INFORMATION, EXPERIENCE, AND THE KNOWLEDGE ARGUMENT

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CERTIFICATION OF APPROVAL

I certify that I have read Information, Experience, and the Knowledge Argument by Travis Wayne Greene, and in my opinion this work meets the criteria for approving a thesis submitted in fulfillment of the requirements for the degree: Master of Arts in Philosophy at San Francisco State University

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I analyze Frank Jackson's knowledge argument by conceiving of human experience as consisting of three types of information: the phenomenal, propositional, and indexical. The knowledge argument raises two questions, one epistemological and the other metaphysical. The epistemological issue is: *What is it like for Mary to see red?* The metaphysical issue is: *Does physical information capture the entirety of human experience*? I argue that our lack of indexical information prevents us from knowing absolutely what seeing red is like for Mary. I also claim that physically-realized indexical information allows for physical information to capture the entirety of human experience, but only contingently. Indexical information is aphysical and, metaphysically speaking, could be realized non-physically. Finally, I propose that, on Kantian grounds, indexical information is necessary for experience.

I certify that the Abstract is a correct representation of the content of this thesis.

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Chair, Thesis Committee Date

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1. Introduction

Since the founding of the Mathematical Theory of Communication by Shannon and Weaver in 1949, philosophers impressed by the theory have been keen on applying the technical concept of information to the more general task of explaining perceptual experience. More specifically, several attempts have been made to formulate theories of perception and experience in terms of information acquisition from the environment.[1] In doing so, these theorists have typically assumed a physicalist metaphysics—in other words, they can be seen as trying to naturalize (i.e., put into a physical vocabulary amenable to scientific study) the way humans acquire information about their environments and extract meaning from that information. Yet, there have been important philosophical arguments that profess to show how perceptual experiences rely on non-physical aspects or entities. One argument in particular is especially of interest because its conclusions rest on the notion of physical information.

Frank Jackson's (1982) influential paper *Epiphenomenal Qualia* employs several thought experiments to illustrate his contention that physicalism—the *sine qua non* metaphysical doctrine of science—is incomplete. In the paper, he argues that a complete

[1] I am referring here to the respective books and papers of Fred Dretske (1981), Adrian Cussins (1990), and Gareth Evans (1982), among others. A related issue taken up by these philosophers concerns whether and to what extent experience is governed by conceptual and nonconceptual processes.

picture of human experience cannot be derived from purely physical information. Using the example of the brilliant neuroscientist Mary, who knows everything there is to know about human visual perception, Jackson claims that she cannot have known what it was like to see red without having actually seen the color red. Having all the relevant *physical* information, he says, is not the same as having all the information, since purely physical information necessarily leaves out the essential qualitative aspects of human experience (these qualitative aspects of experience are more commonly known as *qualia*) (p. 273). These qualia must then be non-physical in nature, since, the argument goes, access to all the relevant physical information did not give us knowledge of them. Such an argument would seem, if successful, to represent a major blow to the project of an information-based theory of human experience, which takes as a starting point the premise that physical events underlie the transmission of all information between organisms and their environments.

Nevertheless, Jackson's analysis of experience has been shown by many to be insufficient, particularly in the way he equivocates in his understanding of knowledge and its relation to various forms of information. Most of his critics have responded to the knowledge argument by pointing out that he fails to distinguish clearly between *phenomenal* and *propositional* forms of knowledge (cf. Churchland (1985); Conee (1994); Fuerst (1994); Lewis (1988)). Others, notably Perry (1979) and McMullen

(1985), introduce yet another kind of knowledge, *indexical* knowledge, which also plays a role in human experience.

Using these philosophers' arguments as stepping-stones, I intend to illustrate how human experience can be conceived of as the sum of information of three distinct types: *phenomenal*, *propositional*, and *indexical*.[2] These divisions help to elucidate, among other things, why mental states have the characteristics they do.[3] Moreover, I plan to argue that the experience of any particular human is the combination of information that is constituted by *phenomenal knowledge* of his own internal states (which serve to transform environmental information to phenomenal information, thereby allowing qualia to play a prominent role in perception), *propositional knowledge* of the world around him—most paradigmatically given to him through the methods of science—and finally, *indexical knowledge*, which permits him to view himself as situated in a larger relational context of events and objects in space time and allows him to construct both a private and public narrative of experience. The main arguments in this paper, however, will mostly be concerned with indexical information and its application to the claims of the knowledge argument.

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[2] Part of the reason I propose such a view of experience is because it respects the biology of human evolution and classifies human knowledge in terms of sublinguistic, linguistic, and metalinguistic information. See also Musacchio (2004) for a discussion of the differences between the phenomenal (sublinguistic) and propositional (linguistic) aspects of experience.

[3] The most relevant upshot of such a view is that the so-called Explanatory Gap is resolved by simply positing that our phenomenal concepts are formed in phylogentically distinct areas of the brain from our theoretical concepts. See Musacchio (2002) for such an account.

Accordingly, this paper is divided into four sections. The first section concerns the knowledge argument, its formulation, and a brief treatment of some influential responses to it. After each response, I provide a short analysis or critique of the way it deals with the knowledge argument. At the same time, the first section will introduce the concepts of phenomenal, propositional, and indexical forms of knowledge or information, which make up the backbone of my interpretation of the knowledge argument.

The second section of this paper will present my reply to the epistemological and metaphysical claims of the knowledge argument. In analyzing these claims, I will put forth an information-based theory of human experience that relies on the three aforementioned kinds of information. In doing so, we will see that defining the physical (and the non-physical) is not an easy task—in the end I will suggest a compromised stance that views the physical and non-physical more as epistemological than metaphysical categories.

The third section is particularly important and centers on the nature of indexical information, its aphysicality, and its role in experience. There the major claim will be that indexical information can be multiply-realized in both physical and non-physical entities: It is aphysical. Finally, the fourth section examines the general philosophical constraints on the scientific study of human experience and how representational content rests not just on the phenomenal details of a representation (the quale in itself), but also on one's unique reaction to those features.

1.1 The Epistemological Question

In my view, the first question raised by Jackson's knowledge argument is an epistemological question. In short, I interpret the major epistemological issue as: *What is it like for Mary to see red?* The answer to this, I suggest, requires that we have certain phenomenal information, which is presented to us in the form of a mental representation; hence, since we do not have access to the same phenomenal information (i.e., the representation has different content) as Mary, we cannot answer the question absolutely.[4] Here is a tightened version of the argument:

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[4] We cannot know what something is like for someone else to any arbitrary degree of certitude, but we can know it approximately. The evidence for this claim is the success of science, which abstracts away from particular spatiotemporal peculiarities and seeks to find inductive laws that apply to all spatiotemporal locations. The universal applicability of scientific laws comes not from describing things perfectly from all spatiotemporal locations, but rather from discovering the commonalities among all the spatiotemporal locations and describing these general features. Thus, we cannot say for sure what it is like for Mary to see red, but we can look to our own experiences of red (albeit couched in different indexical information) and have a good general idea of what it is like. The absurdity of looking for an absolute answer to what seeing red is like for Mary is made clear when we consider that even in our own case, we cannot say absolutely what seeing red is like. If "what seeing red is like" is a concept like our concept of an artichoke, then it is ultimately a class of instances, from which any particular instance is a member.

H.A.C. Dobbs (1951) formulates this view rather clearly in terms of private (representational or subjective) and public (objective or scientific) events. He notes that there is a covariance between physical and personal events. He neatly spells out this difference between the public and private as follows:

> The sense in which the nature of physical events may be said to be 'public' is that physical events are describable in terms that are at any rate *covariant* with respect to the differences in (or transformations between) the spatio-temporal details of location and bodily constitution of different experiencers. The idea of a 'public' world of physical events is a construction based on the covariance found in the experiential events of differently situated and constituted observers,

(a) Phenomenal information is given to Mary via a mental representation.

(b) The content of a mental representation depends on two things: The features of the representation and a reaction to those features.

(c) Mary's reaction to these representational features depends on indexical facts of spatiotemporal history that are unique to her.

(d) Thus, the content of her mental representation is unique to her and we cannot know absolutely what seeing red is like for her. (At best, only approximately.)

1.2 The Metaphysical Question and Two Interpretations

The second question raised by the knowledge argument is metaphysical in nature and several versions of it can be found in Jackson's original paper.[5] The particular problem I want to focus on is: *Does physical information capture the entirety of human experience*? I believe that an adequate answer to this inquiry requires that we are clear about what Jackson means by the phrase *physical information*. That is because there are at least two ways to conceive of what physical information might be.

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discovered by the inter-observer communication achieved through the medium of language. (p. 128)

So according to Dobbs, it seems that language permits successful interpersonal communication by allowing the creation of private-language terms whose meanings covary with actual physical events. On the basis of this covariance we can communicate about states of affairs (i.e., we can express propositions) despite our perspectival and temporal differences. In sum, our individual experiences must not be exactly the same, but sufficiently similar such that we can abstract from our spatio-temporal differences and still refer to public events that covary with private events among speakers of a given language.

[5] Another way Jackson formulates this issue is by claiming that "all correct information is physical information" (p. 275).

Does Jackson mean to claim that the *object of the information*, the particular quale Mary has, cannot be considered as physical information? I suggest that if Jackson means to say that Mary's red quale is not a particular form of physically-realized information, then the knowledge argument is invalid—numerous philosophers have proposed how qualia can be accounted for by physical events and entities in the brain.[6]

Nevertheless, Jackson could also be interpreted to mean that the *information expressed by the quale* is non-physical information. This statement is a claim about a *type* of information, not an *object*. If this is what is meant by physical information, then I propose that indexical information plays this role—indexical information is embedded in representational content, which is embodied by this quale.[7] Moreover, indexical information is *aphysical*. In other words, indexical information is best understood *functionally:* That is, it can be multiply-realized, either physically or non-physically.[8]

Further, since experience, human or otherwise, must contain an element of indexical information, it is only contingently true that the experience of Mary can be captured with reference to only physical information. Metaphysically speaking, it could be that in some alien creature, indexical information is realized non-physically, in which

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[6] See, for instance, Loar (1997), Carruthers (2004), or Papineau (1999) for physicalist explanations of qualia and other arguments against non-physicalist views of experience.

