AN EPISTEMOLOGY FOR THE STUDY OF CONSCIOUSNESS

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Abstract. *This is a prepublication version of the final chapter from the Blackwell Companion to Consciousness. In it I re-examine the basic conditions required for a study of conscious experiences in the light of progress made in recent years in the field of consciousness studies. I argue that neither dualist nor reductionist assumptions about subjectivity versus objectivity and the privacy of experience versus the public nature of scientific observations allow an adequate understanding of how studies of consciousness actually proceed. The chapter examines the sense in which the experimenter is also a subject, the sense in which all experienced phenomena are private and subjective, the different senses in which a phenomenon can nevertheless be public and observations of it objective, and the conditions for intra-subjective and intersubjective repeatability. The chapter goes on to re-examine the empirical method and how methods used in psychology differ from those used in physics. I argue that a reflexive understanding of these relationships supports a form of "critical phenomenology" that fits consciousness studies smoothly into science.*

The nature of consciousness is commonly thought to present a deep problem for science. Psychology and its sister disciplines have nevertheless developed many different methodologies for investigating its phenomenology, in studies of sensation, perception, emotion, thinking, and many other areas that deal directly or indirectly with how phenomena are experienced. Many examples can be found in the chapters of this book. Over the last 20 years or so, there has also been a renewed interest in the development of first-person research methods that focus on "what it is like for subjects to be" in various situations of interest to investigators, for example with the expanded use of phenomenologically inspired *qualitative methods* that are used both in isolation and in conjunction with triangulating third-person quantitative methods in psychological research (see for example, Denzin & Lincoln, 2000, for a review). Complementary first- and third-person methods are also routinely used (without embarrassment or apology) in much of neuropsychology, for example in the search for the neural correlates of consciousness using neuroimaging techniques (see Rees & Frith, chapter43). There have also been in depth re-evaluations of how the use of such combined first- and third-person methods can be refined, for example in the field of neurophenomenology and more generally in cognitive neuroscience (see for example, readings in Varela and Shear, 1999, Velmans, 2000a, Jack & Roepstorff, 2003, 2004).

The investigation of conscious experiences

However, these advances in consciousness studies do not fit easily into the ways that we normally think about science. Given their first-person nature, how is it possible to investigate conscious experiences? Most people assume that the physical objects we see around us are *public*, *objective*, and *observer-independent* (they exist independently of the mind of the observer) making them suitable for investigation by traditional third-person methods. By contrast, percepts of objects and other contents of consciousness are generally thought to be *private*, *subjective*, and *observer-dependent* (their existence depends on the mind of the observer) which is thought to impede their investigation. If physical science relies on public, objective data, how can one establish a "science of consciousness" which relies, at least in part, on subjective experiences? During much of the 20th Century this problem was thought to be so acute that behaviourist psychology tried to exclude the study of consciousness from science, redefining psychology as the "study of behaviour". In the words of John Watson (1913) "Psychology as a behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its method nor is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness" (p 158). Indeed, "The time has come when psychology must discard all reference to consciousness; when it need no longer delude itself into thinking that it is making mental states the object of observation..." (Ibid, p163).

The problem of forming a science of consciousness is made more difficult by the way that consciousness and its contents are usually conceived. Substance dualists such as Descartes believed consciousness to be a state of the mind, and the mind to be an immaterial substance (*res cogitans*), placing it beyond the remit of materialist science; the nature of consciousness, on this view, is a matter for philosophers and theologians. In reaction to this, physicalists of various persuasions have tried to deal with "the problem of consciousness" by denying that consciousness exists or attempting to reduce it to something "objective" such as overt behaviour or a state or function of the brain (see, for example, Baars, chapter 18, chapter 25, or the discussion of Dennett, by Schneider, chapter 24).

In what follows, I suggest that these ways of conceptualising both the problems faced by a science of consciousness and how to resolve them are mistaken. While methodologies for the study of phenomenal consciousness continue to develop and various difficulties still need to be faced and overcome, it will be clear from the chapters in this book that many productive research programmes already exist. I also argue that the seemingly irresolvable dualist versus physicalist debate about the nature of consciousness has its roots in widespread, but nevertheless false assumptions about its phenomenology that they *share*. In so far as they misdescribe the experienced features of conscious experience, they misconstrue the problems of investigating it, giving a misleading impression of how scientific investigations of consciousness can and do proceed.

Common assumptions about the way that physical phenomena relate to psychological phenomena.

