be correctly predicated, the predicate 'red' for example, and one would then examine their microstructure, and find the objects to have a microstructure of some common type. Conversely, one would examine other objects possessing such a microstructure, and find that they may all truly have 'red' predicated of them. By performing a number of experiments of this nature, one might be thought to gain greater and greater justification for **STRUCTURE**. However, to my mind it seems as if the more *direct* justification is given to **A** by such experiments. At the very least, the experiments will provide one with *at least* as much direct justification to **A** as they will to **STRUCTURE**.

2   Conclusion

So to conclude, the theory of colour which I advocate is a form of nihilism which is in many ways strikingly similar to certain forms of realism. I agree with the realist that material objects possess many properties that endow material with dispositions to cause humans to have various colour sensations, though I deny that any of these properties can sensibly be identified with colour properties, nor that colour properties can be thought of as properties of sense-data, seeing as the latter do not exist. I also contend that a realist-inspired semantics of colour ascriptions can be constructed on the nihilist's resources. All in all, I have tried to make the logical space of the dispute over colour properties clear, and I have tried to show that colour properties are themselves both philosophically problematic and unnecessary. On an adverbial, nihilistic view of colour, one can still make sense of the phenomena, without any of the problems one faces on a realist view, and as such it is the preferable of the two.

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Pluralistic Insight into Identity both for Ourselves and for Others[1]

Cameron Bunker[2]

Abstract

I provide a method of investigating identity both for ourselves and for others by exploring the connection between William James' pluralism and Hannah Arendt's ideas on the self. In §2, I present James' pluralism for how we can view our world and self, which will serve as the foundation for this investigation. In §3, I lay out how Arendt attributes the availability of identity for others in terms of action. The question of "Who are you?" is addressed in this section by applying James' pluralism to Arendt's notion of action. In §4, I apply Arendt's notions of solitude and loneliness to an investigation of the identity of ourselves. I conclude that when we view the world pluralistically we can find insight into how to understand the identity of both ourselves and others.

1   Introduction

In *The Compounding of Consciousness*, William James (1967) presents a pluralistic worldview; our minds can make sense of the world in a twofold way. We can intellectualize our world through concepts and definitions, or we can think about our world in nonconceptual terms. James claims that these two modes are not reducible to each other. This two-fold, pluralistic thought can be applied to the idea of the self. "Who am I?" This is a question we can ask ourselves, and we can ask this question towards another ("Who are you?"). Utilizing James' pluralism we get different answers to these questions, depending on which mode of thought we employ.

In order to investigate such answers, I call upon Hannah Arendt for her thought in *The Human Condition* and *The Life of the Mind*. In the former work, Arendt claims that an individual's true identity can only *come into being* upon death, but in life it can become *available* to others through action and speech. Thus, Arendt claims that an individual can never have their true identity revealed to oneself. However, one can find light in the question of their identity through *solitude*. In the latter work, Arendt distinguishes solitude from *loneliness*, the state where one cannot be for themselves. James' pluralistic thought will prove invaluable for our understanding of solitude.

In the following analysis, I will provide a method of investigating identity both for ourselves and for others by exploring the connection between James' pluralism and Arendt's ideas on the self. In §2, I present James' pluralism for how we can view our world, which will serve as the foundation for this investigation. In §3, I lay out how Arendt attributes the availability of identity for others in terms of action. The question of "Who are you?" is addressed in this section by applying James' pluralism to Arendt's notion of action. In §4, I consider the identity of ourselves through an investigation of

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solitude and loneliness in Arendt's thought. The question of "Who am I?" is addressed by applying James' pluralism to Arendt's notions of solitude and loneliness. I conclude that we find insight into how to understand the identity of ourselves and others when we view the world pluralistically.

2 James' Pluralism

To understand James' notion of pluralism, it will be helpful to begin with his thought on the Mills' notions of mental compounding and mental chemistry, which James presents in *The Compounding of Consciousness* (James, 1967). The former notion, introduced by James Mill (1869), refers to how our mind takes simple ideas and forms more complicated ones; for example, our ability to imagine a unicorn calls for a compounding of the images of a horse and a horn. John Stuart Mill (1848) extended this idea to that of the latter notion, mental chemistry. Our minds do more than just compound ideas; sometimes they combine ideas in such a way that they may be impossible to undo. James provides the example of water. We could say that our notion of water as H_2O is a mere compounding of the notions of two hydrogen atoms and one oxygen atom. However, the notion of H_2O is not identical to that of two hydrogen atoms and one oxygen atom, for the former "affects surrounding bodies differently" (James, 1967, 548) than the latter; H_2O is a substance that quenches our thirst and makes things wet and so forth, while the ideas of the separate parts of H_2O cannot capture this absolute alone. The ideas need to be fused in a way that allows for the additional meaning to be included. Thus, we must arrive at the notion of H_2O by means of mental chemistry.

James provides a further example of the alphabet to help clarify this notion (ibid, 549). The alphabet contains twenty-six letters, each which may be represented by an idea. But the idea of the alphabet of a whole provides a new idea, which James calls the introduction of a twenty-seventh fact in our consciousness (ibid, 549-550). He claims that we cannot dissect the alphabet into mere awarenesses of each individual letter but rather that there is awareness of the whole. In this manner, James presents two modes of appearances. One, there is the mode of parts, and two, there is a mode of wholes. However, a problem arises concerning these two modes of viewing since we need to know the relation between parts and wholes. James claims that there are only parts in the physical world (ibid, 551). For example, while we may call the grouping of organs a "bird" it remains that there really is just a collection of those parts, which our mind is able to bind into a whole. Thus James makes this distinction that while our world consists of parts, in the mental world, wholes are realized *in themselves*; the mode of viewing things as wholes is an experience *for* itself. While this distinction may be obscure, it will suffice for this discussion to note that James rejects the reduction of the experience of the absolute or whole into the experience of parts.

James argues that the monist who attempts to make this reduction cannot escape the dualistic language they use to make this reduction (ibid, 553)[3]. My interpretation of this

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[3] The reader may be wondering what debate these terms of "pluralism" and "monism" refer to. While it may be tempting to think of them in metaphysical terms (i.e., the former states that there are two substances, while the latter states that there is just one), I interpret James as advocating something different; he is talking about human experience, and thus monism in this sense holds that there is just one way of experiencing the world (or that all the ways are reducible to one another), while pluralism holds that there are two modes of experience (that cannot be reduced to one another).

claim is that James is drawing out the difficulty in explaining "mental chemistry" in purely conceptual or "intellectualist[4]" terms[5]. This argument against intellectualism can be understood through his example of a photographer (James, 1967, 560): When we envision a photographer, our concepts lead us to define such a person as one who photographs. But we can add more concepts to our image of the photographer (e.g., she might be wearing a red shirt). Now our definition has changed. Is this new person still a photographer? If so, then James maintains that our definition of a photographer now seems to include a requirement of wearing a red shirt. Thus, James' point here is that intellectualism leads us unable to account for change in our experience. To avoid this problem, James claims that we don't experience the world in a one-fold way such that appearances of parts and wholes are reducible to one another. Rather, there are two ways of viewing and thinking about the world, through conceptual terms that allow us to talk about the world with concepts and definitions, and through nonconceptual viewing that allow us to capture holistic human experience.

I fear that the latter notion and its distinction from the former may still be unclear, so I hope to make it clear by introducing Goodman's analysis of eight themes in James thought regarding the conceptual and nonconceptual:

1. There is a nonconceptual element in experience that is widespread or ordinary.
2. That element is known by a kind of acquaintance.
3. Conceptual knowledge is shallower than acquaintance. It is "merely pragmatic," whereas acquaintance lets us see into the life of things.
4. Nonconceptual knowledge cannot be described, but it can be indicated or pointed to.
5. Nonconceptual knowledge can be described, as a flow, confusion, profusion, particularity, animal life, the full self, whole field, a "much-at-once."
6. Concepts cut rather than synthesize.
7. Concepts are made out of the same material as perception.
8. Philosophy should seek a return from a life in concepts to a thicker life of intuition, empathy, and activity.

(Goodman, 2004, 143-144)

We can now relate these themes to James' discussion concerning the relation between wholes and parts. Experience can be viewed as wholes and parts. The latter is the result of conceptual terms; we can dissect our experiences by talking about them through concepts and definitions. But the former viewing, that of the whole, is to view the world without trying to rationalize it; it is to experience what James calls *the absolute* (James, 1967, 551). Through these themes that Goodman draws, especially the fifth, we can see that James believes that the nonconceptual viewing of the world could involve "letting go" or simple acceptance of the world around us. With this understanding in mind, next, I provide the reader with a method of thinking about identity nonconceptually by investigating the question of identity of others through Arendt's thought on human action and speech.

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[4] Intellectualism in James' sense, roughly put, seeks to reduce aspects of experience to abstract concepts, which are used to classify or organize such aspects (Ibid, 559-560)

[5] Goodman (2004, 143-144) shares a similar interpretation.

3   Identity in Action

Before we investigate identity in the work of Arendt, we first need a brief overview of her account of action. Arendt avows that action is the sole activity that resides *between* humans, and thus it has no direct relation with things and matter (Arendt, 1958, 7). Action corresponds to the condition of political life; Arendt claims that to be human involves living among and interacting with other humans. This condition also holds that human beings are human because nobody who has lived or will live is the same as another. Because of our differences, our actions hold the significance of our lives on history. Arendt claims that action has a close connection with the condition of natality; when a human is born, they have the capacity of *acting*, which provides them with the ability to interact with and reveal themselves to others, and to have an impact on human political life (ibid., 9). In other words, action is very important to human life, and, as I will argue below, very important to identity. I interpret Arendt's definition of action as the human capability of *doing*; in order to play a role in society, and therefore history, humans must interact with one another. By doing so, each actor discloses their own unique self to the world.

Indeed, Arendt claims that the agent is revealed through action and in particular through *speech* (ibid., 175-181). In being human (i.e. being equal), we can understand each other. Yet additionally, in being human (i.e. being distinct), we are able to distinguish ourselves from each other and thus to make our identity known. Arendt maintains that this "paradoxical" plurality is the basic condition of action and speech. Through action and speech, an agent's interactions with others reveal the question of their identity. With every person that one meets, the answer to "Who are you?" is implicit in their speech and action. Here Arendt makes salient the need for speech. Through spoken word, the actor identifies themselves "as the actor, announcing what they do, has done, and intends to do" (ibid., 179)[6]. Arendt is making the claim that speech allows humans to identify themselves when they perform actions. For example, I can tell my friend which bar I am going to tonight. This reveals myself as the actor who is going to the bar, and my friend can read this speech as *making explicit* the action, which in turn *makes explicit* an aspect of my identity[7].

In this manner, when asking ourselves "Who are you?" when we meet someone, we can find pieces of the answer in their speech and action. But when we learn about someone through their speech and action, we attribute different qualities (i.e. concepts and definitions) and thus become entangled in a description of *what* that person is. The point is that while the *who* of a person is disclosed implicitly in action and speech, our attempts to talk about this *who* lead us to describe *what* that person is (ibid., 181).

