We Need SBS to Embrace Its Subjectivity Not Hide It

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SBS is one of the foundations upon which the intelligence community turns raw observations into coherent narratives, situational analyses, and predictions. That foundation has a crack and the crack is widening. SBS is about humans – their interactions, communications, and activity. Humans are not homogeneous, rational, nor indexical. Yet, far too many SBS studies assume they are. Such bad assumptions allow the powers of computers, statistics, and mathematical modelling to be deployed in the pursuit of "science." After all, physics and the "hard sciences" succeed by focusing on objectivity. SBS tries to recreate that objectivity through math. But, subjectivity, emotion, context, and habitus cannot be captured through Bayesian statistics. To the extent that the intelligence community is processing observations through an SBS lens which fails to account for the "humanness" of humans, faulty interpretations are likely. This paper argues that the intelligence community needs a different kind of SBS. In the complexity and cybernetics communities we call this Science 2. (c.f. Lissack and Graber, 2014)

"Objectivity and a goal of reliable predictivity are the hallmarks of what we shall label Science 1. These are the hard sciences as traditionally taught and as used as references by philosophers of science. Physics is the exemplar of Science 1. In the Science 1 world we label and categorize via deduction, probabilistic inference, and induction. Science 1 excludes context dependence, thus when it is forced to deal with the possibility instead asserts ceteris paribus. Discovery and attunement to context are the hallmarks of what we shall refer to as Science 2. In the Science 2 world we instead seek to identify relationships, affordances, and potential actions. We ask questions rather than seek to label or categorize. Science 2 explicitly makes room for the context dependencies that Science 1 has excluded. These can be characterized as emergence, volition, reflexive anticipation, heterogeneity, and design, among others". Lissack and Graber (2014)

Sciences of the sentient will require different languages than are commonly used in the hard sciences of non-sentient beings. "One thing that seems not to be considered is that the context

of everyday interaction might have other motivations than the search for laws, causal explanations, prediction, and control that we associate with the ideas of natural and biological science. " (Carr, 2008) But, "the concept of anticipation has been rejected out of hand [in Science 1] … because it appears to violate causality. We have always been taught that we must not allow present changes of state to depend on future states; the future cannot affect the present." (Louie, 2009)

Where Science 1 and Science 2 differ is in objective and purpose. The hard sciences (Science 1) are marked by "Objectivity and a goal of reliable predictivity." In the hard sciences (and as Umpleby 2014 points out with respect to any non-sentient phenomenon) it makes sense to label and categorize via deduction, probabilistic inference, and induction. The world of Science 1 excludes context dependence. "Science 1 target[s] objectivity, truth, universal laws, invariance, and context-free descriptions by the use of models of representing" (Faye 2014).

By contrast context dependence is the hallmark of Science 2. Here the objective and purpose are discovery and attunement to context. In Science 2, the focus of scientific inquiry is on the context and contingencies that have provided an environment wherein the "to be explained" occurs and where regularities alone fail to be explanatory. It "works with meaning and contexts, with how context influences our thinking and bestows meaning to our actions." (Faye, 2014) Where "models of" are the currency of Science 1, "models how" are the currency of Science 2. Here, the scientist seeks to identify relationships, affordances, and potential actions and asks questions rather than seek to label or categorize.

Table 1: What each of the two sciences is good at.

What Science 1 is good at	**What Science 2 is good at**
• Dealing with "knowns"	• Dealing with "unknowns" & emergence
• Decomposition	• Network interaction
• Discovered, well formed, realistic modeling	• Exploring, continually emergent, cybernetic modeling
• Risk analysis	• Opportunity analysis

• Categorization, sensing & matching	• Learning, probing & sense making
• Operates as planned	• Redoing, re-planning
• Distribute "knowledge" to individual actors	• Highlight co-ordination across systems
• History	• Reflexive anticipation
• Actors differentiated by defined properties	• Volition
• Responds to planned contingencies	• Revising to unplanned contingencies
• Simplifying the complicated	• Narrating the complex

To the extent that an intelligence assessment is based upon a Science I type theory, it is critical to recognize the assumptions about human behavior which were made so as to allow the statistical analysis to be performed. Most of the time, these assumptions are NOT articulated nor otherwise made explicit. The absence of that explicitness prevents consideration of variations in those very assumptions. Yet, consideration of such variations may lead to a very different intelligence assessment.

