"Models and Hermeneuts: Knowledge Production and the Culture of HSCB Modeling: A Discussion of Some Implications of Panel V"

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More so than with other kinds of models and simulations, the process of human socio-cultural and behavioral modeling (hereafter, HSCB modeling) is challenged with defining its particular relationship to what I call here the interpretive scene of modeling. By this I mean how information generated by such models is invested with its particular significance. Such is the case, given some basic differences between socio-cultural information and that collected about, say, the physical universe. If forbidding, we can nevertheless build up a model of some expression of the latter, even if a complex and dynamic nonlinear system, as based on relationships among operative physical laws. While, any effort to model cultures necessarily confronts the epistemologically entirely different circumstances of "meaning-making," and "meanings" are not generalizable as laws. The implications of this for the HSCB modeling community are critical for any understanding of the construction and purpose of such models. Here, as raised by the arguments advanced as part of panel V ("Methods, Tools, Frameworks & Models"), I point to some of the basic challenges posed by the hermeneutic circumstances of cultural knowledge in particular for any future HSCB modeling effort, giving particular attention to what these challenges suggest for the relationships between data, models, and decision-

making. If articulated in different ways across the panel, one emergent overarching theme is that of more productively framing HSCB modeling tools not as stand alone problem-solving technologies but as just one feature of what I call here the dialogic ground of a more complex interpretive scene.

The Interpretive Scene of Modeling

McNamara offers an uncontroversial if sometimes overlooked point when she reminds us that models do not forecast. People do. And models cannot be considered independent of human judgment. Along with other panelists, she also suggests that, if verification (that is, a model's internal consistency) is important, for the case of HSCB modeling validation might be even more important. McNamara, therefore, calls for more sustained attention to the relationships, and contexts of relevance, between modeling technology and the people or organizations using it, as incorporated into the process of validation. I will return to the question of what constitutes adequate validation of HSCB modeling tools, given their direct engagement with the meaning-laden context of culture.

Turnley and McNamara encourage recognition of these relationships as critical ground for the interpretive scene of which models are a part. McNamara encourages us to understand validation as itself a form of "sense making," through which stakeholders in a decision space actively negotiate both the benefits and limitations of the application of modeling technology. Complementary to this, Turnley describes the modeling process as a creative exercise in choice-making, with models as partial and selective representations of a given socio-cultural target domain.

In short, goes the suggestion, we are best off if we understand models not as black boxes – as like technological Maxwell's demons – into which data are plugged and out of which meaningful results are self-evidently generated. If models offer "transparency" from data to decision-making, we need to be thinking further about how to make the modeling process itself more transparent. This is important, given the ways we currently discuss modeling and simulation in the context of decision-making. As was presented at this conference, a given model's potential value is evaluated in terms of how useful it is facilitating high-consequence decision-making. In fact, models are given a primary role in moving "from data to decision." A danger here is that computational models acquire too large a role in decision-making, rather than being understood as merely one feature among many of complex interpretive environments.

Rather than locating models as key interventions in a forecasting pipeline that intercede decisively between the "real world," the empirical facts of the case, or objective data, on the one hand, and high-consequence decisions, on the other, this set of papers helpfully trains further attention on the modeling process itself, which is characterized as a complex interpretive scene creatively generative of new knowledge. Particularly with socio-cultural data, we are encouraged to recognize the key stakeholders in modeling as meaning-makers, that is, as a kind of hermeneut. We are encouraged to treat models not as "better" approximations of poorly understood socio-cultural realities but as theory-driven, partial and selective representations, potentially helping such hermeneutically-inclined decision-makers to generate new scenarios and new stories, to become parts of the encompassing and dialogically interpretive scene of decision-making. Understood

this way, models contribute to fluid frameworks for discussion rather than forecasting any particular socio-cultural result.

We might even suggest that, rather than "game changers," models participate in a kind of hermeneutic circle, in which neither the model's meaning nor its encompassing context of decision-making can be adequately understood without reference to each other. Sargent is helpful here, since he emphasizes that, in the operations research methodology he outlines, most simply, models are developed in direct response to a prior definition of a "problem." This problem is, in turn, an identifiable outcome of an ongoing conversation among stakeholders. This is what Turnley means when she refers to a given model as part of a process of "selection." The requirements for data, in their turn, according to Sargent, are generated from the constraints of the model. Another way of putting this is that an interpretive point of view is already built into the model's architecture in the ways that it anticipates what the "problem" is, what information is needed to address it, and the form that information is expected to take. As McNamara puts it, this modeling context is one way in which models express the values of their primary stakeholders. As Turnley, in her turn, puts it, HSCB modeling validation is measured against theoretical propositions not the "real world." Given all of this, in Bevir's constructivist mode, therefore, the relevance of a model is best established against the background context of the "web of beliefs" of the modeling community itself.