A brief account of dualist and reductionist assumptions about conscious phenomenology is given in chapter 27 of this book (see also Velmans, 2000b, chapters 2 to 6 for a more detailed discussion). What assumptions do they share? Substance dualists *split* the world in two ways: for example, dualist models of perception (a) separate the perceiving subject from the perceived object, and (b) separate the experience *of* the object (its conscious phenomenology) in the mind of the subject from the subject's brain (see Figure 27.1). Reductionists accept split (a)—that the perceiving subject is distinct from the perceived object, but they question split (b). While they often accept that experiences *seem* to be immaterial phenomena "in the mind", they argue that science will eventually show these to be nothing more than physical states or functions of the brain (see Figure 27.2).

In short, while dualists and reductionists disagree about the ontology of conscious experiences (about what they really *are*), by and large they agree about how they *appear* (about their phenomenology). They also agree that "physical phenomena" in the world are completely *distinct* from "conscious percepts of those phenomena" in the subject's mind or brain—underpinning the view that "physical phenomena" are public and objective while "conscious phenomena" are private and subjective. This separation of physical from conscious phenomena is illustrated by the way these are conventionally thought to relate to each other in studies of visual perception, as shown in Figure 55.1.

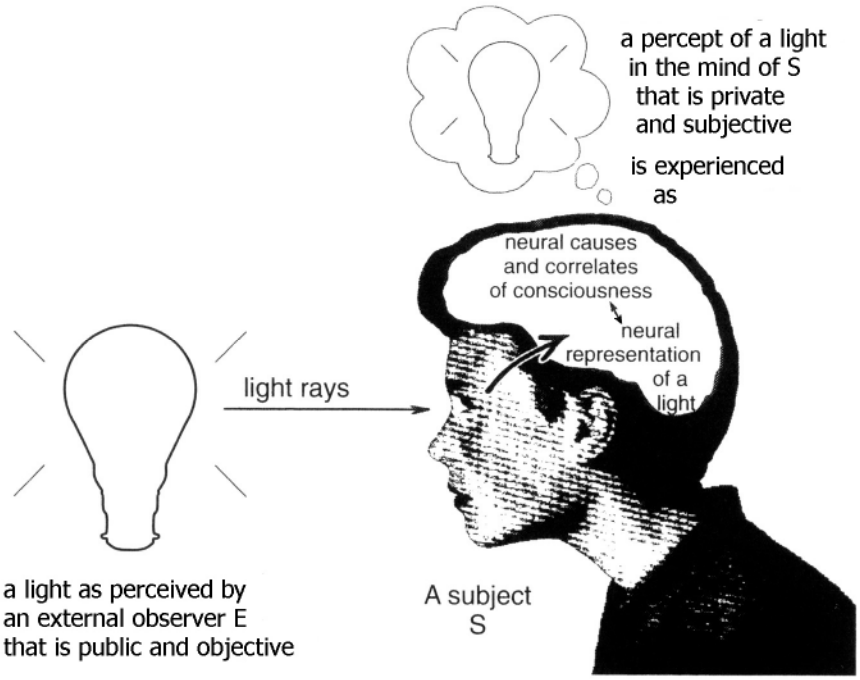

Figure 55.1 A dualist way of viewing the relation of observations to experiences (adapted From Velmans, 2000b)

In this basic experimental arrangement, the subject (S) is asked to focus on the light (the stimulus) and report on or respond to what she experiences, while the

experimenter (E) controls the stimulus and observes S's behaviour and what is going on in her brain. E has observational access to the stimulus and to S's brain states and behaviour, but has no access to what S experiences. In principle, other experimenters can also observe the stimulus and S's brain states and behaviour. Consequently, what E has access to is said to be "public" and "objective". As E does not have access to S's experiences, these are said to be "private" and "subjective" and a problem for science, in the ways noted above. This apparently radical difference in the *epistemic status* of the data accessible to E and S is enshrined in the words commonly used to describe what they perceive. That is, E makes *observations*, whereas S merely has *subjective experiences.*

This way of looking at things forms an adequate working model for many studies. It also fits in with our common (naïve realist) assumption that what we see out in space is the *object itself* and that we have an additional, veridical experience *of* that object in our mind or brain. However, it is easy to show that something about this way of looking at things must be wrong.

First, science tells us that the perceived colour, shape, location in phenomenal space and other visual features of an object such as the light in Figure 55.1 are just surface *representations* of what that object is like, constructed by our visual systems. This is neatly demonstrated by neurological syndromes in which specific features of the visual system are damaged. For example, without colour vision (achromatopsia) the visual world appears entirely coloured in black, white and shades of grey, with other syndromes there is an inability to see form, or movement, or depth in space, and so on (see Zeki, chapter 45). Nor are the surface representations constructed by a normally functioning (but unaided) visual system complete representations of those surfaces—as a microscope will easily show. Such surface appearances are also very different to the descriptions of the deeper structure of the objects and the space in which they are embedded given by physics, for example by relativity theory and quantum mechanics. So, although we normally treat the perceived object (the phenomenal object) as if it truly is the "physical object", what we experience is nevertheless how that object *looks to us*, and not (in any complete sense) how it is *in itself.* Similarly, although we normally think of the 3D phenomenal space in which the perceived object is embedded as "physical space", it too is how space looks to us (phenomenal space) rather than space itself (I give a deeper analysis of how phenomenal objects and the phenomenal space in which they appear to be embedded relate to objects and space themselves in chapter 27; a more detailed analysis is also given in Velmans, 2000b, chapter 7).