[7] This issue will be taken up during my discussion of Michael Tye's Representationalism, in which he argues that differences in phenomenal feels (qualia) are just differences in representational content.

[8] For the account of realization from which I draw, see Brian L. Keeley's (2000) "Shocking Lessons From Electric Fish: The Theory and Practice of Multiple Realization."

case Jackson's claim that physical information cannot capture the whole of experience would be true. Of course, the scope of Jackson's argument does not concern possible alien creatures; rather it concerns humans, whose consitution is wholly physical. Thus the metaphysical possibility of non-physically realized indexical information makes it only contingently true that physical information captures the whole of human experience. Here is a more condensed version of the proposed argument:

> **(a)** Indexical information is necessary for experience.
>
> **(b)** Indexical information is aphysical: It can be realized physically or non-physically.
>
> **(c)** In the case of Mary, the indexical information was realized physically in her brain, but metaphysically speaking, it could have happened otherwise.
>
> **(d)** Thus, in the case of Mary, purely physical information captured her experience, but metaphysically speaking, purely physical information might not always capture experience.
>
> **(e)** Therefore, Jackson's claim that there is more to experience than physical information is only contingently true in cases where indexical information is realized non-physically.

2. The Knowledge Argument

Frank Jackson's knowledge argument is commonly viewed as one of the three main arguments against physicalism.[9] In condensed form, the knowledge argument, or, rather, thought experiment, against materialism goes as follows: Suppose we have an omniscient neuroscientist, Mary, who has all the physical facts of color vision and

[9] The prototypical arguments in the literature are Jackson's (1982) Knowledge Argument, Levine's (1988) Explanatory Gap argument, and Chalmers' (1996, 2002) Conceivability argument.

processing at her disposal; suppose further, that Mary has been kept isolated in a black and white room and has been outfitted with black and white goggles, effectively allowing her only to have seen the world in various shades of grey. One day Mary is released from her black and white environment and sees a ripe tomato for the first time. This knowledge of what it is like to experience a red tomato was not part of the physical information Mary had, and thus there are qualitative aspects of experience—qualia—that necessarily escape the physicalist story. Since qualia escaped the physicalist story, they must be non-physical. Despite Mary's exhaustive knowledge of neuroscientific facts, she learns something new by experiencing the color red for the first time. Physicalism, as the philosophical doctrine that all correct information is physical information, is therefore incomplete. And since it is incomplete, is it false (p. 275).

Jackson also gives us the argument in a more formal context:

> **(a)** Mary (before her release) knows everything physical there is to know about other people.
>
> **(b)** Mary (before her release) does not know everything there is to know about other people (because she l*earns* something about them on her release).
>
> **(c)** Therefore: There are truths about other people (and herself) which escape the physicalist story. (p. 279)

In other words, a paradox arises because if we had all the physical knowledge, and that was all there was to it, then we could never learn anything new. Yet as the example of Mary shows, we do indeed learn something new when we see a new color,

hear a new sound, or taste a new flavor for the first time. If the thesis of physicalism is correct, and we had all the requisite physical knowledge, Mary could not have learned anything new by seeing red for the first time. Thus, the case of Mary presents a direct challenge to the doctrine that physical information or knowledge can capture the whole of human experience.

3. Responses to the Knowledge Argument

Here, I will spell out the ways in which these critiques draw, either implicitly or explicitly, on the distinctions in information in Jackson's argument. In order to make things clearer, whenever we encounter the word "knowledge," we can substitute it with the word "information," since most of the replies to Jackson's argument make no distinction between Mary's having information and her having knowledge, for better or worse.

3.1 Propositional vs. Phenomenal Knowledge

The most popular response to Jackson's argument denies that Mary learns anything new in terms of physical information upon her release. They do acknowledge that Mary learns something new by experiencing a red tomato, but they contend that what she learns is not anything like a physical fact. Many authors (Churchland (1984), Lewis (1988), and Conee (1994), for instance) draw a distinction between *propositional knowledge*—the kind Mary possessed regarding all the facts of cognitive psychology,

perception, and vision—and *phenomenal knowledge*—knowledge of the "what" something *is like*. Conee states that Mary gains phenomenal knowledge of what seeing red is like by becoming "acquainted" with some new property, a phenomenal property (p. 140). By having a red experience and becoming acquainted with the phenomenal property (as opposed to the propositional property found in her neuroscience books) Mary learns what seeing red is like.

All of these authors' responses hinge on the contention that knowing something phenomenally is different than knowing something propositionally. We can only know something phenomenally when we have been exposed to the requisite phenomenal information. Conversely, when we know *that x*, we know *x* propositionally or factually. For instance, we might know *that* retinal stimulation of the cones most sensitive to longer wavelengths of electromagnetic radiation tend to cause red representations in people with normal visual systems. The content of this statement can be expressed in a linguistic proposition. In Mary's case, she was never exposed to the pertinent phenomenal information and thus she could not know what seeing red was like phenomenally, i.e., she never had a mental representation of this environmental information with the right kind of content. The content of this phenomenal information is expressed in a mental representation. Knowing about the facts of electromagnetic radiation and color vision does not in any way help us in being exposed to the right kind of phenomenal information, i.e., in having the appropriate mental representation.

Correspondingly, Churchland and Conee would probably agree with Jackson that phenomenal information is not derivable from propositional information. Learning something through direct perceptual acquaintance is different from learning about something propositionally or factually, and the mere act of learning a new fact does not in any way provide one with direct perceptual acquaintaince with something. It was thus unfair of Jackson to think that Mary's mere knowledge *about* the physical facts of color vision, etc., would give her knowledge of *what it was like* to see a novel color. On this reading of the knowledge argument, it is to be expected that Mary would learn something new upon being released and thus the thought experiment does not represent any threat to the doctrine of physicalism. As Churchland (1985) showed with his analogy of Mary the "Ectoplasmologist," no metaphysical doctrine can explain the *what it is like* aspect of experience, neither physicalism nor dualism, nor anything else; therefore, it should not be a reason to reject physicalism.[10]

Interestingly, Lewis (1988) toys with the idea that the reason we cannot know what it is like to see red for Mary is not because of a lack of physical information, but

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[10] Churchland's (1985) argument goes as follows:

> Suppose that Jackson were arguing, not against materialism, but against dualism: Against the view that there exists a nonmaterial substance—call it "ectoplasm"—whose hidden constitution and nomic intricacies ground all mental phenomena. Let our cloistered Mary be an "ectoplasmologist" this time, and let her know everything there is to know about the ectoplasmic processes underlying vision. There would still be something she did not know: What it is like to see red. Dualism is therefore inadequate to account for all mental phenomena! (p. 24-25).

instead from a lack of *phenomenal information*, which is "irreducibly different" from physical information (p. 285). He proposes a Hypothesis of Phenomenal Information, which essentially states that phenomenal information is "information about a certain part or aspect or feature of experience" (ibid.). Strangely, though, he ultimately rejects this interpretation of the knowledge argument and supports his "ability"[11] view because, according to him, phenomenal information "reveals the presence of some sort of non-physical things or processes within experience… or [reveals] that certain physical things or processes within experience have some sort of non-physical properties" (p. 286). This conclusion seems short-sighted, since there is no good reason why phenomenal information cannot simply be *physically-realized*.

On the contrary, the physical-realizability of phenomenal information makes it completely compatible with physicalism. Lewis appears to commit the fatal mistake of inferring that because phenomenal information contains an essential component of indexical information (thus making it epistemically unique), it must also therefore be metaphysically unique, i.e., non-physical. As I will argue, Mary's knowing what seeing red was like *was* a matter of acquiring the appropriate physically-realized phenomenal information (her having a red representation), but the phenomenal feel of this representation will depend on indexical details unique to her. In sum, I would agree with

[11] In short, Lewis denies that Mary gains any new phenomenal information and instead maintains that learning what seeing red is like is a matter of being "able" to "remember, imagine, and recognize" a red experience when one has it (p. 294).

Lewis that Mary does gain a new ability upon having her first red experience, but this ability is the result of her having the appropriate phenomenal information (her red representation).

3.2 Phenomenal Concepts

Taking a slightly different approach, Block (2002) and Loar (1997) choose to highlight the conceptual independence of physical-functional concepts and phenomenal concepts. They point out that that physical concepts and phenomenal concepts may pick out the same properties, but they do so only contingently. In other words, there is no necessary relation between the properties of, say, our scientific concept of heat and our phenomenal concept of heat. In the case of Mary, she had already known about the physical concept of what it is like to see red in terms of relevant physical processes—she knew it was associated with neuronal firing rates of 40 Hz in the visual cortex, for instance. What she learns upon release, however, is a new concept—a *phenomenal* concept—of an old fact under a new mode of presentation (Block 2002). This new mode of presentation involves a particular qualitative aspect, which provides for the characteristic "red experience" that had evaded her previously in the black and white laboratory. Thus, in a strict sense, Mary does not learn anything new, but conceptualizes what she already knew under a different concept and in a new way.

In Block and Loar's response, it is claimed that upon release Mary learns a new phenomenal concept that picks out the same properties (i.e., what seeing red is like) as

her physical concept. In this case, before being released from her laboratory, Mary had a concept of seeing red that contained all kinds of physical facts about wavelengths, color vision, and neuronal transmission. When she is released, however, she has her first mental representation of red and forms a phenomenal concept of red. These two concepts, the physical and phenomenal, both pick out the same properties (what seeing red is like) but do so by different means: In the physical concept what seeing red is like is presented in terms of physical facts (e.g., neuronal firing rates and so forth); in the phenomenal concept, what seeing red is like is presented as a particular representation with a particular feel (e.g., a red quale).

The phenomenal concept reply works analogously to Churchland's and Conee's replies, but relies on more technical details. And just as with Churchland and Conee, we can frame this response in terms of Mary being exposed to the requisite phenomenal information. Upon having a red representation for the first time, Mary forms a new phenomenal concept, which picks out properties also picked out by her theoretical concept of red. Without ever having had this representation and thereby being exposed to the phenomenal information, she never could have had known what seeing red was like.

