

T2K – “Toward a Science of Consciousness” in Tucson

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Can you imagine what it's like to live in a completely

black-and-white world? Not to be able to recognize faces?

To see sounds and smells, to taste touches and to hear colors?

Most of us can't, but nonetheless—or maybe just because of that—we are deeply fascinated by such quirks of consciousness. And we can learn a lot from them, since often the “abnormal” (in the sense of non-ordinary) is more revealing than the “normal.” This year's conference “*Toward a Science of Consciousness*” in Tucson, Arizona, strongly reflected researchers' recognition of this wisdom. Several plenary sessions were dedicated to the study of extraordinary phenomena such as achromatopsia (complete color-blindness), prosopagnosia (face-blindness), synesthesia (strong associations between sensory modalities) and a range of other phenomena. As a very fruitful extension to previous conferences, not only the researchers' point of view (the so-called third-person-perspective) was represented, but also the subjective perspective of the affected (what is called *the first-person-perspective*).

a GROUP of synaesthetes from Australia offered us glimpses into their lives so brimming with intertwined cross-modal sensory impressions. One was a musician for whom every tone she plays is associated with a distinct color. When she's composing a tune, not only the tones have to please her ears, but also the colors of the tones must fit together. Another was an aromatherapist who not only smells but sees the mixtures of oils and fragrances she puts together. There was a woman who can see things much better when she puts them into her mouth and who described explosions of colors during an orgasm.

A man who can't see any colors at all explained his notion of what colors are, likening them to the "chroma" of a tone. While a tone's pitch would be analogous to the brightness of a color, its particular emotional character, its chroma, would correspond to the hue of a color. What do you think of this analogy?

Meet Bill Choisser

One day when I was relaxing in the hot Arizona sun outside the lecture hall, a man called Bill spoke to me. He was in his fifties, had long, gray hair, a full beard and wore blue jeans. I invited him for lunch along with a couple of friends, not knowing that he was going to tell us one of the most fascinating life stories I had ever heard.

Bill is face-blind. That means he can't recognize people's faces, although otherwise his vision is perfect. Imagine living in a world where you would not recognize your own mother on the street even if she passed right by you. This is Bill's reality (and once he *did* in fact fail to recognize his mother on the street). For 49 years Bill lived without fully recognizing his deficit, and only four years ago he became aware of it as a disability other people don't have. This may utterly surprise us, but Bill never had any way to compare the way faces appeared to him to how they appeared to others. Naturally, social and personal tensions due to his face-blindness were a part of his life (e.g. his mother reproaching him for ignoring her on the street), but he never clearly realized they were due to any kind of inability of his. Yet, Bill has learned early on to use other clues to recognize people. For him, it's people's hair and—funny enough—their blue jeans. He grew up in a mining town where everybody wore blue jeans, and somehow he adopted these as one of his two key features to recognize people. He can tell them apart from how their jeans move around their legs when they walk, but he gets little information when people stand still or wear tight jeans. When they don't wear blue jeans, Bill's ability to recognize them by their pants is gone. In a similar way, the more hair someone has in or framing their faces, the more easily recognizable to Bill they are. He wouldn't even recognize himself in the mirror if he made his hair into a pony tail... Interestingly, while these clues help Bill to recognize men, they don't work for women: he's almost completely unable to recognize the opposite sex.

But it's not just about recognition, it's also about

emotion. He can't emotionally relate to people when the key features he relies on are absent. That's why his friends (and himself) are mostly long-haired people wearing blue jeans. And that's why the time he spent in the navy was sheer horror. Imagine that: All heads and faces shaved, all uniforms the same, no blue jeans. He couldn't recognize anybody, let alone emotionally relate to anyone. In a sense, he was completely alone in this mass of what must have appeared to him as cold uniformity.

Innate face-blindness (prosopagnosia) is extremely rare and so most everyone affected thinks they're the only one in the world. So did Bill. That's why he started to look for other face-blind people over the internet. Over the years, he found many of them scattered all over the planet and brought them together in his web community (see references for URL).

Neural correlates of consciousness

Reflecting the inherently open nature of the research field, the presentations at this year's conference drew from a wide range of disciplines such as biology, psychology, philosophy, quantum physics, art, ethnology, anthropology and ethics. Yet, in all this richness one common focus of research that emerged was the search for the Neural Correlates of Consciousness (NCCs). David Chalmers, one of the conference organizers and leading voices in the philosophy of mind, defined an NCC as a neural state that corresponds with a certain state of conscious experience. Discovering such states in the brain is thought to be a promising strategy to further our understanding of how the brain gives rise to conscious experience (what Chalmers has dubbed "the hard problem"). Although the search for NCCs certainly represents a reasonable and useful research program, the existence of NCCs is an open question that must be answered empirically, since it depends on the truth of several assumptions. First, it is based on the widely held belief that there is some systematic relationship between the mind and the brain. Prevailing materialist thinking takes it that everything in the universe—including consciousness—is made of matter or is a direct or indirect effect of material processes. Thus, consciousness arises somehow from physical processes, which makes it appear likely that there is a systematic causal relationship between the two.