Turnley asserts that this wider conversation must involve not just prospective users. She offers a list of key stakeholders, which, in addition to users, includes at least the following roles: funder, project supporter, questioner, disciplinary or theoretical expert, data provider, and model builders. To this array of people McNamara suggests

that we can add implicated institutions, interests, resources, and supporting technologies, which altogether constitute a distinct "epistemic community," with a particular set of knowledge priorities and utility, as well as assumptions about knowledge-production. I would further note that we can think about the relationships among these institutions, people, materials, and ideas as, themselves, composing a specific cultural scene: the dialogic ground of modeling as a particular interpretive process. That is, their interaction is the background against which a model's significance is determined. Yet, prevailing practice across DoD has been to silo the distinct roles with respect to socio-cultural information – such as "collectors," "analysts" or "advisors" respectively – with little direct collaboration among them. We can note an emerging critique of this state-of-affairs within DoD, such as Flynn's widely-circulated "Fixing Intel," which recognizes the importance of better networks of communication regarding socio-cultural knowledge production. Perhaps something similar would be of benefit to the HSCB modeling community.

How to Make Sense of Data?

The fact that socio-cultural information is better understood as interpreted and interpretable "meanings" rather than as objective data that matches in clear-cut fashion with some aspect of the world has profound implications for the relationship of "data" to models generally. In addition to drawing out some of the implications of treating the modeling process as a kind of dialogic interpretive ground, our panelists complicate the circumstances of data. As Bevir tells us, a datum – as a proposition or concept – is not self-evident. He says, "No proposition ever confronts the world in splendid isolation."

Further, rather than definitive solutions to problems, he offers that models are "just more data." And, as Bevir noted during the question and answer session following the panel, "all data is debatable and inherently up for grabs." For Bevir's meaning holism, data are best understood as evidence of the meanings, or "historically contingent beliefs," that are embedded in peoples' actions. That is, data are meaningfully expressive but not sufficient in themselves. In similar fashion, McNamara notes that data of the socio-cultural sort are representational in nature, and so, themselves socio-cultural constructs. For McNamara, computational models are, therefore, "highly fraught representational technologies." We should pay more attention to developing a healthy appreciation for the limits, as well as the strengths, built into this representational technology.

But this also introduces a significant conceptual challenge with respect to the relationship between data and models. If in different ways, Bevir, McNamara and Turnley all indicate that socio-cultural data are hermeneutic. That is, they are about the generation of meanings (as "webs of belief," representational constructs, or analogies). Yet, at the same time McNamara is clear that to be rigorous model validation, as distinct from model verification, should address a standard of correspondence to observed reality or to some "real world" phenomena of interest. Bevir, like McNamara, also develops an interpretive account for socio-cultural data, while not entirely dissociating his account from an empirical residue of "concrete activity" in the world, of which interpretive data are evidence. But Turnley, here in synch with Sargent, describes the validation process differently, as performed only against the "target domain," which for her consists not of objective facts but theoretical statements meant to elaborate upon a defined problem of interest. Here we have identified a potential challenge for the development of validation

techniques for HSCB modelers: achieving greater rigor with respect to what specifically constitutes the target domain for any given case in the first place. A first step might be to recognize the epistemological character of this challenge.

The question of model validation is of particular importance, given the regular call –heard throughout this conference – for making better use of, as one speaker put it, "real-world timely information that is ground truth." In other words, one perceived value of computational models is the promise of making better use of "the richest sources" of information, assumed to be qualitative and local. As Major General Flynn put it in his address to the meeting, with respect to Afghanistan there is a "mountain of information" and the effort in Afghanistan "is not doing enough to capture that information." For this to happen, however, the data needs to be able to address "gaps," to be better integrated in terms of scope and scale, and to be transferrable across database management systems, the implications of which I return to in the next section of this discussion.

Differences with respect to the sources of data across these panel presentations straddle an epistemological divide. In contrast to Bevir's meaning holism is Sargent's account of data, which further develops the implications of McNamara's emphasis on systematic observational data. For Sargent, it is the various model-building steps which place systematic requirements upon data. And before they can become available for use in a model, "unstructured" data (by which we might assume he means some clutter of "raw data" or empirical facts from the world) must undergo conversion into "structured" data. In unstructured form, in Sargent's word's data might refer to "some collection of numbers, characters, images, or audios that are unprocessed," and we might add texts such as news articles or ethnographic field notes. As unprocessed, they are meaningless

until classified, counted, grouped, archived, quantified, compared or correlated according to defined scales of measurement. At issue, then, across the panelists is whether, when referring to "data," we are referring to empirical socio-cultural facts of some sort – as unstructured, raw, and connected to the world – or referring to always already interpreted meanings. This is not a trivial difference.

