When Explanations "Cause" Error: A Look at Representations and Compressions

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Abstract—We depend upon explanation in order to "make sense" out of our world. And, making sense is all the more important when dealing with change. But, what happens if our explanations are wrong? This question is examined with respect to two types of explanatory model. Models based on labels and categories we shall refer to as "representations." More complex models involving stories, multiple algorithms, rules of thumb, questions, ambiguity we shall refer to as "compressions." Both compressions and representations are reductions. But representations are far more reductive than compressions. Representations can be treated as a set of defined meanings – coherence with regard to a representation is the degree of fidelity between the item in question and the definition of the representation, of the label. By contrast, compressions contain enough degrees of freedom and ambiguity to allow us to make internal predictions so that we may determine our potential actions in the possibility space. Compressions are explanatory via mechanism. Representations are explanatory via category. Managers are often confusing their evocation of a representation (category inclusion) as the creation of a context of compression (description of mechanism). When this type of explanatory error occurs, more errors follow. In the drive for efficiency such substitutions are all too often proclaimed – at the manager's peril..

Keywords—Coherence, Emergence, Reduction, Model

I. INTRODUCTION

SIMPLE models can be many a manager's undoing. Models based on labels and categories we shall refer to as "representations." More complex models involving stories, multiple algorithms, rules of thumb, questions, ambiguity we shall refer to as "compressions." Representations have little capacity for dealing with complexity. In the assertion of category as explanation, context is all too often ignored. Yet, context is key to any understanding of the mechanisms of change. The manager's use of a simple representation can thus mask much of what might be important regarding change. In that masking lies the potential for grave error.

Representations by managers often take the form of rule based checklists and of Demming inspired statistical controls both of which assume that the labels and underlying models have permanent validity. A stasis to the world is assumed which seldom exists. Such a stasis assumes that affordances are predictable, context is controllable, and emergence is non-existent. The world of practicing managers does not match these oversimplifications. Prediction, at best, is only possible in the short term. Boundaries are always shifting.

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The composition of work teams, temporary organization, the company, the industry, or the competitive environment, is rarely predictable (in the long term at least). Identities are unclear. The trade-off between outcome and process does not favor one over the other. In the world we live in, emergence is pervasive, context is seldom controllable, ecologies are emergent and few affordances are predictable. Situation and context play key roles. In the complex world of organization, continuity is but a fragile, temporary and illusionary notion; the assumption of predictability does not hold.

By making assumptions (and in so doing restricting ourselves to a set of labels and a model) we predetermine what might be learned, which will limit the options that appear to be open to us. This is because by adopting a particular perspective, and therefore making assumptions consistent with that perspective, we limit what we can 'see'. "We often fail to allow for the possibility that evidence that should be critical to our judgment is missing. What we see is all there is." [6] The perspective acts as a lens that only allows particular features to come into focus -- all other features are lost or assumed not to be relevant. Furthermore, in communicating with others, by making use of a particular viewpoint, we limit our and their ability to 'see' what is relevant. The problem with ascribing a label, and using it as your method of explanation, is that once one has ascribed it, once one has said this belongs to Label X, then the explanation is done. The assertion is that the representation holds. Implicitly it is further asserted that the complexity and degrees of freedom found in compressions are unnecessary. "I am a "nice" person. Nice persons do X. I must do X." There is no room in this equation for context. The representation is assumed to govern.

II. THE RISK

The risk we face is that our explanations are wrong and so are the actions/decisions based upon them. Computers rely on efficiency's form of coherence. To a computer, coherence is the degree to which an item 'x' matches a definition or a set of items having observable qualities that match one another. Computer coherence is about measurement. Coherence of this kind is not created it is assigned, ascribed, and measured. This is the coherence of efficiency. Efficiency has no room to consider context, history, and situation. Efficient coherence demands a context of stability. The more complex experienced coherence entails a process of finding stability in context. Without reliance on the former, efficiencies are difficult to create ad exploit. Without an awareness of the latter, life passes us by and crises descend seemingly from nowhere. Miracles happen when context history and situation combine in a fortuitous way; nasty surprises occur when context history

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and situation combine in an unfortunate way. In both cases, the predictions at the basis of efficiency's coherence, did not pan out.

