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TYE'S REPRESENTATIONALISM: FEELING THE HEAT?

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ABSTRACT. According to Tye's PANIC theory of consciousness, perceptual states of creatures which are related to a disjunction of external contents will fail to represent sensorily, and thereby fail to be conscious states. In this paper I argue that heat perception, a form of perception neglected in the recent literature, serves as a counterexample to Tye's radical externalist claim. Having laid out Tye's 'absent qualia' scenario, the PANIC theory from which it derives and the case of heat perception as a counterexample, I defend the putative counterexample against three possible responses: (1) that heat perception represents general (i.e. non-disjunctive) intrinsic properties of objects, (2) that heat perception represents the non-specific heat energy that is transferred between a subject's body and another body and (3) that heat perception exclusively represents heat properties of the subject's own body.

1.

If two individuals are in the same brain states, and one of them is enjoying conscious experiences, some would say the other must also be enjoying qualitatively identical conscious experiences. Externalist forms of representationalism, by contrast, reject the claim that the phenomenal character of experience (what an experience seems like to its subject) supervenes on the neural. If the phenomenal character of experience does not supervene on the neural then the question arises of whether neural duplicates might differ phenomenally (e.g. whether their 'qualia' might be inverted). Further, and even more contentiously, the question arises of whether a neural duplicate of a sentient creature might lack experience altogether (i.e. whether its 'qualia' might be absent). Michael Tye (1995; 2000) has claimed that, under certain circumstances, both 'inverted qualia' and 'absent qualia', as just characterized, are indeed metaphysically possible.¹ My objective here is primarily to present a counterexample to the case Tye uses to motivate his more radical absent qualia claim.

If the counterexample is successful, it will also serve to challenge at least one of the presuppositions on which Tye's absent qualia claim is based.

Tye asks us to imagine "a very simple creature that has the capacity to undergo sensations in a single sensory modality", and that is equipped with sensory receptors that "could have been activated by a wide range of different types of physical energy, had the environment been suitably different, but that, in the environment in which the creature naturally lives, only one of these types of energy is found" (Tye 1995, p.194). Provided that the creature can respond cognitively to the physical stimuli by forming simple beliefs about the environment, which then interact with simple desires, Tye claims the creature would have sensory representations, and would thus have conscious states. He then asks us to imagine "another creature that is a microphysical duplicate of the above creature but differs from it by living on another planet and having a dissimilar natural habitat there, in which several different sorts of physical energy impinge upon its sensory receptors". This creature, he claims, would have no sensory representations despite its microphysical identity with the first creature, and would therefore lack conscious states.

The absent qualia claim is a consequence of Tye's theory of the conditions for a state to be a conscious perceptual state (his PANIC theory), combined with his preferred theory of intentional content. Tye's PANIC theory states that in order for a state to be conscious it must be a state which is *poised* for further cognitive processing and which is properly (see following) constituted by *abstract nonconceptual intentional content* (Tye 1995, pp. 137-8). Tye then argues that the phenomenal character of any conscious perceptual experience can be fully explained by the abstract nonconceptual content represented by experience because the first is identical to the second.

Tye's PANIC theory, as just stated, is compatible with different theories of intentional content, i.e. theories about what constitutes the content of distinct intentional states. The theory of intentional content Tye favours involves causal covariation as a central feature. He holds that a perceptual state representing that P can be defined as a state that is tokened in a subject, under optimal conditions, if and only if P and because P (Tye 1995, p.101). It follows from this definition, combined with Tye's PANIC theory, that each distinct character of a conscious experience must be constituted by a distinct content, P, represented by experience. The first simple creature fulfils Tye's constraints on intentional content. It occupies a distinct brain state, B, if and only if there is one type of physical energy impinging on its sensory receptors and because one type of physical energy impinges on its sensory receptors. It will have conscious experiences because all the requirements of the PANIC theory