James' pluralism can be introduced here to help with this dilemma. As previously stated, we may talk about persons with concepts and definitions, which is facilitated by the ability to view the world in conceptual terms. Yet, while we can use these concepts and definitions in describing a person, we often want to do more than this. Our talk about persons has significance. When you talk to me about a third person, we both have

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[6] Note that Arendt is not here saying that when someone speaks you literally find out the facts of their past.

[7] This aspect may be some aspect of my character or dispositions. Maybe my friend attributes that I'm feeling rather gregarious tonight.

an understanding of that person that is implicit in our use of concepts and definitions; the *who* is implicit in our discussing of the *what*. If we heed Arendt's words, then by our use of conceptual talk about a person, a person's identity becomes available to use. The true identity of that person, may not be completely present, but it is implicit and thus available through their action and speech. Thus when we talk about this person, our use of conceptual terms succeeds only because we have an understanding of that person's identity which made available to us through their action and speech. While we could try to pin down this understanding conceptually, it seems to me that we could never succeed; we must view the identity of others holistically[8]. We can view and talk about another person with concepts and definitions, and in talking about another person, we must have some notion of their identity that involves prior nonconceptual viewing of that person. To help clarify, recall and apply Goodman's assertions of James' themes 2, 4, and 5. The implicit availability of someone's identity comes to us through our acquaintance with that person (theme 2); we cannot describe their identity completely, nevertheless we can talk about this person and understand each other (theme 4); and the best way to describe this nonconceptual viewing of their identity would be to call it a flow or a confusion[9].

Two further concerns arise here; we need to know if the true and full identity of a person (i.e., who they are) can be made not just available to others in facets but into actual being. And two, we need to know if one can know their own true and full identity. Concerning the former enquiry, Arendt asserts that who someone is comes into being only in death (ibid., 193). This coheres with Arendt's notion of action; when a person dies, they can no longer act and thus no new qualities or aspects of their essence can be introduced, for without new action, there can be no new disclosures of the agent. In this manner, we may say that when a person passes, their identity is frozen in time. In death, the actor leaves behind their complete story. Everything we can find out about that person is available to us. We may say that their essence is not only available in facets, but their full essence is manifest in the world, which we can know by the story that they leave behind (ibid., 186).

Second, in answer to the second concern of whether we can know ourselves fully, Arendt argues in the negative (ibid., 180). We may only disclose ourselves through our action and speech. We make our identity available to others, but as Arendt states, we cannot be the authors of our own story that we leave behind in death. As stated earlier, action goes between humans; it is part of the public realm. I interpret Arendt as saying that in order for us to know ourselves, we would not only have to step outside of ourselves, but traverse beyond our own deaths. And such a perspective is way beyond human capability. Nevertheless, Arendt alludes to the question of "Who am I?" in another work. In the next section, I investigate show how we can find insight into this question despite our inability to fully know ourselves; we can be "by ourselves".

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[8] As Arendt points out, any attempt to describe who someone is, or describe how we use such descriptions, results in more descriptions. Would we say that we can fully describe someone? I cannot see how, for persons are not only constantly changing but identity rests in potential (i.e., persons can always take new forms). It would be very difficult if not impossible for us to fully know let alone describe conceptually a person in this way.

[9] At first read, this fifth theme might seem contradictory, for James claims that nonconceptual viewing would preclude concepts such as flow and confusion. However, I interpret that these concepts that are summarized in the theme promulgated by Goodman are "fill-in" terms that will help us understand what it means to nonconceptually view something. In other words, we need to use terms and concepts to help the reader understand how we might go about viewing something nonconceptually. We can then view the terms and concepts of flow and confusion as filling in for an indescribable, holistic phenomena.

4   Solitude and Loneliness

Arendt (1978, 185) makes a distinction between two states, solitude and loneliness. These two notions correspond to two ways that we may interact with ourselves. In the previous section, we saw that Arendt claims that to be human is to interact with others. By doing so, we reveal ourselves through action and speech, which we understood using James' pluralism to allow us to understand each other both conceptually and nonconceptually. But what about the question of identity for ourselves? When I ask myself, "Who am I?" I engage in reflection; how I carry out reflection determines whether I will be in solitude or in a state of loneliness. Arendt avows that due to our ability of inner dialogue within ourselves (e.g. being able to ask ourselves questions within our minds), we may keep ourselves company. This results in a state of solitude. However, if we are unable to split-up ourselves into the speaker and listener of this inner dialogue, then we will fall into loneliness, and thus further away from knowing ourselves. Given this result, we need to know what exactly is this inner dialogue and how can we achieve solitude through it.

Arendt claims that when we engage in dialogue with ourselves we must aim to be both the one who asks questions and the one who answers, and we must not contradict ourselves in this action (ibid., 185-186). We may think that this dialogue consists of our silent thoughts about things where we entertain different relations between concepts. However, Arendt seems to want to dive deeper in that true, successful inner dialogue escapes logical reasoning and concepts. She describes the relation between consciousness and thinking (ibid., 189). When we think conceptually, we use concepts and definitions to think *about* things. But this ability presupposes consciousness in the sense of self-awareness. In order to think, human consciousness must be actualized, and Arendt claims that this is only possible because we can accompany ourselves in solitude. And we may accompany ourselves in solitude only when we are *for* ourselves. If we are to be for ourselves, we cannot contradict ourselves, for we would not want to be our own opponents. I interpret Arendt's main point here to be that in order to have silent dialogue with ourselves (using conceptual terms), we must have consciousness in the form of self-awareness, and this arises out of the human condition of being able to think oneself (not just about oneself) as both the speaker and listener[10].Concerning the success of this dialogue as solitude or loneliness, James' pluralism again resonates with Arendt's point and makes it much clearer concerning how to be "for oneself".

When we think to ourselves in concepts and definitions, we can talk about things in our world by description. Concerning ourselves, we may describe *what* we are (viewing ourselves conceptually), but if we are to try to know *who* we are (viewing ourselves nonconceptually), we must engage in successful inner dialogue; we must be for ourselves. This is only possible when we "let go" of trying to pin our identity down with concepts. When we try to know *who* we are by viewing and thinking about ourselves conceptually, we get entangled in our descriptions (similarly to our enquiries into the identity of others discussed in the previous section). If we take Arendt's account to be true, we can never know ourselves fully, but we can be here for ourselves. When we

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[10] It is important to note that Arendt also claims that prior to our ability to think both for and about ourselves, we must be able to engage in dialogue with others (ibid., 189). By engaging in dialogue with others, we then become aware that we may engage in dialogue with ourselves (i.e., consciousness in the sense of self-awareness), and in turn we may think in silent dialogue.

apply James' pluralism and think about ourselves nonconceptually, we don't really come to know ourselves, however we can gain something that is valuable through nonconceptual self-awareness. If we want to be in solitude rather than loneliness, if we want to be both the speaker and listener for ourselves, then we must be fully *present*. My input here is that perhaps, as Arendt claims, we can't know ourselves, but we can be present by and for ourselves if we can escape the continuous conceptualization of our experience. When we are able to realize ourselves in the present moment, when we are able to let go of trying to pin ourselves down with concepts and definitions, and when we are able to grasp this nonconceptual self-awareness, then we come to a state at ease. We no longer need to conceptually know ourselves, for we have found the condition of nonconceptual solitude. We stop trying to explain ourselves *to ourselves* and simply let the experience take hold. The question of "Who am I?" becomes trivial, for we have found an answer that is far better; "I am here."

5   Conclusion

In summary, the questions of "Who are you?" and "Who am I?" have been addressed in Arendt's thought in light of James' Pluralism. Apropos the former enquiry, when we take Arendt's account seriously, we find that viewing persons through their actions conceptually and nonconceptually yield different answers such that there is an implicit nonconceptual understanding in our conceptual viewing of other persons. With regards the second question, "Who am I?" it appears that in order to understand ourselves completely, we should stop trying to accomplish such understanding conceptually, for it might not even be possible. Rather, we should view ourselves nonconceptually by being present and thus in solitude. Arendt's thought leads us into a position where we may view ourselves conceptually or nonconceptually and receive different results. I leave the reader to speculate that, despite these differences these two views that we may take concerning the identity of ourselves expound, we may find that both the conceptual and nonconceptual views have merit. Conceptual thought allows us to talk and think about ourselves and others, which seems to be a pragmatic necessity. But nonetheless it seems that we need nonconceptual thought to access who others really are, and further, we need nonconceptual thought to avoid loneliness. We may never know who we really are, but this is not something that should worry us. Rather than try to be the authors of our own story, we can simply realize ourselves by being for ourselves. I can be present and in solitude by my ability to know that "I am here", which escapes my ability to define it with concepts[11].

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[11] As a closing comment, there are likely many examples of nonconceptual thought, but I think it will help to understand nonconceptual thinking through mindfulness practices. Consider meditation techniques, such as focusing on the breath, as nonconceptual thought. Indeed, these techniques are aimed at drawing the practitioner to the present moment, and these techniques involve the focusing the mind on oneself without thinking with concepts.

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On the Question: How Fast Does Time Pass?[1]

Mahmoud Jalloh[2]

Abstract

In this paper, I take up the question of "how fast does time flow?" This question is usually asked as a rejoinder to the view that time is irreducibly tensed, which is motivated by the fact that we experience the passage of time. I consider what the meaning of this question could be and provide a defence of the view that the passage of time is meaningless (due to its rate of passage being dimensionless), undercutting the motivation for a tensed view of time.

1 Introduction

> "There are philosophers who think that some views about the nature of time can be refuted just by asking this question (in the right tone of voice). Others think the question has an obvious and boring answer"
>
> (Skow, 2011)

Does time "pass" or "flow"? If so, how fast does it go? These questions are instances of a particularly difficult sort of philosophical question. Such questions' meaning or significance is not initially clear. Naturally then, one may wonder whether the question has any meaning or significance at all. It may be that it is a mere misuse of language. However, this version of the questions at hand may be too abrupt. Our subjective experience gives us reason to believe that there is some truth to the statement that time flows (Maudlin 2007, Paul 2015 and 2010). This experience is often used as motivation for a so-called A-theory of time in which the present is somehow metaphysically privileged over the past and future. The present is defined, in part, by the fact that events flow from future to present and into the past.

If one takes the expression of time's flow to be more than metaphorical, as A-theorists tend to, then one would believe that the question of the speed of this flow would be well-formed and answerable (as it is for other flows, like a river)[3].This has provided the grounds for a modus-tollens argument against the A-theorist. Thus, the question is nonsensical, as the only plausible answer is meaningless, and so time cannot be said to flow at all. In this paper I will lay out expositions of the question's possible meaning

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[3] After all, if there was no speed (i.e. 0), then time would not be flowing at all.

and ultimately argue that it is indeed without meaning, providing a problem for the non-metaphorical A-theorist.

2   Establishing the Meaning of the Question

In order to understand the meaning of the questions "Does time pass?" and "How fast?" we should first ascertain what it would mean to answer the first question in the affirmative. This is because the latter question only makes sense if the former does. Markosian (1998) provides a definition of what it means to affirm the passage of time. To say that time passes is to commit to the "passage thesis":

> *Passage Thesis*: "Time is unlike the dimensions of space in at least this one respect: there are some properties possessed by time, but not possessed by any dimension of space, in virtue of which it is true to say that time passes." (Markosian, 1998, 2)

Markosian characterizes the passage of time as making time *distinct* from space (i.e. there are properties of time that are not possessed by any dimension of space). It is due to these properties that it is appropriate and true to say time passes and space does not.