We have to make assumptions; it is unavoidable. Nonetheless, it is important to appreciate the significance of doing so. When managers learn to rely on labels and simplistic encoding methods and singular decodings, they also learn to discount stories and emotions, which are not so easily described in term of rationality and linearity. When managers find that the world is best dealt with through compartmentalization or reductionism, they are tend to think that it is OK to deny the reality of interrelationships or of the multiplicity of interpretations that exist whenever situatedness is acknowledged. When managers learn that abstract quantitative models contain "truth," they are being taught that truth does not include individuality, weak signals, embodiment, or context. Managers learn these lessons not only in the MBA, but also continually in the "managerial environment" surrounding them when they are at work. Managers can find solace in simplistic business models that promise protection from unpredictability, and an excuse to not have to think.

Labels and categories eliminate the individual variations of specific items. The substitution of the label for the thing itself thus simplifies the world. Labels form a very valuable role in limiting the world. Instead of actively discussing the multiple approaches which may all be interpretations, enactments, decodings, or embodiments of a model, managers often act as if there is but one or perhaps two decodings. These "privileged" interpretations are given status as names, labels, or symbols and the labels are then used as guides for action.

III. THE MORI UNCANNY VALLEY AND ITS EFFECTS

Coherence theory (both that of truth and of Thagard [20]) would suggest that as the number of identified common factors between two items increases so too would the recognition of "sameness" and mutual acceptance. This belief underlies the thought that one can "reason" one's way to mutual acceptance of a representation or a label. Yet, "the uncanny valley" of Japanese roboticist Masahiro Mori [13] suggests that this is NOT always true. When one plots emotional response against similarity and claimed identity (see Figure 1), the curve is not a sure, steady upward trend (as indicated by the 45 degree sloping line). Instead, there is a peak shortly before one reaches a completely semblant "look" . . . but then a deep chasm plunges below neutrality into a strongly negative response before rebounding to a second peak where the claimed resemblance is complete. In its original form, describing robots, the uncanny valley:

> *"represents the point at which a person observing the creature or object in question sees something that is nearly human, but just enough off-kilter to seem eerie or disquieting. The first peak, moreover, is where that same individual would see something that is human enough to arouse some empathy, yet at the same time is clearly enough not human to avoid the sense*

> *of wrongness. The slope leading up to this first peak is a province of relative emotional detachment—affection, perhaps, but rarely more than that."* (Bryant 2006)
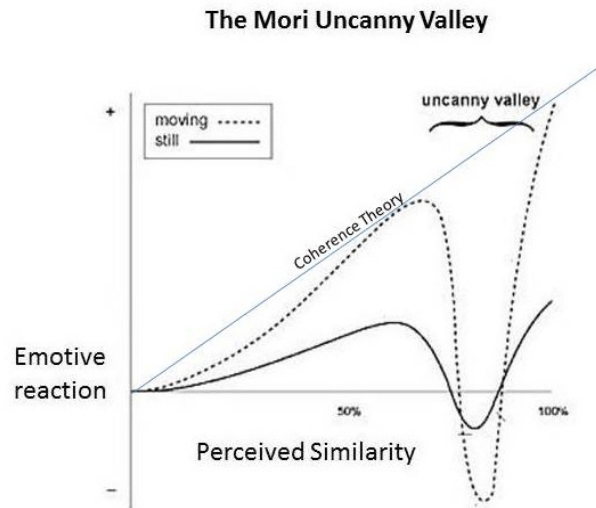

Fig. 1 The Mori Uncanny Valley

To place this figure into present context – first there is engaged discussion, then as the overlap between terms with disassociative meanings becomes too great there is repulsion, finally when mechanism (explanations of actions and meanings not of labels) is allowed to assert itself the overlapping word choices are accepted as a means of bridging gaps or "boundary objects" [18] and emotional coherence is regained. The valley occurs when the self-identity of the observer is threatened by the use of a representation or label counter to that used by the observer. The threat seems to occur when the number of identified common factors (the reasoning used to demand adherence to a given representation) increases above the 50-60% level – assuming that the observer has another label/representation he uses to explain the same material. Another way to describe the valley is shown in Figure 2:

Fig. 2 The Progression of "Acceptance" in the Mori Uncanny Valley

Given the existence of two labels (categories) to describe some item/event/context and the emotional attachment of the observer to the first label, as the perceived characteristics which fall into label #2 increase the observer shifts his/her perception of that label from 1) surface similarities which only highlight differences to 2) boundary objects which give rise to explorations of metaphor to 3) emotional opposition which blocks "rational discussion" to finally a begrudging acceptance that perhaps label #2 is a "better" fit.