are fulfilled. And the resulting conscious experiences will have the phenomenal character they do have because the phenomenal character will be identical to the property P they are representing. The second simple creature, however, does not fulfil Tye's constraints on intentional content. It occupies a brain state, B, because any one of a number of types of physical energy impinges on its sensory organs. It will not have conscious experiences because not all of the requirements of the PANIC theory are fulfilled. Part of the problem here for the representationalist, who is also an externalist about the character of experience, is that, if the simple creature were to have conscious perceptual states, the resulting character of experience would seem to be better explained by an intrinsic non-representational property of experience, which is used to represent different external properties, not only P but also Q, etc.

Why, one might ask, should it not be the case that such brain states represent a disjunction of properties? According to Tye, a disjunction of properties would not have the appropriate causal role for brain states to represent them. Although brain state B is tokened if and only if either P or Q is tokened, B is not tokened, according to Tye, because that disjunctive property is instantiated. Rather B is tokened either because P is tokened or because Q is tokened. The individual properties are causally efficacious, not the disjunction of properties (Tye 1995, p. 195).

Since neither the properties that constitute the relevant disjunction of properties can be represented separately, nor can a disjunction of properties be represented, the conclusion follows that simple creatures whose distinct brain states are caused by a variety of physical stimuli represent neither the individual properties nor their disjunction. And that is to say that they do not sensorily represent any properties, therefore they have no experiences. Tye's is radical form of externalism; not only is the character of experience to be explained in terms of external properties, but consciousness itself is to be, at least partially, explained in terms of the presence of certain types of external properties.

2.

The particular mode of perception I think provides a counterexample to Tye's absent qualia claim, and thus to at least one of the presuppositions on which it is based, is heat perception.² As a matter of fact we humans are sensitive to two different forms of energy - kinetic energy and radiant energy - in a single sensory modality.³

When we touch objects of a certain temperature range (approximately 10-50°C), we experience 'heat sensations'. What happens is that heat is conducted from

the object to the particular part of our body in contact with the object if its temperature is sufficiently greater than our skin temperature (average skin temperature is approximately 34°C), and away from our body if its temperature is sufficiently less than our skin temperature. In physical terms the flow of heat by conduction occurs via collisions between atoms and molecules in the object and in our skin and the subsequent transfer of kinetic energy. The physiological story has not been fully unravelled, but it seems that a number of different types of receptors underlie heat perception.⁴ Some types respond to increases of skin temperature and other types respond to decreases in skin temperature. Oversimplifying somewhat, the former are associated with sensations of *warmth* and *hotness*, whilst the latter are associated with sensations of *coldness*. Interestingly, in the present context, the qualitatively identical sensations of warmth and hotness can also be caused by radiant heat energy. Radiant heat, in contrast to heat conduction, does not require the presence of a material medium; it is transferred by means of photons of energy. So we have a *prima facie* case of the same kinds of brain states being sensorily responsive to different kinds of physical energies.

Some might object that feeling the heat of distal objects is not a proper form of perception. Whereas we actively detect the heat of things by touching them, the heat of distal objects, such as the sun, just impinges upon us. This objection is beside the point; what an objector has to establish is the non-identity of the characters of experience. Anyway, it is a merely contingent difference; we might have used parts of our body actively to detect heat from distal sources. And sometimes, when we make contact with proximal objects accidentally, their heat is not detected deliberately.