Where Block and Loar's conclusion runs amiss, however, is the claim that Mary does not learn anything new, she merely finds a new way of conceptualizing the properties of seeing red. I would argue, however, that the formation of phenomenal concepts occurs by exposure to the requisite phenomenal information. Without the

phenomenal information, there is no phenomenal concept. So if we agree that Mary learns a new concept, then we have to agree that she gains new information—phenomenal information.

3.3 Indexical Information

McMullen (1985) goes a slightly different route in her diagnosis of the problem raised by Jackson's thought experiments. She believes that we want to say that Mary acquires new information when she goes outside, but the problem is, we cannot seem to figure out what kind of information that might be (p. 211). Jackson's argument purports to show that what Mary learns cannot be *physical* information, since by stipulation, Mary knew everything there was to know about physics. Thus McMullen claims that what Mary learns is *indexical* information. At first glance this may appear to be a rather abstruse way to respond to the knowledge argument. Let me try to spell out more clearly how one might read Jackson's thought experiment as involving indexical information. The following is adapted from McMullen (1985, p. 217).

> **(a)** If we imagine Mary, upon seeing blue for the first time, saying "This is what blue looks like," then she acquires new information.
> **(b)** Mary's new information can only be expressed by using the demonstrative "this."
> **(c)** The information expressed by "This is what blue looks like" cannot be expressed by any other referring expression.

(d) The information expressed by "This is what blue looks like" cannot be expressed by anyone else, since no one else is in the right context to use the demonstrative.
(e) Since no one else can express the information Mary expresses when she says "This is what blue looks like," no one else can know whether it is true.
(f) According to Jackson's argument, Mary *already* had all the relevant physical knowledge of color experiences.
(g) Thus, the information gained only by Mary, upon seeing blue for the first time, was not physical information.

McMullen's response purports to show that since what Mary learns is only expressible in indexical terms, and since *ex hypothesi* Jackson stipulates that what she learns is not physical information, Mary must have therefore gained indexical information about what seeing blue (or red) was like.

This conclusion is problematic for a couple reasons. The first is that Jackson's premise that what Mary learns is not physical information begs the question, *What is physical information?* Based on what I have argued, Jackson's use of the phrase admits of at least two quite different interpretations. Jackson essentially argues for the non-physicality of qualia by assuming they are non-physical: What Mary learned has to be non-physical, since by stipulation she knew everything about the physical.

But it can be maintained, *contra* Jackson and McMullen, that what Mary learns is physical information. I would argue that a blue representation (i.e., a blue quale) is physically-realized phenomenal information and thus falls into the category of physical information. On this interpretation, the major issue is really whether Mary's physical information refers to a type of information or to a particular object that happens to take a

physical vehicle for its expression. Fleshing out the ambiguity in these two ways of interpreting *physical information* will be one of the primary tasks of the present work.

4. Demonstrative Identification and Indexical Information

McMullen's analysis rests on Mary's demonstrative identification of what seeing blue is like, but it is not clear how this counts as producing new information. Surely, the relevant information was Mary's having the blue representation in the first place. This information event exposed her to the appropriate phenomenal information. On this view the issue becomes: Does demonstrative identification of a representation produce indexical information? I would argue that it does not since indexical information essentially *relates* someone or something with an object or its wider environment. Any *relation* requires at least two relata. Mary's pointing out her blue representation does not relate her blue representation to her in any new way. For Mary's blue representation to be what it is, it must, *ipso facto*, bear a certain relation to her. At best, Mary's demonstrative identification of her blue representation is simply her *conscious awareness* of pre-existing indexical information.

As I will later argue, indexical information is embedded in phenomenal and propositional information, as a kind of metadata, which provides structure and coherence to sensory and linguistic information. In other words, phenomenal and propositional

information are the vehicles of indexical information; without the appropriate indexical information, the appropriate meaning could not be extracted. If this is right, then it implies that indexical information by itself is not possible: There must some medium or vehicle that provides the basis for the indexical information. After all, Mary's pointing to her blue experience is just pointing out the phenomenal information that was represented to her. Mary's pointing, in itself, is irrelevant; Mary has to be pointing *at something*. When Mary mentally "points" to her blue representation, it is this blue representation that has indexical information embedded in it; the mere *act* of pointing at this information does not produce new information—at most it only makes her consciously aware of information that must have been there in order for her to point in the first place.

Mary's blue representation represents blue from a particular point in space and at a particular time and as *her* blue representation. I would assume, barring some neurological disorder, that Mary never questioned whether this blue representation might belong to someone else, or perhaps to no one. Her blue representation contains, implicitly, unique indexical information that relates it to her in the way that only her representations relate to her—indeed this relation is what makes it *hers*.[12] The major

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[12] For anecdotal evidence of the brain's role in deriving indexical information from phenomenal information (e.g., the representation), consider the case of a severe amnesiac. Due to brain trauma, the severe amnesiac is unable to derive much indexical information from phenomenal information because his memory is so short as to prevent him from ever developing any sort of personal narrative from which he can react to the features of phenomenal information. Presented with his own reflection, he asks "Who is this man?" This all suggests that his ability to relate a visual representation of himself *to himself* has been lost due to damage to the parts of the brain responsible for indexicalizing phenomenal (representational) information.

problem with McMullen's argument is that it seems to assume that purely indexical information is a possibility. On the contrary, when Mary demonstratively identifies her blue representation, she is not so much discovering some new indexical information as she is merely becoming consciously aware of already-present indexical information embedded in her blue representation.

Of course, one might still object that this embedded indexical information does not "exist" until it is consciously perceived, identified, or utilized by Mary. Only when Mary becomes conscious of this color representation does she learn something. I admit that conscious awareness does play a role in learning, but I would emphasize that what Mary learns is not anything *new*. She does not gain any indexical information that was not *already there* in her blue representation. The relevant environmental information is picked up by Mary's visual system regardless of whether she can consciously identify this process. Consciousness or awareness of a representation should not factor as a condition for indexical information because that would unfairly limit the domain of indexical information to conscious creatures. The following paragraph should make this point clearer.

McMullen's indexical interpretation of Mary's situation mistakenly conflates the *act* of learning something indexically (e.g., pointing to some representation and saying "*This* is what seeing blue is like.") with learning a *piece* of indexical information (a bit of information that tells us about the person who had the representation, or the

spatiotemporal details of the representation). Indexical information is already contained in any representation we have (the content of the representation depends in part on how one reacts to the representation, which depends, among other things, on one's past experiences; I will treat this issue at length in section 13); pointing out that we have just had a particular color representation is superfluous. I do not doubt that there are cases where we learn things by demonstrative identification (e.g., "Ah, *that's* the smell of shark fin soup"), but I do doubt that this is how we learn new phenomenal or perceptual concepts, and I do not think mentally identifying the particular "feel" of the smell of shark fin soup conveys any indexical information that was not already implied in my representation of the smell.

Indeed, in order to "point" to something in the first place requires that one *already* know where one is, since the direction of the pointing is conditional on where one happens to be standing. Accordingly, while discussing the way in which humans demonstratively identify sounds coming from certain directions *without conscious thinking* or *rule application* (e.g., the hand I write with is my right hand), Gareth Evans (1982) writes:

> No one hears a sound as coming from the side of the hand he writes with, in the sense that in order to locate the sound he has to say to himself "I write with this hand"…. "so the sound is coming from other there" (pointing with his right hand). Rather, having heard the sound

> directionally, a person can immediately say to himself "It's coming from over there" (pointing with what is in fact his right hand), and may then reflect as an afterthought "and that's the hand I write with." (p. 50-51)

In other words, Evans is pointing out that demonstrative identification occurs at the subconscious (or preconscious) level, even though we may later use it at the conscious level when we think, for instance, the thought *that sound over there*. In the case of Mary's pointing out her blue experience, indexical information is *already contained in* her blue representation. As Evans might put it, spatial information is embodied in perception, and Mary's thinking *this blue representation* is merely the conscious reformulation of information already present in her perceptual experience (p. 51).

As I briefly touched on in Block and Loar's response to the knowledge argument, the formation of phenomenal concepts happens for the most part unconsciously and automatically in humans. Indeed, highlighting the non-verbal and unconscious formation of phenomenal concepts, Loar (1997) refers to phenomenal concepts as "recognitional concepts," and Musacchio (2002) asserts that phenomenal concepts are "*language-independent* concepts" (p. 339). Accordingly, Mary is certainly able to think "*This* [demonstratively identifying] is what blue is like" after having her first blue representation, but this was not necessary in order for her to have known what seeing blue was like. If one espouses McMullen's view of indexical information, then one must

accept the implausible consequence that many higher animals with color vision (and perhaps humans infants, as well) cannot know what it is like to see blue, for instance. Yet it seems obvious that an animal such as a pigeon (or a human infant) knows what it is like to see blue, even if it cannot consciously identify a blue representation. In short, McMullen's view is too anthropocentric to explain how phenomenal concepts are formed, and for that reason the view that demonstrative identification of representations of color (for instance) gives one any *new* indexical information not already contained in the representation itself should be rejected.

SECTION II

5. Physical Information is Ambiguous

I trace the major problem with Jackson's knowledge argument back to his insistence that Mary had "all the *physical information*" (p. 275). The issue of contention, however, is: What is Jackson referring to when he talks about physical information? Are we dealing with **(a)** a *type* of information, or **(b)** an *object*? If Jackson means a *type* of information, then he could be read as referring to the particular form that a more general type of information takes. In other words, he might be making the claim that the information Mary has is simply *realized* physically, as opposed to non-physically. If this is the case, then how are we to make sense of physical and non-physical forms of information? Physical information is easy enough to imagine: It might be variations in air pressure, which convey a sound when exposed to the appropriate sense organs, or

certain frequencies of electromagnetic radiation, which produce color experiences in sense organs like our eyes. Similarly, non-physical information might be the type of information useful to non-physical entities. Maybe angels perceive their non-physical environments through sense organs sensitive to non-physical environmental information. All this may sound implausible, but it is metaphysically possible.[13]

On the other hand, *physical information* could also be interpreted as referring to the *particular object* that expresses information—the red quale. On this view, the red quale is a physical object that embodies indexical information, much as a tree's shadow provides indirect information about its shape, size, and position. Put simply, Jackson is ambiguous as to whether he is making a claim about information *simpliciter*, or about a particular object that expresses information.