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The Mori Valley suggests: when a claim is made that a given representation applies to set of circumstances, situations, individuals, events etc. an observer may tend to react to that claim in a manner approximating Mori's curve. The use of a different label for a similar set of circumstances may evoke a significantly negative reaction. This is directly in contradiction to the claims of "boundary object" proponents who claim that the overlap allows for the identification of a common area between the two thoughts and that this common are becomes the basis for dialogue. While both the Mori hypothesis and the boundary object hypothesis can simultaneously be true where the perceived similarity is at or below the first Mori peak, the hypotheses diverge thereafter.

The Mori hypothesis suggests that once similarity crosses a threshold there is an emotive reaction which interferes with rational discourse. Surely this does not apply to everything; and common sense suggests that it applies only to items where the observer has either an emotional investment or has incorporated the representation of the item into self-identity. If true, then the ascription of an indexical representation to a seemingly "misfit" example of set would provoke the reaction. Think of it as a form of cognitive dissonance caused by too much similarity. *It is this risk – emotional rejection from the use of the same signs, symbols, words, labels etc. for two meanings -- which demands awareness by managers.*

Inherent in the multiplicity of meanings is the recognition that only one meaning will be primary within the context of a given situated activity. That primary meaning will not be the solely representative meaning but will take its primacy from the context. Word choice in usage is tentative much as the acceptance of a theory. What works for the moment may be supervened by a better meaning in an instant. Activity shapes meanings, and access to meanings further influences potential activity. In theory, the dissonance produced thereby forces a reversion in the perceived meaning of the word. Context dependence takes over. "It is not merely the content of a word that changes, but the way reality is generated and reflected in a word" [21] In practice, *the Mori hypothesis suggests that stubbornness and defensiveness will kick in instead as defensive reactions to the threat posed to the dominance of the previously accepted representation or label.*

Douglas Hofstadter [5] has labeled this idea as "conceptual slippage." Such slippage would works as follows. An organization and its members begin with some existing set of concepts and they encounter change. The members of the organization attempt to explain the change via metaphor. The use of a metaphor evokes a glom of meanings. Each such use of metaphor is a perturbation to the existing self-referencing system (be it an individual, the organization or some holonic part thereof). The perturbations (please notice the plural) caused by the glom or gloms interact in multiple-dimensions with the self-referenced core. This is because the components of the glom each cause their own perturbations in a holonic way. As this series of interactions and resultant emergent behavior self-organizes, "least action" then takes over. The encounter reduces some of the concepts to the status of gloms, and in such a status, the possibility arises for new conceptual understanding to emerge.

Such understanding will be influenced by the metaphors available to label the gloms, for in the adjacent meanings implicit in the metaphors is the potential synthesis represented by the new concept. By contrast, gloms will not work well in a system that is dependent upon representations, reductions and causality. In such a world, evoked meanings become reified and are carried across new situated activities. Dissonance from the mismatch – the very attribute of the Mori hypothesis is the likely result.