The issue is NOT with the modelling per se being done, but with the absence of communication about critical assumptions which inform that model. No SBS scientist has an omniscient window on "truth." The assumptions made to allow for modelling and statistics are based upon the beliefs of the scientists performing them – not on "truth." If SBS is to maintain a foundational role, it must find a way to get scientists to explicitly recognize and communicate about these assumptions AND to be willing to rerun analyses to test for fragility/robustness if other assumptions were made. Our supposed faith in models and statistical reliability disguises our fear of dealing with the ambiguous, the uncertain, and the unknown. An r-squared of .89 cannot "explain" the motivations which distinguish a committed protester from a suicide bomber. But, the safety of hundreds may depend on having just such an understanding.

Science 1 works best when its practitioners adopt a world-view based on some form of scientific realism. Scientific Realism makes truth claims, judges those claims for coherence against a pre-given world, and affords the status of "real" to entities whose existence cannot be observed and can only be inferred. Thus, the outputs of models and statistics are treated as "real" and outliers

tend to be treated as “error.” This “reality” is a limitation. Piattelli-Palmarini (1996): "we take up only those actions and solutions that have an immediate effect on the situation, and always as they have been framed for us." Kahneman (2011): "We are ruined by our own biases. When making decisions, we see what we want, ignore probabilities, and minimize risks that uproot our hopes." Gould (2010): "We therefore fail to note important items in plain sight, while we misread other facts by forcing them into preset mental channels, even when we retain a buried memory of actual events." The practitioners of Science 1 are often comfortable with judging the reality of a representation by its predictive success – predictions based on observing regularities. "Scientific theories appear as ordering principles that explain general classes of observational and experimental facts, including the taxonomies, 'laws,' causal chains and other empirical regularities that are discovered about such facts.” Ziman (1984) Science 1 is not a science of studying outliers. But, in human affairs, outliers matter.

By contrast, Science 2 practitioners are making use of the world view known as pragmatic constructivism. (Note many such scientists will deny the label while making use of its precepts.) Pragmatic Constructivism begins by asking what actions are being contemplated and how judgments regarding those actions can be arrived at; it notes that human “constructions” [interpretations of the world and the narratives which provide meaning] are always changing and "what matters" is the representations of a supposed reality that we opt to deal with at a given time. (c.f. Rorty 1991) "Knowing in pragmatist constructivism, is individually, culturally, and socially framed. There is no fixed reality waiting to be discovered by diligent analysis. Experience is interpreted in various ways and different people experience the same events in wildly divergent, yet internally coherent ways." (Brookfield, 2000) Science 2 uses regularities as a platform from which to observe outliers.

It is a critical difference.

Instead of actively discussing the multiple approaches which may all be interpretations, enactments, decodings, or embodiments of a model, Science 1 often leads us to act as if there is

but one meaning defined by its label. Science 2 implies that a continuous major task is to extract, from the phenomena Science 1 wishes to represent, the facts which have to be considered during the process of the scientists' accounting for it. Facts will include not only objects but also actions, events, and the choices re attended-to meanings on the part of the observed actors which the accountant deems relevant. (c.f. Norreklit et al, 2010, Rorty 1991, Vaihinger, 1924) Two sets of choices distinguish the data sets of Science 2 from those of Science 1. First is the choices of attended-to meanings on the part of the observed actors and second is the choice of relevant variables by the scientist. This paper is arguing that much more attention needs to be paid to both of these choices. They need to be laid out as explicitly as possible, tested for variance effects, and communicated as part of the results. SBS without such explicitness only works in a world which is static and well known. Such worlds are not the general concern of the intelligence community.

The caution here is to not adopt the Freidman (1953) standard where a model is judged not on the realism of its assumptions but only on the accuracy of its predictions (Pfleider, 2014). Science 1 models may have high short-term predictive accuracy, but if the assumptions which provided that accuracy are not exposed, made explicit, and variance tested for fragility and robustness, then even medium-term dependence may be risky. Unlike the world of physics, humans keep changing their world. If SBS is to be useful, it must explicitly take into account such changes. Stasis is but an illusion.

"All interpretations made by a scientist are hypotheses, and all hypotheses are tentative. They must forever be tested and they must be revised if found to be unsatisfactory." (Mayr, 1982)

A related paper suggests the variables against which all SBS derived models should be as Mayr suggests "forever" tested. (c.f. Lissack, 2016 a-c) Our national security might depend on it.

"When my information changes, I alter my conclusions. What do you do, sir?" (Keynes, 1987)

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