

**INFORMATION-PROCESSING, PHENOMENAL CONSCIOUSNESS AND  
MOLYNEUX'S QUESTION**

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Ordinary common sense suggests that we have just one set of shape concepts that we apply indifferently on the bases of sight and touch. Yet we understand the shape concepts, we know what shape properties are, only because we have experience of shapes. And phenomenal experience of shape in vision and phenomenal experience of shape in touch seem to be quite different. So how can the shape concepts we grasp and use on the basis of vision be the same as the shape concepts we grasp and use on the basis of touch?

I think this is the intuitive puzzle that underlies the question sent by the Dublin lawyer Molyneux to John Locke. This concerns a man born blind, who learns by the use of his touch to discriminate cubes from spheres. Suppose him now to gain the use of his sight. And suppose him to be presented with a cube and a sphere, of nighly the same bigness. Quære, will he be able to tell, by the use of his vision alone, which is the sphere, and which the cube? (Locke 1975, II/ix/8.)

In his seminal paper 'Molyneux's Question', Gareth Evans agreed in posing the underlying issue as a problem about our concepts of shape: are the concepts grasped and used on the basis of vision the same as the concepts grasped and used on the basis of touch? And he gave an argument which aimed to show and explain how it can be that it

is the same shape concepts that we exercise on the basis of vision as on the basis of touch. Evans' argument uses the notion of an egocentric way of representing space, or 'egocentric space'. For present purposes, we can follow Evans in characterising egocentric space as a space defined by the axes up, down, left, right, in front and behind, and centred on the subject (cf. Evans 1982, pp. 153-154; Evans 1985, p. 384). Here are the steps of his argument:

- (1) Shape concepts have their meaning in virtue of their relations to egocentric space.
- (2) Egocentric space has its content in virtue of its relations to behaviour.
- (3) Egocentric space in vision and in touch has its content in virtue of its relations to the very same behavioural repertoire.
- (4) Consequently, egocentric spatial content is of the same type in vision as in touch.
- (5) Since egocentric space is the same in vision as in touch, shape concepts have the same content whether they are acquired and used on the basis of vision or on the basis of touch.

Evans presents his conclusion, (5), as addressing the fundamental issue underlying the original Molyneux question. The argument is that if it is the same type of content, egocentric content, that we use indifferently in vision and in touch, and if we apply shape concepts on the basis of egocentric content, whether in vision or touch, then it will be true that the newly sighted man will be able to say immediately which is the sphere and which the cube. The reason is that he will simply be applying the same concept on the same egocentric basis as before.

Evans was one of the first to introduce the idea that there is a distinction between the type of representational content used in our thought and talk, which he called ‘conceptual content’, and the kind of content that is involved in biological information-processing, which he called ‘non-conceptual content’; and he tried to provide principled ways of distinguishing them, and a view of their relation to one another. (See Evans 1982, index entries under ‘conceptual and non-conceptual content’, especially p. 157. For an overview of the current state of play, see Gunther 2003.) This distinction immediately bears on the argument sketched above, in steps (1)-(5). For Evans takes it that the problem about shape concepts – about what is going on at the level of conceptual content – has to be resolved by looking at the relation of shape concepts to space represented egocentrically – which he takes to be a non-conceptual level of representation. I will review the basis of this distinction between conceptual and nonconceptual content in §2 below.

For the moment, we can remark that the key move here, the move that makes all this bear on the intuitive puzzle raised by Molyneux’s Question, is that Evans assumes that the phenomenal content of perceptual experience is to be given in terms of non-conceptual content (Evans 1985, pp. 386-388). The puzzle was to understand how to acknowledge that we have a unitary set of shape concepts, exercised indifferently in all the sensory modalities. For experience of the shapes is what provides us with our knowledge of what the shape properties are, and the phenomenal character of vision seems so different to the phenomenal character of touch (cf. Grice 1962). In effect, Evans gives a way of addressing this question. Since the egocentric content of visual experience is the same as the egocentric content of tactile experience, the two senses can

in principle be making the very same contribution to our understanding of shape concepts. In the relevant respect, then, the phenomenal characters of the two senses are the same. In effect, what happens here is that Evans substitutes a problem about the architecture of our information processing and its relation to conceptual thought for a problem about the relation of phenomenal experience to conceptual thought.

It seems to me, though, that the appeal to non-conceptual content does not give a convincing characterisation of the phenomenal content of experience, and I will pursue this point below. Briefly, the problem is that on the face of it, we would expect that an account of the basis of conceptual content should yield the result that sameness of content will be transparent to the subject. This is indeed implicit in the above argument, when it is assumed that sameness of the shape concepts applied on the basis of sight and of touch should mean that the subject realises that it is the same shapes being perceived by sight as by touch. And we would ordinarily assume that sameness of phenomenal content should be apparent to the subject. If two aspects of your experience have the same phenomenal content, it should seem to you that they do. But there is no such transparency of the content involved in biological information processing. The subject need not register, in any way or at any level, sameness of the content involved in two biological information-processing stages.

There is a further, related problem in Evans' discussion. He seems to assume the following principle: if an information-processing routine can be applied to the informational content of one sensory modality, it can also be applied to the informational content of any other sensory modality. So if shape information can be derived from the egocentric spatial information in one modality, the subject can equally well derive it from

the egocentric spatial information in another modality. This principle needs only to be spelt out to be seen to be problematic; and it does not help that the sensory information is assumed to be part of phenomenal content. I suspect, however, that what underlies the mistake here is a supposition that a phenomenal content is somehow 'central' and that the computational processes applied to any such content must consequently also be 'central' and equally applicable to any other phenomenal content.

