A Welcome Dialogue on Empirical Issues: Reply to commentaries on Baars on contrastive analysis

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Abstract: Davis, Allen, and Newman raise significant empirical questions. I agree with Davis that the operational definition of unconsciousness is criterion-dependent, and that the criterion can be set more conservatively than I did here. Contrastive analysis would still work if we compared clearly "conscious" to "much less conscious" phenomena. I agree with Velmans and Mangan that contrastive analysis involves the subject's first-person perspective --- that is why we study consciousness, after all --- but a rigorous physicalist could equally well trace the logic from behaviorally defined operations to the first-person perspective. There is no principled disconnect between these two perspectives on the evidence, and we know from almost two centuries of psychophysical research that there is rarely any mismatch in scientific practice. I am very encouraged by the ease of communication in these commentaries. Bringsjord's challenge seems to involve a difference of views on what are the most interesting questions.

1. Introduction

1.1 I am grateful to my commentators for their time and thoughts. We should remind ourselves first, however, of the remarkable significance of having a serious, empirically responsible dialogue on the scientific study of consciousness *at all*. Intelligent, well-informed scientific discussion of human experience has been hard to find over the last few decades. The credible literature has been growing with agonizing slowness. This kind

of forum is vitally needed to increase the dialogue about empirically responsible and theoretically rigorous work.

1.2 I will reply in three chunks. The first I will call *The Facts* because it matches the empirical emphasis of my target article, with replies to Davis, Allen, and Newman. Second I'll discuss Velmans' and Mangan's arguments about first- vs. third-person interpretation of the facts. I will call this *The First And Third-person Stories Converge When You Look At The Evidence*. Finally I will try to cope with Bringsjord's comment in *Defending My Machismo*.

2 The Facts: Replies to Davis, Allen, and Newman

2.1 In these three commentaries I am pleased by the ease of communication. We are dealing with issues of evidence. I concede some points, some are empirical questions that need testing, and we may have an ongoing debate on a few others. But we have clear criteria for making decisions, and I have an exciting sense that we are not talking in circles. That is truly exceptional in discussions of consciousness, and very welcome indeed.

2.2 Davis (1994) argues correctly that some of the putatively unconscious processes cited in my target article are still debated, the argument being whether they are really unconscious, or only fleetingly or partly unconscious. This is correct. Unfortunately this is one of those debates that starts with William James and continues to the present, showing no signs of abating. For that reason, I suggest we treat this as a criterion-setting problem. Indeed, the absolute threshold of sensory stimulation, first determined by Weber and Fechner in the 19th Century, is still being discussed, with a substantial body of opinion favoring a criterion-dependent approach. We can set the criterion for unconscious processes more conservatively than I do in the target article. As Davis points out, that would still allow a contrastive analysis to delineate a useful set of empirical constraints on consciousness. We might then label the right column in each table "minimally conscious" rather than unconscious.

2.3 Jacoby and Kelley (1992) have developed an interesting criterion for what may be considered "functionally unconscious." In effect they suggest that we set the criterion for unconsciousness at the point where people lose control over the ability to do something with the "unconscious" event, say act upon a visual image, report a recalled memory fragment, and the like. Since controlling or acting upon conscious events is terribly important in many common tasks, such as recall, planning, and source attribution (knowing the source of an event in memory), this may be a pragmatically useful way to go.

2.4 Allen (1994) supports the contrastive analysis approach in a general way, but suggests modifications. First, he suggests we should use the term "awareness." He writes, "One can only guess that such a zealous avoidance reflected the author's desire to stay clear of having to deal with the issues of *self*, self-consciousness," and in general, those problems of definition that plague "what's it like to be... " questions. But the conspicuous

failure to at least clarify the reasons why awareness and unawareness were not used was curious." (Section 2.1)

2.5 Allen is exactly right. I am trying to be as precise and consistent as possible, using "consciousness" as a clearly defined term, operationally and ultimately theoretically (see Baars, 1988 for details; also Baars, in press). So far I have not found a need for the term "awareness." I'm happy, of course, to hear arguments for defining an additional entity. If "awareness" is meant to be an exact synonym for consciousness, I personally prefer to avoid using it to prevent confusion. But as long as "awareness" is defined rigorously I see no problem with the *word* at all.