We can flesh out this characterisation in the following way. Asserting the passage thesis commits Markosian to two further theses, the first semantic, the second metaphysical:

> *The Tensed Conception of Semantics*: Propositions have truth-values at times and tenses (past, present, and future) that are ineliminable and fundamental (Markosian, 1998, 2).

> *A-Property Thesis*: Events have monadic tense properties (being present, being past, being future) that are not to be analyzed in terms of relational B-properties, they are properly basic.

To provide a picture of what these two theses commits one to, consider an event, E. For example, the event of me submitting this paper for review. Say, at time t=0, that E has not yet occurred and will occur at t=1, then E would have the property of being future: $Ft=0(E)$. At this time, proposition P, 'E is occurring,' is false (note the present tense of the verb occurring), while the proposition P*, 'E will occur,' is true (again, not the 'will'). Then consider how this picture changes at time t=1, when I am submitting this paper. At t=1, E has the property of being present: $Prt=1(E)$, P becomes true and P* becomes false.

In sum: A present tensed proposition regarding some event is true at some time if and only if that event is present at that time and false otherwise. A past tensed proposition regarding some event is true at some time if and only if that event is past at that time and false otherwise. A future tensed proposition regarding some event is true at some time if and only if that event is future at that time and false otherwise[4].

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[4] There are, of course, more sophisticated A-properties and tenses, e.g. 5 days from now, now and forever, etc., I leave aside such complications as they are irrelevant to the purposes of this paper.

The third thesis that Markosian takes to be part of a commitment to the assertion that time passes is the pure passage of time thesis:

> *Pure Passage of Time Thesis*: Times and events inexorably have different A-properties successively, this is what the passage of time consists of (Markosian, 1998, 8-9).

This is what gives time its flow; events future become events present and events present become events past. *Prima facie*, Markosian presents an intuitive correspondence theory of the passage of time: events successively change their tense properties and as such claims about them change their truth-value relative to the change in the events properties. It is not, however, the final word on the meaning of time's passage.

Van Cleve (2011) takes issue with Markosian's (1998) exposition of the meaning of time's passage and presents an alternative view from Prior. Prior sees the tensed conception of semantics as optional for the passage of time, and does not accept the A-property thesis (and further denies that the former implies the latter) (Van Cleve, 2011, 143). In Prior's tense logic, tenses are substitutes for A-properties rather than mere semantic analogues. Rather than taking tenses to be properties attached to events, they are sentential operators, acting similarly to modal operators (i.e. tenses are adverbial rather than predicative) (ibid, 142-143). This avoids a commitment to events in the semantics; rather than needing actual events that *have* A-properties for a tensed statement about that event to be true, one can merely make a semantic claim about the truth-value of some sentence[5].

Van Cleve then presents Prior's arguments that Markosian's semantics is rooted in an assumed (and I think, mistaken) ontology. For Prior, there are no time "entities" (ibid, 143); the Newtonian assumption that times exist independently of events in the world is unnecessary to the establishment of the meaning of times passage. Markosian makes a similar mistake with respect to time as Heidegger warned us against with respect to Being[6]; Time itself is not a being, it is a category mistake to assign properties, in this case A-properties, to it as if it is. Prior's tense logic "lets us express truths about the topological structure of time without committing ourselves to Time as an entity" (Van Cleve, 2011, 7)[7].

So what, then, is a less ontologically presumptuous reading of the passage of time? The passage of time is, for Prior, the mere idea that truth values change in time. And so we get Markosian's semantic claim, without the metaphysical baggage of times and events, nor a correspondence theory of tense. In response to the further question of the rate of time's passage, Prior, perhaps facetiously, proffers the simple answer: a second per second (ibid, 163).

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[5] This is a similar move as Tarski's T-Schema. A supposedly ontologically neutral semantic analysis. Van Cleve admits as much by suggesting it can avoid liar-like paradoxes (Van Cleve, 2011, 4).

[6] "Being is not itself a being", See the first two chapters of Heidegger (1962)

[7] Maudlin (2007) too gives in to this temptation, he takes these topological truths to be law-like and wants to include the fundamental laws of physics into his ontology. It seems like this argument may turn on whether one believes that descriptions require a target *object*.

Now that we have some formulations of what it means to ask "Does time pass?" as well as a suggestive answer to the further question "How fast?" I shall move to a discussion of the meaning, or meaninglessness, and some answers to the latter question.

3   The Incoherence of the Rate of Time's Passage

Assuming one has convinced an interlocutor that the passage of time is at least not initially nonsensical, the interlocutor may naturally push and ask: At what rate does it pass? The common analogy is between the "flow" of time and the "flow" of a river. Certainly a river flows at some definite, perhaps variable, non-zero rate, so too, must time, if the analogy is to hold. If there is no such coherent flow rate for time's passage, then time cannot be said to truly pass at all. Markosian argues that the question of "how fast does time pass?" arises from these principles:

> *Rate Principle*: For any x, if x changes/passes, then it changes/passes at some rate. (A rate is a ratio between a parameter or metric of measurement and a unit of time.) (Markosian, 1998, 13)

> *Coherence Principle*: For any x, if some x flows or passes, then it is possible to state coherently the rate at which x flows or passes. (Markosian, 1998, 14)

Markosian then lays out some possible strategies for measuring rates in order to show that in each case there is a way out of arguments against there being a rate of passage for time. I will use Van Cleve's (2011, 11-12) distillation of these three possible strategies: (1) a rate may be measured by comparing to any other rate; (2) a rate of change can only be measured in comparison to the rate of the passage of time, either (2a) the pure passage of time can be measured in comparison with itself, or (2b) it makes no sense to assign a rate to the pure passage of time.

A common objection to the pure passage of time thesis arises from accepting (2) but denying (2a) and (2b); the pure passage of time must be measured by *another* external time dimension. As the external time dimension (commonly called hyper-time) must also pass in reference to a higher time dimension, there is a threat of infinite regress to this strategy[8]. However, I want to set this argument aside. Markosian believes that his interlocutors have not shown that he should accept the premise that time's rate of measure must be compared to an external (hyper)time dimension and so he denies it. I agree that there is no motivation for this premise; there are plenty of rates of change that have nothing to do with time (e.g. exchange rates, elevation rates), so why would time's rate of change have an extra constraint on what it can be compared to? However, the A-theorist needs the flow of time to be a property unique to it and not shared with space. So then the question *really* is: what's special about time?

If we deny that the rate of time's passage must be compared to an external (hyper)time dimension, we may then claim that the rate of passage of time can measured by comparing it to a "mundane" process (Van Cleve, 2011, 12); this is strategy (1). For example, the fact that that a person is running at a rate of 12 miles per hour can be

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[8] See Skow (2011) on the ensuing debate regarding this argument.

flipped into the fact that time is passing at a rate of one hour per 12 miles run by this same person. However this does not get us the direct measurement of the pure passage of time. What is an hour? It is a measure that is defined by some other mundane process (one 1/24th of the period of the sun's rotation in the sky). In measuring rates, we are always comparing the changes of some phenomenon to the changes of some other phenomenon (e.g. distance travelled by a runner versus distance travelled by clock hands). Generally we do not actually care about the second phenomenon and use it as a stand in for direct comparison with the passage of time itself. To have this strategy effectively answer the question of the rate of time's passage, one would need to postulate that some processes are more directly linked to the pure passage of time. What this privilege consists of needs to be supplied before this is anything more than conjecture.

If one takes strategy (2a), there is an issue of units. How fast does time pass? At a rate of one second per second. Van Inwagen and I both share the complaint that this cannot be a meaningful rate, the units cancel and the number (unity) is dimensionless. Such dimensionless quantities are meaningless, to say that time passes at the rate of one second per second is to say that time passes at a rate of six (or fifty-two, whatever number fits your fancy). Six what? Any physics student has it beat into them that if you do not attach units to your number then it tells us nothing physical. Maudlin (2007) argues, that while this rate of time's passage is indeed an *a priori truth*, it is not meaningless. He likens it to monetary exchange rates: 1 USD is worth 1 USD, but this is not vacuous. One must specify the units of the exchange, they do not, as it were, "cancel out." He distinguishes ratios from numbers, the former retain their unit measures (like π as the ratio between a circle's diameter and circumference) while the later do not have such units (the real number π). Ratios have an associated class of units, length for π, in the circumference–diameter case. And so the rate of time's flow – one second per second – is not vacuous as it "is a measure of how much something changes *per unit* time."

I think Maudlin is bit quick in his rejection of this objection. While the units may not "cancel out" and *do* say something about the formal constraints on the passage of time (it must be self-consistent), he ignores how truly vacuous tautologies are. Maudlin's constraint is merely that there be a use of the appropriate *kind* of units, both of these rates use solely temporal units. The former proposition, being a tautology at best, category mistake at worst, then does not tell us *anything* about the world. Nothing hangs on it, especially physically. A contrasting case will make this clearer. Consider the statement "a year passes every three hundred sixty-five days." A way of putting this mathematically would be with a ratio: $\frac{1\ \text{year}}{365\ \text{days}}$. The significance of such a ratio is linguistic, it allows us to translate values in terms of years into days and vice versa. One may object to this analysis. Don't 'year' and 'day' correspond to aspects of physical reality? A year is the length of time it takes for the Earth to complete a revolution around the Sun and a day is the length of time it takes for the Earth to rotate about its own axis. Therefore this ratio is not merely linguistic, but rather has physical significance!

There is a problem with this line of thought – or at least with these particular examples. Let's focus on one of them. Due to astronomical effects like precession and tidal forces, what we call a year is not exactly the duration of the Earth's solar rotation (the sidereal year). This is well-known and the reason we have leap-years every so often (to correct for the inaccuracies). Likewise with other measures (e.g. days). What does this show us?

It shows us that a change in the units, the ratios and terms we associate with certain phenomena need not correspond to physical reality in a robust way. Put differently, we could use a different value for year, say 365.25 days per year, and this would be of no physical significance: it would be more accurate to the phenomenon of the Earth's orbit, but it would not be more or less accurate in terms to the length of *time* itself (remember that days itself is a pragmatically chosen unit as well). Let's return to the ratio of one second per second. This is a translation from the language of seconds to the language of seconds, a completely isomorphic transformation. As such, it is completely trivial and could not have any physical significance[9].