IV. INDIVIDUAL'S ROLE IN ASSIGNING MEANING

While codes and similar representations are constrained by pre-established meanings, cues, affordances and similar compressions are free of such constraints. Affordances suggest that meaning is contained from inside one's self. When one encounters a signal, the signal evokes a meaning based on what's going on in the receiver's head and is not based on what the transmitter of the signal intended. We refer to these signals as "cues." The inability to define the environment in which a signal will be interpreted, and the parallel inability to predict affordances are what render cues complex and their study part of qualitative complexity. Cues are thus the label for the emergent meaning which results from an intersection of attendance to environment, situation, history, and cognition, such that semiotic affordance are perceived to allow for action, assignment of cognition, label, or code, or for boundary breaking. Compressions are cued while representations are mapped. Cues tap into experience while codes tap into ascription. Cues are situated and contextual. Codes are ascriptive and conforming to pre-established judgments. Once we create the degrees of freedom both semiotic affordances can be recognized and compressions cued, by telling stories. What matters about a story is what the listeners do with it, not the smile it brings to the face of the teller in its one hundredth reincarnation. Listeners use the images evoked to create meaning … meaning that goes on to inform actions. When we tell stories and share languaging, the changing context can bring us from raw experience to the possibilities and limits of shared consciousness. Such sharing is the exploration of homologies which underlie the compressions being discussed. Affordances and their import demand an attention to underlying homologies rather than to surface labels. The Russian innovation method TRIZ focuses on just such storytelling. Stories are not a set of labels. If they were then as the labels get triggered a predefined set of images would be unfolded by the listener. Every listener would hear and construct the same story. Children learn that this is not true when they play "telephone" or "operator." Corporate managers, however, tend to forget this childhood lesson. The children's game illustrates the new things that can emerge as stories are told and retold. The corporate chieftains tend to expect the same meaning to be evoked by their story as they retell it from audience to audience. They thus reduce story to representation. The chieftains miss what the children gained. In telling and retelling the same war stories they often fail to ask their listeners about the images the story evoked. What matters about a story is what the listeners do with it, not the smile it brings to the face of the teller in its one hundredth reincarnation.

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Listeners use the images evoked to create meaning (to build a model/compression which is situated about then present context)… meaning that goes on to inform actions.

John Seely Brown [3] of PARC Xerox fame likes to say that good stories are emotionally engaging. Stories provide a broader framework that enables us to understand the generalities, or looseness, of ideas. Stories can be embedded in a new context, and the nuggets of knowledge contained in these stories can be applied to a new range of settings. As Orr [15] puts it, "The key element is the situated production of understanding: through narration, in that the integration of the various facts of the situation is accomplished through a verbal consideration of those facts with a primary criterion of coherence. They do not know where they are going to find the information they need to understand and solve this problem. In their search for inspiration, they tell stories."

Each actor coming to the situation has own set of representations and compressions and is forced to react to the assertions of boundaries and indexicals. Individuals have the Mori reaction while algorithms do not.

The context set out by the storyteller will conjure up a new set of "related ideas" in the minds of each listener. Meaning emerges from the combination of what the storyteller supplies and what the listener's mind now adds. Stories suggest new images, combinations of old and new ideas, and allow the listener to place him/herself in a simulacrum of related action. Meaningful stories are not made up of isolated words. They too must evoke deeply held values and images. To offer up isolated words is to evoke a shallow stream of water in a hot desert. Whatever value there is dries up quickly. The empty articulation of representations in the form of jargon which is itself disconnected from the experiences of those who are forced to deal with that articulation can lead to the Mori Valley. The proclamation of a label as being indexical can act to offend the self-identity of those who adhere to a different description or a different context. In metaphorical terms where the successful storyteller has carved the canyon for the compression to run through, the articulator of idle representations has built a canal and the river had other ideas.

Once again the choice of explanatory form can work to expand or restrict the degrees of freedom available to next actions.

Since narratives guide us through uncertainty and change, they are critical in how we deal with emergence. "People do not simply tell stories ?they enact them" (Pentland 1999).[16]

When affordance and homology coincide the amount of effort needed for a coherent response to complexity is reduced. The obverse is also true. But, affordances are not "appropriate" best practices and homologies are not shared labels. In the drive for efficiency such substitutions are all too often proclaimed - at the manager's peril. Managers need to learn that context can be explored for affordances and that the mental models of their stakeholders - suppliers, customers, employees, and fellow organization members - can be mined for homologies.

Such narratives are by definition compressions and NOT representations. "The sense of coherence expresses a person's inner ability to see existing possibilities around him or herself and make use of the best ones in respect to the demands." (Kalimo et al., 2002.)

When, instead labels and judgments are allowed to dominate, while affordances are overlooked, and the cuing of "other" homologies is ignored, the prospect of unanticipated emergence is vastly increased. The fear of the unknown constrains creativity and innovation and in the long-run effectiveness. That fear is implicit when there is an insistence on adherence to representations and a reluctance to explore compressions. Better understandings of affordances, homologies, representations and compressions are thus vital ingredients in the manager's arsenal. Complexity cannot often be managed, but our response to it can be "guided" if we give ourselves the tools.