Note that it follows from this that, while perceived objects are in one sense "physical" (there really are objects there that have appearances), they are in another sense "psychological" (the way that they appear depends not just on the objects themselves but on the way that those appearances are constructed by our visual systems).

Second, we *don't* have any experience of an object "in our mind" or "in our brain" *in addition* to the object as perceived out in the world. Rather, such phenomenal objects *constitute* what we experience—and in terms of their *phenomenology*, an object as

perceived and our experience *of* the object are one and the same. When looking at this print, for example, the print that one sees out here on the page is the only "print experience" that one has. So the naïve realist view that what we see out in space is the *object itself* and that we have an additional, veridical experience *of* that object in our mind or brain is wrong in two ways—it is neither consistent with third person science, nor first person experience.

If so, we need to rethink the experimental arrangement shown in Figure 55.1 in the reflexive way shown in Figure 55.2. This makes it clear that when S attends to the light stimulus she does *not* have an experience *of* a light that is subjectively located "in her mind" or "in her brain", with its attendant problems for science. She just experiences a light in a room. Indeed, what the subject experiences is very similar to what the experimenter experiences when he gazes at the light (she just sees the light stimulus from a different angle), in spite of the different terms they might use to describe what they experience (a "physical light stimulus" versus a "subjective experience of light"). If so, there can be no actual difference in the subjective vs. objective status of the *phenomenology* of the light "experienced" by S and "observed" by E.

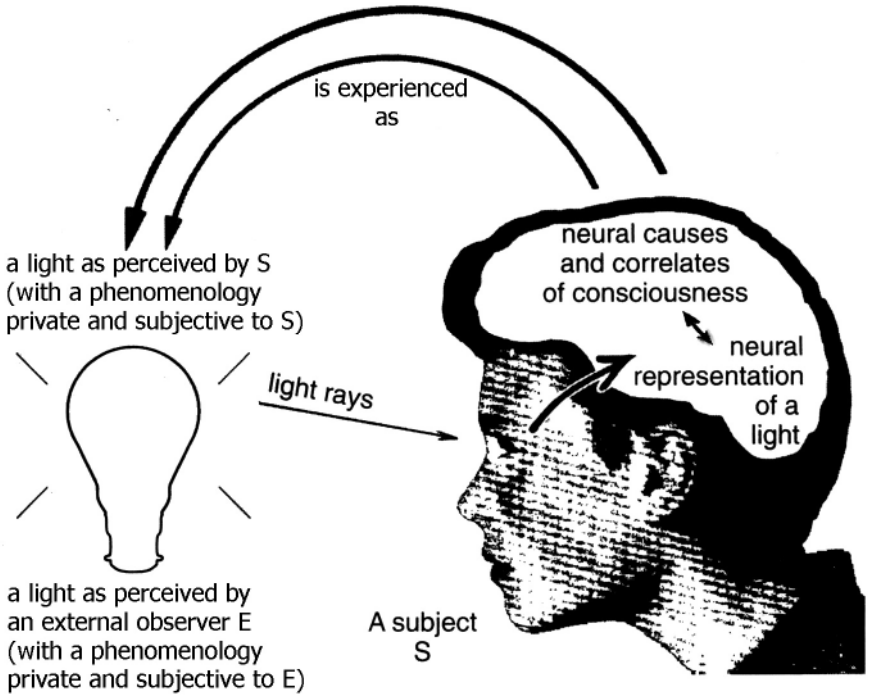

Figure 2. A reflexive way of viewing the relation of observations to experiences (adapted from Velmans, 2000b)

When an experimenter is also a subject.

Another way to grasp the same point is to note that *the roles of S and E are interchangeable*. What makes one human being a "subject" and another an "experimenter"? As I have noted in Velmans (2000b, chapter 8) their different roles are defined largely by *differences in their interests* in the experiment, reflected in

differences in what they are required to do. The subject is required to focus only on her *own* experiences (of the light), which she needs to respond to or report on in an appropriate way. The experimenter is interested primarily in the *subject's* experiences, and in how these depend on the light stimulus or brain states that he can "observe."