However, the existence of NCCs could also be reconciled with a dualistic conception of the world. Although dualism sees the mind as essentially independent from the brain, there might still be some systematic connections between the two, since some kind of interaction between mind and brain must also be assumed in a dualistic framework. It is in fact hard to think of any plausible theory that would deny any systematic relationship between mind and brain. Thus, the first assumption seems a reasonable one.

Another assumption behind the idea of NCCs is that the brain is the exclusive physical basis of conscious experience. This assumption, too, is widespread and

supported by numerous lines of evidence. Still, it is by no means an unquestioned one. In his plenary talk, philosopher Evan Thompson defined consciousness as an intersubjective phenomenon which does not find its basis solely in one human brain but emerges out of interpersonal interaction. Thus, he rejects Chalmers' definition of the "hard problem" as misguided, since it fails to acknowledge the essentially social nature of human consciousness.

First-person perspective

The justification of the search for NCCs as a research program does not, however, depend on the truth or falsity of its underlying assumptions. Even if we should never find a true NCC, the knowledge and facts we gain in the course of our search will probably transform the entire enterprise and lead it into more promising directions. In that sense, I believe that failure and success can be equally enlightening, and often the latter is crucially dependent on the former.

However, the scientific study of consciousness in the past several decades has been dominated by the neurosciences on one side and a functionalist approach to psychology on the other, while the phenomenology of subjective, first-person experience has been largely neglected. Now at the turn of the millenium, the Tucson conference (dubbed by someone "T2K") reflected a growing awareness of this bias. Both organizers and many researchers recognized that a search for NCCs that takes serious the task of establishing links between the physical and the mental must not only thoroughly explore the neurobiological side of this divide, but also the mental side. Thus, there were a number of presentations that called for a revival of the systematic study of phenomenology. Russell Hurlburt from the University of Nevada has begun to tap and classify the basic denizens of our every day phenomenological consciousness (does it surprise you that most of the time you're engaging in some kind of thinking and that you don't pay conscious attention to the environment?). Several plenary talks advocated the use of meditation to hone skills of introspection, thereby coming to a better understanding of the mechanisms of our mental processes. And the various first-person reports from people with color-, face-blindness and synesthesia provided glimpses into heretofore largely uncharted phenomenal territories.

Neural synchrony and binding

Progress was also made on the neurobiological side of the divide, using well-established third-person methodologies (i.e. what is typically called "science"). In recent years, studies of the visual system of animals and humans have suggested that neural synchrony may be the key to feature binding and conscious perception. What does that mean?

Imagine walking down the street and watching a car pass by. The car has a color, a complex shape, and it is moving. All these features are processed in different places in your brain. So how does your brain "bind" these

features together so that it knows that they all belong to the same object, i.e. the car? It does, so the theory goes, by using synchronized neuronal firing in the range of 30 Hz or higher between the different brain areas that process the different features of an object. The idea is that this is kind of a neural signature that identifies which of the various features simultaneously processed by the brain belong to the same object. There is also evidence that feature binding may be a prerequisite for conscious perception. In fact, the process of feature binding could be subjectively experienced as attention that is turned towards an object so that it may be consciously perceived.

Other theories are simpler. John G. Taylor from King's College in London offered, in unexpected simplicity, that consciousness is localized to the parietal lobes. He presented a fair amount of evidence in support of his hypothesis and—since he probably felt that the simple would be hard to swallow for some—ended by saying that finding consciousness clearly localized wouldn't necessarily make it easier to understand than if it was distributed all over the brain. In which he was probably right.

Quantum physics

Invoking quantum physics to explain consciousness has appealed to many people, researchers and adherents of trans-modernism alike. Maybe this is because some interpretations of quantum physics assign a crucial role to conscious observers, or maybe it is just because both quantum physics and consciousness are mysterious, and it is tempting to think that these mysteries have a common basis. Whatever the reason, the validity of this approach is completely unclear.

In Tucson, we saw presentations of varying quality on this topic. Gerard Milburn from the University of Queensland in Australia opened a fascinating window into the strange principles and seemingly infinite powers of quantum computing. In a very competent talk, David Albert from Columbia University, established a quantum mechanical basis for the exclusivity of first-person, subjective knowledge, i.e. the fact that certain kinds of information appear to be in principle only accessible to the subject of experience. However, as he was cautious to point out, it is as yet unclear whether his model has anything to do with the real world. Stuart Hameroff, one of the conference organizers from the University of Arizona, presented a sweeping theory of how collapsing quantum superpositional states in the neurons' microtubules could generate moments of consciousness. Unfortunately, he spread out the (not too generous) substance of his theory so thinly that the result was full of holes. It will require a lot more evidence (or even any evidence) for the quantum-microtubule theory of consciousness to become a serious candidate amongst rivaling theories.