Turnley in fact suggests that one perhaps unanticipated outcome of the modeling process vis-à-vis socio-cultural information is that it tends to reconvert often contested meanings, as dialogic or narrative products of collective interpretation, into surrogate data points available for quantitative manipulation, but which in the process suffer a loss of meaning. Computational modeling, in her view, strips the often ethnographic sources of socio-cultural data of their meaningful context, collapsing often complex beliefs into individual manifestations of behavior or into the interchangeable pathways of a network sociogram. This poses a particular challenge, given the forms qualitative data often take – Bevir's storytelling or Turnley's narrative, among others. A further challenge, then, is to ask how computational models can address the problem of richness not just as a matter of adding layers of complexity but more importantly so as not to efface meaningful context.

The Locations of Meaning

If what I've been calling interpretive meanings are the stock-in-trade of socio-cultural knowledge production, and if HSCB models are part of the interpretive scene rather than apart, the potential epistemological divide evident across the rich discussion of the panelist brings into focus a critical question for the modeling enterprise, that is: whether "data" are prior to and distinct from "meanings" (particularly as objective, raw,

unstructured, or unprocessed) or whether meanings are themselves the only sort of data we should expect for socio-cultural problem-solving. One way to think about this is via a comparison between the perspectives of Bevir and Sargent with respect to what constitute meaningful "units" of analysis.

Bevir asserts that any concept or proposition – as a datum – does not possess "intrinsic properties and objective boundaries." Furthermore, explanation comes from unpacking the conceptual connections in particular "webs of belief." In such a case, the conceptual boundary between data and meaning is hard to locate. This, then, poses a challenge to any effort to organize information into comparable units or sets, as available for standardized measure, or as subject to some kind of operation or manipulation. In this regard, Turnley is explicit that analogy, as a task of establishing criteria of "likeness," is a creative hermeneutic enterprise and not something immanent in socio-cultural worlds for us to stumble upon. In such accounts we are invited to understand computational models as actively producing socio-cultural knowledge rather than simply representing it.

Sargent, however, describes data much differently. He explains, for example, that quantitative variables are also qualitative since they also contain all necessary qualitative information. In this scenario variables are mutually exclusive and discrete vehicles from which information can be extracted. This sets up a very different state-of-affairs from that of Bevir and Turnley. Rather than "conversion," which we can understand as a creative reinterpretation, data understood as vehicles of meaning promise access to an objective reality divisible into standardized parts that already contain their significance and which it is the purpose of the modeling process to simply extract and represent. We hear a lot about new data mining and data extraction software, as part of modeling efforts. But, as

Bevir's and other hermeneutical approaches suggest, "sentiment extraction," "belief extraction" or the "rapid semi-automated extraction" of any cultural factors, might be more technical fantasy than modeling reality, at least in the hermeneutic mode.

In this case the relative "goodness," "completeness," or "reliability" of data follows directly from whether they can be easily standardized for comparison and uniformly extracted. And this is part of the goal of increasing the "interoperability" of models, and where data is viewed as fungible, where one user's model easily becomes another user's data. Such scenarios are, too, another way in which meaningful contexts can be stripped away from data.

For qualitative data, this has definite consequences. Hard-to-classify "field notes" must quickly take the form of more standardized "field reports," which need to rely upon a commonly used "code book" of some sort like the popular ASCOPE (Area, Structures, Capabilities, Organizations, Peoples, and Events) system for the classification of field data. Relatively "thin" and more easily extractable data sources are given priority, such as journalism, national opinion surveys or polling data. With this conception of data, models are given a task we might describe as the generation of significant information about a patchwork world of data points as checked off cultural boxes representing quantifiable variables of cultural difference. But such a scenario might, quite literally, be meaningless, despite a model's forecast. There are, in short, epistemological consequences in assuming that cultures can be divided up into vehicles of extractable meaning. And we should be thinking more about the relative compatibility of such different epistemological departure points for data destined for models to be used with socio-cultural knowledge, as part of our ongoing dialogue.

As suggested by some of the presentations during our meeting, however, in practice what this too often comes to mean is that "ground truth" is replaced by a variety of data that is compiled largely using web mining data extraction software, and collected from websites, online forums, blogs, Youtube, and Second Life, where information is already formatted as HTML pages, in word documents, pdf files, as power point slides, or downloadable as video, image, or audio files. Too often the differences between "virtual" and non-virtual realities get lost in the shuffle. While social media web content has its values, we should not confuse this with in theater collection of data on the ground, which is rarely done with regard to computational social science applications. And were it to be done, this, in turn, raises practical and ethical questions yet to be resolved with regard to working with counterparts in a battlefield space or conflict zone. Modelers also complain, as occurred during our meeting, that "unstructured" qualitative data is not systematically available for use in such models. If, as discussed by Major General Flynn, collectors will be generating more "district narrative assessments," for these to be available to modelers, such assessments would have to maintain a standard format while using interchangeable categories. But this would decrease the likelihood that information outside of established expectations would find its way into the data sets of such models.