I will take up this point in §4 below, where I look at steps (1) and (5), the argument that shape concepts have meaning in virtue of their relations to egocentric space. It is, I think, wrong to suppose that shape information is derived from egocentric information in the way that Evans supposes; it is a mistake to suppose that shape concepts have their meanings in virtue of their relations to egocentric space. The main points I have made in the last two paragraphs arise even if we set that mistake aside. In §5 I will argue that the relations of shape concepts to behaviour cannot exhaust the significance of shape concepts, which are concepts of categorical properties.

In §§1-3 I will discuss steps (2)-(4), in which Evans aims to establish that egocentric content is of the same type in vision as in touch. My aim here is to set out the basic problem about the type of content that Evans is supposing we find in perceptual experience. On the one hand, you might take it to be conceptual content, in which case whether we have the same contents in different sensory modalities will be transparent to the subject; but we lose any picture of the relation of experiential content to the content ascribed in information-processing accounts of perception. Alternatively, you might take experiential content to be the kind of law-governed content found in information-

processing accounts of perception; but then we have no reason to suppose that sameness of content will be transparent to the subject.

However, Evans offers an argument for the transparent sameness of egocentric content in the different sensory modalities which might seem to transcend this dilemma, so I begin by looking at it, in §1.

### **1. Egocentric Space**

Evans gives a brief summing up of his argument that egocentric spatial content is the same whatever the sensory modality. The argument is that '[t]here is only one egocentric space, because there is only one behavioural space' (Evans 1982, p. 160; cf. Evans 1985, pp. 389-390). The idea here is that each sensory modality has its spatial content in virtue of its relations to behaviour. Moreover, it is not as though each sensory modality has its own particular repertoire of behaviours associated with it. That is, it is not as though there is one set of behaviours which are particularly appropriate in response to visual input, another set of behaviours which are responses to auditory input, and so on. Rather, there is a single set of behaviours which are suitable as responses to spatial perceptual input in whatever sensory modality. Evans thinks that this establishes that egocentric spatial content is the same in all sensory modalities.

To evaluate this line of argument, let us begin with the idea that egocentric space has its content in virtue of its relations to behaviour. I think that there is a confusion which can make this idea seem more straightforward than it is. Suppose we consider a

submarine commander who, let's assume, uses latitude and longitude co-ordinates in instructing the ship's computer and navigation systems as to just how the craft should move. It is, we suppose, quite a sophisticated submarine, which at the highest level of control uses only latitude and longitude co-ordinates. Moreover, we can suppose that most of the information the commander has about where he is and where he wants to go comes in the form of latitude and longitude co-ordinates. In that case, latitude and longitude play a special role in navigating the ship. But that does not mean that this co-ordinate system has its meaning in virtue of its role in the control of the submarine. Rather, the co-ordinate system has its meaning entirely prior to its use in navigation, and this prior meaning is exploited when the system is used in control of the submarine.

It seems quite plausible that egocentric space plays a special role in our ordinary high-level control of our own movements. And it seems quite plausible that very often, the information that the subject has from perception about the location of this or that target comes in egocentric form. So egocentric space may play just the kind of role in the control of spatial action that I just envisaged for latitude and longitude in the case of the submarine. But in this case too, it does not follow that egocentric spatial terms have their contents in virtue of their role in the direction of action. It remains possible that the egocentric terms have their meanings in virtue of some quite separate range of facts.

Notice, incidentally, that the latitude and longitude system is being used at the highest level of decision-making. It may well be that the execution of a command to move to a particular destination will mean that a lot of computing machinery has to operate. It may be that this will involve translation from the high-level command into lower-level frames of reference used in more immediate control of the submarine's

steering system. Ultimately, indeed, the instructions issued may be entirely non-spatial - simply to fire one or another engine, for example. The commander may know nothing of exactly what is going on at these lower levels. And the meaning of the latitude and longitude system is still not given in terms of its relations to these lower levels.

It may be that the submarine commander can be said to possess the latitude-longitude system of representation only in virtue of the fact that it plays a role in the explanation of his behaviour. Similarly, someone might be said to possess an egocentric system of representation only in virtue of the role that the system plays in the explanation of his behaviour. But in neither case would it follow that the content of either system of representation, the latitude-longitude system or the egocentric system, had to be explained in terms of its connections with behaviour.

At any rate, whatever the motivation for the idea, what are the implications of supposing that egocentric spatial content is actually constituted by its implications for behaviour? The natural way to implement that idea would be to suppose that identifying the egocentric location of an object is identifying something like an affordance of the object, in the sense of Gibson 1979. That is, knowing the egocentric location of the thing is a matter of knowing that it affords grasping if you move thus-and-so, that it affords avoidance if you move thus-and-so, and so on. And the same affordance has to be presented in the same way to the subject, whichever sensory modality is used in finding out about it, since the subject only has one behavioural repertoire.

What is doing the work here is the idea that the same affordances are being identified in the very same ways: that is, they are being identified from the perspective of the agent who may be acting to use them. So if both vision and touch, for example, represent an object as being just to one's right, they are both, on this account, representing the object as 'reachable thus-and-so'. And the 'thus-and-so' has to be spelt out in the same way both times, this argument continues, because in both cases the reaching is being specified in just the same way, from the viewpoint of the agent who may execute it.

If we accept this interpretation of the suggestion that egocentric spatial content is constituted by its implications for behaviour, we can see the force of Evans' argument that 'there is only one egocentric space, because there is only one behavioural space'. The idea here is that egocentric content identifies the locations of objects merely as affordances. But there is only one set of affordances provided by the egocentric location of an object, no matter how through which modality the location is identified. This is the force of the point that there are not different behaviours associated with each sensory modality. The idea is that whatever the sensory modality, identification of the location of an object is always identification of it as providing the very same set of affordances. It is for this reason that egocentric space has to be the same, whatever the modality.