2.6 For me, models of neural and mental representations differ only in level of analysis. At this point in scientific history, differentiating between neural and mental events on a principled basis is becoming more difficult, partly because we have better (though still very fragmentary) models of neural subsystems, and partly because we are now seeing historic advances in techniques for imaging the living brain, making much more of the neural level observable. One way to maintain theoretical explicitness and precision in this situation is to stick with a consistent operational definition of a representation at *any* level. I find it useful to operationally define a representation as an entity that allows the nervous system to correctly detect matches and mismatches with respect to an event in the world, or in principle, with an internal event. This operational definition allows us to consider the "model of the habituated stimulus" (Sokolov, 1964) to *be* a mental representation, though it is largely unconscious, as well as visual images, percepts, pre-perceptual processes, etc.

2.7 Allen (1994) misunderstands the emphasis in my sentence about perception and conscious stimulus representation. That sentence should be read, "There is little disagreement that 'perception' is *conscious* (as opposed to unconscious) stimulus representation." The whole point is precisely what Allen says, which is that there is a natural contrast between aspects of perceptual processing that involves conscious stimulus representation and those that imply unconscious ones.

2.8 I disagree with Allen's argument against the idea of competition between different potential conscious contents, which almost all cognitive authors on the subject consider to be fundamental, as I do (see Baars, 1988). Whether consciousness is a high-level or a low-level property is an empirical question: We can be conscious of a single dot of light in the dark night sky, requiring only a stream of single photons entering a single retinal receptor; most people would probably consider this "low-level." On the other hand, I labor under the persuasive delusion that we are all actually consciously discussing consciousness, which is probably a fairly high-level thing. Consciousness is marked by its ability to traverse many different levels of representation. If we don't consider consciousness to be a property, in some sense, of mental or neural representations, we get stuck in another one of those complicated debates about whether consciousness is "intrinsic vs. extrinsic". I think scientifically it's better to considerconsciousness as a property of representations and processes, since otherwise we can't talk about it at all.

2.9 Newman is my co-author on neurophysiological papers based on Global Workspace theory (Newman & Baars, 1993; Baars & Newman, 1994). Not surprisingly, I endorse most of his comments (Newman, 1994). The notion of contrastive analysis, as others have noted, is an application of the general scientific method, of being able to treat the object of study as a variable. That is not always easy: Being able to treat the atmosphere as a variable by understanding that it did not extend throughout space was a major breakthrough. Many scientific breakthroughs result from the realization that some previously assumed constant, like atmospheric pressure, frictionless movement, the uniformity of space, the velocity and mass of the Newtonian universe, and the like, were actually variables. As Newman points out, contrasting conscious to broadly similar unconscious processes is something we do naturally today, but which was conceptually inconceivable in the 19th Century, and indeed into the 1950s and '60s in experimental psychology.

2.10 Hopefully, we can develop a neurobiological version of the contrastive analysis evidence, for example by contrasting the very small area of lesions that create coma (in the reticular formation, nucleus reticularis thalami, and intralaminar nucleus) to the vast domain of lesions that may change *conscious contents* but do not abolish the *state* of waking consciousness. For example, an entire cerebral hemisphere can be lost without a loss of consciousness. Further contrastive analyses, based on excellent work in anaesthesia, single- cell recording of visual processing, evoked potentials and the like, may allow us to hone in on the neural mechanisms of consciousness in the foreseeable future.

2.11 In general, I agree with Newman's theoretical perspective. His most novel idea, one that I still have not quite come to terms with, is the activation of the global attentional matrix, especially activation of Layer I of cerebral cortex (see Newman & Baars, 1993). Different neurobiologists favor different cortical layers as candidates for conscious contents, but the general notion of cortex-wide activation for specific conscious contents is one that I am still not ready to endorse, although it is a fascinating and deep idea. In the purely cognitive part of Global Workspace theory, I feel we have a very solid array of evidence. I do not yet have that sense with respect to this neurobiological hypothesis, and would be very interested in further work on this point.