Others might object that our perceptual experiences actually have different characters, and thus different representational contents, when caused by heat conduction and radiant energy respectively. It is, admittedly, true that there is often a difference in phenomenal character: whereas it *seems* that the objects we are in contact with are either hot or cold (think of feeling a warm plate), it may not, in the case of the objects we are not in contact with, *seem* that they are hot (think of feeling the sun's rays). But the reason for this is that in the former case we also sense the tactile properties of the object. That is, we sense such properties via a different sensory modality; the receptors (Pacinian corpuscles) which respond to pressure are physiologically distinct from those that respond to heat. The natural conclusion to draw is that the character of experience that often results when we feel the heat of objects when we touch them is a bi-modal form of experience; such a phenomenal character of experience as results from touching hot objects can only be constituted by two modes of perception operating together. However, such does not show that

there *must be* a relevant difference in the character of experience provided by touching hot things. Were we to touch an object so softly that we were not to feel its pressure on our skin, we might still feel its heat (or think of gently immersing the palm of a hand in a basin of warm water). It would feel just like feeling the radiant heat of an object.

Returning to Tye's thought experiment, it seems plausible to imagine a simple creature that has the capacity to undergo heat sensations because it is equipped with sensory receptors that could be activated by both the kinetic energy of molecules and the radiant energy of photons, but that, as a matter of contingent fact, only responds to either one or the other because only one or the other is actually available in the environment in which it lives. It might be that all the objects around it are the same temperature as it but it feels the heat of its sun. Or it might be that it is a subterranean dweller and only feels the heat of the objects with which it is in direct contact. Such a creature would enjoy heat sensations on Tye's account. But, given that we know we do sensorily respond both to the kinetic energy of molecules and the radiant energy of photons, it seems intuitively plausible that the duplicate of such a simple creature would also enjoy heat sensations even though its sensory receptors are, as a matter of contingent fact, responsive to both the radiant energy of the photons from its sun and the kinetic energy of the molecules of the objects in its immediate vicinity.⁵ Therefore we have little reason to think that a simple such creature would lack qualia. Furthermore, we now have a principled reason to doubt Tye's radical externalist claim about the constitutive conditions of conscious states.

3.

The conclusion suggested by the preceding section is that a single state of a simple creature *can* sensorily represent either different features or a disjunction of different features. A possible response to this is that the simple creature's brain states *do* sensorily represent because they causally co-vary with a further more general set of properties.⁶ But exactly what would these more general properties be? Tye, one might presume, would take our 'experience of heat' to be understood as he thinks we should understand our experience of any other secondary quality, that is to say, in terms of our representation of objective properties. Colours are identical to objective reflectance properties, sound to objective acoustic properties, and so on (Tye 1995, pp. 144-50). If the line of argument of the rest of this section is correct, it is not clear that this move can be made in the case of heat perception.

It may be true that we seem to perceive hotness and coldness as being properties of objects we touch, but it seems much less plausible to think that there are such properties in the things themselves which our heat sensations thereby represent. Temperature, for instance, constitutes a single continuum or range of values rather than two broad groups. In other words, it does not seem plausible to think that the temperature scale is divided into two intrinsically different parts corresponding to our sensations of hot and cold.⁷ Temperature, it might be pointed out, is not the same as heat; the temperature of a substance is equivalent to the average kinetic energy of its constituent molecules, whereas the heat of something is a function of its temperature, mass and specific heat capacity. But this distinction does not make a relevant difference here. There are two heat phenomena that support the present view.

Consider two vessels, one having half the capacity of the other, both full of water. Suppose also that the same amount of heat is contained in the water of both vessels. According to Tye, phenomenal character is to be identified with representational content. Thus, if the characters of two experiences vary, so must their representational contents vary. In the present example it cannot then be that our perceptual experience represents the heat of the water because, although the heat contained in both vessels will, by hypothesis, be the same, the characters of our experiences (were we to immerse a hand in either vessel) would be different. The reason for this is straightforward: although the heat in the two vessels is the same, the amount of water in them is different, and so the temperature of the water will be different.

