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A Basis for Understanding the Genesis and Evolution of Culture Differences Between Divergent Communities of Interest

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Abstract

Understanding the processes of creating and communicating meaning gives insight into the genesis and evolution of culture gaps. Meaning making involves transformation functions that operate on perceptions in perception space to create meaningful interpretations which are metaphor, extended metaphor and collections of metaphor in interpretation space. The process recursively creates interpretations which when taken together with sensory perceptions are unavoidably biased world views. When we attempt to communicate between world views, this bias creates an uncertainty which acts in ways similar to Shannon entropy in communications systems. This suggests necessary and sufficient conditions for overcoming the uncertainty. The concept has application to any negotiation which involves the communication of ideas between parties.

Key words: culture gap, metaphor, interpretation, communication, world view, Shannon Entropy

C. P. Snow, in his famous Rede lecture of 1959 (1), spoke of culture gaps between communities of interest. His contemporary, information theorist Claude E. Shannon, without exactly realizing it shed light on bridging those gaps. Mark Turner (2) makes a cogent and forceful argument that what he calls "story" is a basic principle of mind and the projection of one story helps us understand another one. Turner calls this projection "parable". He says, "We interpret every level of our experience by means of parable." Ricardo Llosa speaks of stories composed of symbols and how they make possible the quick transmission of ideas to a wide range of people. (3)

Metaphor is foundational to these meaning making processes. For example, we learn quickly as a toddler that a ball released falls to the floor. This image, metaphor if you will, of the ball dropped to the floor serves us well all the rest of our lives as we carry objects about and use implements knowing that if we aren't careful they will fall to the floor and break or perhaps do damage to us or the floor. In short, we make sense of the world through our ability to make metaphor.

Understanding the processes of creating and communicating meaning gives insight into the genesis and evolution of culture differences. I suggest that meaning making involves transformation functions that operate on perception to create meaningful interpretations which are metaphor, extended metaphor and collections of metaphor. The process recursively creates interpretations which when taken together with sensory perceptions are biased world views. Let's see how this works.

Terminology as used in this paper

Meaningful Object: any object containing, connoting or denoting a meaning. This includes physical objects, language constructs, and images.

Perception: any idea or sensory data.

Perception space: the aggregate of all available perceptions.

Interpretation: a metaphor, extended metaphor or collection of metaphors resulting from a substitution of a meaningful object for a perception. Nothing is implied as to the accuracy of the meaningful object.

Interpretation space: the collection of all available meaningful objects plus all prior interpretation.

World View: the union of perception space and interpretation space. It is the aggregate of all available perceptions plus all available meaningful objects plus all prior interpretation.

Metaphor transformation: the creation of an interpretation by substituting a meaningful object from a world view for an object in perception space; the process of creating meaning.

Metaphor making: the recursive use of metaphor transformation to produce instances of meaningful interpretation.

Metaphor maker: any person or community of interest capable of a metaphor transformation.

Communication: a process of sending information without regard to meaning from a sender entity through a communication medium to a receiver entity.

Communication channel: the construct of sender + medium + receiver.

Metaphor as recursive meaning making

Let

P	be any perception.
T	be a metaphor making transformation on P
I	be a meaningful interpretation of P brought about by T

Then we can write

$I = T(P)$ to mean the perception *P* is transformed by *T* to create an interpretation *I*.

I can be further transformed recursively as in
$I_1 = T(I), I_2 = T(I_1),...$

For example, we can write

orbiting object = T (moon)
satellite = T (orbiting object)

The transformation *T* causes an object such as a language construct in the world view to be substituted for the perception in order to create meaning in interpretation space. The domain of *T* is the set of all possible perceptions available which includes all prior interpretations. The range of *T* is the set of all possible interpretations of those perceptions.

Consider the poet Seamus Heaney's view of a lovely scene such as in his poem Ballynahinch Lake (4)...

So we stopped and parked in the spring-cleaning light
Of Connemara on a Sunday morning
As a captivating brightness held and opened
And the utter mountain mirrored in the lake
Entered us like a wedge knocked sweetly home
Into core timber.

The scene is of two people in a car (*parked in the spring-cleaning light*) in Connemara Ireland. What they perceive *becomes captivating brightness* with the image of a *mountain mirrored in the lake*. This image is further transformed into action as it *entered us like a wedge knocked sweetly home/ Into core timber*. I commend the rest of this beautiful short poem to you. It moves gracefully through several more transformations in just nine short lines to finally return the two people almost to where they began, but not quite. They are left a little different as Heaney says *Yet something in us had unhoused itself* which he finally transforms into the driver's brow *which shook a little as the ignition fired*.