5.1 Interpretation (a): Physical Information Refers to a *Type of Information*

Assume for the moment that Jackson has claim **(a)** in mind. Going back to the guiding metaphysical question in the introduction, how are we to square claim **(a)** with his contention that physical information does not capture the entirety of experience? I suggest that one way to do this is to imagine physical information as a token of more general types of information. In particular, physical information represents just one way

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[13] This argument shares a certain affinity with David Chalmers' (2002) "Conceivability Argument," in which he argues that the conceivability of zombies just like us physically, but without consciousness, implies their metaphysical possibility, and thus the non-physicality of consciousness.

to realize the three types of information in human experience: the phenomenal, propositional, and indexical. Each of these types of information is multiply-realizable in physical or non-physical substrates.

Physical information is just how these types of information are tokened in human experience, but metaphysically speaking, it is not necessary that they be. In other words, these types of information could be tokened non-physically, in say, angels. For instance, it is conceivable that angels could have non-physically realized phenomenal information that represents to them environmental information (maybe their "brains" are made from Churchland's "Ectoplasm"). It also seems conceivable that propositional information could be realized non-physically. If angels were to communicate about possible states of their worlds, then perhaps they would do so by means of non-physically realized "telepathic" propositions. Finally, it is imaginable that indexical information could be realized non-physically as well. For instance, the "ectoplasmic" structures or processes responsible for organizing an angel's experience appropriately as *her experience* and as happening in some temporal order might be non-physical.

If all these types of information can be tokened both physically and non-physically, then the thesis that physical information *does not* capture the whole of experience is only true if we consider the scope of that proposition to cover both physical and non-physical entities (i.e., humans and angels). Thus, in the case of Mary the neuroscientist, Jackson was wrong to claim that physical information did not capture the

entirety of her experiences. Phenomenal information is realized physically in Mary—her mental representations, or rather qualia, are physical events; propositional information is realized physically in Mary—she sees physical symbols and hears physical sounds; and indexical information is realized physically in Mary—the brain that organizes all of her sensory information and makes a coherent experience is a physical entity. Consequently for Mary, physical information *does* capture the entirety of her experience. In other words, there is no aspect of Mary's experience that is tokened non-physically.

5.2 Interpretation (b): Physical Information Refers to an *Object*

On the other hand, it might be difficult at first to understand what is meant by the alternate statement **(b)**. In this interpretation Jackson makes a claim about an object—the red quale. According to him, purely physical information fails to capture the red quale that Mary is exposed to when she is released from her black and white room. In other words, Jackson assumes that qualia must be non-physical since they are, *ex hypothesi*, left out of the physicalist picture. Earlier, however, I made the point that a major issue brought up in the knowledge argument is *What exactly fits in the physicalist picture?* A major motivation for this paper has been to show just how qualia fit into the physicalist picture. Here is how.

Qualia convey information—in particular, *structural information*. In the case of Mary, her red quale has its particular structure as a result of its dependence on indexical details unique to Mary. In other words, part of the reason why we cannot know

absolutely what seeing red is like for Mary is because her red quale contains information unique to her. We cannot disentangle the representational content from its context; we cannot examine a particular quale disembodied from the context in which it was experienced because this very relation between the experiencer and the quale is what provides for its unique content.[14] In short, on this interpretation, Mary does learn something new when she comes out of her black and white room—in particular she learns what the "feel" of a red quale is like.

Put differently, merely knowing about the properties of light at 650 nm does not *expose* her to light at 650 nm, i.e., she is not exposed to the appropriate phenomenal information and she does not have that particular qualitative experience of redness.[15] Similarly, one does not learn about qualia propositionally, but instead by direct acquaintance, as Conee noted in his response to the knowledge argument. At the same time, this red quale is a physical object and can therefore be construed as a token of

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[14] Daniel Dennett's paper *Quining Qualia,* makes a similar point, but for different reasons. He writes, "If there are qualia, they are even less accessible to our ken than we thought. Not only are the classical intersubjective comparisons impossible…. But we cannot tell in our own cases whether our qualia have been inverted" (p. 231). In his paper, Dennett argues that intersubjective comparisons of qualia are impossible because there is no good way to verify the assertions made about them. We can have our qualia shifted or inverted in two ways, and there is no real way to verify which have actually undergone inversion and which are simply "recalled" as being inverted (ibid.).

[15] Indeed, this seemingly obvious distinction has led many, most notably Jose Musacchio (2002), to write: "The explanatory gap is based on the false expectation that the physiological process that constitutes a qualitative experience could be *recreated* through propositions. It should be obvious that explaining a physiological process, such as digestion or immunity, cannot duplicate it" (p. 333).

physical information. What I mean by this will become clearer in later sections, when I address the relations among qualia, representations, and indexical information.

6. Hempel's Dilemma and Problems With Defining the Physical

While discussing these two interpretations of Jackson's claims, a major question of definition has been looming in the background. How should we decide what exactly counts as *physical*? Unfortunately this question does not seem to have a universally agreed-upon answer. In asking it, we find ourselves facing Hempel's Dilemma: If we define physics as the body of physical knowledge that we presently possess, then physics is surely incomplete and would be falsified any time we gained any new physical knowledge. On the other hand, if we define physics as the totality of physical knowledge we *could* possess, then we lose sight of what "physical" really means, since in the future we may have physical explanations for phenomena in fields currently far removed from physics, such as economics or political science (Melnyk 1997). This seems counterintuitive to many who believe that the objects of physics are special in that there is some characteristic or property common among them. The end result is that we cannot seem to define physics as either as the current or potential body of knowledge regarding physical things.

My reply to this dilemma is to accept the second horn and define physics as the body of knowledge of an ideal, complete physical theory.[16] In doing so, we take on the burdensome task of having to defend the view that phenomena in the realm of sociology, for instance, can be reduced to physical phenomena. Depending on your preferred metaphysics, this can be either a positive or negative consequence. In doing so, however, we gain the potential to explain the cognitive abilities of alien creatures whose cognitive abilities might presently only be explainable by reference to non-physical processes. Put differently, by defining physicalism as the body of knowledge we *could* possess, we leave open the possibility that what we currently call non-physical (say, for instance, telekinesis) might turn out to be due to unforeseen physical effects. Of course, the negative result of doing this is that the very term *physical* becomes unclear. This is precisely the issue highlighted by Hempel's Dilemma—the formulation of the physical as the body of knowledge of an ideal physics leads to the allegation that this view lacks sufficiently determinate content (cf. Dowell (2006)).

7. The Physical and Non-Physical as Epistemological Categories

One might even claim that by formulating the physical in terms of an ideal physics forces the physical to become an epistemological, rather than a metaphysical category. In other words, it becomes a term for the class of objects whose properties we

[16] J.L. Dowell (2006) also argues for this option. She stakes her claims on the argument that as long as our ideal physics maintains the hallmarks of scientific theories and its objects of study are the world's relatively fundamental elements, then an ideal physics can still boast of having sufficiently determinate content.

can explain—whereupon explaining their properties these objects become *physical objects*—rather than some sort of fundamental substance or natural kind in the universe.

Accepting this conclusion is not as bad it may seem on first glance. This is because enumerating the properties of the non-physical, or even formulating the essential aspects of the non-physical, seems a hopeless task. Firstly, how could we ever prove that something is non-physical? Devising some sort of experiment or using some physical device to measure something supposedly non-physical seems *prima facie* impossible. How could we ever be sure our measurements were accurate when we could not explain how the two substances interacted? Claiming that something is non-physical amounts to assuming that it has some property (or not, perhaps properties only belong to the realm of the physical) we could not even imagine as physical creatures. The non-physical exists as a metaphysical or logical possibility, but any attempt to imagine it is futile. Even when we try to imagine how something like telekinesis might work, we are likely to do so by imagining physical waves propagating through the air like undulating electromagnetic fields. Do we still want to claim that telekinesis is non-physical when we can describe it using something like Maxwell's equations? At what point during its subsumption and description by physical laws does telekinesis change from something non-physical to physical? It does not seem like there is a good answer to this problem.[17]

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[17] A similar case in the history of science could be made for the positing of a luminferous ether, through which electromagnetic radiation propagated and was affected by the drag of the earth through it. However, when Einstein formulated his Special Theory of Relativity without reference to an ether, and when the

One approach is to say that *non-physical* simply means that we are ignorant as to the physical details of a certain phenomenon. As noted above, by doing so the physical has changed from a metaphysical to an epistemological category. Though this move may make some philosophers shudder, there is some historical evidence validating such a view. For instance, at the turn of the 20th century, when biology was still a blossoming science, biologists were baffled as to how "life" could arise. Surely, they thought, it could not simply emerge from a mere collection of cells and various electro-chemical reactions. There must have been some force, an *elan vital,* that permeated creatures and caused life. Today, no reputable biologist believes such a thing. In the case of life, as we learned more about the physical processes that constitute organisms, we began to realize that the initial positing of some non-physical *elan vital* was simply a way to cover up our ignorance of the physical makeup of organisms.

Philosophical debates surrounding consciousness proceed likewise. According to some philosophers, consciousness cannot just be what happens when you take masses of cells, connect them, and initiate various electro-chemical reactions among them. The inferential move from physical cells and electro-chemical reactions to the assertion of a new metaphysical substance seems to me to be more than a bit hasty. To draw such a

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Michelson-Morley experiments showed that light traveled at a constant speed regardless of the direction of the light (if there were an ether, light would be sometimes travelling in the same direction, thus speeding its transmission; other times it would travel in the opposite direction, thus slowing its transmission) postulation of this non-physical ether was deemed unnecessary. For more discussion, see Alfred Bork's (1966) "Physics Just Before Einstein" in *Science* Vol. 152, No. 3722 (p. 597-603).

conclusion is certainly within the bounds of logic, but it shows contempt for pragmatism, that virtue that has made Occam's razor such an asset in scientific investigation. In any case, claiming that consciousness is non-physical is a scientifically dead-end move, a cop-out. In short, the only viable way to interpret the word *physical* is as an epistemological category; we may claim that something is non-physical, but this is only a euphemism for "We have not yet explained how this works physically."