A better bet might then be that heat sensations represent the temperature of the water, i.e. the average kinetic energy of its constituent molecules. But this cannot be right either. Consider a copper pipe and a woollen scarf of the same temperature. The copper pipe feels either much colder or much hotter than the woollen scarf when they are both at the same temperature. So it cannot be that heat sensations represent temperature, because materials having the same temperature feel different (in the relevant respects). This is not an anomaly or misrepresentation (i.e. it is not a case where optimal conditions fail to obtain) but a general feature; materials generally have different conductivities (in this case copper has a higher conductivity than wool). Nor can it be that we are detecting the thermal conductivity of the object, for the same object will feel different if it is hotter. So, on a causal co-variation theory of intentional content, combined with Tye's central contention of the identity of character and content represented, heat sensations can represent neither the heat, nor the temperature, nor the conductivity of objects, since it is neither heat, nor

temperature, nor conductivity that co-varies appropriately with the representational states in question.

If anyone is still unconvinced by these examples, and still wants to hold that our heat sensations do represent general properties that objects have, they should reflect on the fact that consistency requires they also hold that the qualitatively identical warmth sensations we have when we feel the heat of distal objects must represent either the same heat properties or the temperatures of those distal objects. And that, to me, amounts to a *reductio* of the view.

4.

The above line of argument indicates that heat sensations do not co-vary appropriately with any intrinsic properties of objects. One might respond that they co-vary with another objective feature: the direction from which, and the extent to which, energy *per se* is transferred. Sensations of hotness co-vary with amounts of energy transferred to the subject's body that are greater than those which co-vary with sensations of warmth. Sensations of coldness co-vary with amounts of energy that are transferred away from the subject's body. Even if heat sensations do not represent heat as being located in objects (or less solid stuff), this is no reason to conclude that they do not represent heat being transferred from (or to) an object (or less solid stuff), nor, indeed, that this is what the character of such heat experiences makes manifest to us.

It is true that kinetic and radiant energy are both classed as types of energy. And it is also true that kinetic and radiant energy are related in so far as either can be transformed into the other. But, just because we normally classify both as forms of energy and each kind of energy is transformable into the other kind of energy, does not imply that there is a more general property, such as would be required if our heat sensations are to represent a non-disjunctive property. One reason for thinking that there is no such more general property is that kinetic and radiant energy just are so distinct. This is manifested by the fact that either form of energy can only be transformed into the other form of energy in the presence of matter. In the present case of heat perception, the different forms of heat energy can only be related via the way we respond to them, that is to say, via the way they are similarly transduced by our heat receptors. In terms of the current argument, energy is only transferred either because one or because the other of two very different forms of energy transferral is operative, not because there is any more general property of energy transferral.

There is an additional difficulty facing anyone trying to pursue the present general property response. To claim that there is a more general feature represented in heat perception seems to undermine Tye's original 'absent qualia' claim. For if we can say in the present case that the states in question do not represent 'different types of physical energy' but energy *per se*, it then becomes unclear what it is that constitutes sufficiently different forms of energy in those cases where a creature is supposed to be rendered a 'zombie'. And this is to cast doubt on the tenability of Tye's preferred theory of intentional content; for it is now unclear exactly what it is that constrains the relation between representational state and content represented, such that a form of energy does count as a distinct form of energy.

5.

There is a final causal co-variation response. That response is to say that it is not that distinct parts of our body feel heat rather than distinct parts of our body feel hot or cold.⁸ Or, to put matters more accurately in representationalist terms, our sensations of hotness and coldness do not represent the way of the external world at all, but properties of our own bodies. According to this response, we are not sensitive to different external physical energies at all here, but rather to variations in temperature at peripheral parts of our bodies.

It is uncontroversial that we do, on occasion, feel hot and feel cold. A large part of the explanation for this is supplied by the presence of another physiological system located in the hypothalamus that detects small deviations from mean body temperature. This system is the best candidate for explaining the experiences we have when we ourselves feel either hot or cold. And there is no reason why we cannot explain ourselves feeling either hot or cold in terms of the representation of our own heat or temperature by reference to the causal co-variation of states of this system and distinct body temperatures. So why should we not then say that our particular heat sensations represent the heat or temperature of distinct parts of our bodies?