To exchange roles, S and E merely have to turn their heads, so that E focuses exclusively on the light and describes what he experiences, while S focuses her attention not just on the light (which she now thinks of as a "stimulus") but also on events she can observe in E's brain, and on E's reports of what he experiences. In this situation, E becomes the "subject" and S becomes the "experimenter." Following current conventions, S would now be entitled to think of her observations (of the light and E's brain) as "public and objective" and to regard E's experiences of the light as "private and subjective."

However, this outcome is absurd, as the phenomenology of the light remains the same, viewed from the perspective of either S or E, whether it is *thought of* as an "observed stimulus" or an "experience." Nothing has changed in the character of the light that E and S can observe other than the focus of their interest. That is, in terms of *phenomenology* there is no difference between "observed phenomena" and "experiences."

But which is it? If the phenomenology of the light remains the same whether it is thought of a "stimulus" or an "experience," is the phenomenon *private and subjective* or is it *public and objective*? This is a subtle matter that we need to examine with care.

The sense in which all experienced phenomena are private and subjective.

In dualism, "experiences" are private and subjective, while "physical phenomena" are public and objective as noted above. However, according to the reflexive model there is no *phenomenal* difference between the physical phenomena that we "observe" and the physical phenomena that we "experience". When we turn our attention to the external world, physical phenomena just *are* what we experience. If so, there is a sense in which physical phenomena are "private and subjective" just like the other things we experience. For example, I cannot experience your phenomenal mountain or your phenomenal tree. I only have access to my own phenomenal mountain and tree. Similarly, I only have access to my own phenomenal light stimulus and my own observations of its physical properties (in terms of meter readings of its intensity, frequency, and so on). That is, w*e each live in our own private, phenomenal world*.

If we each live in our own private, phenomenal world then each "observation" is, in a sense, private. This was evident to the father of operationalism, the physicist P.W. Bridgman (1936), who concluded that, in the final analysis, "science is only my private science". However, this is clearly not the whole story. When an entity or event is placed beyond the body surface (as the entities and events studied by Physics usually are) it can be perceived by any member of the public suitably located in space and

time. Under these circumstances such entities or events are "public" in the sense that there is *public access* to the observed entity or event *itself*.

Public access to the stimulus itself.

While we normally think of the phenomena that we perceive as being "physical", this distinction between the phenomena perceived by any given observer and the stimulus entity or event *itself* is important. Being appearances, perceived phenomena *represent* things themselves, but are not identical to them (see above). The light perceived by E and S, for example, can be described in terms of its perceived brightness and colour. But, in terms of physics, the stimulus is better described as electromagnetism with a given mix of energies and frequencies. As with all visually observed phenomena, the phenomenal light only *becomes* a phenomenal light once the stimulus interacts with an appropriately structured visual system—and the result of this observed-observer interaction is an *experienced* light which is private to the observer in the way described above. However, if the stimulus itself is beyond the body surface and has an independent existence, it remains there *to be* observed whether it is observed (at a given moment) or not. That is why the stimulus itself is *publicly accessible* in spite of the fact that each observation/experience of it is private to a given observer.

Public in the sense of similar private experiences.

To the extent that observed entities and events are subject to similar perceptual and cognitive processing in different human beings, it is also reasonable to assume a degree of *commonality* in the way such things are experienced. Although each experience remains private, it may be a private experience that others share. For example, unless observers are suffering from red/green colour blindness, we normally take it for granted that they perceive electromagnetic stimuli with wavelength 700 nm as red and those of 500 nm as green. Given the privacy of light phenomenology there is no way to be certain that others experience "red" and "green" as we do ourselves (the classical problem of "other minds"). But in normal life, and in the practice of science, we adopt the working assumption that the same stimulus, observed by similar observers under similar conditions, will produce similar observations or experiences. Thus, while *experienced* entities and events (phenomena) remain private to each observer, if their perceptual, cognitive and other observing apparatus is similar, we assume that their experiences (of a given stimulus) are similar. Consequently, experienced phenomena may be "public" in the special sense that other observers have similar or shared experiences.

In sum:

1. There is only *private* access to individual observed or experienced *phenomena.*

2. There can be *public* access to the entities and events that serve as the stimuli for such phenomena (the entities and events which the phenomena

represent). This applies, for example, to the entities and events studied by physics.

3. If the perceptual, cognitive and other observing apparatus of different observers is similar, we assume that their experiences (of a given stimulus) are similar. In this special sense, experienced phenomena may be *public* in so far as they are *similar or shared private experiences.*

From subjectivity to intersubjectivity

This reanalysis of private versus public phenomena also provides a natural way to think about the relation between *subjectivity* and *intersubjectivity*. Each (private) observation or experience is necessarily *subjective*, in that it is always the observation or experience of a *given* observer, viewed and described from his or her individual perspective. However, once that experience is shared with another observer it can become *inter*-subjective. That is, through the sharing of a similar experience, subjective views and descriptions of that experience potentially converge, enabling intersubjective agreement about what has been experienced.

