

Commentary **Logan Trujillo**

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Are verbal reports all we will ever have in a science of consciousness?

The central point that I took from Morten Overgaard's article "On the theoretical and methodological foundations for a science of consciousness", is that a science of consciousness is possible if we assume a priori that a relation exists between subjective verbal reports and conscious states. This is presumably due to a fundamental asymmetry in the direct observation of conscious states. We have no means to measure consciousness directly in a third-person manner; we have no "telescope into the mind". This is the apparent fact of the matter concerning the privacy of subjective experience. The only consciousness we can detect or measure directly appears to be our own.

Given this limitation, the only third-person access we do have to consciousness is via verbal reports. These are measures plagued with notorious difficulties; most notably, the inability for external observers to directly validate the truth values of statements about the conscious experience of a subject. As Overgaard correctly points out, these difficulties are surmountable through use of structured interviews and psychophysical correlative/statistical methods (such as signal detection theory) that properly interrogate observers about their experiences while accounting for response bias and error. Psychophysical and psychophysiological covariations observed using these measures have a greater likelihood of reliability, thus making a science of consciousness possible.

Will a science of consciousness be forever solely reliant upon verbal reports as the primary data measures? Is it truly impossible to measure consciousness in a third-person manner? It would be interesting to imagine for a moment if a technology could be developed that allowed two or more conscious individuals to directly peer into the depths of one another's consciousness, as encapsulated in the fabled "consciousness meter" (Chalmers, 1996a). The consciousness meter is to be distinguished from another concept that has been discussed in the context of the mind-body problem, namely the "autocerebroscope" (Meehls, 1996) or "psychoscope" (Baars, 1998). This latter device hypothetically allows oneself, or other observers, to distinguish conscious vs. non-conscious brain states, and displays the results on some kind of output device (a computer screen, for example). As such, it still remains an indirect measure of consciousness, one that relies upon inferences made from certain constellations of measured brain states and behavioral processes. The consciousness meter (or as shall be named here, the "qualiascope"; I shall use these terms interchangeably) is a device of a different caliber: it hypothetically allows another observer to directly experience the consciousness of another! We could imagine that such a hypothetical device could be calibrated to impress the simplest of the observed participant's experiences onto the observer, or could impress larger combinations of

experiences that reflect complex perceptual, emotional, cognitive, and motor-related contents. What would count as an observation through such an "experience" detector?

I would argue that an observation through such a device would entail that the observing subject would be directly aware (in the sense of Overgaard) of an observed participant's conscious state(s). If the observed participant viewed a red rose, the observer would experience the red rose as well. If the observed tasted wine, so would the observer. If the observed stubbed her toe, the observer may experience a sharp pain sensation followed by a dull pain sensation in the toe. On Overgaard's (in press) definition of consciousness, the existence of a conscious state presupposes an observing subject who is directly aware of it. Consciousness is intrinsically a phenomenon of observation. In the first-person case, to directly measure a conscious experience is to have that experience itself. It is reasonable that the same should hold true for any third-person direct measure of consciousness.

The existence of a qualiascope would have enormous consequences for a science of consciousness. Most obviously, such a device would enable direct correlations between psychophysical stimulation conditions and states of consciousness (Chalmers, 1996a). Of course, proper training would be necessary in order to "read" the conscious states of another (Ramachandran and Hirstein, 1997). As in the development of the optical telescope, early observations would be initially subject to distortion and error. Assuming the existence of psychophysical bridge laws (Chalmers, 1996b) in which conscious states are regularly correlated with stimulation conditions and physiological/physical states, a greater consensus of measurement outcomes can be achieved by reducing observational error via improvements in technology, methods, and training.

Furthermore, it is clear that such observations would complement and enhance verbal reports. Direct observations of conscious states could enable independent verification of verbal reports about those states. If a qualiascope observer experienced a "red" visual quale while the subject reported "green", the former would know that the subject was lying. At first glance it seems that this setup merely moves the problem of other minds back a level because at some point we would have to rely upon the verbal reports of the observer about the experience she observed. However this situation is not unlike that typically found in science where we take for granted the reports of other observers as published in the literature (Overgaard). The difference between this case and the case using verbal reports alone is that if there are any doubts about the veracity of the verbal reports, all one need do is observe through the consciousness meter oneself.

The existence of a consciousness meter might allow empirical investigation into some of the deeper issues in psychology and the philosophy of mind. For example, suppose the device is developed to the level that the observer's consciousness can be impressed with the observed's conscious self-nature and personality. This scenario suggests a potential breakdown between the traditional first- vs. third-person distinction. If the subjective experience of the two observers is such that they experience a partial or total "merging of self", which observer's experience counts as "first-person" and which as "third-person"? Is it even coherent to speak of the distinction between two observers, subjectively speaking, in such a situation? Phenomenologically, at what point would a singular consciousness individuate out of underlying, background processes? Carefully crafted empirical studies using the measuring apparatus could potentially answer these and other questions concerning the nature of the self.