The trouble with this gloss on the content of egocentric identifications of location is that we would ordinarily take spatial location to be the categorical basis of these affordances. That is, we think that it is the relative locations of the thing and the agent

that explain why it is possible for the agent to act on the thing. We do not suppose that egocentric location is actually constituted by the possibility of the agent acting on the thing. This comes out when we consider the relation between the basic egocentric frame, and other systems of reference to places. It probably is true that initially, perception merely identifies the locations of objects in a basic egocentric frame, in which locations are specified in terms merely of their relations to the subject, and not in terms of their relations to one another. It is this basic system of identifications that you might take to be a set of identifications of Gibsonian affordances. But we can also operate with egocentric terms, using an egocentric frame that is centred not on oneself, but on an arbitrary object one can see. For example, I might say that ‘the window is to the right of the door’, and this may be true even though the window and the door are both on my left. In this case, there may be no assumption that the door itself has an intrinsic right or left; rather, I take my own right or left, and project them onto the door, using it as a reference object. Linguists describe this as use of a deictic frame of reference (cf. Garnham 1989). It can also happen, though, that I identify locations in terms of the egocentric frame generated by the axes of an object other than myself, such as another person, or a car, for example. So I might say that my bicycle is in front of and slightly to the left of a car that you and I can both see. Linguists describe this as use of an intrinsic frame of reference (Garnham 1989). The first point to notice about deictic and intrinsic place-identifications is that they can straightforwardly be derived from basic egocentric information about where the various objects are with respect to me, together perhaps with some information about the shapes of the objects, from which their intrinsic axes can be derived. Indeed that seems

to be why we find it so easy, in ordinary vision, to find deictic and intrinsic locations of seen objects.

The point now about deictic and intrinsic identifications of places is that they are rich in causal significance. It might be that the relation of the door to the window has implications for the structural safety of the building. Or the relation of my bicycle to the car might affect how safe the bicycle is from being flattened by the car. But these causal implications of location can't be derived from the affordances I described earlier, concerning how I myself should go about reaching or avoiding seen objects. The natural reading of the situation is that the basic egocentric identifications of location are the grounds of affordances, rather than being constituted by these affordances, and that from these grounds of affordances we can determine further spatial relations, which ground further causal implications.

If, however, we think of egocentric locations as the grounds of affordances, then on the face of it, we lose the argument that the spatial contents of different sensory modalities must be identifying the same affordances in the same ways. We have to acknowledge that it is possible that a single egocentric location could be identified in two quite different ways, yet still be grounding the very same possibilities of behaviour. That is, a subject could be identifying locations in one way by vision, and in a different way by hearing, and yet these two different ways of identifying locations could ground the very same behavioural reactions; they could ground the ascription to the object of the very same sets of affordances. The difference between the identifications of places in the two sensory modalities would emerge in the fact that it could still be informative for the subject to find that it is the same range of places that is being identified by vision as by

hearing. Of course, the subject might be expected to recognise that the place-identifications in the two modalities typically ground the very same behavioural responses, and that those responses are typically equally successful whether based on vision or on hearing. And this means that the subject would have available an inference to the best explanation, which would argue that it must be the very same range of places that is being identified by vision as by hearing, since the very same behaviours as yield success in response to visual input also yield success in response to the auditory input. But that implies that we are dealing with different ways of identifying places in the different sensory modalities, so that it is a substantive inference to the best explanation that determines that it is the same range of places that is being identified in these different ways. If it really were transparently obvious that it is the same range of places being identified by vision as by hearing, there would be no scope for there to be such an inference to the best explanation. The identity of the places identified through vision and hearing would simply be guaranteed by the mode of place-identification used.

## **2. Conceptual vs. Non-conceptual Content**

Suppose we were to accept that there is a sameness of egocentric spatial content across sensory modalities. Under what circumstances would this sameness of content mean that the sameness of the places identified in the different modalities was transparent to the subject? I think we can focus this problem by drawing a distinction between two types of content: on the one hand, the information-processing content which scientists use in

characterising the operations brain systems involved in perception, for example, and on the other hand, the kind of conceptual content that we ascribe to each other in our everyday commonsense talk about beliefs and desires and so on. The kind of content in which Evans was interested was supposed to be the content of consciousness, not merely brain states, and to be non-conceptual. But I think we can triangulate the kind of phenomenal content he was after by comparing it to these other two types.

There do seem to be quite sharp differences between these two other types of content. Consider the question why cognitive science ascribes content to brain systems at all. It is after all often argued that this is in itself a mistake, that states of the brain cannot literally represent aspects of the external environment. If we want to characterise brain states, why not simply describe the anatomy and physiology and leave it at that? One traditional reason for not leaving it there is that cognitive science seems to have found laws – rough and ready, *ceteris paribus* laws no doubt, but laws nonetheless – which are stated at the level of content. That is, we can for example describe human hearing as performing a kind of processing to establish the location of a sound, and the description may be stated at the level of content. There are laws dealing with the kinds of illusions and breakdowns to which such a system is prone. And these laws are relatively indifferent to the details of the physiology of the system in which they are realised. They would apply equally to a different species, with a quite different physiology to ours, which had nonetheless, and perhaps for similar reasons, developed auditory systems working on similar principles.

It is important to note that, as has frequently been observed since Fodor 1983, there is a certain modular organisation to the brain systems studied by scientists (cf.