Storytelling helps us to consolidate our experiences and to make them available in the future to ourselves and to others. The power of a story is that it allows listeners to recreate experience. Too many details or too much exegesis removes the potency of the imagination. The power of a good story is in the experience it evokes. Most stories are set in a context. That context reinforces the images of place and time. The model of time and place creates order, structure and recognition; many details do not need to be told and room is created for imagination to roam. In effect, the storyteller carves out a canyon for the listener to supply a river of meaning to run through it. Meaning emerges from the combination of what the storyteller supplies and what the listener's adds. Stories suggest new images and combinations of old and new ideas, and they allow listeners to place themselves in a simulacrum of related actions. Meaningful stories are not made up of isolated words. They evoke deeply held values and images. To offer up isolated words, is to evoke a shallow stream of water in a hot desert. Whatever value there is dries up quickly.

In their desire to "explain" (and thus to understand causality) managers often construct and interact with narratives built around representations and not around compressions. Such narratives work to reduce uncertainty only while the participants perceive that the label on which the narrative is based is the "best" descriptor for the situation they perceive. When "best" slips to "satisficing", and then to "questioning", the relevance and the resonance of the label? based narrative declines, and coherence declines with it. There are alternatives to making use of labels, categories, and models as the means for establishing coherence and for creating narratives. To address emergence and coherence, managers need a better understanding of how narratives become good "fits" to their situation.

V. LESSONS

The risk of having too little resilience lies with those who believe that explanation can consist of an assignment to category (as opposed to those who believe that an explanation requires an explication of mechanism). This type of explanation states that if we can identify the category or label to which something or some situation belongs we have sufficiently explained it. If explanation consisted solely of taxonomy such an approach might work. But, category?based explanations provide no guidance for the how something happens and for the what?ifs of change. All that category based explanations can tell you about a "what-if" is

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whether after the "if" the category assignment still holds true. Fine, when efficiency is the only goal. But, dangerous in a world with emergence.

By restricting ourselves to a set of representations, we predetermine what might be learned, which will limit the options that appear to be open to us. Stopping here is what acts to stifle creativity and ultimately to interfere with effectiveness. What is critical is that the interpretive and retelling efforts NOT stop when the representation gets assigned. To stop at this point is to ignore dialogue and revert to the ascribed coherence and retrospective judgments of identity where the label is the explanation. Instead the goal is to keep dialoguing so that homologies of mechanism and what?if effects can be exposed to articulation, pondered about, and used to shape an ongoing narrative. That narrative serves as the compression and is the alternative to representation. With such compressions, affordances are more easily perceived, opportunities are better exploited (or at least explored), resonance has a better chance of taking hold, and experienced coherence can assert itself in the embrace of emergence.

Single accounts, ascribed labels, adherence to categories and to coding, are all in accordance with the acceptance of context as being pre-given and unchangeable. There is an alternative. We can work to alter the context, to shape it, to help influence what affordances it presents and what narratives it affords.

To do this we need to stop making lists of labels and categories. We need to stop drawing the two-by two matrices of which MBA's are so fond. Instead we need to outline the ingredients for dialogue surrounding the situation, idea, or context we seek to address. We can do this by making use of the dialogic square. We can do this by emphasizing the need to consider the DIS-similarities evoked by analogies and metaphors. WE can do this by remembering that representations are NOT enough, that we need to be making use of models which involve compressions if we expect to capture enough of the complexity around us so as to preserve our resilience.

Efficiency can be the enemy of resilience. A drive for simplicity can be the enemy of awareness. A quest for checklists, labels, rules and categories can be the enemy of tomorrow's possibilities. In the quest to limit possibility space itself lies yet another avenue for complex causation.

Thus our lessons.: Explanation can take the form of category or of mechanism. Category based explanation may be efficient but they are not resilient. Resilience requires: narrativesnotlabels,mechanismsnotcategories, afocuson experience andnotonlabels and a need to be aware of when representations work and when they fail. Managers need to become aware of the complex role of both representations and compressions in defining the possibility space, in allowing for the overt recognition of affordances, and in challenging the experience of coherence as life itself unfolds. The choice of explanatory form has a causal role bigger than they might assume.

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