On Cultural Models and Meanings

Sargent defines a model straightforwardly as "an abstraction of some system." In what seems a comparable vein, Bevir describes models as "reifications that highlight patterns in concrete activity." Both definitions suppose an organized system or pattern of information from which to draw further conclusions. This can be done in a variety of

ways. As Sargent observes, there can be several models of the same system as well as several sorts of models. Bevir's description of meaning holism, however, suggests a kind of systems hermeneutics, where the meaning of a given "sentence" or "belief" (as units of analysis) depends on the wider "web of beliefs" of which it is a part. This approach to meaning is in fact quite comparable to what we find in structural linguistics or semiotics, as with Saussure's negative theory of value. In this case a given sign in a sign system does not possess a discrete or positive value of its own, so much as its value is emergent as a result of its position with respect to all the other signs composing the system. We might embrace the constructivist approach to meaning production with which Bevir has identified, however, while at the same time questioning that models credibly represent socio-cultural systems (that is, "wholes" of various kinds), even if complex and dynamic.

In fact the epistemological divide to which I keep returning here presents us with several considerations for the conception of culture that underwrites a given modeling process. First, as part of the validation process, we should recognize a specific military conception of culture, as largely inscribed in doctrine, and as doctrine directly informs the algorithmic code of the model. As has been pointed out, a prevailing conception of culture as "cultural terrain" has direct implications for how cultural factors matter in any "what if" modeling scenario. In short, they become cartographic variables in a mapping exercise. But this is a highly selective account of culture.

Of relevance to a more robust process of model validation is better incorporation of the meaningful implications of the shaping influence of doctrinal parameters – whether new counterinsurgency doctrine, stability operations doctrine, or new doctrine for the joint intelligence preparation of the operational environment – as they provide the basic

lexicon, and meaningful categories, used to develop a model's socio-cultural code. While doctrine, as a starting point, might be a good way to address frustrating inconsistencies in terminology and the call for a "shared framework" for socio-cultural data across different modeling efforts, it also risks ignoring that differences in vocabulary can obscure more profound epistemological differences between, in this case, the discrete identification of features of the cultural terrain and the dialogic co-production of culture as a hermeneutic project.

Second, a system-based approach to culture, where culture is understood to be a "complex whole" or "total way of life" of a given people, might make the best fit for the modeling process, but it is in problematic tension, say, with the contemporary account of culture among sociocultural anthropologists, as at once historically constituted, open-ended, multiply interpreted, unevenly distributed, and regularly contested. An additional issue raised by the panelists, if at times inadvertently, is the relative fit, therefore, of such a system-based "holism" with much less holistic socio-cultural realities. Contemporary anthropologists are fundamentally skeptical about any effort to distinguish cultures by identifying their respective core sets of values. A concern for the "system as a whole," in other words, runs the risk of grossly misrecognizing how cultural meanings circulate through societies, as multivocal, contested, and dialogically co-constructed. Models that are now developing new human or cultural terrain data frameworks and built to resemble SimCity-like environments, for example, clearly raise the topic of holism as a technical but also interpretive problem, as yet not resolved.

Bevir moves closer to an anthropological account of culture when he describes models as like "fables," none of which are "uniquely correct accounts of the world." This

conception is conversant with Turnley's view of a model as a representation of a target domain, where the goal is not to be most correct or comprehensive so much as to create a new understanding of the target. As she nicely puts it, a model is a "technique for the creation of new knowledge through the logic of selection," which in effect provisionally completes an analogy. As several panelists differently suggest, in so doing and as part of the interpretive ground, models might help us create new "what if" stories which, in turn, might service the ongoing dialogue. At the same time, as Turnley stresses, models are also a kind of interpretive lens or prism, framing what we see and how we see it. Without a more developed and hermeneutically-inclined validation process, models, thus, can be a decidedly mixed blessing.

Pertinent to this discussion, then, are the assumptions we bring to bear about what "culture" is in the first place and how it finds its way into the modeling enterprise. First of all, in our discussions throughout the conference and as suggested by the "unifying framework" under which the conference itself was convened, one goal appears to be to develop a "comprehensive theory of culture" for use by the computational modeling community. Without it, the ostensible work of "mapping the socio-cultural terrain" can quickly become an exercise of ambiguous purpose. In different ways across the several presentations, such a goal of comprehensiveness was revisited, if in the comparative discussion of cultural "codes," cultural taxonomies, "core cultural dimensions," or the description of a culture's "central tendency." And yet, panel V, in the words of Robert Rubinstein, gave attention to the ways that the requirements of models lead too easily to the "fallacy of detachable cultural descriptions," that is, systematic descriptions with no meaningful real-world referent. This remains a critical issue to address.