Coltheart 1999). For present purposes, we can take modularity to be a matter of informational encapsulation – that is, that information processed within one system is not generally available to all other input systems – and domain specificity – that is, the various input systems are processing different sets of initial raw data. And for present purposes, we can acknowledge that the conformity of input systems to this rough working definition may be a matter of degree. That is, there may be some overlap in the raw data being processed by different systems, and there on occasion be some capacity for one system to make use of information processed by another system. The present point is that the laws governing the processing of contents of a particular kind will, in general, be module-specific. That is: suppose, for example, you are told that there is somewhere in the subject's brain, a representation of a particular stimulus as at a particular location.. The significance of this representation will depend on the laws governing the inputs which can produce such a representation and the outputs which such a representation can generate, perhaps in conjunction with other representations. So you only know the significance of the subject's brain having a representation of the location of a stimulus when you know what the relevant laws are. But the relevant laws will be, as I shall say, 'module-specific'. That is, you will know the significance of the subject's brain having that representation of the location of a stimulus only when you know in which module the representation figures. There is no general presumption that representations will be processed in the very same way, in whatever modules they figure. So to grasp the significance of the subject's brain having that representation of the location of a stimulus, we need to know in which module the representation figures and we need to know the laws governing the processing of representations within that module.

Of course, the outputs from one module will often be the inputs to one or more other modules, so we cannot say that the only relevant laws are those governing the processing of contents within modules; we do also need to acknowledge the existence of laws about the relations between the outputs of one system and the inputs to another. In effect we have already noticed the existence of these kinds of connections, when we considered the ways in which vision can calibrate touch. And we will also have to acknowledge the importance of laws about the relations between external stimuli, input systems and the environmental effects of actions based on processing.

In contrast to the contents ascribed to information-processing modules, there are the contents ascribed in common-sense psychology, when we attribute particular thoughts and speech-acts to one another. These are generally taken to be subject to a battery of a priori constraints; certainly they are taken by Evans to be so. In particular, there is what Evans called the 'Intuitive Criterion of Difference' governing the ascription of conceptual contents:

the thought associated with one sentence *S* as its sense must be different from the thought associated with another sentence *S* as *its* sense, if it is possible for someone to understand both sentences at a given time while coherently taking different attitudes towards them, i.e. accepting (rejecting) one while rejecting (accepting), or being agnostic about, the other.

(Evans 1982, p. 19)

So if two sentences express the same thought, it must be immediately recognisable by the subject, in the sense that the subject cannot coherently take conflicting attitudes towards them.

This immediately marks a point of contrast between conceptual contents and information-processing contents. When two information-processing contents are contents in different modular systems, there is no guarantee that their sameness of content must be registered in any way or at any level. They may simply be in different modules, with their significance regulated by quite different sets of laws.

Moreover, even within a single module, since we are dealing only with the empirically discovered laws governing the processing of information within that module, there will be no *a priori* guarantee that within the module, there could not be two tokenings of the very same single content – say to the effect that a particular stimulus is at a given location – such that within the module there was acceptance of one token content and rejection or agnosticism about the other.

We can see the difference between information-processing contents and conceptual contents very plainly if we consider the phenomenon of asymmetric cross-modal transfer of learning. Streri describes the phenomenon as follows:

At the age of 5 months, babies show haptic recognition of the shape of objects which they have already seen, but it has not been possible to observe the reverse transfer.

(Streri, 1993, p. 130; cf. Streri and Pecheux, 1986)

These findings are puzzling if we take ourselves to be dealing here with conceptual contents in vision and in touch, which must now be assumed to be identical, to explain the ability of the infants to recognise haptically the shapes they have seen, and now assumed not to be identical, to explain the inability to recognise visually the shapes they have explored haptically. The findings are, however, relatively unproblematic, conceptually at any rate, if we take ourselves to be dealing with information-processing contents governed by laws which may vary over time as the child matures. We have simply discovered something about the empirical laws governing the contents in question.

Evans is emphatic that the egocentric spatial content of the senses is not conceptual content. So there is no reason to suppose that egocentric content will be subject to the 'Intuitive Criterion of Difference': it could be that two spatial contents were the same yet the subject could rationally assess them in conflicting ways. And if we think of egocentric content as law-governed, module-specific content, then there is positive reason to dispute the idea that sameness of content in different modules must be transparent to the subject. Even if content, in this sense, is 'subjectively available' to the subject, there is no reason, so far, to suppose that sameness or difference of egocentric content in different sensory systems must be transparent to the subject.

### **3. The Contents of Experience**

I think the fact is that the notion of a non-conceptual content of experience comes under great pressure at this point. On the one hand, it is supposed to be a kind of foundation for conceptual content, and when we reflect on that, it can easily seem that sameness or difference of non-conceptual content must be transparent to the subject. Consider, for example, a demonstrative like 'there', referring to a perceived place. This is conceptual identification of a place, and when we refer on the basis of vision to a place, and then refer on the basis of touch to the very same place, the sameness of conceptual content has to be grounded in a sameness of non-conceptual content. And since the conceptual demonstratives are subject to the Intuitive Criterion of Difference, this makes it look as though sameness of the place identified must be apparent to the subject. And that transparent sameness of place can only be grounded in a transparent sameness of place at the level of non-conceptual content.

The problem is that the non-conceptual content of experience is usually thought to be content of the very same kind as is ascribed in information-processing accounts of perception. The idea is that this kind of information-processing content at some point becomes 'subjectively available', and that a discovery of this point is what will make the link between ordinary subjective experience and scientific accounts of perception. This is all but explicit in the very idea of a 'neural correlate of consciousness': the idea is that conscious experience has a certain representational content, and brain-processing has a certain representational content, and what is sought, by those looking for a neural correlate of consciousness, is the point at which the content of the brain processing is the very same as the content of experience. But this just requires that the content of consciousness should be content of the very same type as information-processing content.