How different observers establish intersubjectivity through negotiating agreed descriptions of shared experiences is a complex process that we do not need to examine here. Suffice it to say that it involves far more than shared experience. One also needs a shared language, shared cognitive structures, a shared world-view or scientific paradigm, shared training and expertise and so on. To the extent that an experience or observation can be *generally* shared (by a community of observers), it can form part of the database of a communal science.

The quest for objectivity.

The terms "objectivity" and "intersubjectivity" are often used interchangeably in philosophy of science, for example in the writings of Karl Popper. However, in his book *Objective Knowledge*, Popper makes the added claim that the logical content of books, and the world of scientific problems, theories and arguments forms a kind of "third world" of objective knowledge, and "knowledge in this objective sense is totally independent of anybody's claim to know; it is also independent of anybody's belief, or disposition to assert, or assert, or to act. Knowledge in the objective sense is knowledge without a knower; it is knowledge without a knowing subject" (Popper, 1972, p. 109).

But note that, so far, the above analysis of intersubjectivity avoids any reference to "objectivity" in spite of the fact that it deals with a standard *physical* phenomenon (an observed light). Intersubjectivity of the kind described above requires the *presence* of subjectivity rather than its *absence.*

Popper is right, of course, to note that knowledge that is codified into books and other artefacts has an existence that is, in one sense, observer-free. That is, the *books* exist in our libraries after their writers are long dead and their readers absent, and they

form a repository of knowledge that can influence future social and technological development in ways which extend well beyond that envisaged by their original authors. However the *knowledge itself* is not observer-free. Rather, it is valuable precisely because it encodes individual or collective experience. Nor, strictly speaking, is the print in books "knowledge." As Searle (1997) points out, words and other symbolic forms are intrinsically just ink marks on a page. They only become *symbols,* let alone convey meaning, to creatures that know how to interpret and understand them. But then the knowledge is in the knowing agent, not in the book. If so, the autonomous existence of books (and other media) provides no basis for "objective knowledge" of the kind that Popper describes, i.e. knowledge "that is totally independent of anybody's claim to know," "knowledge without a knower," and "knowledge without a knowing subject". On the contrary, without knowing subjects, there is no knowledge *of any kind* (whether objective or not).

Four kinds of objectivity

Given the above, I would argue for a more nuanced understanding of scientific "objectivity." I would agree that:

1) Science can be "objective" in the sense of "intersubjective" (see above).

2) Descriptions of observations or experiences (observation statements) can be "objective" in the sense of sense of being dispassionate, accurate, truthful and so on.

3) Scientific method can also be "objective" in the sense that it follows well-specified, repeatable procedures (perhaps using standard measuring instruments).

However, one cannot make observations without engaging the experiences and cognitions of a conscious subject (unobserved meter readings are not "observations"). If so

4) Science *cannot* be "objective" in the sense of being *observer-free*.

Intra-subjective and inter-subjective repeatability.

According to the reflexive model of perception in Figure 55.2 and the analysis above, there is no phenomenal difference between *observations* and *experiences*. Each observation results from an interaction of an observer with an observed. Consequently, each observation is observer-dependent and unique. This applies even to observations made by the same observer, of the same entity or event, under the same observation conditions, *at different times*—although under these circumstances the observer may have no doubt that he/she is making *repeated* observations of the same entity or event.

If the conditions of observation are sufficiently standardised (e.g. using meter readings, computer printouts and so on) the observation may be repeatable within a community of (suitably trained) observers, in which case intersubjectivity can be

established by *collective agreement*. Once again, however, it is important to note that different observers cannot have a numerically *identical* experience. Even if they observe the same event, at the same location, at the same time, they each have their own, unique experience. *Inter*subjective repeatability resembles *intra*subjective repeatability in that it merely requires observations to be sufficiently similar to be taken for "tokens" of the same "type." This applies particularly to observations in science, where repeatability typically requires intersubjective agreement amongst scientists observing similar events at *different* times and in *different* geographical locations.

Consequences of the above analysis for a science of consciousness

The analysis has, so far, focused on physical events. But the same analysis can be applied to the investigation of events that are usually thought of as "mental" or "psychological" (thoughts, images, dreams, feelings etc.). Although the *methodologies* appropriate to the study of physical and mental phenomena may be very different, the same *epistemic* criteria apply to their scientific investigation. Physical phenomena and mental (psychological) phenomena are just different kinds of phenomena that observers experience (whether they are experimenters or subjects).