3. The First And Third-person Stories Converge When You Look At The Evidence: Reply to Velmans and Mangan

3.1 Whether contrastive analysis involves first or third-hand evidence is an interesting question with a simple answer: It is first-hand for me when I consider my experience, and first-hand for you when you consider yours, but your experience is third-person for me, and vice versa. Given the mirror-like nature of the evidence, the scientifically pragmatic question is: Do they converge reasonable well, at least in many basic situations, so that we can infer your first-person experience from your response to a particular wavelength of light, in order to double-check the accuracy of your report for the purposes of scientific

consensus? The answer, of course, is a thundering "Yes" in perception, psychophysics, many imagery tasks, many memory tasks, much inner speech, and other conscious events. That means that the endless discussions about first vs. third person report can be cut short. They are scientifically irrelevant: The answer to the either-or dichotomy, as so often in psychology, is *both*.

3.2 Given this integrative perspective, I just don't see much of a difference between myself and Max Velmans (1994) or Bruce Mangan (1994). I welcome our convergence as a sign of a genuine, emerging consensus in which we may differ on matters of emphasis and perhaps phrasing, but not on whether we are "really" studying first or third-person perspectives on experience. Experimental psychologists who prefer the third person perspective will find, perhaps to their surprise, that their findings correspond to their own experience. Phenomenologists who prefer the first-person perspective will come to realize that most of the time we can specify a great deal from the public perspective. Scientifically we are studying *both*.

3.3 If there were a clear case where first and third-person evidence did *not* converge in a *principled way* we would have an interesting paradox. I don't mean cases like hallucinations or afterimages, which are conceptually trivial. In fact I don't know of a single case where we can establish a principled non-convergence on a solid evidentiary basis. There is some talk about examples like free will, but they are not at all persuasive. None of them, as far as I can tell, survive a searching examination.

3.4 In sum, the first five commentators develop aspects of an emerging consensus. This may be an event of historic significance, speaking without exaggeration. It is not limited to just thee and me, but seems to be spreading throughout the field. Welcome to the new scientific age of consciousness studies.

4. Defending My Machismo: Reply to Bringsjord

4.1 Finding a good way to assess conscious and unconscious functioning is not a test of manhood, or womanhood for that matter. I may seem timid to some, but so what? It's nice to know that while many working scientists today might think that the present effort is too ambitious, at least one philosopher believes it's not ambitious enough (Bringsjord, 1994). I've told myself in the last 16 years of hard and isolated work on these issues that success could be defined when some people would dispute the plausibility of the evidence, while others would claim that it was obvious all along. I'm pleased that that happy state is now being achieved.

4.2 My claim is *not* that the Bat Challenge is necessarily insuperable from a scientific point of view, but that it's strategically senseless to begin by trying to cross the peaks of the Rocky Mountains rather than searching for a mountain pass. It's just a pragmatic decision. Eventually --- Who knows? --- we may find out what it's like to be a bat. I would dearly love to know. Let us begin with the easy problems, for then we may learn about the harder ones. But let's not burden ourselves with the false and self-defeating belief that Bat Being is the only valid way to know about consciousness.

5. Summary And Conclusions: Where Do We Go Next?

5.1 I am again impressed by our common ground, and by how rare and refreshing it is to have that. I may not be right about the claims made in the target article, but in that case, I can be *shown* to be wrong, or incomplete, or poorly defined, or something. But you and I can come to an agreement on that. I certainly don't mind conceding the argument when the evidence and operational definitions are clear. The criteria are pretty much agreed upon, the evidence is out there, and more can be collected. The foundation in testable evidence is about as solid as we find in any frontier domain in science. Now we can think about the next step, which is: What theoretical inferences are justified, based on this evidence?

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