In this case, we can write

New Interpretation = T(Scene) meaning the poet's new interpretation = poet's metaphorical transformation of the scene.

Or if we define P_B to be the perceived scene at Ballynahinch Lake
and let T be the poet's metaphorical transformation on P_B

we can write in more abbreviated form

$I_B = T(P_B)$

Do you sense some deception? I don't intend trickery, but in point of fact, we have just done precisely what I described earlier. We took the idea of a poet making a language metaphor; substituted a pseudo sentence to describe what he did and then immediately substituted a mathematical notation for the same thing. Our interpretations went from the idea of poet writing metaphor to a mathematical equation of some sort. And something else,

our transformations went from metaphor drawn from language to metaphor drawn from mathematical symbols.

We can write what we just did symbolically

$I_0 = T(P)$ where T is the creation of the pseudo sentence *New Interpretation = T(Scene)*
$I_1 = T(I_0)$ where T is the creation of the equation $I = T(P)$
.
.
.
$I_{n+1} = T(I_n)$
.
.
.

where each transformation T yields an addition to our interpretation space. Each new instance of interpretation may differ only slightly from the previous one if at all, but each is a new instance of interpretation never the less.

Recursive transformations create bias

By our definition of world view, we can write

World View = $\{I_0=T(P), I_1=T(I_0), I_2=T(I_1)... I_n=T(I_{n-1})\} \cup \{P\}$

to mean this particular world view is the collection of all interpretations under the transformation T plus all of perception space. Notice one interpretation is built from another. This recursion is important because it is the genesis of bias.

Suppose a poet and a physicist think about the reactions inside a nuclear reactor. The physicist might notice that the equation

$$f(x) = g(x) + \int_a^b K(x,y) f(y) dy$$

providing she chooses the functions K and f appropriately, can serve to mimic some of the phenomena. In fact, she can easily do so by choosing from a class of probabilistic functions. She even has a metaphorical name for this well known process. She calls it a "random walk". The name conjures up the process itself, the image of a small particle colliding at random with another and causing other particles to careen away along random paths within the boundaries of the theoretical reactor. The right hand side of the equation amounts to the transformation metaphor and each new $f(x)$ on the left serves as a new interpretation brought about by the transformation. The transformation function is metaphor drawn from the symbols and constructs of mathematics.

Our poet works in the same fashion as his friend except that his experiment is a testing of new images expressed in language metaphor and arrangements of them on a page. He might write a line such as *brilliant instances of chance* to describe the particle collisions. With each new image and each new arrangement a new instance of interpretation is formed. The transformation function in his case is metaphor making drawn from language and results significantly from internal influences such as his imaginings and his choices of language.

These examples illustrate how metaphor making transformations create biased world views. Each began with an initial perception of the same thing, but each evolved a different set of interpretations. The only fundamental difference between our poet's and our physicist's processes is in the approaches taken to "experimentation". Let's distinguish the poet's and the physicist's interpretations by I and I' and their transformation functions by T, and T' to indicate that each chose substitutions from different interpretation sets. Then we can write...

Poet's Interpretation Space, $\{I\} = \{I_0=T(P), I_1=T(I_0), I_2=T(I_1)... I_n=T(I_{(n-1)})\}$

Physicist's Interpretation Space, $\{I'\} = \{I'_0=T'(P), I'_1=T'(I'_0), I'_2=T'(I'_1)... I'_n=T'(I'_{(n-1)})\}$

Poet's World View = $\{I\} \cup \{P\}$ to mean his interpretation space plus his perception space.

Physicist's World View = $\{I'\} \cup \{P\}$ to mean his interpretation space plus his perception space.

The important feature is that each metaphor maker is limited in meaning making ability because he can only choose objects within his world view with which to make the transformation. Those are the only meaningful objects available to him. In other words, the metaphor maker is forever biased.

Bias distorts (changes) the resultant range of interpretations and hence the world view. Note that no value judgment is made about bias. It's neither good nor bad in and of itself. In fact, we regularly make use of bias and pri-

or interpretation to simplify and even preserve life. For example, our preconceived notions of danger help us to act quickly "without thinking" in order to avoid danger.

Distortion affects communication

When two communities of interest have strongly overlapping world views, the distortions may not be pronounced. For example, we all agree on certain commonalities such as colors, what is and what is not dangerous, but on large scales such as Snow's two cultures or national cultures, the differences become pronounced. The situation becomes more complex when the two try to communicate. Communities of interest are compelled to communicate for economic benefit, safety, defense, discovery, enlightenment and all sorts of other reasons.