Claiming that the physical is an epistemic rather than metaphysical category sounds odd initially, but the upshot of such a view is that it makes the non-physical (whatever that might be) much more intelligible. The non-physical becomes simply that which we cannot currently explain using the current body of physical knowledge. If, however, we claim that the physical is a metaphysical category, as Markosian (2000) seems to assume, then I think it is much harder to make a case for what the non-physical might be. Again, any attempt to imagine a non-physical thing must imagine it as taking up time and space, thereby making our imagined non-physical thing a physical thing. It is one thing to gloss over the phrase "non-physical," it is quite another to try to *really* imagine what that would be like; similarly, we can think "1200-sided polygon" but we cannot *really* imagine what such an object would look like. So, in the end, it depends on what is more attractive philosophically: Do we want a physical more clearly defined at the expense of an unclear non-physical, or do we want a less clearly defined physical for a more clearly defined non-physical? Since this paper argues that indexical information

is necessary for experience, and that indexical information can be realized both physically and non-physically (in the epistemological sense mentioned above), I choose the latter option, since it makes the notion of the non-physical much more intelligible.

Section III

8. Indexical Information and the Organization of Phenomenal Information

In order to see how we cannot derive an answer to the question of what it is like for Mary to see red from the physical facts, we have to invoke the notion of *indexical information*. Philosophers generally refer to indexical information or propositions to explain the unique situations of persons who demonstratively identify an object, refer to themselves, or make statements that rely on indexical temporal terms, such as *now*, *later,* or *tomorrow* (cf. Perry 1979). What makes propositions that express indexical information special is that the content of these propositions is accessed in a unique way, in a way that picks out only the person who happens to be in that particular situation. For instance, Perry (1979) maintains that indexical information is of "limited accessibility" and says, "Anyone at any time can have access to any proposition, but not in any way. Anyone can believe of John Perry that he is a making a mess. And anyone can be in the belief state classified by the sentence 'I am making a mess,' but only I can have that

belief by being in that state" (19). According to Perry then, indexical information is distinct in the way it links content to a uniquely specified state of affairs, which hold only for that particular person. In other words, one's identity and spatiotemporal circumstance play a special role in determining whether one may properly "access" the content of a proposition. As such, the notion of the indexical has been viewed as problematic by some because of the way it limits the accessibility of propositional content to only those persons who satisfy some unique set of conditions.

In particular, indexical information has been relevant in the debate of Jackson's knowledge argument for the way in which it seems to suggest that scientific, objective theories of human experience are impossible. The worry is that if scientific theories of human experience must be couched in objective third-person terms, then there will be some facts, namely indexical facts, that are necessarily left out, since the content of some propositions is conditioned on speaker's unique identity and set of circumstances. In other words, there may be some facts of experience that simply resist translation into objective third-person propositions. McMullen characterizes this threat to physicalism as "consisting in the suspicion that since the cognitive significance of sentences or thoughts expressed with indexicals or demonstratives could not be captured by the objective language of physics (i.e., by replacing the indexical and demonstrative expressions with descriptions) they must represent subjective, non-physical fact" (231). This is a genuine concern for anyone wishing to develop a phenomenally sensitive vocabulary to describe

perceptual experience, and the views represented in this paper are certainly compatible with this point, albeit for slightly different reasons.

On my view, because of differences in indexical information (the spatiotemporal particulars of individual perceivers) completely couching first-person experience in third-person terms is metaphysically impossible. Seeing things from *your point of view* is conceptually impossible, since this would entail that I see things *from my perspective* from *your perspective*. This is why we cannot know *absolutely* what it is like for Mary to see red, though we can know approximately. There are obviously enough similarities among our perceptual experiences, i.e., they co-vary to such an extent, that we can understand one another when we communicate about what are essentially private experiences, unique to our individual perspectives. Here, differences in indexical information preclude the categorical encompassing of subjective facts by objective facts.

This is not to say, however, that anything about these subjective facts is non-physical, as McMullen framed the objection. It is one thing to claim that there are epistemic limits to scientific description; it is another to claim that phenomenal facts are essentially non-physical. As I have argued, qualia are physically realized forms of structural information: Nothing about them implies they must be somehow non-physical entities. In the final analysis, the real problem is the mistaken inference that because qualia have special epistemic properties—they provide unique indexical information—they must also have special metaphysical properties, i.e., they must be non-physical.

With that said, my usage of the term indexical information is slightly unconventional. In contrast to these above-mentioned views, I use the notion of indexical information more broadly, as information that situates other information within a meaningful or relevant context. In this sense, indexical information has a closer affinity to Floridi's (1999) notion of "metadata," which provide relational information about other data, such as where or when a datum was constructed, its format, availability, usage restrictions, and other related properties (p. 20). Such a definition captures both spatial (the demonstrative aspect of indexical information, i.e., pointing to *there*—a point in space) and temporal (i.e., *when* did something take place?) aspects of information.

Indexical information is more than just information about when and where some information event took place, however. The importance of indexical information is due to its effect of *organizing* information in a way meaningful for a subject. If you have ever been stranded on a ship in the ocean with absolutely nothing in sight save for the horizon, you might have an idea of how hard it is to figure out your location. Without any identifying landmarks or objects, you might think that travel in any direction is equally good. The crucial element that is missing is some reference point from which you can make approximations of distances and locations of things relative to you. There are two ways to view the situation: Either you are given too much information (the seeming-infinity of the bare horizon in the case of the lost ship) or else you do not know how to value the given information so that you can place the information in an appropriate

context or theory about your location. Because you cannot figure out how to assign value to any of the possible directions of movement—you have no point of self-reference—every direction seems just as good as the other. Raw information, without any sort of idea of the information's contextual relevance, is useless.

The underlying point of the lost ship analogy is that perceptual experiences must also contain an element of organization or structure in order to make sense of the base phenomenal information. Kant was probably the first philosopher to understand this when he argued that in order for perceptual experience to be intelligible there had to be something to organize the undifferentiated mass of perceptual information. He proposed that certain concepts of space and time were the preconditions for the possibility of perceptual experiences. Similarly, Paul Churchland (2005) describes perceptual experience as a procedure that "filters information from a low-entropy flux of energy from our sensory peripheries" (p. 48). For Churchland, we are "epistemic engines" that take low-entropy environmental information and process that information to create high-entropy neuronal structures that *embody* the information originally in our environment (italics mine, p. 45). In essence, I am positing a similar situation in the case of perceptual experience and experience more generally; but instead of relying on notions of fundamental or thermodynamical concepts, I am claiming that phenomenal information, in the form of representations, must contain indexical information in order to abstract any meaning from it. In doing so, I want to avoid making explicit claims about the extent to

which perceptual experiences are nonconceptual or conceptual, conscious or nonconscious, because that would lead us too far astray from the analysis at hand.

Here I would like briefly to mention interesting work done by Cussins (1990) and Evans (1982) that illustrates the degree to which perceptual experience is influenced by nonconscious and nonconceptual notions of space and time. Evans uses the phrase "egocentric space" to describe that nonconscious process by which humans navigate their environments and seem to implicitly operate from a self-referential standpoint (p. 49). Both philosophers harp on the tensions between a public space of reference (used in objective, scientific descriptions) and a private, egocentric space (used in subjective, personal descriptions) of reference, which serves to guide our perceptual experiences. For these theorists, human experience arises through the interplay between private and public spheres of reference; our sense of a public sphere is ultimately founded on our sense of private egocentric space. Thus, such analyses can be construed as implicit support for the claim that indexical information is a crucial and necessary aspect in perceptual experience.

The most exciting result of understanding perceptual experience as necessarily consisting in indexical information is that we can apply such a claim to *all* creatures capable of experience, angels included. By taking a Kantian approach to experience and fusing it with the notion of indexical information, we come to the conclusion that in every case of experience, there must have been some element of structure or organization in

order for that experience to be an experience. Generalizing further, any alien creature we might encounter in the universe could be said to have experience, perceptual or otherwise, only when it possesses some organizational element to abstract meaning from the undifferentiated mass of environment information surrounding it. Conceiving of experience in this way turns experience into essentially a *functional* concept capable of being realized by both physical and non-physical entities, whatever those might be.[18] Indeed, concerning this information-based view of experience, Churchland (2005) writes:

> This naturalistic portrait, note well, makes no reference to the variety of material substrates that might sustain such an energetic and informational economy. Many different substrates are presumably possible. What makes them all cognitive creatures—part of it, anyway—is their shared thermodynamic and information-multiplying profile. (p. 45)

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[18] In this respect, indexical information has similarities with certain information theoretic theories in physics. Floridi (2005) comments on "It From Bit" theories of information (proposed by both Wheeler and Bennett), in which the universe's essential nature is "digital and is composed of information as data instead of matter or energy"; material objects are, in this theory, "a complex secondary manifestation" (p. 22). My question is: What is the metaphysical status of information, then? If it turns out that matter and energy are only *contingent* rather than necessary manifestations of digital information, then is information aphysical?

He continues his explanation of the theory by concluding, "That which we call reality arises in the last analysis from the posing of yes or no questions and the registering of equipment-evoked responses (ibid.). These "equipment-evoked responses" might be viewed as Kant's innate concepts of time and space, in the case of humans. Speaking somewhat metaphorically, by posing yes or no questions (and thereby gaining a "bit" of information), the relevance of phenomenal information is determined, i.e. representations receive their contents. An organism with a cognitive system dedicated to the posing of just these sorts of "questions" ("Which stimulus came before or after?" or "What is the relation of these stimuli *to me*?") is then capable of experience, even if its cognitive system is non-physical.

Here Churchland remarks on the way in which an information-based conception of experience is multifaceted and multiply realizable. The question I have however, is what limits this to only material substrates? It seems just as possible for non-material entities to have perceptual experiences as well, so long as they are capable of organizing information in a meaningful way.