One difficulty with the concept of a consciousness meter is illustrated by the following: consider two observers each looking at the same red rose. Subjectively, the overall situation is very similar to the qualiascope scenario in which only one of the participants is actually viewing the stimulus. In both cases, the participants have the same types of experiences, albeit each from different spatial and cognitive perspectives. However, in the former case it would be incorrect to say that one observer is directly aware of another's consciousness. Instead the participants are directly aware of the contents of their own consciousness, which match due to identical stimulation conditions. How could a qualiascope observer know the difference between experiences elicited through common sensory stimulation and true direct awareness of the observed's conscious state? The answer may lie in the fact that the observer would most likely operate in a laboratory context with the prior knowledge that certain experienced conscious states are not the result of direct sensory stimulation. This should be enough information to prime the observer towards interpreting her experiences as qualiascopic, rather than sensory, in origin.

This interpretive goal would be facilitated if the observer were isolated from incoming sensory information. Then via use of psychophysical correlative measures, the intensity and content of the observer's experience could be compared with that of the observed participant and the parameters of the eliciting stimulus. This would verify the accuracy of the observer's measurements (to the limits of whatever precision the device-observer interface is capable). Although this process would rely on verbal reports to communicate the results of the experiential observations to non-participants, as discussed earlier the non-participants would merely have to "look through" the qualiascope themselves to calibrate the veracity of the reports.

Admittedly this entire, somewhat fanciful, discussion has been based on the assumption that a consciousness meter exists and possesses ideal measurement characteristics. Is there any reasonable basis by which such an apparatus might be possible? It has been plausibly argued that a chain of neurons connecting two brains might allow the brains' representative patterns to impress upon each other, and thus

allow separate individuals connected by such a chain to share experiences (Ramachandran and Hirstein, 1997). Such a result, if it turns out to be true, could be the cornerstone for a whole new brain-mind-consciousness imaging technology. Crude sensory and cortical implant technology has already been developed to help the sensory and motor impaired (Dobelle et al., 1974; Schmidt et al., 1996; Barinaga, 1999). This technology, coupled with the use of biological material such as chains of neurons grown in culture (Yagi et al., 1998), might lead to the development of effective communication interfaces between qualiascopic participants.

This scheme assumes an extreme materialistic, reductive metaphysics for consciousness in which conscious states are identical to brain states. A dualist (one who believes that mind and matter are separate "substances" that somehow interact with one another) might suggest that the same sharing of experience is possible, but via some non-local, immaterial, yet physically-real process akin to that claimed in the investigations of parapsychology (Beloff, 1994; Radin, 1997). Which explanation is true depends upon which solution to the mind-body problem, or "hard-problem of consciousness" (Chalmers (1996b), turns out to be correct. Based upon the arguments of Ramachandran and Hirstein (1997) and Radin (1997), research and development of the consciousness meter concept could potentially lead to an empirical decision between these two metaphysical views. Ultimately, whichever approach actually works in the development of such a device will be the one that is most likely to be true. Thus the successful (or unsuccessful) development of a qualiascope would be an example of an operationalization of a metaphysical question (Overgaard).

This age-old debate on the mind-body problem is currently encapsulated in the search for the physical correlates of consciousness. I say "physical correlates" instead of "neural correlates" because it is not yet clear if consciousness is purely neurally based. There is a body of controversial data that can be interpreted as supporting certain forms of dualism (Radin, 1997). Nevertheless, current mainstream theory and data support some form of materialism, in either its reductive or emergent aspects. It is clear that the search for the neural correlates of consciousness (NCC) will certainly facilitate the development of a consciousness meter in that any plausible device will at least involve the monitoring of brain activity in some manner. This monitoring technology would be the foundation for the actual biophysical technology necessary to implement such qualiascope. Furthermore, NCC research will inform us of the proper brain regions/processes to tap into for our observations of particular conscious states. In addition, the direct access of another's conscious states could help to solve the "linking problem" in NCC research (Overgaard). One side of the needed direct correlation between conscious states and brain states would be given by providing a direct correlation between consciousness and behavioral measurements. This in turn could facilitate the correlation between brain measures and the NCC as the direct awareness measures and verbal reports converge and reliably covary with the underlying biophysical technology. Hence NCC and

qualiascope research would mutually inform and constrain each other during their development.

The main point of this commentary has been to argue that the direct measurement of other conscious minds is possible in principle and is within reach via extrapolation from current technology and theoretical understanding of consciousness. The likelihood of such technology ever being developed is contingent upon advances in technology and clarification of related ethical issues. Certainly any type of brain/machine interface would necessitate continued invasive research in animals and humans as we finish mapping, and learn to manipulate, brain-behavior relationships. However it is the research of humans with their unique capacity to communicate experiences via language, which would be the most crucial for developing a consciousness meter, as well as the most vexing. Current ethical standards allow invasive procedures only on key patient populations. What is needed is development of precise noninvasive brain stimulation and recording technology that can be used on normal, healthy populations. It is most likely that a convergence of noninvasive imaging measures such as fMRI, EEG, and MEG will contribute the most towards our understanding of the NCC in humans (Baars, 1998). There is also some evidence that external energy fields can stimulate neurophysiological processes in regular ways (George et al., 2002). It is currently unclear if this stimulation technology can eventually modulate brain functions with the specificity necessary to reasonably instantiate a consciousness meter. Unless this technology becomes more refined, or prevailing ethical standards change, or compelling evidence for a dualistic interpretation of the mind-body problem becomes available, verbal reports may be all we will ever have in a science of consciousness.

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