This takes us to the third strategy, (2b), which was suggested earlier by Prior, denying that it makes sense for the passage of time to have a rate. This can cut both ways, one can take this to show that there is a deeper incoherence in the notion of time passing as any passage should have a rate (as has been shown), or one can take it to show that the passage of time is a special sort of passage, one without any discernible rate. Van Cleve makes a distinction between absolute and comparative rates, the former being rates independent of any other rates and the latter being rates that are co-defining (e.g. monetary exchange rates). This distinction he gets from Newton's own distinction between absolute and relative motion. Relative motion is simple to understand, it is the change of position of one body relative to the change of position of another body, over some period of time (e.g. two ships passing one another). Thus, there is not no sense in which a body's relative motion can be defined without defining the relative motion of another body. Absolute motion, on the other hand, is the change of position of a body, over some period of time, irrespective of the motion of any other body[10]. For this to make sense, Newton needed a way to fix the initial and final positions of the body without reference to any other bodies, thus he introduced the concept of absolute space. This substratum gives each position in space a stable identity, allowing a change in position to be well-defined. Much like Newton, then, Van Cleve needs the postulation of some substratum that grounds the facts of absolute rates independent of any other comparative rates. Van Cleve suggests that we should again consider the pure passage of time to be this sort of absolute rate of change, leading us again to the tautological rate of one second per one second. He goes on to argue, that this does not even depend on the sort of substantivalist view expressed above and criticized by Prior. Indeed, he shows how Prior's answer was a serious, and deflationary, response to the question "How fast does time pass?"

Again, I wish to reiterate my concerns. Perhaps it is not nonsensical to say that time passes at a rate of one second per second, but it is also not *saying* anything at all. It is, perhaps, *showing* what it means for time to pass, that is, that one second precedes the next and the truth-value of certain tensed (metrically or otherwise) propositions changes with time. This however ignores why we wanted to establish the fact that time passes in the first place, it is supposed to be, as Skow puts it, *metaphysically interesting*. This is because it is supposed to motivate the dynamic theory of time against the attacks of the defenders of the static theory. So the A-theorist has a dilemma, which we started the paper with, they must establish their view on a nonsensical basis, a misuse of language, or say nothing at all.

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[9] It's important to note that I am only dealing with units and ratios that deal with the same kind of measurements. Transformations between say lengths and times (i.e. velocities) are physically significant

[10] See Huggett (1999, 159-169) for more explication of this distinction and the problems it is designed to solve.

4   Conclusion

In this paper, I have attempted to make clear the meaning of the question: "How fast does time pass?" To do so, I first had to clarify what time's passage may mean and what commitments come with its acceptance: either Markosian's pure passage thesis or the deflated Priorian semantic thesis. I then delineate and respond to a number of possible strategies to answer the question coherently: (1) establishing the rate of time's passage relative to the rates of other processes, (2) establishing the rate of time's passage absolutely. The first strategy, I argue, fails by neglecting to establish what processes are to be reliable guides to the rate of time's passage, and why. It also fails to explain why time's passage is *special,* in a way the spatial rates of change are not. The second strategy, I argue, fails to establish anything physically or metaphysically interesting as the most promising candidate rate: one second per second is linguistically tautologous. The lack of any satisfying answer to the question: "How fast does time pass?" undercuts the motivation for a dynamic theory of time. The hope is that future motivations for dynamic theories of time are clearer and are clearly significant, providing a satisfactory answer to the question of how fast time passes.

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Is Logic Empirical? Logical 'Conventionalism' from an Empirical Standpoint

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Abstract

The laws of classical logic are taken to be logical truths, and logical truths are taken to objectively hold. However, we might question our faith in these truths: why are they true? One often avoided approach is logical conventionalism, because it makes the logical truths dependent on somewhat intersubjective linguistic conventions. Another approach, proposed by Putnam (1975) and more recently Dickson (2001) or Maddy (2007), is to adopt empiricism about logic. On this view, logical truths are true because they are true of the world alone – this gives logical truths an air of objectivity unlike logical conventionalism. Putnam and Dickson both take logical truths to be true in virtue of the world's structure, and the structure of the world is to be understood to be given by our best empirical theory, quantum mechanics. As it turns out, the structure of quantum mechanics apparently makes true the laws of quantum logic, and falsifies (one half of) the distributive law, something which was taken to be a logical truth under classical logic. Empiricists take this to indicate that the distributive law was not a logical truth to begin with. However, this argument assumes that there is a single determinate structure of the world prescribed by quantum mechanics. In this essay, I argue that this assumption is false, and that the structure of the world is underdetermined in quantum mechanics. Likewise, the choice of 'true' logic, as given by the world's structure, is also underdetermined. This leads to what I call empirical conventionalism: the world alone fails to determine our logical truths. We need something broadly intersubjective, and thus less than objective, to fix our choice of logic even under empiricism. An attempt to avoid one form of conventionalism has thus led us back to another.

1   Introduction

Consider the *distributive law over conjunctions* for all sentences *p, q,* and *r*:

$$(CON): p \text{ and } (q \text{ or } r) \leftrightarrow (p \text{ and } q) \text{ or } (p \text{ and } r)$$

Alongside other 'laws' of classical logic, CON is usually taken as a logical truth – meaning that regardless of the contents of p, q or r, CON objectively holds.

We might ask: why are logical truths true? One approach takes logical truths to follow from meanings of subsentential operators. This seems to lead to logical conventionalism, (roughly) the thesis that logical truths, e.g. CON, are true 'in virtue of meaning' or 'true by convention' (Warren, 2016, 2). However, logical conventionalism is intuitively

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unsatisfactory for explaining CON's objective truth since it makes CON's truth dependent on (at best) intersubjective conventions.[2]

One attractive alternative is empiricism, which claims that the facts determining choice of logic are not conventional because they are given by the world alone, independent of human conventions. Empiricism, taken as the thesis that the world alone determines our logic, prima facie avoids the problem of intersubjectivity: a logic is objectively true because it is validated solely by a mind-independent world. Logical truths hold independent of us because there are empirical facts of the matter deciding the 'true' logic.

How is a logic validated by the world? Maddy (2007, 226) proposes that 'logic is true of the world because of its *underlying structural features*'. For example, I might say that CON is validated by the world's CON-structure: whenever I have a red ball *and* either a blue *or* green ball, I have *either* a red *and* blue ball, *or* a red *and* green ball. Conversely, to say that CON is *not* validated is to say that the world does not have a CON-structure.

The difficulty, then, is determining the world's structure: the empiricist strategy is to 'read off' logic from *our best (most empirically successful) sciences* (Putnam, 1975, 179), which I take to be quantum mechanics (QM).[3] Putnam thinks this approach is superior to logical conventionalism:

> Anyone who really regards the choice of a logic as a 'matter of convention', will have to say that whether 'hidden variables exist', or whether, perhaps, a mysterious' disturbance by the measurement exists', […] is likewise a matter of convention.
>
> (Putnam, 1975, 191-192)

If relevant empirical facts about QM determining the 'true' logic appear determinate and objective, empiricism has an edge over logical conventionalism in explaining CON's objective truth. However, CON appears false in the logic of quantum mechanics, quantum logic (QL). Empiricists like Putnam (1975) and Dickson (2001) interpret this to mean that CON *is* false, and QL is instead the 'true' logic (Dickson, 2001, 2). The objectivity of empiricism thus comes at a cost: CON is, after all, a *law* of logic, which we had hoped to establish as objectively true. The empiricist might bite the bullet here and find forsaking CON a worthwhile price for reclaiming objectivity for logic.

Here, I re-examine this strategy, specifically its presupposition of a determinate world-structure prescribed by QM. In this essay, I show that the choice of world-structure in QM is *empirically conventional:* nothing within QM's formalism, from which all empirical results are derived, can determine the choice of world-structure, or 'true' logic. The world alone fails to decide our logic. Putnam's challenge to the conventionalist thus fails: those relevant empirical facts which determine the 'true' logic *are* still conventional, leaving us with yet another form of conventionalism.

In §2, I introduce basic QM formalism – the backbone of QM's empirical success. In §3 I define QL on QM's structure, and show why CON prima facie fails in QL. In §4 I present

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[2] Quine (1936) remains the starting point against explicit conventionalism. However, see Warren (2016) who argues for implicit conventionalism.

[3] I employ non-relativistic QM here, and assume that the conceptual problems afflicting various interpretations presented here in relativistic QM are resolvable – if so, the issues discussed later remain.

two well-known interpretations of QM**,** each with a different interpretation of QM formalism and thereby different conclusions about QL's status and CON. In §5, I argue that the empirical results of quantum mechanics *underdetermines* interpretation, and leads to empirical conventionalism about QM's interpretation. A fortiori, the 'true' logic is underdetermined. This leads to a conventionalism about logic, from within empiricism.

2   Basic Quantum Mechanical Formalism

Before I describe QL, I first present QM's formalism underpinning it: "a set of equations and [...] calculational rules for making predictions that can be compared with experiment" (Cushing, 1993, 265). The formalism alone is enough to explain all empirical results, and its empirical success is undisputed. As Cushing notes, most physicists, in experimental contexts, focus *exclusively* on the formalism and 'getting the numbers right' (ibid, 265).

> **Systems:** a quantum system (the quantum analogue of classical physical systems) is represented by some *Hilbert space* $\mathfrak{K}$ (i.e. a complex complete inner-product vector space).

> **Observables:** each observable (measurable property of the system), e.g. spin or momentum, is represented by a Hermitian operator[4] with an associated family of projection operators, each projecting onto (normalized) mutually orthogonal one-dimensional subspaces of some $\mathfrak{K}$. The set of these subspaces form an *orthonormal basis* of some $\mathfrak{K}$ (i.e. they generate the span[5] of that $\mathfrak{K}$).

> **States***:* Every one-dimensional subspace of an orthonormal basis is an *eigenstate* of the observable, and represents a possible *state* of the system (e.g. spin-up, spin-down). However, since $\mathfrak{K}$ is constructed from the span of such subspaces, all of their linear combinations are also inside $\mathfrak{K}$, and likewise possible states of the system: if ψ and ϕ are distinct eigenstates of a system, then the *superposition* of the two eigenstates, a vector aψ + bϕ, where a and b are complex numbers such that $|a^2| + |b^2| = 1$, is *itself* a possible state of the system.

> **Dynamics***: A wave equation (e.g. Schrödinger's equation) governs the dynamics of states in $\mathfrak{K}$ over time. A solution to this equation is a wave-function Ψ describing how a system deterministically evolves over time.*

> **Composite Systems:** the tensor product ⊗ of multiple systems describes these systems. Given two systems 1 and 2 with the bases:

$$\{|+_x^1\rangle, |-_x^1\rangle\} \text{ and } \{|+_x^2\rangle, |-_x^2\rangle\}$$

A new basis for the composite system, $\mathfrak{K}_c$, is constructed with the following possible states:

$$\{|+_x^1\rangle \otimes |+_x^2\rangle, |+_x^1\rangle \otimes |-_x^2\rangle, |-_x^1\rangle \otimes |+_x^2\rangle, |-_x^1\rangle \otimes |-_x^2\rangle\}$$

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[4] An operator A on $\mathfrak{K}$ is *Hermitian* if, for all vectors u and v, ⟨u|Av⟩ = ⟨Au|v⟩. For more details, see Hughes (1993).
[5] The *span of vectors* is the set of all their possible linear combinations*.*

Notably, these states are irreducibly composite: For example, $|-\frac{1}{x}\rangle \otimes |+\frac{2}{x}\rangle$ cannot be broken down into independent sub-states $|-\frac{1}{x}\rangle$ or $|+\frac{2}{x}\rangle$; these states are *entangled* and must be described together. This is the source of Einstein-Podolsky-Rosen correlations[6] and quantum non-locality.