And as I have been stressing, content of this type, co-ordinate with module-specific information-processing laws, is not in general transparent: sameness of this type of content need not be apparent to the subject.

Evans himself gives a vivid characterisation of the relation between the content of conscious experience, information-processing content and conceptual content, as follows:

we arrive at conscious perceptual experience when sensory input is not only connected to behavioural dispositions in the way I have been describing – perhaps in some phylogenetically more ancient part of the brain – but also serves as the input to a thinking, concept-applying and reasoning system; so that the subject's thoughts, plans and deliberations are also systematically dependent on the informational properties of the input. When there is such a further link, we can say that the person, rather than just some part of his brain, receives and possesses the information.

(Evans 1982, p. 158; cf. Evans 1985, p. 387)

Although the passage is not fully explicit, the natural reading is that experiential content is the very same content as brain-processing content, only it is brain-processing content that is input into a 'thinking, concept-applying and reasoning system'. We can, that is, make sense of counterfactuals such as 'if this content had not been input into a thinking, concept-applying and reasoning system, then it would have been mere brain-processing content and not conscious at all.'

Just to emphasise the main point here: Evans is operating with a single generic notion of non-conceptual, informational content, which he uses in characterising both the deliverances of conscious perception, and the information-processing carried out by the brain. His characterisation of the spatial content of auditory input, for example, is a characterisation of this generic notion of content:

auditory input – or rather that complex property of auditory input which encodes the direction of sound – acquires a non-conceptual spatial *content* for an organism by being linked with behavioural output in, presumably, an advantageous way.

(Evans 1982, p. 156)

And he glosses the account as follows:

So far I have been considering the non-conceptual content of perceptual informational states. Such states are not ipso facto perceptual *experiences* – that is, states of a conscious subject .... it seems abundantly clear that evolution could throw up an organism in which such advantageous links were established, long before it had provided us with a conscious subject of experience.

(Evans 1982, pp. 157-158)

Since there is, of course, a distinction between the case in which non-conceptual content is not the content of an experience, and the case in which the non-conceptual content is the content of an experience, this raises the question how that distinction is to be

explained. And it is here that Evans appeals to his idea that the content is the content of conscious perceptual experience when it is not only connected to behavioural dispositions in the ‘advantageous’ way indicated, but is also ‘the input to a *thinking, concept-applying and reasoning system*’ (p. 158). But, by his own lights, Evans has given the constitutive account of this generic type of content in advance of any appeal to consciousness or its being input to a thinking, concept-applying and reasoning system.

This point is indeed driven home in his discussion of Molyneux’s Question, where, as we have seen, his whole point is that we can appeal to the way in which non-conceptual spatial content is constituted by its links to behaviour, in advance of any appeal being made to the way in which this content is linked to the thinking, concept-applying and reasoning system, in order to establish that the spatial concepts are shared across the modalities.

Incidentally, Evans uses the same general strategy in arguing that conceptual thought, unlike the content of conscious experience, must conform to what he calls the Generality Constraint. His idea here is that conceptual thought is subject to the requirement that anyone capable of grasping the thought that a is F must also be capable of grasping the thoughts that b is F, that c is F, and so on, for all the other suitable singular ways of thinking they understand; and they must be capable of thinking that a is G, that a is H, and so on, for every other suitable predicative concept they grasp. But the non-conceptual content of experience is subject to no such constraint:

It is one of the fundamental differences between human thought and the information-processing that takes place in our brains that the Generality

Constraint applies to the former but not to the latter. When we attribute to the brain computations whereby it localizes the sounds we hear, we *ipso facto* attribute to it representations of the speed of sound and of the distance between the ears, without any commitment to the idea that it should be able to represent the speed of light or the distance between anything else.

(Evans 1982, p. 104)

Without any further argument, Evans then takes it for the remainder of the book that the content of perception, whether conscious or not, is not subject to the Generality Constraint. This procedure only makes sense on the supposition that we are here dealing with a single generic notion of non-conceptual content, which can be used equally in connection with conscious and non-conscious states. Since Evans aims to derive the distinctive characteristics of conceptual thought from the fact that it meets the Generality Constraint, he could hardly acknowledge that the content of conscious perception meets the Generality Constraint without maintaining that the content of conscious perception too is conceptual. But the passage just quoted is the only argument he feels obliged to give for the claim that the content of conscious perception is not subject to the Generality Constraint; and this procedure only makes sense on the supposition of a single generic notion of non-conceptual content.

On this interpretation, then, the content of experience is the same as the content of information-processing brain systems. The problem is now that as we have seen, sameness of the contents produced by information-processing in different sensory modalities will not in general be transparent to the subject, even if those contents are

contents of experience. For the module-specific laws which govern those contents will not in general guarantee transparency.

You might argue that the guarantee of transparency comes just because the non-conceptual content is input a ‘thinking, concept-applying and reasoning system’. If the same concept is applied in response to non-conceptual input in two different sensory modalities, then the transparency of conceptual content implies that it will be apparent to the subject that it is the same external property or particular that is being perceived through the two sensory modalities. But that reaction stands Evans’ approach on its head. The whole point of Evans’ approach was to ground the transparent unity of our shape concepts in the transparent unity of egocentric space. Suppose for a moment that the transparent unity of egocentric space is somehow grounded in the transparent sameness of the concepts we apply on the basis of sight and touch. That means that we have lost the explanation Evans set out in the 5-step argument with which I began, whose point was to explain how it can be that we are applying the very same shape concepts on the bases of sight as of touch. The whole strategy was to establish transparent sameness of egocentric content across the different sensory modalities, and argue that this was the basis for the transparent unity of the shape concepts we use. This is evident in Evans 1982, where the transparent unity of egocentric space is argued for without shape concepts being mentioned at all. Or, to put it another way, if we begin with the assumption that egocentric space has no transparent unity in advance of the content being input to a ‘thinking, concept-applying and reasoning system’, we will not be able to establish the unity of the shape concepts we actually have merely by saying that they are responses to egocentric content.