9. Indexical Information is Aphysical

This leads me to defend my claim that indexical information is an aphysical kind of information. Now, from the start I think I have a very different conception of the phrase "non-physical" or aphysical than Jackson. Jackson seems to use the phrase to suggest an antagonistic relationship with the methods and descriptions of current physics. Thus, for him, qualia embody the non-physical entity *par excellence* (here I would already reply that the word "entity" itself seems to imply some physical, or at least spatial, characteristics of qualia) in the sense that, *in priniciple,* physics could never hope to describe or explain its existence. Implicitly, then, Jackson seems to support the notion that physics refers to the body of knowledge of things that we can presently explain physically. According to him, because we cannot explain qualia using the present physics, qualia must be non-physical. This seems naïve.

There is no contradiction—as Jackson seems to assume—in asserting that something can serve as a vehicle for both physical and non-physical things. Put differently, instead of dividing things strictly into the metaphysical categories of the physical or non-physical, there is a third option: the *aphysical*. How is this possible? If we imagine, for instance, indexical information to be a type of information, then in any creature capable of experience, those experiences can be realized by physical or non-physical events. If we agree that indexical information is an essential part of what it is to have an experience of anything, then in some alien creature whose mental life is decidedly based on non-physical happenings, then the particular indexical information contained in the "mental representation" (the token) can be non-physical. Conversely, in the case of humans, our mental lives are determined by physical events in the brain, and the indexical information contained in our mental representations is an example of a physical token. What is interesting here is the possibility that a type of information can be tokened both physically and non-physically. This seeming paradox becomes clear when we recognize that indexical information, as a type of information, is aphysical.

10. Structural Information

What kind of information could be aphysical? I propose that my version of indexical information bears a close relation to the concept of *structural information*, as found in Harms (1994). There, Harms likens structural information to "information processing" and speaks of our alleles as containing structural information in the way their

specific nucleotide sequences (their structure) contain information about the proteins they encode for (p. 499). Similarly, any experience contains structural information about the person having the experience and his particular spatiotemporal details. Gareth Evans (1982), for instance, speaks of—in the case of auditory perceptual experiences—spatial information being embodied in the auditory experience (p. 51). It is by means of processing this spatial information that one is able to relate to one's external environment in a meaningful way. According to Evans, this means we relate to events, we extract meaning from the information presented to us through our senses, in terms of how these events present us with possibilities for action. In other words, through a process of indexicalization (i.e., based on the structure of the information, the perceiver's relation to the external stimulus can be extrapolated) we extract meaning from the information presented to us in our environments.[19]

Yet another way of understanding the notion of structural information has been considered by Stalnaker (2003). He writes:

> One thing contains information about another if there are causal and counterfactual dependencies between the states of one and the states of the other. An object contains information about its environment if the object is

[19] The neuroscientist Vittorio Gallese (2003) also argues that representational content is determined by indexical information. He claims: "The same *sensorimotor* circuits that control the ongoing activity of the organism within in its environment also map objects and events in that very same environment, thus defining and shaping their representational content. It is no coincidence that our representation of the world is a *model* of it that *must* incorporate our idiosyncratic way to interact [sic] with it." (p. 1236)

> in some state that it wouldn't be in if the environment weren't a certain way. X carries the information that P if the object would not be in the state it is in were it not the case that P.…The pattern of light and dark on the ground on a sunny day carries information about the shape of the tree since there are systematic counterfactual dependences between a range of alternative possible shapes of the tree and a corresponding range of alternative patterns on the ground. (p. 99)

Applying this to the case of qualia and indexical information, we can see how this structural information, embodied in representational content, carries information about the experiencer's particular spatiotemporal details. Put differently, there exists a counterfactual dependency between the representational content and the indexical information embodied in the quale: Depending on where, when, and how Mary reacts to the red quale, it will take on different content—it will have a different "feel." I attempt explain the relations among these various aspects of perceptual experience in detail in section 13. There, I argue that based on the representationalism of Michael Tye, that representational content is not just due to features of a representation, but is additionally determined by one's reaction to the features of the representation.

Returning again to the notion of indexical information, the familiar phrase *information processing* also captures its essence well. Firstly, it implies that indexical information filters or orders information so that meaning can be extracted from it. This is

what Kant and Churchland both have emphasized. Secondly, it highlights that indexical information is not an object or entity with an independent existence, but a *process* or action. In other words, there is no one "thing" we can point at and say "That is indexical information." By doing so, we would only happen to be pointing at the thing that *realizes* the particular process.

11. Clarifying The Aphysical

As mentioned earlier, we might invoke a type-token distinction when discussing the role of indexical information. As such, indexical information is a *type* of information through which individual *tokens* of information are realized. For a more concrete example of the type-token distinction, let us examine a kick. One way to define a kick would be to say it is an action or process that involves many related movements in some particular way. More specifically, it is a type of action, and the causal relations among its constituent movements help to define what a kick is. This is essentially what the philosophical doctrine of *functionalism* (or perhaps more specifically, *teleological functionalism*[20]) states: We define things not by their essences, whatever those might be, or by listing the specific properties they must have, but by the causal roles linking together their parts in the appropriate ways. As such, a kick can be tokened in many different ways as long as the end result is a kick. A horse can kick, a human can kick, a

[20] See Robert Van Gulick's paper "A Functionalist Plea for Self-Consciousness" for a brief discussion of teleological functionalism and its conception of perception as the acquisition and analysis of information, which allows an organism to successfully adapt to its environment and reach its goals (p. 153).

kangaroo can kick, and so can a robot. The differences among these different tokens of kicks (the length of the legs, the speeds, and the directions of the movements, for example) are unimportant. What is important is the way these limbs move together to deliver a blow. Likewise, there may be many different cognitive systems that function in such a way as to organize perceptual information (some even non-physical) into meaningful phenomenal information.

Nevertheless, some may intuitively recoil from the idea of the aphysical. At first blush it seems paradoxical that something can be realized both physically and non-physically. First, I want to emphasize that by aphysical, I mean that indexical information can *potentially* be physical or non-physical. I do not claim that indexical information can be realized in these states simultaneously; that would clearly be paradoxical. Rather, by aphysical it is meant that an individual token of indexical information is metaphysically undetermined in the same way prior to flipping, a coin toss is undetermined. In a given coin toss, an unflipped coin is neither heads nor tails—either state of the coin is equiprobable—until it has been tokened by flipping. Throughout I have asserted that in order for experience of any kind to occur, indexical information must be present—it must be tokened in some form. By analogy then, an experience, perceptual or otherwise, is like a coin toss: Before examining any particular case of experience, we can expect that it will either be tokened physically or non-physically. In the case of human experience, however, we are dealing with a metaphorical coin where both sides are the same. We can

therefore expect that every flip of the coin and every instance of experience will thus be tokened physically.

11.1 Multiple Realization and The Aphysical in Economics

To further clarify what has been written above, I would like to introduce two examples where the concept of the aphysical is useful. The first example comes from the field of economics; the second from physics. In philosophy, there is much debate surrounding the "unity of the sciences" and the reducibility of say, the laws of economics, to the laws of neurobiology. The idea is that if all sciences are unified, then the theories of the most basic science—physics—can explain all other theories in the "special sciences." One influential argument states that since the theories of the special sciences (economics, psychology, linguistics, etc.) are defined in terms of *multiply-realizable* functional entities, those theories cannot be reduced to the lower-level physical theories of say, neurobiology.[21] There is a different taxonomy of entities posited in the special sciences, which physics, as the basic science, simply does not posit. Economics, for instance, must therefore rely on its own set of unique laws that describes high-level functionally defined events that take place at the level of whole societies, thereby giving economics relative autonomy from the lower-level sciences. I do not wish to comment

[21] For a classic exposition of why the laws of say, economics, are not reducible to physical laws, see Fodor's (1974) "Special Sciences, or the Disunity of Science as a Working Hypothesis."

on the inter-theoretic reducibility of the different sciences, but rather point out a similar tension in the application of certain physical concepts to economic contexts.

In the course of our discussion of indexical information, I have claimed that indexical information can be realized both physically and non-physically, i.e., that it is aphysical. Fodor's argument concerning the disunity of science strikes me as making a similar claim, but from within a different context. The main difference is that I envision multiple-realization at a much broader level that allows for the non-physical realization of indexical information.[22] By applying the concept of multiple realization to not just physical events, but to possibly non-physical ones as well, some apparent puzzles begin to emerge. One puzzle might occur when we invoke entities from the traditional taxonomy of physics in the special sciences. My suggestion is that by positing the aphysicality of these entities, we can make sense of such a view.

If, for instance, one holds that economic events are non-physical in the sense that they are not the objects of study of physics, *and* believes that some entities in the taxonomy of physics are also entities in the taxonomy of economics (for example), then there is an apparent paradox. This view of physical objects—that they are simply the objects that physics studies—has been called the Physical Theory Account of Physical

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[22] It should be mentioned that Fodor (1974) indirectly supports the doctrine of *token physicalism*: That all events in the special sciences are physical events.

Objects (PTAPO), and its shortcomings have been discussed elsewhere.[23] I do not wish to defend or critique this account of physical objects; rather, I have adduced it to point out that adherence to the PTAPO while defending the view that entities in the taxonomy of physics can be posited in the taxonomy of, say, economics, can be defended by claiming these inter-theoretic entities to be aphysical. Here is what I mean.

As our understanding of dynamic systems has increased, there has been heightened interest in the application of physical laws to problems in economics and other "social" sciences—most notably, the thermodynamic concept of *entropy* has been introduced in economic analyses where traditional Keynesian and Monetarist theories fall short (Jaynes 1991). Though entropic economic theories are still in their infancy, they represent a promising approach to understanding economic activity. Thus Jaynes writes:

> It may be that a macroeconomic system does not move in response to or at least not solely in response to the "forces" that are supposed to exist in current theories; it may simply move in the direction of increasing entropy as constrained by the conservation laws imposed by Nature and Government just as a thermodynamic system makes its approach to equilibrium in the direction of increasing entropy as constrained by the conservation of mass, energy, etc. (p. 2)

[23] For discussion of this view and a list of its endorsers, see Markosian (2000).