Measurements: Lastly, given a measurement on a system in state ψ, the projection postulate states that:

$$\psi = \sum_k a_k \psi_k \rightarrow \psi_j$$

Upon measurement, ψ is 'collapsed' onto some one-dimensional subspace representing an eigenstate. If ψ is some superposed state $\psi = a\psi_1 + b\psi_2$, the postulate states that ψ 'collapses' into one of two eigenstates ψ_1 or ψ_2, with the *Born rule* prescribing probabilities for the states occurring as $|a^2|$ and $|b^2|$ respectively. Thus, in considering whether a system is in state ψ_1 *or* ψ_2, we must calculate it via calculating the probabilities of $|a^2|$ and $|b^2|$ from $a\psi_1 + b\psi_2$.

3   Basic Quantum Logic

3.1 $\mathfrak{K}$'s structure, and QL

The set of all possible subspaces of $\mathfrak{K}$, $S(\mathfrak{K})$. $S(\mathfrak{K})$ has a structure: it is a *partially ordered lattice* $L(\mathfrak{K})$, with $P \leqslant Q$ defined as P being a subspace of Q in $\mathfrak{K}$. For any two subspaces in $L(\mathfrak{K})$, there is a greatest subspace common to both (the *infimum*), and a smallest subspace containing them both (the *supremum*). Following Hughes[7], I define meet ($\wedge$) and join ($\vee$) on subspaces in $L(\mathfrak{K})$:

$$\text{(Meet) } P \wedge Q = P \cap Q$$

$$\text{(Join) } P \vee Q = \cap\{N : N \in S(\mathfrak{K}) \text{ and } P \leqslant N, Q \leqslant N\}$$

While the meet/infimum of two subspaces is equivalent to their intersection, the join/supremum of two subspaces is *not* their union in the classical sense. Rather, it is their span, viz. the plane containing the two subspaces and all their possible linear combinations. Indeed, a union of two subspaces is in general *not* a subspace in $\mathfrak{K}$.[8] This reflects QM's principle that, if any two states are possible states of a system, then, at the same time, so too is their linear combination.

In $L(\mathfrak{K})$ every subspace is a subspace of $\mathfrak{K}$, and the subspace of every member of $L(\mathfrak{K})$ is the origin vector 0. Hence, $\mathfrak{K}$ is the *maximum element,* and 0 the *minimum element,* of $L(\mathfrak{K})$.

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[6] See Fine (2014) for an excellent historical summary on Einstein-Podolsky-Rosen correlations.
[7] See Hughes (1994) for a full formal account of **QL**
[8] Specifically, $P \cup Q$ is a subspace iff one of them is contained in the other.

The *orthocomplement* $P^\perp$ of any subspace P is such that $P \vee P^\perp = \mathfrak{K}$, $P \wedge P^\perp = 0$, $(P^\perp)^\perp = P$, and $P \leqslant Q$ implies $Q^\perp \leqslant P^\perp$. Two subspaces P and Q are *orthogonal*, $P \perp Q$, iff $P \leqslant Q^\perp$.

We can quite naturally define QL as a formal logic on $L(\mathfrak{K})$. First we start with a set of logical vocabulary $\{`\vee_{QL}`, `\&`, `\sim`\}$, and take the propositions to be handled by QL to be all experimental propositions, x_p, which may be asked of a system, of the form 'will the system pass a test for some possible state P with probability 1?' (Bacciagaluppi, 2009, 9) A function $f \colon x_i \to L(\mathfrak{K})$ then puts the set of these propositions x_i into bijective correspondence with $L(\mathfrak{K})$. For each proposition $x_p, x_q \in x_i$, and subspaces $P, Q \in L(\mathfrak{K})$,

$$f(x_p \,\&\, x_q) \text{ iff } f(x_p) \wedge f(x_q) = P \wedge Q$$

$$f(x_p \vee_{QL} x_q) \text{ iff } f(x_p) \vee f(x_q) = P \vee Q$$

$$f(\sim x_p) \text{ iff } [f(x_p)]^\perp = P^\perp$$

Clearly, '&', '$\vee_{QL}$' and '$\sim$' parallel the meet ($\wedge$), join ($\vee$) and orthocomplement ($\perp$) operations on $L(\mathfrak{K})$.

Lastly,[9] I define logical consequence as:

$$x_p \vDash_{QL} x_q \text{ iff } f(x_p) \leqslant f(x_q) = P \leqslant Q$$

3.2 The Status of CON

With QL set up, I return to the issue raised in §1. Recall the empiricist claim: QL, based off the structure of QM, apparently shows that CON is false. Consider QL's equivalent of CON:

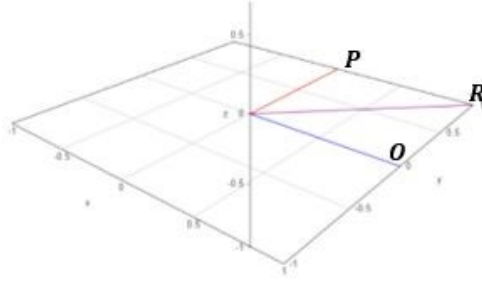**(CON*)**: $x_R \,\&\, (x_P \vee_{QL} x_Q) \;\leftrightarrow\; (x_R \,\&\, x_P) \vee_{QL} (x_R \,\&\, x_Q)$

This holds iff:

(CON†): $R \wedge (P \vee Q) = (R \wedge P) \vee (R \wedge Q)$

Suppose that P and Q are orthogonal, and $R = P + Q$:

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[9] I ignore ultrafilters – **QL**'s analogue for truth-assignment – and logical truth due to space constraints. Nothing I discuss turns on them.

Clearly, $(R \wedge P) = 0$ and $(R \wedge Q) = 0$, i.e. they only intersect at 0. Therefore, $0 \vee 0 = 0$ on the right-hand side of CON†. However, consider the left-hand side: the intersection of the plane containing P and Q, and the subspace R is clearly R itself, since the entirety of R is on the plane. Since $0 \neq R$, CON† is false. A fortiori, CON* is false.

Objection: nothing so far shows that the classical CON, employing 'and' and 'or', has broken down. Rather, I merely demonstrated the falsehood of CON*, using '&' and '$\vee_{QL}$', on a restricted class of *experimental propositions*. Thus Maudlin (2003, 491) complains that "quantum 'logic' isn't *logic,* i.e. isn't an account of conjunction and disjunction". To show that CON*'s failure entails CON's failure from an empirical perspective, proponents of QL must show that QL *is* classical logic – we just got the logical behaviour of 'or' wrong.

I think this requires us to first claim that, in the context of experimental propositions, there is **(a)** no connective 'or' that is *meaningfully definable,* and **(b)** the best replacement for 'or' is '$\vee_{QL}$'. Furthermore, **(c)** we must show that the experimental propositions of QL exhaust the propositions about the world. In other words, the structure of QM must completely describe the world. Without **(c)**, then the proponent of classical logic can still claim that the world is *really* classical, and the non-classical nature of QL only arises in the context of measurements: the world alone still gives us classical logic. Given **(a)** – **(c)**, though, the proponent of QL can assert that there is no other way to 'read off' disjunction from the structure of the world without using '$\vee_{QL}$'. This, together with the empiricist assumption that logic is given by the world alone, justifies the claim that 'or' was *really* '$\vee_{QL}$' all along: CON* is *really* CON, and since CON* is false, so is CON.

Within the context of experimental propositions, there is justification for **(a)**: there is no clear way to introduce 'or' within QM's structure since there is, in general, no experimental proposition or subspace in $\mathfrak{K}$ corresponding to the classical disjunction of P and Q (Bacciagaluppi, 2009, 19). Furthermore, the one special case where $P \cup Q$ *is* a subspace, viz. when one of the subspaces is contained in the other, can be interpreted in terms of the *span* of P and Q as well. Lastly, it is clear that the span of P and Q is widely used experimentally, in e.g. considering superposed states of P and Q. Thus, either there is no experimental proposition corresponding to $P \cup Q$, or $P \cup Q$ can be understood as the span of P and Q in the special case, which in turn applies generally in QM. This gives us reason to claim that we cannot even speak of the classical 'or' meaningfully in terms of experimental propositions.

Dickson (2001, 4) further argues for **(b)**, claiming that '$\vee_{QL}$' is the only other plausible candidate for replacing our classical 'or', since '$\vee_{QL}$' satisfies most of our constraints on 'or'. It is worth looking at the logical behaviour of '$\vee_{QL}$' to see its similarity to 'or'. For example:

$$P \leqslant P \vee Q$$

$$Q \leqslant P \vee Q$$

28

Consequently:

$$x_P \vDash_{QL} x_P \vee_{QL} x_Q$$

$$x_Q \vDash_{QL} x_P \vee_{QL} x_Q$$

Notably, this is reminiscent of the introduction rules for 'or'. Furthermore:

$$\text{If } x_P \vDash_{QL} x_R \text{ and } x_Q \vDash_{QL} x_R,$$

$$\text{then } x_P \vee_{QL} x_Q \vDash_{QL} x_R$$

This is also similar to the elimination rules for 'or'. '$\vee_{QL}$' thereby appears to behave like the classical 'or'. Of course, '$\vee_{QL}$' behaves differently in other contexts, notably CON.[10] However, given **(a)**, '$\vee_{QL}$' seems the closest substitute for our classical intuitions about disjunctions in the context of experimental propositions.

4   Two Interpretations: Quantum Logic as Global Logic?

(a) and **(b)** concludes that classical logic cannot be 'read off' the structure of experimental propositions in QM. However, what about **(c)** – do experimental propositions exhaust all propositions about the world? I argue that there are at least two ways[11] to understand the world-structure QM prescribes and QL's experimental propositions: this suggests that philosophical claims based on QM are "highly dependent on the interpretational approach one adopts towards the theory"(Bacciagaluppi, 2009, 36-37).

4.1   Bohmian 'Pilot-Wave' Interpretation

Bohm's 'pilot-wave' interpretation (BM) takes every particle to have determinate positions and trajectories. However, particles are guided by a 'pilot-wave' obeying the wave-function Ψ, causing Bohmian particles to evolve in a uniquely quantum fashion. This wave-function also generates a statistical distribution of the particles' positions, P = $|\Psi^2|$. This set-up allows BM to uncontroversially satisfy the constraints of QM formalism, as introduced in §2, e.g. the Born rule, and recovers *all* empirical results of QM.

However, on BM's view, QM formalism is merely *epistemic* in nature. As Bohm notes: "The use of statistics is [...] not inherent in the conceptual structure, but merely a consequence of our ignorance of the precise initial conditions of the particle" (Bohm, 1952, 171). QM formalism is simply an effective tool for us to calculate the properties of particles, given that the determinate but hidden, level of phenomena – particles with

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[10] For an in-depth analysis of the logical behavior of '$\vee_{QL}$', see Humberstone (2011, 913-917).

[11] I leave out the 'Copenhagen' interpretation here due to space-constraints – accepting it would not harm our case anyway.

determinate positions/trajectories – postulated by BM lies beyond the reach of measurement. However, in BM, particles are *really* ontologically classical (Bacciagaluppi, 2009, 30-31).