Altered states

In our account of the 1998 Tucson conference, (MAPS Bulletin Vol.8 No.3), we expressed the hope that in the next conference the organizers would dedicate a plenary

session to studies of hallucinogen- and other drug-induced altered states of consciousness. I was pleased to see that this was indeed what they did. Luis Eduardo Luna from the Swedish School of Economics and Benny Shanon from the Hebrew University in Jerusalem both talked about the phenomenology of the ayahuasca experience. Shanon offered a cognitivist psychological framework within which to analyze the ayahuasca experience and underscored the importance of firsthand experience in its study.

A highly interesting talk was given by Elisabeth Ferguson from the Institute of Transpersonal Psychology in Palo Alto. She reported about an experiment with MDMA-experienced subjects who underwent hypnotic suggestion in order to re- evoke the characteristic MDMA feeling. The results do indeed suggest that the hypnotic state is psychologically very similar to previous MDMA experiences of the subjects. It would be interesting to see whether this similarity extends to physiological effects of MDMA such as elevated blood pressure and heart rate. This experiment may have potentially important consequences for current efforts to re-establish MDMA as an adjunct to psychotherapy. If hypnotic suggestion could be reliably used to evoke an MDMA-like feeling and if the hypnotic state proved to be therapeutically valuable, the actual exposure to MDMA in psychotherapy might be reduced, which could help quell concerns about potential MDMA-induced neurotoxicity. Preliminary results from Ferguson's studies even indicate that an MDMA-like experience may be induced in subjects without prior exposure to the drug.

In a concurrent session on Altered States of Consciousness Stanely Krippner presented a cross-cultural model of dissociative experiences that classifies experiences according to the extent they are controlled or uncontrolled, and are characterized by flow or dissociation. His model provides a more fine-grained categorization of experience than what Western science would subsume under the label "psychopathological."

Charles Tart introduced us to his Archive of Scientists' Transcendent Experience (TASTE), which provides scientists with an anonymous way to describe any kind of altered, non-ordinary experience they've had but kept to themselves for fear of ridicule or adverse career effects. Take a look at this most interesting archive (URL given below).

My own presentation in this session focussed on how psychopharmacologically induced altered states of consciousness could facilitate the detection of neural correlates of consciousness by expanding the range and/or intensity of both subjective experience and neurobiological states. Thus, correlations between neurobiological and experiential variables may not manifest during normal consciousness, but may become apparent only under psychopharmacological stimulation.

Endings with bangs

After a week of filling up our consciousnesses with consciousness talk, Friday evening witnessed the second edition of the Poetry Slam, which had been very successfully initiated at the 1998 conference. Again, it was a hilarious event full of funny, thoughtful, beautiful, silly, intellectual and even dissociative poetry finished off with the David Chalmers' Zombie Brothers Blues Band singing the Zombie Blues. On Saturday evening Chalmers invited all participants to an "End of Consciousness" party at his place, which, alas, I missed.

In between, however, Marilyn Schlitz from the Institute of Noetic Sciences had another bang in store for us on Saturday morning's plenary session which was concerned with the question: "Consciousness at the millenium: where are we now, and where are we going?" At the 1998 conference she had presented data on "Distant Intentionality" experiments, which indicated that a person can intentionally influence another person's autonomous activity from a distance (i.e. both persons are in different rooms, and the influenced person does not know of the presence of the influencing person). Since then, her group has replicated this finding several times, but in the spirit of rigorous science, she wanted other labs to replicate it too. So an English colleague of hers repeated the experiment, using the very same design and even the same subject population. Still, he consistently failed to find evidence for distant intentionality. According to Schlitz, this is evidence for a fundamental experimenter effect going far beyond what was so far known under this term. It could mean that the experimenter's mental set and expectation toward the outcome of the experiment may influence the actual outcome in the preferred direction. Should this turn out to be the case, science would face the almost frightening task of going through all past experiments again, trying to evaluate the effects of possible experimenter's bias. Or maybe this is naïve. Maybe the real task would be to question the nature of reality...

References

- Bill Choisser's website of the face-blind: <http://www.choisser.com>
- Charles Tart's Archive of Scientists' Transcendent Experiences (TASTE): <http://psychology.ucdavis.edu/tart/taste>
- Evan Thompson's view on the intersubjective nature of consciousness: <http://www.canisius.edu/~gallagher/pcs.html>
- A "webliography" of various resources on consciousness: <http://www.consciousness.arizona.edu/links.html>