There is a reason to think that we do perceive our own heat when we feel the heat of objects. When the index finger of my right hand feels the heat conveyed from another object, that finger can itself feel hot to the touch of the index finger of my left hand. When the index finger of my right hand feels something colder than it, and heat is conveyed from it, that finger can itself feel cold to the touch of the index finger of my left hand. That is to say, my sensations of hotness and coldness co-vary with the heat of the index finger of my right hand (i.e. the increase and decrease of the heat of

that finger). And, of course, the same reasoning can be applied to the index finger of my left hand when it feels the heat of the index finger of my right hand. The preceding remarks highlight what is distinctive about the perception of heat amongst the perceptual modalities, namely the mechanism underlying heat perception is the transference of heat energy to the body. In perceiving heat parts of our body are heated up. This causes sensory receptors to respond. We do not turn red when we see something red, nor do we make a noise when we hear sounds.

One of the objections mentioned earlier remains: there is still no reason to think that a continuous range of temperatures is divided into three broad types corresponding to our sensations of coldness, warmth and hotness, in the way it seems to be. But there is a more serious difficulty. Suppose heat sensations represent to their subjects of experience the heat in parts of their bodies. The onus is on the defender of the causal co-variation theory to say why we should trace the causal co-variation to our skin and no further in this case - where there are legitimate candidates for external causal co-variations - when we do not do so in the cases of the other proximal senses, olfaction, gustation and touch. The challenge for the causal co-variation theory of intentional content is to respond without resorting to a different theory of intentional content altogether. And it is a challenge that the causal co-variation account must respond to. Otherwise someone will suggest that our same heat sensations are used to represent distinct properties: both disjunctive features external to our bodies and features internal to our bodies.

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NOTES

1. In this usage, a quale may be understood non-controversially as equivalent to a phenomenal character of experience. It is agreed by (nearly) all that our experiences have them. Some people use the term 'qualia' to refer to something else: intrinsic properties of experience that supervene on the neural. Since representationalists think there are no such properties, this is

not what Tye thinks is lacking when qualia are absent, rather it is the phenomenal character of experience, and thereby conscious experience itself.

2. Despite featuring centrally in the works of Locke and Berkeley, heat perception has been largely neglected in the contemporary literature. Exceptions are Vesey 1960, Strang 1961 and Armstrong 1962. The present objection is not intended as an objection to representationalism more generally; other versions of representationalism might respond by giving a different account of how brain states get to represent what they do. Rather, in as much as heat perception may provide a way of adjudicating between different forms of representationalism, this paper is intended as a contribution to that project.

3. The matter of whether heat perception involves a single sensory modality arguably deserves more attention. If one individuates modalities by reference to the types of physical stimuli sensory receptors are sensitive too, one might hold that two sensory modalities are realized here. But if one individuates sensory modalities in terms of the co-presence of sufficiently similar types of sensory receptors then it is more reasonable to think that there is only one modality.

4. For more details see Martin & Jessel 1991.

5. I claim that it is intuitively plausible that a simple creature would have heat sensations on the basis of my own experience. The point is not that we evolved from simple such creatures, although we may have done so. This is an issue only about the external conditions that are supposed to be necessary for any particular perceptual state to be a conscious one. In this respect the cases are relevantly similar.

6. This is how Tye says his response would proceed if someone were to present a putative counterexample, 1995, p. 228, ft 4.

7. The view is defended in Strang 1961. Strang argues that we do seem to perceive the hotness and coldness of things via our sensations of hotness and coldness but we are in error to think there really are the corresponding properties of hot and cold (which is not to deny that objects have objective heat properties such as temperatures). His view is stronger than a traditional Lockean secondary quality view of heat, on which account heat produces heat sensations in us, i.e. there are corresponding properties, but it is properties supervening on the neural that constitute the character of our heat sensations.

8. The distinction is drawn and discussed in Vesey 1960.

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