Particularly, in the case of superpositions and '$\vee_{QL}$': under BM, if a system is in a superposed state, then Ψ 'pilots' particles to two states with a frequency distribution obeying the Born rule. However, importantly, the particles themselves are either in 'support' of one state or another in the classical sense: "the [position/trajectory] configuration of the system is located only in one of these different components, and this is already a matter of classical logic" (Ibid, 31).

On this deeper level, particles are in some determinate position at any one time, and all other properties are further derived from position variables on BM's view. The world is *fundamentally classical*, and CON remains true. The use of spans – and '$\vee_{QL}$' – instead of classical union in QL reflects not the world, but our inability to access the level of hidden variables: the 'non-classical' nature of QL arises from our epistemic limitations.

It is thus inadmissible to claim that QL's experimental propositions exhaust all propositions about the world. Experimental propositions reflect not the totality of the world, but the limits of our epistemic access to the world. QL is, under BM, merely a logic of measurements and cannot be taken to conclusively replace classical logic (and thereby falsify CON).

4.2   Many-Worlds Interpretation

Contrariwise, the *many-worlds interpretation* (MWI) claims that QM's formalism, and the experimental propositions of QL, completely describes the universe. However, on this view, our 'world' is but one 'branch' of the universe.

Consider a measurement device ϕ which points $up\,|\uparrow_\phi\rangle$ when an electron is spin-up, points $down\,|\downarrow_\phi\rangle$ when an electron is spin-down, and points $nowhere\,|\oslash_\phi\rangle$ when there is no electron. Furthermore, an observer, O, can likewise be considered a system: Suppose O observes ϕ pointing a certain direction when ϕ in fact points in that direction. Let $|\uparrow_O\rangle, |\downarrow_O\rangle$, and $|\oslash_O\rangle$ represent these O-states. Given a system E of a spin$_x$-1/2 electron prepared in a superposed state $a|+_E\rangle + b|-_E\rangle$, we can construct a composite system $E \otimes \phi \otimes O$. Thus, when O observes ϕ measuring E:

$$(a|+_E\rangle + b|-_E\rangle) \otimes |\oslash_\phi\rangle \otimes |\oslash_O\rangle \;\rightarrow\; a|+_E\rangle \otimes |\uparrow_\phi\rangle \otimes |\uparrow_O\rangle + b|-_E\rangle \otimes |\downarrow_\phi\rangle \otimes |\downarrow_O\rangle$$

However, instead of saying $a|+_E\rangle \otimes |\uparrow_\phi\rangle \otimes |\uparrow_O\rangle + b|-_E\rangle \otimes |\downarrow_\phi\rangle \otimes |\downarrow_O\rangle$ 'collapses' into $a|+_E\rangle \otimes |\uparrow_\phi\rangle \otimes |\uparrow_O\rangle$ or $b|-_E\rangle \otimes |\downarrow_\phi\rangle \otimes |\downarrow_O\rangle$ upon interaction with ϕ (per the projection postulate), MWI claims that the universe is in *both* states simultaneously – the universe remains *superposed*. This seems absurd since our measurements show *one* definite result. However, the phenomenology of measurement, and the projection postulate, is explained away in MWI by saying that *we*, as O, are entangled with one particular measurement outcome or another – from (one of) *our* perspective(s), only one outcome obtains. Furthermore, $a|+_E\rangle \otimes |\uparrow_\phi\rangle \otimes |\uparrow_O\rangle$ and $b|-_E\rangle \otimes |\downarrow_\phi\rangle \otimes |\downarrow_O\rangle$ rapidly *decohere* [12]

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[12] For more on decoherence in MWI, see e.g. Wallace (2010, 2012).

following measurement, due to environmental interferences, and become *dynamically independent* of one another. For all practical purposes, then, there is only one definite state relevant to *us* ('one of' us). The other 'world' is effectively inaccessible.

Thus, MWI accounts for exactly the same empirical results as BM, and, as before, QL works as a logic of measurements. However, according to MWI, and unlike BM, the formalism of QM and the possible experimental propositions – corresponding to possible subspaces of $\mathfrak{K}$ – are *not* just propositions about measurements or reflections of our epistemic limits: rather, they are *genuine* propositions about the universe.

Prime example: MWI takes superposed states as actual states of single particles, not stochastic distributions of classical particles into possible states per BM. On MWI, systems which are in superposed states stay *so* after measurement unlike BM, where particles are in either some determinate state or another. On MWI, each component state of the superposition *actually* obtains, albeit in dynamically independent 'worlds'. In considering the classical union of two states of a system, then, we must consider the span of the two states where we find their linear combination, i.e. the *actual* state of the universe. Hence, we see that propositions about the universe behave like the experimental propositions of QL in that they map onto the lattice-structure of $L(\mathfrak{K})$: QL under MWI *replaces* classical logic as the 'true' logic of the world.

Furthermore, MWI explains why classical logic has been so successful from our perspective: CON *is* validated by *our* 'world', which is decohered from other worlds (in everyday macroscopic scenarios) – only one of the quantum disjuncts obtain *from our perspective*. However, we were mistaken to think that our 'world' is all there is to the universe. Both quantum disjuncts really do obtain in the universe, and the universe is described completely by QM and the experimental propositions in QL. Thus **(c)** obtains, and we might claim that CON is really not validated by the world. Turning BM on its head, on MWI it is *classical logic* that arises from our epistemic limitations.

5 Empirical (Under)-Determination of Interpretation and Logic

I began by asking why logical truths are true. Hoping to avoid the conventionalist path, I turned to empiricism. However, §4 shows that the world alone, given by our best sciences, cannot give a decisive answer to whether experimental propositions exhaust all propositions about the world. Though BM and MWI are *empirically* equivalent, each reproducing QM's empirical results, each interpretation includes postulations about the world (hidden variables or dynamically independent worlds) beyond empirical reach. These interpretations also take different logics to be *the* universally true logic. This leads us to conclude that empirical evidence alone fails to determine the logic of the world: The 'true' logic, under empiricism, remains underdetermined.

I propose this situation leads back to *conventionalism*. Here, conventionalism is not the thesis that logic is 'true by meaning' or 'convention'. It makes no substantive claims about the truth-status of logical truths. Rather, this conventionalism is analogous to the situation for our universe's 'ultimate' space-time structure. It is generally agreed that *that* is conventional, in the sense that general relativity "allows for a wide variety of cosmological models but that, due to structure internal to the theory itself, does not allow us to determine which of these models best represents our universe" (Manchak,

2009, 53).

This applies for QM and its various interpretations: "no amount of evidence will ever compel us to embrace a particular scientific claim" (Ibid, 53) about QM's interpretation. This is what I call *empirical conventionalism*, which is described by Sklar as such: "insofar as the two theories have the same predictive content with regard to the directly observable facts, they ought to be viewed as merely conventional alternatives to one another and not as genuinely alternative theories about the nature of the world" (Sklar, 2004, 958). In other words, QM formalism and its empirical results is in principle indifferent between interpretations.

This is old news in physics – many have been willing to 'shut up and calculate', ignoring interpretative questions precisely because of empirical conventionalism. What is new to us is the result that the choice of 'true logic' is also empirically conventional. No empirical evidence can determine whether QL or classical logic is true; this choice is arbitrary from an empirical perspective. Thus Belousek (2005, 673) concludes: "the 'book of nature' proves too ambiguous to be uniquely interpretable".

Cushing's solution is to go beyond empirical facts of the matter "to include factors such as fertility, beauty, coherence, naturalness and the like" (Cushing, 1993, 272). However, it is unclear what evidence can *empirically* settle the debate here, since all empirical results (ever) available to the two interpretations are equivalent. In any case, to rely on such extra-empirical factors is to give up on empiricism. Rather, logic choice is determined partly by human factors, which are at best intersubjective. To go down this route is to lose the objectivity of logic even on the empiricist view, yet it seems that, at least within QM, we must go down this route.

This distinction between unempirical and empirical facts can be further clarified with Putnam's (1974, 33) distinction between two types of facts constraining what he calls total science:

| **(ICC) Internal Coherence Constraint:** | Science must cohere with *simplicity*, and agreement with *intuition*, and so on. |
| **(ECC) External Coherence Constraint:** | Science must agree with *experimental checks*, i.e. empirical facts. |

Here, an interpretation is chosen not only because it coheres with all possible empirical facts, viz. ECC, but also because of simplicity, intuitiveness, fecundity, etc., viz. ICC. Putnam suggests that ICC provides a further fact of the matter that decides between seemingly empirically conventional choices.

Two points: first, I think the acceptance of ICC simply makes the *un*empirical elements involved in interpretational choice more obvious. While something *can* be a determinate fact of the matter given such constraints, these constraints of simplicity, intuitiveness, etc., are exactly what appear to be intersubjective. Even if there could be a decisive fact of the matter given some choice of ICC, I am not sure we could ever find objective grounds for ICCs themselves. The choice of a determinate interpretation with ICC thus comes at a loss of objectivity.

Secondly, it is unclear whether there even *is* a fact of the matter under ICC whether BM or MWI is better. To me, at least, it is not apparent whether BM or MWI, presented above, is *simpler,* or more *intuitive.* Given the complicated nature of QM, and the technical and

conceptual apparatus required for both BM (hidden level of phenomena, distinct pilot-waves guiding quantum particles, non-locality) and MWI (a world of infinite 'worlds', decoherence as a rough-grained process), neither BM nor MWI obviously satisfies any given ICC (e.g. simplicity, etc.) better than the other. One is ultimately left to one's metaphysical predilections.

In any case, the empiricist would have lost much in adopting ICC. Recall that empiricism aims to place logical truths on firmer grounds than logical conventionalism. Empiricism does so by appealing to the world because the relevant empirical facts determining a 'true' logic are intuitively objective in a way our linguistic conventions are not. However, even within empiricism, there is no determinate interpretational choice for QM. ECC does not suffice for any decision on the true world-structure and the 'true' logic; we must appeal to ICC, be it simplicity, intuition, or what-not. Regardless of the outcome of that debate, the resulting situation is certainly not objective as the choice seems to amount to something about *us,* as rational beings, as scientists, and so on. Consequently, the world *alone* has failed to give us the 'true' logic. Empiricism thus fails to obtain objectivity for logic, leading instead to empirical conventionalism. It is no longer clear whether this is more attractive than logical conventionalism.

6   Conclusion

Empiricists who want to recover the objectivity of logic by appealing to the world alone must recognize that our best theory of the world, QM, is underdetermined when it comes to the world-structure it prescribes. This entails that the 'true' logic is likewise empirically conventional – we have no empirical reason to think that CON (and classical logic) is true of the world or otherwise, because the true structure of the quantum world is unknown (indeed, unknowable). Adopting ICC to determine our 'true' logic only ameliorates this situation by basing our choice of logic on intersubjective – not quite objective – facts. Thus, empiricism, with its associated empirical conventionalism about logic, appears no better off than logical conventionalism in accounting for the objectivity of logical truths: something broadly conventional lurks.