This convergence of psychological with physical phenomena is self-evident in situations where the same phenomenon can be thought of as either "physical" or "psychological" depending on one's interest in it. At first glance, for example, a visual illusion of the kind shown in Figure 3, might seem to present difficulties, for the reason that physical and psychological descriptions of this phenomenon conflict.

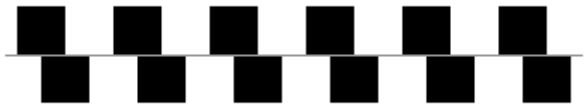

Figure 55.3 In what way does the central line tilt?

Physically, the figure consists entirely of squares, separated by a horizontal line. But subjectively, the line seems to tilt down to the left, and the squares don't seem to be entirely square. However, these physical and psychological descriptions result from two different observation procedures. To obtain the physical description, an experimenter E can place a straight edge against each line, thereby obscuring the cues responsible for the illusion and providing a fixed reference against which the curvature and orientation of the line can be judged. To confirm that the line is actually straight, other experimenters ($E_{1\ to\ n}$) can repeat this procedure. In so far as they each observe the line to be straight under these conditions, their observations are public, intersubjective and repeatable.

But, the fact that the line *appears* to be bent and to tilt to the left (once the straight edge is removed) is similarly public, intersubjective and repeatable (amongst subjects

$S_{1\ to\ n}$). Consequently, the illusion can be investigated using relatively conventional scientific procedures, in spite of the fact that the *illusion* is unambiguously *mental*. One can, for example, simply move the straight edge outside the figure making it seem parallel to the central line—thereby obtaining a measure of the angle of the illusion. Similar criteria apply to the study of other mental events. $S_{1\ to\ n}$ might, for example, all report that a given increase in light intensity produces a just noticeable difference in brightness, an experience/observation that is intersubjective and repeatable. Alternatively, $S_{1\ to\ n}$ might all report that a given anaesthetic removes pain or, if they stare at a red light spot, that a green after-image appears, making such phenomena similarly public, intersubjective, and repeatable.

The empirical method.

In sum, it is possible to give a non-dualist account of the empirical method, i.e. a non-dualist account of what scientists actually do when they test their theories, establish intersubjectivity, repeatability and so on which accepts that, in terms of *phenomenology*, the phenomena that scientists "observe" and the phenomena that scientists "experience" are one and the same. While this forces one to re-examine the sense in which observed phenomena are "public and objective" rather than "private and subjective," the crucial *role* of observations in theory testing and development remains unchanged.

The above analysis also retains a number of senses in which observations can be made "objective." That is, observations can be "objective" in the sense of *intersubjective*, and the observers can "be objective" in the sense of being dispassionate, accurate and truthful. Procedures can also "be objectified" in the sense of being standardised and explicit. No observations, however, can be objective in the sense of being *observer-free*. Looked at in this way, there is no unbridgeable, epistemic gap that separates physical phenomena from psychological phenomena.

In short, once the *empirical method* is stripped of the dualist splitting of "public, objective" from "private, subjective" phenomena, it applies as much to the science of consciousness as it does to the science of physics in that it adheres to the following principle:

If observers $E_{1\ to\ n}$ (or subjects $S_{1\ to\ n}$) carry out procedures $P_{1\ to\ n}$ under observation conditions $O_{1\ to\ n}$ they should observe (or experience) result R.

(Assuming that $E_{1\ to\ n}$ and $S_{1\ to\ n}$ have similar perceptual and cognitive systems, that $P_{1\ to\ n}$ are the procedures which constitute the experiment or investigation, and that $O_{1\ to\ n}$ includes *all* relevant background conditions, including those internal to the observer, such as their attentiveness, the paradigm within which they are trained to make observations, and so on—where the values of subscript n can differ for E, S, P, and O respectively).

Or, to put it more simply:

If you carry out these procedures you will observe or experience these results.

How methods used to study consciousness differ from methods used in physics.

It goes without saying that the empirical method, formulated in this way, provides only basic, *epistemic* conditions for the study of consciousness. One also requires *methodologies* appropriate to the subject matter—and the methodologies required to study conscious appearances are generally very different from those used in physics. There are many ways in which the phenomena we usually think of as physical or psychological differ from each other and amongst themselves (in terms of their relative permanence, stability, measurability, controllability, describability, complexity, variability, dependence on the observational arrangements, and so on). Even where the *same* phenomenon is the subject of both psychological and physical investigation (as might be the case with the light in Figure 55.2 or the visual illusion in Figure 55.3 above) the *interests* of psychologist and physicist differ, requiring different investigative techniques. These differences in interests or in the phenomena themselves can greatly complicate systematic study and it is not my intention to minimise these difficulties. Unlike entities and events *themselves*, one cannot hook measuring instruments up to conscious appearances. For example, an instrument that measures the intensity of the light in Figure 55.2 (in lumens) cannot measure its experienced brightness. Given this, one needs some method of systematising subjective judgements and consequent reports, for example, by recording minimal discriminable differences in brightness, in the ways typically used in psychophysical experiments.