I think the truth is that it is a mistake to approach this topic by identifying the content of conscious experience with either conceptual content or information-processing content. We have to acknowledge that there is such a thing as the phenomenal content of experience, and that it is related to conceptual content and to information-processing content. But phenomenal content does not have to be identified with either conceptual or information-processing content. On the face of it, there are three quite different sets of phenomena here - conceptual content, information-processing content, and phenomenal content - and we ought simply to articulate their relations to one another without feeling compelled to provide reductions.

Which relations ought we to be considering? We have to acknowledge that the conscious experience of a subject is causally explained, in part at any rate, by the content of the information-processing carried out in that subject's brain. Part of the reason why the subject has a conscious experience with this particular phenomenal content is that the brain-processing had a particular informational content. There must further be causal-explanatory relations between the subject's conceptual judgements and the contents of the underlying brain-processing. The whole methodology of cognitive science as applied to human subjects depends on the idea that their verbal reports, which presumably are in general conceptual, can be explained in part by the contents of the underlying brain-processing in various more or less modular sub-systems. So there are certainly relations between information-processing content and phenomenal content, and between information-processing contents and phenomenal contents.

What about the relations between phenomenal content and conceptual content? As I began this essay by saying, it seems to me that this is the really difficult issue raised

by Molyneux's Question. On the face of it, the phenomenal contents of our experiences in different sensory modalities are quite different – isn't that why it is generally apparent to us whether we are seeing or touching an object? And on the face of it, we have the shape concepts we do because of our experiences of shape. We do not think of shapes merely as hypothetical possessors of various functional roles; rather, we take it that in experience we encounter the categorical properties themselves. How then could it be possible for us to acquire and use the very same shape concepts on the basis of vision as on touch, given the apparent differences in the phenomenal contents of sight and touch?

Since this is plainly a difficult question, it is natural to do what Evans does, and replace it with a more tractable problem about the architecture of perceptual information-processing in various modalities, and its relation to conceptual thought. This exercise is actually helpful in addressing the harder problem, just because of the relations I have already remarked between information-processing and phenomenal experience, and between information-processing and conceptual thought. But the exercise will not in itself constitute a solution to the Molyneux problem.

On this understanding, then, let us finally look at Evans' picture of the information-processing architecture, and its relation to our concepts of shape. It seems to me that this picture is instructively mistaken. There are morals here for anyone attempting an assault on the Molyneux problem.

#### **4. Shape Concepts and Egocentric Space**

As I said at the outset, Evans seems to operate on the assumption that if an information-processing procedure can be applied to the conscious content of any one sensory modality, then it can be applied to the conscious content of any sensory modality. There is no basis for this assumption. If we are assuming that the phenomenal content of sensory experience is information-processing content, then the computational processes applied to that content may be module-specific; there is no reason in general to suppose that an operation which can be carried out within one modular system can equally be carried out within all modular systems. Discussing this issue is a little bit complicated here, because the example we have to deal with is Evans' idea that the subject somehow derives information about the shapes of the objects perceived from egocentric information about the locations of their parts. The idea is that if the subject perform this computation within one sensory modality, then it must be possible for the subject to execute the computation within any other sensory modality that provides such egocentric spatial information. I think the real problem is the idea that this computational procedure must be general-purpose, rather than modality-specific, because it is being applied to contents of consciousness. What complicates matters is that it does not seem right anyway to say that we derive shape information from egocentric spatial information. Here is what Evans says about this:

When we think of a blind man synthesising the information he receives by a sequence of haptic perceptions of a chair into a unitary representation, we can think of him ending the process by being in a complex informational state which embodies information concerning the egocentric location of each of the parts of

the chair; the top *over there, to the right* (here, he is inclined to point or reach out), the back running from *there* to *here*, and so on. Each bit of the information is directly manifestable in his behaviour, and is equally and immediately influential upon his thoughts. One, but not the only, manifestation of this latter state of affairs is the subject's judging that there is a chair-shaped object in front of him.

We started off by thinking about what is involved in perceptions which specify the egocentric position of a stimulus, and we find that we have captured perceptions which convey, at least in a rudimentary way, *shape* or *figure* – i.e. perceptions upon the basis of which shape concepts could be applied.

(Evans 1985, 389)

Presumably Evans does not suppose that we find the shapes of objects by articulate verbal reasoning based on knowledge of the egocentric locations of their parts. This crucial passage seems to be suggesting rather a sub-personal computation for finding shapes. It is not here made fully explicit how the computation of shape from egocentric location is supposed to go. The suggestion seems to be that the computation begins with the parts of the object – presumably specified as already possessing their own particular shapes – and that the shape of the object as a whole is derived from this information together with information about the egocentric locations of the parts. So, for example, consider the similarities and differences between the shapes of a teacup and a bucket. The teacup has as parts a bowl and a handle at its side. The bucket has as parts a bowl and a handle over the top. Evans' proposal would then be that the relation between the

handle and the bowl of the teacup is derived from information about their respective egocentric locations. Similarly, the relation between the handle and the bowl of the bucket is derived from knowledge of their respective egocentric locations. We can contrast this with a theory in which the relations between the bowl and the handle in these two cases are given in an object-centred frame of reference, using primitive such as ‘over the mouth of the bowl’, or ‘down one side of the bowl’. There seems to be no particular reason to suppose that the derivation of this kind of information has to go in the way Evans envisages (cf., e.g., Bruce et. al. 1996, chapter 9, ‘Object Recognition’, for a review of the possibilities here).