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Disentangled Externalisms

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Abstract

In contemporary philosophy of mind, the consensus is that content externalism and vehicle externalism are logically independent. Both proponents and critics of content externalism agree that content externalism does not entail vehicle externalism, and vice versa. Sprevak and Kallestrup have recently challenged that view and argued that the conviction that content externalism and vehicle externalism are logically independent is not true for various forms of vehicle externalism. (Sprevak and Kallestrup 2014) According to them, what one can mean by vehicle externalism is vague and this is a problematic for understanding the relationship between content externalism and vehicle externalism. My aim here is to respond to their analysis of the subject by arguing that what they call "realization-vehicle externalism" is the most precisely formulated type of vehicle externalism and with an even more precise understanding of it, the independency principle (IP) is in no trouble. I will mostly use their terminology to avoid any possible misunderstandings.

In §1, I will clarify what one means by content externalism and vehicle externalism comparing both of them to internalist accounts of content and pointing out the most straightforward differences. In §2, I consider some different types of vehicle externalism examined by Sprevak and Kallestrup and include further analysis of where they differ. I will argue that the differences stem from the philosophical motivation behind these definitions. In §3, the problems with the two most promising types of vehicle externalism are discussed and I argue that the realization vehicle externalism (with some modifications) is the best type of vehicle externalism. Later in that section, I clarify these modifications and attempt to achieve a new characterization of realization vehicle externalism, which works properly with the independency principle.

1   Content Externalism vs. Vehicle Externalism

Philosophical theories about mental content try to explain the mechanisms behind one's having a content bearing mental state, such as a particular belief or any other propositional attitude. On the one hand, the proponents of content internalism argue that mental content is narrow in the sense that all of these processes are totally within the body, more precisely, inside the brain of the individual. Of course, perception and sensation have a role in the process but ultimately they are only tools to set body-bound conditions. According to content internalists, the role of individuating the mental content belongs entirely to the individual. If this is the case, then the individual's mental

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states with content supervene on her internal features. That is, whenever the same internal features are present, the same mental content is individuated.

Content externalism, by contrast, holds that mental content is wide in the sense that it is at least partly individuated in respect of the relations between the individual and the external reality. As Sprevak and Kallestrup put it, content externalists argue that the individuation of mental content fails to supervene on internal features of the individual. (2014, p. 81) That is, two individuals with the same internal features can have quite different mental content if the physical and social environment they interact is to some extent different. This possibility is apparent in the traditional thought experiments for content externalism.

The most famous thought experiment on content externalism is Putnam's twin earth experiment. Suppose that there are two Earths that are exactly the same except for the fact that in (real) Earth the physical entity we refer to as water is H_2O while in the other Earth it is another substance, XYZ. Putnam argues that it could be the case that if I were to have a doppelganger in Twin Earth, then my doppelganger in the twin Earth would have the same underlying mental and psychological base as me whenever we have a content bearing mental state about water. Nonetheless, it is apparent that while in the real Earth I have some sort of propositional attitude about "water", my twin in the twin Earth would have the same sort of propositional attitude about "t-water". That is, the same supervenience base is shared in both cases where content differs- in one case the content is H_2O, and in the other, it is XYZ (Putnam 1973)[2].

A similar thought experiment is Tyler Burge's arthritis. Suppose a member of an English speaking community has a problem with her thighs. She goes and sees her doctor saying, "I have arthritis in my thigh." The doctor replies however, by saying that arthritis is a disease which would only take place at joints, not thighs. Hence, the patient has a false belief. In the counterfactual case, again similar to Putnam's twin Earth, everything stays the same except the fact that this time her linguistic community uses the word arthritis to refer a disease which could take place either at joints or at thighs. In this case, the patient has a true belief when she believes that she has arthritis on her thigh. Hence, although the psychological basis remains the same in both patients, the belief content that they have is clearly different. Mental content, then, Burge concludes, is not only determined by internal conditions but wider social factors can have a decisive impact on one's content bearing mental state (Burge 1979).

As we have seen in the traditional thought experiments, content externalism gives an account of how mental states with content are individuated, on which that content bearing mental states fail to supervene on the internal features of the individual. Rather, they supervene on the internal features of the individual plus the external features, which may be either physical such as Putnam's water, or socio-linguistic such as Burge's arthritis.

Vehicle externalism, on the other hand, holds that vehicle of content are not only within the body, but they go beyond the individual. Vehicle of content is simply the physical item underlying the mental state which includes that particular content.[3] Therefore,

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[2] Notice that this type of content externalism is about the natural kind terms. The intuition is that the content depends on the physical nature of the entities around us.

[3] For the thesis of VE, it does not matter whether the relevant content is perceptual or conceptual, or whether there is a non-conceptual content of perception at all.

vehicle externalism gives an account of the nature of the content bearing mental states, namely, that they are not merely internal to the body. In recent literature of philosophy of mind, this view is generally called the extended mind thesis since in that view, human cognition 'extends' beyond the body. (Clark and Chalmers 1998) Throughout the last two decades, many philosophers who have argued for or against vehicle externalism have used different terminology and definitions of their own to put forward various views. What Sprevak and Kallestrup call the independence principle, however, has generally been agreed upon. IP simply holds that content externalism and vehicle externalism are logically independent and hence can be accepted or rejected independently. Admitting that the list is not exhaustive, Sprevak and Kallestrup analyze four different ways of defining vehicle externalism and rightly conclude that no version of vehicle externalism provides direct evidence to accept IP. (2014, 84-93)

In the next section, I will evaluate their analysis regarding different types of vehicle externalism, namely, Explanatory (E-VE), Minimal Supervenience Base (MSB-VE) and Realization (R-VE). I will ignore active externalism since it is not a favored version to ground vehicle externalism.[4]

2 Various Externalisms

Apart from active externalism, there are three versions of vehicle externalism that Sprevak and Kallestrup cite, which are defined in different ways and with different motivations. The first one is Noë's explanatory definition. E-VE holds;

> (1) Vehicle externalism is true iff an external resource is explanatorily ineliminable.[5]

To be explanatorily ineliminable for any kind of mental state is to be necessarily involved in the explanation of the character of that state. E-VE states that without appealing to the external resources outside the body, it is not possible to properly explain the character of content bearing mental states. E-VE's motivation for externalism, therefore, stems from the need to involve external resources in the explanation of the character of a content bearing mental state. E-VE, in that sense, is a way of defining vehicle externalism and does not concern itself with further constraints on vehicle externalism. The thesis is that vehicle externalism must be the case since it is simply impossible to explain the mental without vehicle externalism. For E-VE, further complications about vehicle externalism are nothing more than problems to be solved in the way to understand vehicle externalism. In that sense, E-VE is not even a definition; rather it is an argument for any specific kind of vehicle externalism.[6]

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[4] To discuss the problems of active externalism in grounding vehicle externalism would be unnecessary for the purpose of this paper. For the details of the problems of active externalism, see (Sprevak and Kallestrup 2014, 83-84).

[5] This definition (1) and following definitions (2) and (3) are taken directly from (Sprevak and Kallestrup 2014) to avoid any possible ambiguity for the reader.

[6] Here I discuss E-VE only as a distinct version of defining vehicle externalism, as Sprevak and Kallestrup do. Noe's enactive approach to the nature of experience provides more about the constraints of a possible vehicle externalism. However, it tries to do this distinct from the particular argument E-VE provides. The enactive approach does put constraints on vehicle externalism and has a concern to precisely characterize a type of vehicle externalism, especially on the base of phenomenal experience and intersubjectivity. The enactive view, however, is out of the scope of this essay. For more details, see (Noe 2005) and (Thompson 2005).

The second formulation is Ned Block's definition of vehicle externalism, which appeals to *minimal supervenience base*. MSB-VE states;

> (2) Vehicle externalism is true iff an external resource is part of the minimal supervenience base for that mental state/process.

Minimal supervenience base, as its name suggests, is the minimal physical supervenience base for a mental state to occur. If minimal supervenience base includes resources other than body-bound physical states, then vehicle externalism turns out to be true since the minimal supervenience base would include external resources. MSB-VE seems to provide an overall good definition of vehicle externalism since it captures the core of any kind of externalism claim, namely the physical supervenience base of the mental. Notice that, "minimal", in this definition, implies a necessity. An external resource must be an essential part of the occurrence of the relevant mental state.

The last definition is the realization vehicle externalism. R-VE tries to elaborate vehicle externalism in order to have a clear understanding of it. R-VE states;

> (3) Vehicle externalism is true iff the mental state is realized by the conjunction of the agent's neural activity and an external resource.

R-VE makes the very clear claim about the nature of vehicle externalism that some mental states are "realized" in the way they are not only by body-bound physical states. Using the notion of realization, R-VE adds to the discussions grounded on supervenience. It holds that supervenience is not enough to ground vehicle externalism; vehicle externalism is an account about the mechanisms of content-bearing mental states *realize* in the way they do. Theories of content based merely on supervenience fail to include that as a definition of vehicle externalism. R-VE tries to solve this problem by an appeal to the notion of realization.

Regarding these three definitions, Sprevak and Kallestrup write;

> "Min-supervenience differs from Explanatory. There is no reason why explanation of the existence or character of a mental state/process should make ineliminable reference to everything in its minimal supervenience base; indeed, such an explanation is likely to be too detailed to be informative."

(Sprevak and Kallestrup 2014, 85)

and,

> "Realization differs from Explanatory. The explanation of the existence or character of a mental state/process need not appeal to all, or indeed appeal to only, the realizers of that mental state/process."

(Sprevak and Kallestrup 2014, 86)

It is clear that E-VE is different from both MSB-VE and R-VE. This difference, however, is not a matter of foundation, but it is a matter of perspective. E-VE, as we see, is a more general way of stating vehicle externalism than MSB-VE or R-VE. E-VE does not attempt to give an account of the mechanisms of the individuation of mental content. Therefore E-VE, indeed, does not need to make ineliminable reference to *everything* in a mental state's minimal supervenience base. The reason why, however, is not the fact

that either E-VE or MSB-VE is true while the other is false, but simply is that E-VE and MSB-VE define vehicle externalism with different motivations. E-VE simply states that vehicle externalism must be the case based on explanatory reasons while MSB-VE and R-VE try to give account for the mechanisms of vehicle externalism. In short, MSB-VE and E-VE are not rival accounts. The case is the same for the relationship between E-VE and R-VE. It is true that E-VE does not need to appeal to the realizers of the relevant content-bearing mental state. Being a more elaborate version of MSB-VE, R-VE tries to give a precise definition of the mechanisms of the content bearing mental states and differs from E-VE in that regard. E-VE must be distinguished in that manner from the other two versions of vehicle externalism for the assessment of IP. The question of whether IP is problematic can only be answered with a theory of vehicle externalism (and also content externalism) which is formulated precisely and in detail. That is nothing like a general definition such as E-VE provides.

MSB-VE and R-VE, on the other hand, are rival accounts in the sense that they both attempt to provide the precision and the detail required for the assessment of IP. Both, however, fail to do so. In the next section, I will argue that the reason for this is that MSB-VE is not detailed enough and R-VE is lost in its terminology. When the definition and further specifications of R-VE are purified from confusions, R-VE, as the most precise definition of vehicle externalism, provides good grounds for IP.