If this is the case, then it would appear that the concept of entropy in economics is ontologically-speaking analogous to that of indexical information. Entropy is therefore aphysical if it can be justifiably used to explain the behavior of both physical and non-physical objects in economics and physics. That is, if one thinks the objects of study in economics are non-physical (i.e., and they are non-physical under the PTAPO), and one also believes that entropy explains economic events, there is a paradox; this paradox, however, can be solved by positing that entropy is aphysical: It can be realized physically in the case of say, individual gas molecules, or it can be realized non-physically in the case of macroeconomic events. To borrow Fodor's terminology, we might say that entropy is multiply realizable. In fact, on just this issue Churchland (2005) writes in a footnote:

> For we can now appreciate that Economics is the study of the metabolisms of superorganisms, a phenomenon that once again falls firmly within the province of nonequilibrium thermodynamics, a science whose laws are blind to such implementational details. A national economy, after all, embodies a flow of both energy and materials: it creates real physical and organizational structures, and it dissipates vast amounts of (initially low-entropy) energy in the process. It is too soon to insist that Economics will indeed find such an explanatory reduction. But neither can Fodor justly insist that it will not. (p. 47)

I agree wholeheartedly with Churchland. It is due to the fact that entropy is "blind" to implementational details that renders it a likely candidate for an instance of an aphysical entity.

11.2 The Aphysical in Physics

A similar argument might be made for the case of virtual particles in theoretical physics. There much controversy has centered on whether virtual particles are "real."[24] By real, I assume it is meant that they are physical particles and not something else, perhaps non-physical. In any case, it seems to me that we could refer to these virtual particles as aphysical: As long as they exist in some other dimension, we have no theories about them (i.e., they are not objects of study of physics), and they can be considered non-physical; but when such a particle appears in our four dimensional space time, it is physical—quantum mechanics describes its position via probability functions and so forth.[25] Saying this particle is aphysical seems to me preferable than saying it is non-physical. If we say it is non-physical, then we have the additional burden of trying to

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[24] For example, see Robert Weingard's (1982) paper "Do Virtual Particles Exist?" for his defense of why they should be considered real.

[25] Markosian (2000) defends a Spatial Location Account (SLA) of what constitutes a physical object. In essence, the SLA states that while many objects such as souls, propositions, and universals may exist *in time*, only those objects that exist *in space* are physical objects (p. 377). Accordingly, the virtual particles discussed above could be viewed as being physical objects when they are within our four dimensional space time, and non-physical when they are outside of it. In this way, Markosian's definition of physical objects as objects that have a spatial location is compatible with considering virtual particles as aphysical objects.

explain how something can apparently change from the non-physical into the physical. In my opinion, the simpler and more intuitive solution is to argue that the physical and non-physical are epistemological categories and accept the tradeoff I described at the end of section 7. There I claimed that by saying that physical and non-physical are epistemological rather than metaphysical categories, we trade some clarity about the physical (which, based on our present knowledge of physics, we understand fairly well) for increased clarity about the non-physical (about which we have hardly any guiding intuitions). The end result is that we can more readily make sense of what the non-physical is: It is simply that which we cannot currently explain using our present physical knowledge.

Section IV

12. Philosophical Constraints on the Scientific Study of Human Experience

This point brings out another tension in Jackson's understanding of physicalism as the doctrine that all correct information is physical information. Jackson's definition of physicalism is too narrow. His version seems to imply that physicalism, beyond being a scientific doctrine about the nature of things, is a doctrine about *human experience*, with all its accompanying idiosyncrasies, paradoxes, and confusions that have occupied both poets and philosophers alike for centuries. Scientists, in contrast, have tended to shy away from questions concerning the nature of human experience; instead they have focused on the *causes* of human experience. These are very different fields of inquiry.

Human experience is different from other objects of study for at least one main reason: It happens *from a perspective*. In the view of Gareth Evans (1982), it is essential that we clearly delineate that space from which an organism operates—its egocentric space—from the space that is seen as truly objective and "from no point of view"—its public space (p. 48). It is impossible to *experience* anything without having a point of view. I mean this quite literally. For, to experience anything means that information has been appropriately situated for a subject. Even when we have an experience of an amorphous hazy blob, we still can categorize that experience as having hazy properties and some sort of defined boundaries. The fundamental tension in the scientific study of anything is reconciling this desire to paradoxically describe things from "no point of view" *from a point of view*. We want to describe, for example, the artichoke sitting on the table in front of us, but we do not perceive that artichoke as it is, in itself, from no point of view—instead, we are given information, phenomenal information, through our senses (which already limits our perception of the artichoke; perhaps if we were sensitive to energy in the UV region of the electromagnetic spectrum we would gain an even greater understanding of the spectral reflectance properties of the artichoke), which comes from a particular angle (we do not receive, for instance, any sensory information about the back-side of the artichoke) and occurs at a particular time (we do not receive sensory information about an artichoke from 436 BC or 2500 AD, but at, say March 16th 2012 at 9:30 PM). Thus, from a particular point of view of an artichoke, we try to get at a level of description of an artichoke that takes as a starting point no particular view.

When we think about things this way, discrepancies and confusions are bound to occur concerning the "real nature" of objects.

The best solution, I think, is to forget trying to describe the "real nature" or essence of anything. Perhaps an alien race of beings possesses a sensory organ that allows it to represent an aspect of the artichoke we never even knew or imagined existed. Our best and most objective descriptions of the artichoke would arguably leave this aspect out. Here is the point put more generally: How can we know with certainty that we have reached that level of description from no point of view? It does not seem like we could ever say, *a priori*, that there could not exist some alien perceivers that could not perceive some novel property of an object. Our understanding of perception is nowhere good enough to make claims concerning its limits. Nevertheless, I believe the best solution to this problem of perspective is, as Peirce did, to *assume* that there is a real nature to things, a level of description from no point of view, and use that as our guiding principle in our descriptions of things. We should strive to describe things from that level, even if in practice such a level is not attainable.

Returning again to the case of Mary, we are now one step closer to explaining why we cannot, at least absolutely, know what it is like for Mary to see red. In order to do that, we have to make another potentially controversial claim regarding perceptual experience. In particular, we must assert that Mary's coming to know what it is like to see red is the result of her being exposed to some phenomenal information. Such an

assertion shares some similarity with Russell's (1921) theory of perception, in which all we have perceptual access to are not the external objects in themselves, but only sense data, data produced by our sense organs as a response to unknowable external events. When we perceive an object, we do not directly perceive the properties of the object itself; instead what we perceive are properties of the sense data used to *represent* these objects. For the purposes of this paper, I will briefly present one such view, which, together with the notion of indexical information, will show why we cannot know absolutely what it is like for Mary to see red.

13. The Role of Representation in Experience

In my opinion, the best example of representationalism comes from Michael Tye. He believes that the properties of these sense data, or representations as we shall from now on call them, depend on the way these properties are represented to us. Tye (1999) explains the reason why some of us claim that certain perceptual experiences have a characteristic "feel" to them: The "feel" of a red visual experience is explained by reference to the kind of representational properties present in that experience. Discussing the question of why visual experiences representing red should feel different from those representing blue, he writes:

> This felt difference is, I claim, solely a matter of content. Since the colours represented by the two experiences are different, the experiences themselves are introspectively distinguishable. The reason, then, that the

> visual experience of red "feels" as it does is that it could not "feel" any other way. The "felt" aspect simply cannot be divorced from the representational aspect. (p. 455)

Therefore, according to Tye, differences in representational content alone serve to distinguish between phenomenal experiences of different colors. This is an important point. Remember, part of the knowledge argument is based on the claim that what Mary gains by seeing red for the first time is a red quale. If we fuse together Tye's representationalism with this stipulation of Mary obtaining a red quale, then we might infer that Mary's obtainment of the red quale was nothing more than her having a visual representation with a certain kind of property—namely the kind that produces a characteristic "red feeling." So far, it seems, Mary's situation is totally amenable to this representationalist interpretation. But we are still missing one important piece of the puzzle.

Before we examine this last piece of the argument, it might be helpful to review the claims brought forth in the preceding paragraphs. To begin with, perceptual experiences need some sort of organizing principle or structure in order to be meaningful, and indexical information plays this role. This means that Mary's perceptual experience of seeing red for the first time must have involved some indexical information that served to organize this perception both spatially and temporally, and even as belonging to herself (i.e., it was *her*, and not anyone else's, perceptual experience). Secondly, I have argued

that what we perceive are not objects in themselves, Russell's "unsensed sensibilia," but properties of our internal representations of those objects. This implies, among other things, that qualia—those aspects giving a particular "feel" to perceptual experiences—derive from aspects of representational content. Some might object at this rather vague account of qualia, but for now let us just assume this much.

The third and final point I would like to make concerns the ontological status of these mental representations. Surely, a representation, whether mental or nonmental, contains some information, but what *kind* of information? The most obvious candidate among the three I have claimed make up human experience is *phenomenal information*. Thus, any time we have a mental representation (whether conscious or unconscious, it does not matter) we are presented with phenomenal information. But, as I remarked above, before phenomenal information can be made intelligible, it must be appropriately situated or contextualized. This means that the intelligibility of phenomenal information depends on the accompanying indexical information, which is information that represents any given information event as having a spatiotemporal location, and as happening *to that particular person*. Without this indexical information, phenomenal information would otherwise be what William James once referred to as a "bloomin' buzzin' confusion" (Goodman 2012).

13.1 The Two Levels of Representational Content

According to Michael Tye, the differences in visual content among colors are fundamentally differences in the representational features of those colors. Another way of putting it is to say that the reason a red perceptual experience feels different than a blue one is because their representations have different properties, which account for their respective feels. This much certainly seems plausible. Common sense suggests that during the communication of private events (pain for instance), your feeling of "pain" is sufficiently similar to mine such that when I say "pain," I can understand your utterance by thinking something like, "pain [mine] = pain [yours]." In other words, on this view the representational content of pain is sufficiently similar among people such that we get the "meaning" of private events in others by comparison to our own case. Certainly, similarities in brain physiology would lend credibility to this position.