Suppose, for a moment, though, that Evans’ picture is correct and that shape information is derived from egocentric information in touch. And suppose that we have a subject capable of deriving shape information from egocentric tactual information, as Evans must suppose Molyneux’s newly sighted man to be. And suppose that this subject does also have egocentric visual content, and that this is transparently the same as his tactual egocentric content. It still does not follow that this subject would be capable of identifying shapes on the basis of vision. For the ability to extract shape information from egocentric information could still be modality specific; that is, the capacity to perform this kind of derivation might be something that the subject has in relation to touch, but not in relation to vision.

To see this it may help to consider a case in which spatial information really is derived from egocentric spatial information, so that something like Evans’ picture is correct. Suppose we go back to the distinction I drew in §1 above between a basic egocentric frame, on the one hand, and the use of deictic and intrinsic reference frames

on the other. So, for example, when I look around me and see where everything is, for the purposes of reaching and grasping myself, I am making use of basic egocentric visual information. In effect, I see where objects are in relation to me, but I am not concerned with their spatial relations to one another. If, however, you ask me where the tennis racket is, I might say, 'It is to the right of the ball', and here I am projecting my own left and right onto the ball and using that deictic frame of reference to locate the ball. And when I say 'The racket is on Bill's left', I am using Bill's intrinsic axes to generate a frame of reference, and locating the racket in that frame of reference. Now these computations of deictic and intrinsic locations are performed 'on demand' by the visual system. They have to be derived from the basic egocentric information one has in vision, they are not performed automatically: you have to look to see whether the racket is on Bill's left, for instance. (See Logan 1995 for detailed development of this point.) But it is not, either, as though the determination of deictic and intrinsic locations is a matter of explicit calculation by the subject. The subject does not, for example, have to engage in verbal reasoning to find deictic and intrinsic locations: it really is a visual matter. The subject has only to look to find out the deictic and intrinsic locations of things.

So this case seems to meet a part, at any rate, of Evans' picture: deictic and intrinsic locations are being derived from basic egocentric locations. And this derivation is a perceptual matter. Suppose now that we have a subject who can find deictic and intrinsic locations on the basis of vision alone. And suppose that this subject also has tactual information about the egocentric locations of the various objects around him. Would it follow from this that the subject is able to use this basic egocentric information in touch to find the deictic and intrinsic locations of things? Evans' answer is that the

subject is bound to be able to do so. He is arguing that a subject who can extract shape information from egocentric visual information must also be able to extract shape information from egocentric tactual information, if it is transparently the same egocentric information that is presented in both sensory modalities. Just so, a subject who can find deictic and intrinsic locations on the basis of vision alone ought to be able to perform the very same operations to find deictic and intrinsic locations on the basis of touch.

Once we have set out the reasoning here explicitly, it is evident that there is a problem. The problem is that the computational procedure that is being used to derive the deictic or intrinsic information about location may be modality-specific. That is, the computational procedure may be available for the deliverances of vision but not for the deliverances of touch. It seems entirely possible that there could be a subject who could find deictic and intrinsic locations on the basis of specifically visual attention alone, but who could not compute deictic and intrinsic locations on the basis of touch alone, even though touch provided basic egocentric information.

I think it is easy to see the picture that Evans is using here. He is taking it that after visual or tactual information-processing becomes conscious, once we are at the level at which the information-processing contents are 'subjectively available', any further operations performed on the now conscious contents cannot be modality-specific but must be general-purpose, central-system operations. And that seems simply to be a mistake. It is true that verbal reasoning applied by the subject to information he has in perceptual awareness seems to be general-purpose. Any verbal reasoning I can perform on my visual information is also reasoning I could apply to transparently similar tactual information. But the sub-personal processing applied to visual egocentric information,

whether conscious or not, may still be modality-specific and not available for use on information provided by touch.

### **5. Shape as Categorical**

There is a line of thought in the literature which runs somewhat as follows. Shape properties have causal significance. The shape of an object has endlessly many implications for how it will behave in interactions with other objects. To understand a shape concept you have to grasp something of the causal significance of the shape property. Indeed, even to perceive a shape property you have to grasp something of its causal significance. This is part of the point of Bennett's distinction between shape-blindness and colour-blindness (Bennett 1971). That someone is colour-blind can easily escape detection. If someone were shape-blind, however, it would affect every aspect of interaction with the surroundings; it could not escape notice.

The idea then is that the causal significance of a shape property is the same whether it is identified on the basis of vision or on the basis of touch; the idea is that round things roll, whatever the modality through which they are perceived, and that to perceive something as round, in whatever modality, you must perceive it as having a tendency to roll. So you might argue that this causal significance to the property can be constant across the sensory modalities, even though the appearance of the object varies. This seems to be something like Judith Jarvis Thompson's idea in her discussion of Molyneux, where her point is that even the newly sighted subject, if he really is seeing

the shapes of the objects before him, must grasp that the properties perceived will have the same causal significance, whether they are perceived by sight or touch (Thompson 1974). In contrast, there could be no such thing as perceiving a colour through some modality other than vision, because all there is to a colour is what is given in perception, and the colour perception has no specific causal significance which could be held constant and associated with an appearance in some non-visual modality. In the absence of causal significance, the sensory appearance of the colour is thought to be modality-specific.

Evans developed a version of this idea in ‘Things Without the Mind’, when he spoke of shape properties as embedded in a primitive mechanics of our surroundings: ‘to grasp these primary properties, one must master a set of interconnected principles which make up an elementary theory – of primitive mechanics – into which these properties fit, and which alone gives them sense.’ (Evans 1980, p. 269). In contrast, ‘no single *sensory* property can be defined in relation to different senses.’ (Evans 1980, p. 270).