3   A New Realization Vehicle Externalism

I agree with Sprevak and Kallestrup that MSB-VE fails to provide good grounds for IP on the direction from content externalism to vehicle externalism and that it suffices to block the entailment from vehicle externalism to content externalism. (Sprevak and Kallestrup 2014, 88) An external resource which takes a part in the minimal supervenience base of one's content bearing mental state simply does not necessarily need to have a role in the individuation of the mental content. By its definition, however, MSB-VE implicitly holds that content externalism entails vehicle externalism. As we have seen in the second section, MSB-VE holds vehicle externalism is true iff an external resource is part of the minimal supervenience base for that mental state. This requirement is also met by content externalism. For content externalism, the minimal supervenience base must include an external resource. For MSB-VE, if an external resource is part of the minimal supervenience base, then vehicle externalism is true. Hence, content externalism entails vehicle externalism and IP fails. The failure stems from the inadequate characterization of vehicle externalism by only appealing to the minimal supervenience base. Beyond defining minimal supervenience base, MSB-VE does not characterize and differentiate between the parts (internal or external) having place in the minimal supervenience base. This leads to the conclusion that content externalism entails vehicle externalism.

The type of R-VE Sprevak and Kallestrup considers is based on the works of Shoemaker (2007) and Wilson (2001). Shoemaker introduces the notions of total realizer and core realizer. A total realizer of a property, he defines, is the property whose instantiation is sufficient for the realization of that property. A core realizer of a property, on the other hand, is the "salient" part of a total realization of that property. (Shoemaker 2007, 21) Wilson's account of realization adds to this terminology by specifying the parts that play a role in a total realization in addition to the core realizers. (Wilson 2001, 8-9) He calls

these the non-core parts. Non-core part helps the core-part to play its required causal role for the total realization. Importantly, Wilson also distinguishes between the realizers of a system and the background conditions. This notion of background conditions is crucial to make sense of any theory of realization. On the base of these distinctions, Wilson defines three types of realizations; narrow realization (NR), wide realization (WR) and radically wide realization (R-WR). He defines them as follows;

> "NR: It is a type of total realization whose non-core part is located within the individual having that property.
>
> WR: It is the total realization whose non-core part is not located entirely within the individual.
>
> R-WR: It is a type of WR whose core part is not located entirely within the individual."

> (Wilson 2001, 11)

Once this framework is set, Sprevak and Kallestrup argue that R-VE fails to block entailment either from content externalism to vehicle externalism or from vehicle externalism to content externalism. The reason why, they think, is the fact that the distinction between core and non-core realizers is what they call interest relative. (Sprevak and Kallestrup 2014, 93) As they emphasize, for this version of R-VE, the difference between content externalism and vehicle externalism becomes a matter of the difference between wide realization and radically wide realization. That is, what Wilson calls wide realization defines content externalism and what he calls radically wide realization defines vehicle externalism. If the distinction between core and non-core parts, however, is interest relative, then one cannot talk about a solid ground for IP since the distinction between wide and radically wide realization and hence the distinction between content externalism and vehicle externalism depends on the interest. IP, in that case, would become true or false depending on the explanatory context.

The second problem about that kind of R-VE is that it also fails to block entailment from vehicle externalism to content externalism. The issue is that in order for any realization to be radically wide, it should also be wide. This is required by definition since radically wide realization is defined as "a wide realization whose core part is not located entirely within the individual." Therefore, for this version of R-VE, vehicle externalism necessarily entails content externalism and IP turns out to be false. The reason behind these problems about R- vehicle externalism, I argue, is that its elaboration hinges on vague concepts like "salient" and "non-core".

The concept of "salient" is quite pragmatic since what is salient is salient in a particular context to a particular agent. What is meant by non-core is also not clear since even if one is able to detect the core-part of a total realization, the remainder parts are left as a unified bulk. In that sense, these two concepts are not appropriate for their job, namely, playing a part in the elaboration of R-VE. They do not only fail to totally represent the parts in realization, but they also misrepresent them. Hence, a proper and precise version of R-VE should be reformulated so as to avoid these confusions.

The first thing to dispose of is defining the core realizer as the salient part of a total realization since what becomes salient depends on the context. Therefore, the distinction between wide realization and radically wide realization cannot be drawn

based on core realizers. There is no core realizer of a property without the particular context or explanatory interest. This can be put, maybe more accurately, in that way too: all parts playing a role for the total realization are core realizers. Take the example of Sprevak and Kallestrup. A mousetrap is a total realizer of the property of catching and killing mice. If one is interested in explaining how it does the killing, some parts become salient. If one is interested in explaining how it attracts mice, some other parts seem to be the core realizers. (Sprevak and Kallestrup 2014, 93) The analogy suffices to show that how a core realizer can depend on the explanatory interest. Moreover, it also successfully shows another important point. Without the agent who is interested in explaining the particular aspects of the system, all parts of the total realizer work together to realize the property of catching and killing mice. All parts of the mousetrap are required and have the same importance for the total realization. All parts of it, then, are, in a sense, core realizers. But, although they are the same in their being core realizers, *the way they contribute to the total realization is still different.* R-VE (and other versions of vehicle externalism fail too) fails to account for this simple, obvious difference. This is the fundamental reason why they fail providing good grounds for IP.

For a total realization, then, there are no core or non-core realizers. All the parts of a total realizer act as a core realizer since they have the same importance for the total realization and they help each other to play the required causal role they need to play for a total realization. Since there is no part we can refer to as non-core, however, it does not make sense to call them core. Therefore, I will call them just "realizers". This, however, at the first sight might seem like a complete disaster for assessing IP; when there is no core/non-core distinction, R-VE cannot offer a proper basis for making a comparison between content externalism and vehicle externalism. However, by demanding further clarification about these realizer parts, we may be able to better understand the relation between content externalism and vehicle externalism.

The required clarification is about accounting for how different realizers can contribute in different ways to the total realization. The brain, for example, has a different causal role for the total realization of a mental state with water or twater content and water or twater has a different one for the same total realization. Vehicle externalism and content externalism, in that sense, *make claims about different types of realizers*. The claim of vehicle externalism is not about the realizers which are related with the properties related to content individuation, but it is about the realizers of the property of being a mental state with content. The claim of content externalism, on the other hand, is directly related with the realizers of the content individuation.

To illustrate, consider again Putnam's twin Earth. (Putnam, 1973) Water and twater, in that case, are substitutable for the total realization of a mental state with content. It is the case that the doppelgangers in two identical earths have the same sets of realizers except water and twater. Water, or twater, as the realizers of that particular mental state, contributes to the total realization by individuating the content. The brain, on the other hand, despite the fact that it contributes to the total realization by helping other realizers like water and twater to have the required causal role, mainly contributes to the total realization in a different manner. It plays a part as a realizer of the mental state with content, whether its content is water or twater. In other words, it plays a part as one of the realizers of the vehicle of the content. Notice that this is partly the reason why Shoemaker's use of "salient" becomes vague. If one's explanatory interests are in content individuating realizers, for instance, then water and twater become salient. As interests change, the different types of realizers become salient or not.

A problem seems to arise at that point. What about the seemingly irrelevant realizers of the property of catching and killing mice? What about, for example, the mouse-trap not being sucked up by a super-massive black hole while the mouse is about to be caught? Does this realizer have the same importance with the other generic realizers such as the parts of a system such as a mouse trap? In other words, are these infinitely many realizers, like the black hole would have the same importance with the other parts of the system? In that case, it seems, it would be impossible to talk about the distinction between content externalism and vehicle externalism because every single aspect of the world would have a "generic" role in the total realization of any of one's content bearing mental state.

Wilson's use of background conditions, I think, provides a solution to this problem. He writes;

> [...]the total realization of H excludes the background conditions that are necessary for there to be the appropriate, functioning system. While these may themselves be necessary for a given entity to have H, since they are not states of S, they are no part of the total realization of H. Thus, total realizations should be distinguished from the broader circumstances in which they occur. (Wilson 2001, 9)

Still, it needs further explanation for it to work for a theory of realization of mental properties where there is no distinction between core and non-core realizers since when there is no such distinction, it may appear that there is no healthy criterion to distinguish between the system's own realizers and the background conditions. I think this view is simply false. Talking about non-hierarchical generic realizers does not make one necessarily unable to distinguish between the realizers of a system and the background conditions. This conviction stems from the view that if one is to talk about a system, it must necessarily be a result of an explanatory interest. This is, however, not the case. One picks systems anytime in ordinary life without any explanatory interest. We ordinarily identify a sparrow, a ship, a rock, a mousetrap etc. This, of course, is related to how one's sensory and perceptual apparatus is shaped, but this is irrelevant for our subject since their level of veridicality is more of an epistemological problem. Here, it suffices to state that the identified systems are obviously in contrast with the background conditions that make their existence possible. Indeed, this contrast is the very reason why one can make sense of things around and within.

Hence, explanatory interest and saliency enter into picture when a particular system has already been identified. My following definition of wide and radically-wide realization offers a solution based on this; systems (cognitive systems for our concern) are identified before the explanatory interest and the related saliency arise. Therefore, systems and their states are de facto distinguishable from the background conditions which make the realization of a system possible to occur.

Then, there is a distinction between interest-dependency and subject-dependency. In the case of generic realizers, systems are obviously distinct from background conditions indifferent of interest-dependency but they are subject-dependent in the sense that they are identified depending on the sensory apparatus and cognitive abilities of the subject. However, as I pointed out, this is, as long as it is not interest-dependent in an explanatory context, irrelevant to our topic. In my account, systems and their properties that are defined through a theory of realization where every realizer that has the same importance does not need to suffer from interest-dependency. System's realizers and

the background conditions can be kept distinct safely. The black hole example falls into the category of background conditions. What is more, only after a system is identified, do core and non-core realizers enter into the picture. That is, the realizers in question are ipso facto the realizers of the already identified system.

There are, then, different kinds of realizers for a cognitive system to have content bearing mental states. Two major ones are the realizers of the properties of vehicle of content such as brain and the realizers of properties of content such as water or arthritis. They, by working together, lead to the total realization of having a content bearing mental state. In this formulation of realization, narrow realization, wide realization and radically wide realization are defined as follows;

> NR: Realizers are located entirely within the individual having the realized property.

> WR: Realizers of the properties related to content individuation are not located entirely within the individual.

> R-WR: Realizers of the properties related to vehicle of content are not located entirely within the individual.

So, according to this new type of realization;

> *Content externalism* is true iff the property of having a content bearing mental state is widely realized

And,

> *Vehicle externalism* is true iff the property of having a content bearing mental state is radically widely realized.

IP, here, is no more in trouble, neither from content externalism to vehicle externalism, nor from vehicle externalism to content externalism. One can be a proponent of vehicle internalism and content externalism together. It is possible for the total realization of a content bearing mental state to have content individuation realizers external and realizers of vehicle of content internal to the body, and vice versa.

4   Conclusion

Sprevak and Kallestrup challenged the general assumption that content externalism and vehicle externalism are independent. They argued that for various forms of vehicle externalism, IP does not hold. I argued that the problem about IP is about the level of precision of a possible account of vehicle externalism. I have demonstrated that all the forms of vehicle externalism Sprevak and Kallestrup analyze lacked that precision. R-VE, however, when reformulated to include a precise and detailed theory of realization manages to provide solid grounds for IP. Specifications and clarifications made on the work of Shoemaker (2007) and Wilson (2001) can provide a clear statement of vehicle externalism, which includes a solid grounding of IP.

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