But this view seems insufficient to account for the wide variety of behavioral differences among individuals while experiencing pain or when presented with a red color swatch. The major shortcoming of this common sense view is that it neglects the way in which we *react* to the features of our phenomenal states in sometimes opposing ways. Therefore, I propose that representational content depends on two things: Representational features and a reaction to those features.[26] In other words, the overall

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[26] Such a view of perceptual experiences is known as a Higher Order Theory of Experience, and there are many real-world examples of perceptual experiences that seem to corroborate it. For instance, persons with the genetic condition known as pain asymbolia register damage done to their bodies as "pain," but fail to

feel of a phenomenal experience is determined not just by the representational content, but also by one's personal history and emotional connection to the representational object (and also perhaps by differences in brain structure, as in the case of synesthesia, where subjects report, for instance, phenomenal experiences of certain colors when seeing numbers or hearing certain pitches).

13.2 Personal vs. Public Histories and Representational Content

Now, what is someone's personal history other than a collection of various events that occur in space-time? By the phrase *personal history* we may mean one's personal psychological narrative, that temporally-ordered chain of events unique to oneself and seen from one's personal perspective; this conception can be contrasted with a public, objective narrative, the kind that the discipline of history is dedicated to, which we might imagine as a timeline of events seen from God's perspective, or rather, from no perspective. The major difference between these histories—or collections of events—is that the accuracy of our personal narratives is ultimately governed by our memory's ability to correctly match perceived events with actual, physical events. Though many

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associate it with any negative response (Aydede & Guezeldere 2002). Studies with morphine addicts, too, have shown that it is possible to differentiate between having a pain sensation (with a particular location and intensity, say) and an affective response (Lycan 1997). Morphine addicts notice a pain but it nevertheless does not bother them in the way it would a normal person. In fact, there has been research on pain that demonstrates that the the unpleasantness of pain (the overall pain experience) stems not from the first-order pain representation (the pain sensation, in psychological terms), but rather from the reaction to the pain sensation (the second-order representation) (Price 2000). In other words, we are presented with a certain pain quale, but our overall pain *experience* is not determined until we have some reaction to that pain quale.

events that affect us may take place in our public history, i.e., that realm of experience we share with others, it is ultimately our *perception* of public events that shapes our memories. It may happen, for instance, that I have a dream in which I dive into a swimming pool of blood. Later on, I may forget this was just a dream. Despite the fact I never dove into a swimming pool of blood in my public history, my belief in this event's actual occurrence will likely alter the representational content of future red perceptual experiences: I may tend to be disgusted, horrified, and think of the taste of copper, for instance. In effect, the representational content has been altered in a way that is unique to me, based on my own perceived actions and past history.

Here is another example to illustrate the way in which representational content depends in part on one's reaction to it.[27] Consider the case of the anorexic and the body-builder. When certain physiological changes take place within the body, such as lack of some nutrient, low blood sugar, decreased hormonal levels, etc., the subjects' brains represent this physical state of various chemicals in their bodies with a characteristic hunger feeling. Both the anorexic and the body-builder might at this point say, "I feel hungry." But this is not to say that their experiences of this representation are the same.

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[27] Daniel Dennett analyzes perceptual experience similarly. In discussing how two Maxwell House coffee tasters, Chase and Sanborn, reflect on their coffee qualia, he introduces the notion of a "reactive attitude" to describe how representational content depends, in part, on how one *responds* to the content in question (p. 232).

Though the features of this hunger representation may be sufficiently similar to prompt both subjects to say, "I feel hungry," their experiences are different. This is because the body-builder is likely to react to this representation in a completely different way—he is likely to associate it with positive emotional responses, since he views eating as a way to replenish essential nutrients needed for muscle repair and growth. On the other hand, the anorexic is likely to react to this representation of hunger in a negative way—eating is associated with contributing to her negative body image, for instance. Indeed, as the neuroscientist Gazzaniga (1989) remarks: "Biologically driven events [produce] a different felt state, which in turn must be interpreted. Each individual's interpretation, unique to their [sic] own past and present psychological history, is then stored in memory and becomes powerfully determinant in the content of an individual's ongoing consciousness" (p. 951). In more philosophical language, Gazzaniga is saying that the features of a representation ought to be differentiated from the overall content of a representation, which are unique depending on how one reacts to those initial representational features. And of course, how one reacts to the features of a representation depends on one's personal narrative, or as Gazzaniga calls it, one's "past and present psychological history." In sum, phenomenal experience is made up of more than just the features of a representation: It consists in the representational features at hand *plus* a reaction to those features.

The crux of this distinction is the connection between one's reaction to representational content and indexical information, which, as we defined earlier, is information embodied in phenomenal information that serves to structure such information in a way as to make it meaningful. In this case, we are given some phenomenal information in the form of a color representation, but our reaction to this representation is dependent on who we are, where we are, and when we experience it. As the Spanish philosopher Jose Ortega y Gasset once remarked, "I am I, plus my circumstances" (Holmes). In other words, one's private history, that collection of events unique to oneself, functions discursively to determine both *who one is* and *how one reacts* to events. This implies that the ultimate content of one's representations is dynamically conditioned upon one's unique indexical information, reflecting one's constantly shifting spatiotemporal circumstances and the way in which one responds to those circumstances.

14. What All This Means for Mary the Neuroscientist

Turning back to Mary the neuroscientist, we can see that even if we had the relevant phenomenal information we could not know what it was like to represent that information because of differences in indexical information. Provided that we could even have access to the "same" phenomenal information, we would not respond to it in the same way, given our differences in past experiences (i.e., indexical information). Put succinctly, our qualia would be different and we could not know what it is like for Mary

to experience red. We would have to have been exposed to her exact phenomenal information (which is in principle impossible due to slight differences in spatiotemporal details between us) and also have undergone the very same series of events in our personal histories and reacted to those events in identical ways.

Now we are finally in a position to give a good explanation as to why knowing all the neuroscientific facts of color vision and cognitive psychology did not allow Mary to know what seeing red would be like. We can simply say that while in her black and white laboratory, Mary was never exposed to the appropriate phenomenal information. All Mary had access to prior to seeing a ripe tomato was propositional information—the mere facts—regarding the processes of retinal stimulation by electromagnetic radiation and the corresponding neuronal transmission of the stimulation by electrical impulse in the brain. As noted in Musacchio (2002), merely describing a process does not *recreate* that process. That is to say, describing how red representations are produced *does not produce* red representations. What Mary the neuroscientist lacked was a *red representation*, which would have given her the necessary phenomenal information to know what seeing red was like.

15. Conclusion

My response to Frank Jackson's knowledge argument has rested upon the assumption that human experience consists in three distinct types of information, all of which are realized physically in humans—the phenomenal, the propositional, and the

indexical. Regarding the essential role of information in experience, Gareth Evans has written: "People are, in short and among other things, gatherers, transmitters and storers of information. These platitudes locate perception, communication, and memory in a system—the informational system—which constitutes the substratum our lives" (p. 252).[28] This information-based view of human experience, inspired by original work from Fred Dretske, Adrian Cussins, and Vittorio Gallese, has been an underlying theme in this work. Further, the critical analyses of the knowledge argument by Paul Churchland, Ned Block, Brian Loar, and Carolyn McMullen have served to bring out, albeit indirectly, the many ways perceptual experiences rely on different types of information. We have seen that we can know something phenomenally, propositionally, and indexically. By classifying information in this way, we can begin to look at philosophical problems in a new light. For instance, I have examined why indexical information has led to problems in the scientific study of mental phenomena: We cannot know what it is like *for someone or something* to experience something because we lack the appropriate indexical information—at best we can only know this approximately.

Moreover, by combining the notions of phenomenal and indexical information with the view of mental content known as representationalism, I have provided an answer to the question of why certain phenomenal states have a characteristic feel, and why this feel cannot be described perfectly by anyone other than the person with the original

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[28] This quote was taken from D.W. Hamlyn (1994) and quotes Gareth Evans (1982, p. 122)

phenomenal state. If representational content, or rather phenomenal feel, is determined by two things—the features of that representation and a reaction to those features, based on indexical facts and a unique personal history—then it follows that no two people could have the exact same representational content. The content can be close enough to permit public communication, but it cannot be transmitted perfectly.

Beyond just allowing us to view philosophical problems in a new way, the notion of indexical information is an interesting object of metaphysical study on its own. I have claimed that indexical information is essential to experience in that it provides coherency and organization to phenomenal information. It is a *type* of information that can be variably realized in physical and non-physical tokens. In other words, it is a functional kind. Phenomenal information, however, can be realized either physically or non-physically depending on the experiencer. In the case of human beings, representations are the vehicles of phenomenal information, but the ultimate content of these representations is determined by indexical information. Thus, in human experience there is an essential physical aspect, but as far as experience is concerned it is only contingently physical, in the sense that there is a metaphysical possibility for indexical information to be also realized non-physically.

When we speak of the possibility that indexical information can be realized non-physically, we must be clear that we do not mean this in the sense of "opposed to physics." On the contrary, we mean aphysical in the sense that indexical information is

indifferent to whether it is realized in a physical or non-physical medium. I have tried to show the existence of similar phenomena in the case of entropy in economics and virtual particles in physics. Depending on how one views the program of theory reduction among the various sciences, there are arguments to be made that entropy occurs both in physical systems such as gases, and in purportedly "non-physical" macroeconomic systems, such as entire societies. Similarly, there are debates in physics over whether virtual particles are real (i.e. physical) entities, or whether they are mere mathematical shorthand for explaining certain subatomic phenomena. I suggest that one way to view virtual particles is as aphysical: When they interact with measurement devices they are physical, but they are non-physical when not interacting with measurement devices. Based on these examples, I conclude that Jackson's claim that there is more to experience than just physical information is only half-right—experience does indeed contain an aphysical aspect in the form of indexical information. However, in order for any creature to have an experience of anything, this indexical information must be realized in some medium.

So if Jackson means physical information to refer to the objects of information—in the case of Mary and the red quale—then he is wrong to claim that physical information does not capture the whole of human experience. We can explain all individual representations as physical events in the brain. This is, however, not to say that we can explain every neurobiological aspect of a representation, but simply that it is a

physical happening. But if Jackson means physical information to refer to a *type* of information in experience, then he is partly right that there is more to experience than just the type of physical information—there is indexical information, which is aphysical. This is probably not a conclusion that Jackson would be happy with, but nevertheless it reveals the consequences of not clearly defining the notion of physical information.

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