One way of pursuing this line of thought would be to ask whether the shuffle through egocentric space is really essential to Evans’ approach. His idea was to argue that shape concepts are tied to egocentric representations, and that ‘there is only one egocentric space, because there is only one behavioural space’. But couldn’t we argue directly: ‘there is only one system of shape concepts, because there is only one behavioural space’? That is, you might argue that the implications of roundness for how you interact with the object are exactly the same in vision as in touch, so you must perceive the object as yielding exactly the same affordances, whether you see it or touch it; and that is all there is to seeing it as the same shape again. In effect, this is a form of

the idea that to grasp shape concepts is to grasp the causal significance of shape properties; the proposal is that this grasp of causal significance is provided by a grasp of the affordances of objects.

One problem with this is that the ability move and act on objects in ways appropriate to their shapes seems to be quite different to the ability to apply shape concepts explicitly to them. There are patients who can reach and grasp successfully, while being incapable of successfully comparing the shapes of two seen objects. And there are patients who are incapable of successful reaching and grasping, who can nonetheless correctly compare and contrast the shapes of seen objects (Milner and Goodale 1995). And we ordinarily think that our grasp of shape properties is not exhausted by our grasp of causal significance. An explicit grasp of shape concepts is not merely a matter of making articulate the causal connections we implicitly grasped in our unreflective manipulations of objects. We do not think of an object's possession of a shape property as a matter merely of the object having a collection of dispositions to behave in various ways, or as a matter of the object merely being disposed to be affected by us in various ways. This comes out very clearly when you think of what happens when there is a change in the shape of an object. Suppose for instance that you take a piece of paper and fold it into the shape of an aeroplane. Many of the dispositional properties of the piece of paper have now changed: it has various tendencies it did not have before. If you really thought that there was no more to the paper having a shape than its having such tendencies to behaviour, you would have to suppose that the dispositional characteristics of the paper had somehow been affected directly, and somehow affected en masse. But we have no picture of how you could affect the

dispositional characteristics of an object except by affecting the grounds of those dispositions; and we would ordinarily take it that changing the shape of the paper is changing the categorical grounds of those various dispositions. And what makes it so compelling that we have encountered shape as a categorical property is that our phenomenal experience seems uncontroversibly to be experience of shape as categorical, not merely experience of a collection of unsubstantiated threats and promises.

I think it is fair to say that the current philosophical literature on Molyneux manages only to point, in one way or another, to the sameness of the collections of dispositions that are associated with the shape properties we ascribe on the bases of sight and touch. If, though, we assume that the shape concepts we ordinarily apply on the bases of vision and touch are concepts of categorical properties, rather than merely collections of dispositions, then we need to know more than that the collections of dispositions we are ascribing on the basis of sight and touch are the same. We need to know that that our phenomenal experience in sight and in touch confronts with just the same categorical shape properties, in just the same ways. And so far, that question is still wide open.

## REFERENCES

- Bennett, Jonathan. 1971. *Locke, Berkeley, Hume: Central Themes*. Oxford: Oxford University Press.
- Bruce, Vicki, Patrick R. Green and Mark A. Georgeson. 1996. *Visual Perception: Physiology, Psychology and Ecology*. 3<sup>rd</sup> Edition. Hove, East Sussex: Psychology Press.
- Coltheart, Max. 1999. 'Modularity and Cognition'. *Trends in Cognitive Sciences* 3, 115-120.
- Evans, Gareth. 1980. 'Things Without the Mind'. In Zak van Straaten (ed.), *Philosophical Subjects: Essays Presented to P.F. Strawson*. Oxford: Oxford University Press. Reprinted in his *Collected Papers*. Oxford: Oxford University Press (page references to this reprinting).
- Evans, Gareth. 1982. *The Varieties of Reference*. Oxford: Oxford University Press.
- Evans, Gareth. 1985b. 'Molyneux's Question'. In his *Collected Papers*. Oxford: Oxford University Press.
- Fodor, Jerry. 1983. *The Modularity of Mind*. Cambridge, Mass.: MIT Press.
- Garnham, A. 1989. 'A Unified Theory of the Meaning of Some Spatial Relational Terms'. *Cognition*, 31, 45-60.
- Gibson, J.J. 1979. *The Ecological Approach to Visual Perception*. Hillsdale, NJ: Erlbaum.
- Grice, H.P. 1962. 'Some Remarks about the Senses'. In R.J. Butler (ed.), *Analytical Philosophy*. Oxford: Blackwells.

- Gunther, York. 2003. *Essays on Nonconceptual Content*. Cambridge, Mass.: MIT Press.
- Locke, John. 1975. *An Essay Concerning Human Understanding*, ed. P.H. Nidditch. Oxford: Oxford University Press.
- Logan, Gordon. 1995. 'Linguistic and Conceptual Control of Visual Spatial Attention.' *Cognitive Psychology* 28, 103-174.
- Milner, A. David and Goodale, Melvyn A. 1995. *The Visual Brain in Action*. Oxford: Oxford University Press.
- Streri, Arlette. 1993. *Seeing, Reaching, Touching: The Relations Between Vision and Touch in Infancy*. Cambridge, Mass.: MIT Press.
- Streri, Arlette and M.-G. Pêcheux. 1986. 'Cross-Modal Transfer of Form in 5-Month-Old Infants'. *British Journal of Developmental Psychology*, 4, 161-167.
- Thompson, Judith Jarvis. 1974. 'Molyneux's Question'. *Journal of Philosophy* 71,