To communicate, we require a communication channel which consists of a sender, a transmission medium and a receiver.

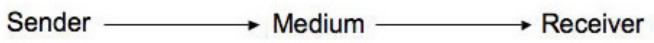

Figure 1. Communications Channel

The basic problem of communication is to reconstruct as closely as possible the input signal after observing the received signal at the output. In our case, the sender is a metaphor maker with an interpretation space; the receiver is another metaphor maker with a different interpretation space; the medium is a means of communication complete with its own noise and distortion.

Claude E. Shannon (5), working with physical communication systems, developed the notion of what he called entropy which is a measure of the uncertainty that the message is correctly received and interpreted. The Shannon idea of entropy is not the same as the thermodynamic notion of entropy. Entropy in the Shannon sense is best stated as the difference between the uncertainty of the message before it is sent and the uncertainty of the message after it is received and interpreted and is a measure of the probable amount of information contained in the message.

Shannon showed that unavoidable and uncorrectable errors occur in the communication when the amount of information transmitted exceeds the channel carrying capacity. Conversely and perhaps more importantly, he also showed that if the probable amount of information in the message is below the channel capacity, then the information can always be received without error even if there is noise and distortion in the channel during transmission. Shannon was dealing with coded information in physical systems, but metaphor encodes and encapsulates meaning as symbol in exactly the same way. So it makes sense to consider the exchange of metaphors between metaphor makers to be subject to the same uncertainty as messages in the Shannon sense.

Our communication channel will have noise in the form of bias distortion brought about by recursively generated meaning as limited by the subset of perception and prior interpretation available in the sender and receiver world views. This means that in the initial state when two metaphor makers agree to exchange metaphors, there is uncertainty as to what metaphor the sender will choose to send. Let's call this initial uncertainty U_{Before}.

The sender's metaphor is received as a perception by the receiver who uses metaphor transformation to create his own interpretation. There is still uncertainty that the receiver's interpretation matches the one sent. Let's call the uncertainty in this new state U_{After}. It is based on the probability that the metaphor sent matches one in the receiver's interpretation space and if we could measure it, it would measure the amount of distortion in the dialog. We can say the amount of information correctly communicated is limited by the channel capacity, $C = U_{Before} - U_{After}$.

If the sender and receiver interpretation spaces are so disjoint that the metaphors cannot be sufficiently matched then the channel capacity will be small. Conversely, when the two interpretation spaces are congruent, there is a high degree of certainty the receiver's interpretation will match the sender's. In other words, there is little uncertainty after receipt so U_{After} will be small and the channel capacity,

$C = U_{Before} - U_{After}$ will more nearly approximate U_{Before}. In other words the interpretation for the receiver will be close to that of the sender.

The extent to which the metaphors of one interpretation space do not contain the same meaning in another interpretation space determines the communication channel capacity. The broader the meaning, the lower the probability of a suitable meaningful object in the receiver's world view and the more likely his interpretation will differ from the sender's interpretation and thus the lower the channel capacity.

Figure 2 illustrates this. We have a sender in one perception space attempting to create meaning in a receiver's interpretation space. The sender transforms a perception *P* into an interpretation *I* which becomes a perception in the receiver's perception space. The receiver constructs meaning by modifying the perception sent to him by performing a metaphorical transformation to create a new interpretation *I′*. The roles then reverse and the process is repeated in the opposite direction.

Conclusion

By enlarging our world views, we gain a larger space of objects from which to create meaning. This lowers the uncertainty when we communicate. It simply says that each community of interest must use metaphor that has a high probability of meaning in both interpretation spaces.