Symmetries and asymmetries of access

Physical and psychological investigations also have systematic differences in the typical *relation* of the observer to that which is observed. For experimental purposes, the entities and events studied by physics are located *external* to the observers. Placed this way, such entities and events afford *public access* (see above) and different observers establish intersubjectivity, repeatability and so on by using similar exteroceptive systems and equipment to observe them. E and S in Figure 55.2, for example, might observe the light via their visual systems, supplemented by similar instruments that measure its intensity, frequency and other physical properties. When S and E (and any other observer suitably place in space and time) use similar means to access information about a given entity or event we may say that they have *symmetrical access* to the observed (in this case, to the stimulus light itself). If the event of interest is located on the surface of or within S's body, or within S's brain, as would be the case in the study of physiology or neurophysiology, it remains external to E. Thus placed, it can still afford public, symmetrical access to a community of other, suitably placed external observers ($E_{1\ to\ n}$). Consequently, such events can be investigated by the same "external" means employed in other areas of natural science.

However, E and S (and any other observers) have *asymmetrical access* to each other's *experiences* of an observed (asymmetrical access to *each other's* observed phenomena). That is, they know what it is like to have their own experiences, but they can only access the experiences of others indirectly via their verbal descriptions or

non-verbal behaviour. This applies to *all* observed phenomena; for example, it applies even if the observed is a simple physical stimulus, such as the light in Figure 55.2. As E does not have direct access to S's experience of the light and vice-versa, there is no way for E and S to be *certain* that they have a similar experience (whatever they might claim). E might nevertheless *infer* that S's experience is similar to his own on the assumption that S has similar perceptual apparatus, operating under similar observation arrangements, and on the basis of S's similar observation reports. S normally makes similar assumptions about E. It is important to note that this has not impeded the development of physics and other natural sciences, which simply ignore the problem of "other minds" (uncertainty about what other observers actually experience). They just take it for granted that if *observation reports* are the same, then the corresponding *observations* are the same, and consequently that the observed entities and events are the same. The success of natural science testifies to the pragmatic value of this approach.

Given this, it seems justifiable to apply the same pragmatic criteria to the observations of subjects in studies of consciousness (i.e. to their "subjective reports"). If, given a standard stimulus and standardised observation conditions, different subjects give similar reports of what they experience, then (barring any evidence to the contrary) it is reasonable to assume that they have similar experiences. Ironically, psychologists have often agonised over the merits of observation reports *when produced by subjects*, although like other scientists, they take them for granted *when produced by experimenters*, on the grounds that the observations of subjects are "private and subjective," while those of experimenters are "public and objective." As experimenters do not have direct access to each other's experiences any more than they have access to the experiences of subjects, this is a fallacy, as we have seen. Provided that the observation conditions are sufficiently standardised, the observations reported by subjects can be made public, intersubjective, and repeatable amongst a community of subjects in much the same way that observations can be made public, intersubjective and repeatable amongst a community of experimenters. This provides an epistemic basis for a science of consciousness that includes its phenomenology.

In sum, asymmetries of access complicate, but do not prevent the investigation of experience. In Figure 55.2, E has access, in principle, to the events and processes in S's visual system, but not to S's experience. While S focuses exclusively on the light, she has access to her experience, but not to the antecedent processing in her visual system. Under these circumstances, the information available to S *complements* the information available to E. To obtain a complete account of visual perception one needs to utilise *both* sources of information. In Velmans (1991a, b, 2000b) I have argued that a similar analysis can be applied to all situations where both first- and third-person information about the operation of a mental process is available. First- and third-person accounts of the mind are complementary and mutually irreducible. A complete account of mind requires both.

There is, of course, much more to be said about suitable methods for the investigation of consciousness. And it has to be admitted that the methodological problems are

sometimes complex and the solutions sometimes controversial, particularly in the use of those introspective and phenomenological methods where subjects become the primary investigators of themselves (see Gallagher, chapter 53 and Shear, chapter 54). But this does not alter the fact that the *phenomena* of consciousness observed under these conditions are potentially public (in the sense of being private experiences that are shared), intersubjective and repeatable. Consequently, the need to use and develop methodologies appropriate to the study of such phenomena does not place them beyond science. Rather, it is part of science—although in this case, a form of first-person science.