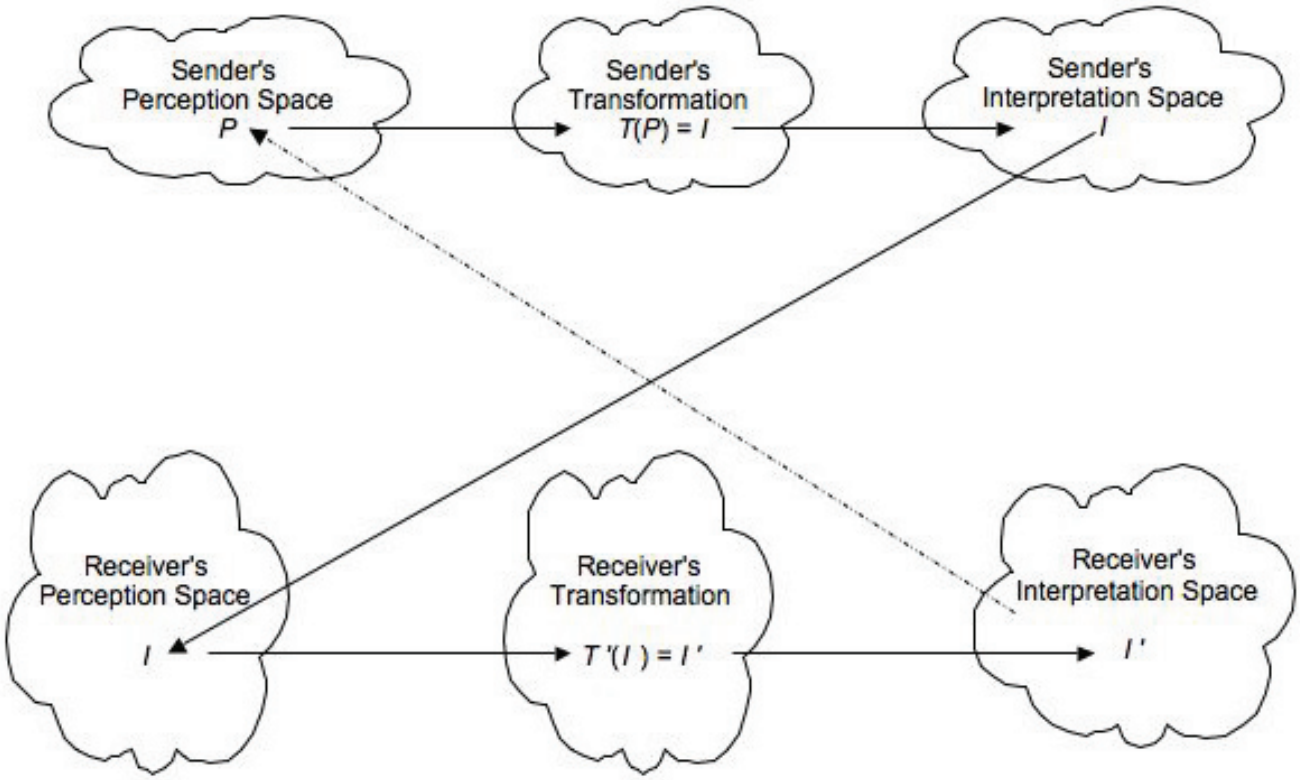

Figure 2

Assuming that the parties are serious about reaching understanding and neither is purposefully attempting to obfuscate, as the dialog continues from *P* to *I* to *I′* to *I′′* to *I′′′*..., the sequence {*P*, *I*, *I′*, *I′′*, *I′′′*,...} will always converge to an interpretation sufficiently matched in each world view if the uncertainty is always at or below the channel capacity. Otherwise, convergence (shared understanding) is unlikely. This simply means that each communicator must choose metaphor (meaningful object) that has a high probability of similar meaning in the other communicator's interpretation space.

It isn't necessary for one community of interest to understand another community's world view on the others' terms or even to accept it entirely as their own. There is simply the imperative for the one community to take advantage of the power of metaphor to "see" the others' world view, to bring it into its own through its own understandable metaphorical transformations. Appreciation is the key, not full comprehension. World views do not have to merge. There only need to be communication channels with adequate capacity which is equivalent to saying the uncertainty in the message must be low. In order for this to happen, there must be a seeking willingness within each

community of interest for a bridging of meaning in one world view to intended meaning in another to take place. No matter whether we stand in a community of science or in a community of the humanities, the community of our religion or the community of nonreligious belief, the community of one nation or the community of another nation, if we assume an attitude of seeking willingness to interpret the view in the other community, we will fulfill our potential as metaphor makers. We will become instruments of transformation.

To do so opens community to discovery and new insight. To fail to do so relegates us to domains limited by parochial views and isolationism. In limiting our domain of perception, we limit the range of our interpretations and the understanding toward which we stumble.

Camelia Elias speaks of invention and inventiveness in her essay "Stumbling Unto Grace: Invention and the Poetics of Imagination." She says, "We can perhaps appropriately say that interpretation is a fugue on inventiveness, that interpretation is a form of sameness in its difference which gives stumbling a status of grace." (6)

We could paraphrase her and say, Metaphor is a fugue on perception, that metaphor is a form of sameness in its difference which gives our stumbling toward understanding a status of grace.

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The author declares that he has no competing interests.

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