Critical Realism

The grounding of science in intersubjectivity rather than some observer-free objectivity places scientific knowledge back where it belongs, in individual researchers and scientific communities. Individuals, interacting with their communities, establish intersubjectively shared, consensus realities. Different social and scientific communities may, of course, hold very different views about the nature of the world, and investigate it in ways determined by very different paradigms. Grounding science in intersubjectivity therefore introduces a measure of social relativism. But it does not, in my view, open the way to an unfettered social relativism.

Knowledge may exist only in the knower (or a community of knowers), but *it is constrained by the nature of that which is known*. Consequently, the epistemology developed here (and in Velmans, 1990, 1993, 1999, 2000b) adopts a form of *critical realism* that is entirely standard in mainstream science. It assumes that experiences are experiences *of* entities and events (in the external world, body, brain or mind itself) and that these experiences are representations of those entities and events. This allows that there may be many different ways of experiencing a given entity or event (from different perspectives, distances, with attention directed to different properties, and so on), but it also accepts that, for given purposes, representations can differ in their accuracy or utility. In the visual system, for example, there are clear differences between "veridical" percepts, illusions and hallucinations that can be tested by physical interaction with the world. In a similar way, there are many ways of construing or theorising about the nature of observed entities and events appropriate to the purposes of different social and intellectual communities. But this does not prevent an assessment of the relative merits of different theories, for example in terms of their ability to explain, predict or control observed events, that is, in terms of their ability to *fulfil* the purposes for which they are to be used.

Critical phenomenology

The analysis above also supports a form of *critical phenomenology* (CP)—a commonsense, natural, but non-reductive approach to the study of mind. This adopts the conventional view that human experiences have causes and correlates in the external world, body and brain that can be investigated by a range of *third-person methods* commonly used in cognitive science, neuroscience and related sciences. However CP recognises that third-person methods do *not* provide direct

access to subjects' experiences, and that the causes and correlates of conscious experiences are not the experiences themselves (see Velmans, 1998, 2000b chapters 3, 4 and 5 for an extensive discussion). Subjects do, however, have access to their own experiences, on which they can report. Consequently, third-person methods have to be supplemented by *first-person methods* that guide subjects to attend to aspects of their conscious experience that are of interest to experimenters (or to the subjects themselves).

It will be apparent to those familiar with the issues that this even-handed, nonreductive approach to first- and third-person methods distinguishes CP from more behaviourally oriented approaches such as Dennett's *heterophenomenology* which tries to restrict the science of consciousness to third-person methods. I do not have space to do a fuller comparison here, but see the on-line dialogue with Dennett in Velmans (2001), Dennett (2003), and Velmans (2006) for a more detailed analysis.

Why call this approach "*critical* phenomenology" rather than just "phenomenology"? First, to dissociate it from the classical, philosophical versions of Phenomenology discussed by Gallagher in chapter 53, in which third-person methods and third-person science have a minor (and sometimes suspect) role. Instead, critical phenomenology adopts a form of "psychological complementarity principle" in which first-person descriptions of experience and third-person descriptions of correlated brain states are accounts of what is going on in the mind that are complementary and mutually irreducible. A complete account of mind requires both (see above). Second, while CP takes subjective experiences to be real, it remains cautious about the veridical nature of phenomenal reports in that it assumes neither first- or third-person reports of phenomena to be incorrigible, complete, or unrevisable—and it remains open about how such reports should be interpreted within some body of theory.

CP is also open to the possibility that first-person investigations can be improved by the development of more refined first-person investigative methods, just as third-person investigations can be improved by the development of more refined third-person methods. CP also takes it as read that first- and third-person investigations of the mind can be used conjointly, either providing triangulating evidence for each other, or in other instances to inform each other. Third-person observations of brain and behaviour for example can sometimes inform and perhaps alter interpretations of first-person experiences (very subtle differences in first-person experience for example can sometimes be shown to have quite distinct, correlated differences in accompanying neural activity in the brain). Likewise, first-person accounts of subjective experience can inform third-person accounts of what is going on in the brain—indeed, without such first-person accounts, it would be impossible to discover the neural correlates of given conscious experiences. In adopting the view that subjective conscious experiences are real, but our descriptions and understanding of them revisable, CP exemplifies the *critical realism* outlined above.

Finally, CP is *reflexive*, taking it for granted that *experimenters* have first-person experiences and can describe those experiences much as their subjects do. And crucially, experimenter's *third-person reports of others* are based, in the first instance, on their *own first-person experiences* in the ways shown above.

In what way can the phenomena that we experience form part of science? If this analysis is correct, the "phenomena" observed by experimenters are as much a part of the world that they experience as are the "subjective experiences" of subjects. If so, the *whole* of science may be thought of as an attempt to make sense of the phenomena that we observe or experience.

Further reading

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