

Communication and Culture: A Complexity Theory Approach

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In the target paper, Kashima (in press) harvests insights from communication research, shared reality theory in social psychology, diffusionism in cognitive anthropology and connectionism in cognitive psychology to propose a neo-diffusionist account of culture. A major contribution of this account is that it offers a social psychological explanation of the formation, maintenance, and transformation of culture over time. According to this account, cultural ideas and practices are those that are widespread within a designated human group; they are “generated (largely randomly), socially transmitted, and retained within a human population due to their adaptive advantage.” (p. x).

Communication and Context-Specific Shared Reality

The focus in Kashima’s analysis is *social* transmission of knowledge through grounding of meaning in interpersonal communication. Communication is a joint activity through which socially bounded participants negotiate meanings in concrete physical, temporal and social settings. A primary goal of communication is to attain mutual acceptance of meanings in a conversation a sufficient level so that the conversation can move forward. Successful grounding requires perspective taking and coordination of effort and perspectives. As a result, compared to messages intended for the self (e.g., private or internal speeches), messages intended for a social audience typically contains fewer idiosyncratic expressions and more expressions that the communicators assume to

be comprehensible to the audience (audience design). Once shared meanings are established through communication, they become part of the intersubjective reality shared among the communicators. From this perspective, grounding is a dynamic, recursive process whereby communicators initiating a new conversation rely on their initial common ground to formulate messages for each other, modify their common ground as the conversation moves forward, and establish mutually accepted meanings at the conclusion of the conversation.

The neo-diffusionist account resonates with the post-Whorfian approach to communication and culture (Krauss & Chiu, 1988), which argues that “through communication, the private cognitions of individuals can be made public and directed toward a shared representation of the referent.” (p. 53) Specifically, using language to describe a state of affairs can evoke or create an internal representation that differs from and may overshadow the internal representations of the same state of affairs evoked or created by other means of encoding. Moreover, how a state of affairs is described in verbal communication is affected by the contexts of language use, including the ground rules and assumptions that govern usage, audience design, and the immediate, ongoing and emerging properties of the communication situation. Furthermore, the linguistic representations evoked or created in communication can affect a language user's subsequent cognitions (Chiu, Krauss, & Lee, 1999; Chiu, Leung, & Kwan, 2007; Lau, Chiu, & Lee, 2001; Lau, Lee, & Chiu, 2004). Indeed, consistent with the neo-diffusionist account, our research on referential communication shows that in the process of interpersonal communication, each communicator assesses the partner's view of the referent based on the partner's community membership, prior communications, the

referent context, and the emergent properties of the communication situations; and tailors a message that is appropriate to the common ground (Lau, Chiu, & Hong, 2001). Once consensus is reached on the meaning of the referent, the consensual meaning becomes a part of the communicators' shared reality and may overshadow previous representations of the referent (Chiu, Krauss & Lau, 1998).

The Communication-Culture Nexus

A major contribution and also a challenge for the neo-diffusionist model to extrapolate from the grounding process in interpersonal communication to construction of shared reality in a human group. Kashima (in press) assumes that the process connecting context-specific common ground to generalized common ground is a linear one:

“As each individual leaves a particular joint activity, he or she will participate in another joint activity, then yet another joint activity, and so on. As people join and leave joint activities in succession, they carry forward their memories of context-specific common grounds. Thus, the common grounds – or mutually shared meaning – that results from individuals' continuous participations in numerous joint activities are cumulated in their cognitions, which are embodied and situated in their social milieu. It is this continuous stream of joint activities that construct and reconstruct the social reality in which these individuals live.” (p. x)

The idea has several limitations. First, there are important variations in interpersonal communication processes, particularly in a pluralistic or multicultural society, where competing discourses on the same issue prevail. For example, there are instances in which people tend not to include generalized common ground in their own culture when talking to an audience from a different culture. When talking to an outgroup

audience, communicators seeking psychological convergence may spontaneously modify their message to align it with the prevalent view in the community of the audience (e.g., Leung, Lee, & Chiu, 2013; Zou et al., 2009).¹ In addition, communicators from different cultures may have dissimilar perspectives on the subject of the conversation. Under this circumstance, they may negotiate a new way of referring to the referent, which may not align with the cultural perspective of either communicator (Wilkes-Gibbs & Kim, 1991).

Second, the power dynamics in interpersonal communication may limit the social generalization of context-specific common ground. Communicators who are motivated to maintain psychological divergence with their communication partners may highlight mutual disagreements rather than seeking consensus during communication (Tong, Hong, Lee, & Chiu, 1999). Furthermore, some communicators have greater social influence than others (Nowak, De Raad, & Borkowski, 2011), and some communicators (e.g., Anng San Suu Kyi) are more resistant to majority influence than others (Xie et al., 2011).

Third, communicators do not randomly select their interaction partners. Some may be more inclined to communicate with others with similar backgrounds, and some may prefer talking to dissimilar others (Byrne, 1971). These individual differences can have significant effects on the evolution of cultural consensus and diversity in the society. Given these complexities, it is not easy to derive from principles of interpersonal communication the trajectory of how cultural consensus evolves through interpersonal communications. Indeed, a major research challenge is to predict how cultural consensus and diversity evolve when multiple agents with different communication preferences and motivations, as well as different levels of influence and resistance to majority influence,

¹ Kashima (in press) recognizes that when talking to new immigrants, people may communicate information incongruent with the generalized common ground in the mainstream culture, but he attributes this tendency to the dominance of task goals over social goals in this context.

interact with each other.

Complexity Theory and Agent-Based Modeling

Complexity theory can provide new insights on the communication-culture nexus. Complexity theory shares several metatheoretical assumptions with neo-diffusionism. For example, like neo-diffusionism, complexity theory views culture as a self-organizing and self-reproducing adaptive system that co-evolves with other systems, such as economic and political systems (Walby, 2009). As a self-organizing and self-reproducing system, each culture is assumed to have internal processes that connect its agents and reproduce its contents, and communication plays an important role in these self-organizing and self-reproducing processes (Hatt, 2009).

Complexity theory further asserts that patterns at higher levels can emerge in ways that are hardly predictable at the lower levels (Chalmers, 2006). Because agents' actions are not independent, interactions between individual agents at the micro-level can give rise to macro emergent properties that are not derivable from the properties of a single micro-level entity. However, once the critical lower-level entities and the principles governing their interactions are explicitly identified, they can be translated into the micro-specifications in simulation models that are constructed to predict the emergent properties (Chalmers, 2006).

Agent-based models can be applied to simulate the evolution of cultural consensus and diversity through communication. In a recent agent-based modeling study, we constructed a community with multiple agents ($N = 2600$), each randomly assigned to a node in a grid. We use a response competition algorithm to characterize the agents' decision process. Specifically, each agent holds two competing opinions (A and B). If the

strength of opinion A is higher than that of opinion B, the agent adopts opinion A, and vice versa. If the opinions are equally strong, the agent remains undecided (indifferent). In the initial distribution, 75% of the agents hold Opinion A, and 25% hold Opinion B.

At each time step, a randomly selected agent chooses a conversation partner from its nearest neighbors and decides whether to make an egocentric speech (speak positively about the speaker's own opinion) or accommodate to the opinion of the listener (speak of the listener's opinion favorably). Recall that audience design in message formulation is a crucial process in the construction of shared meanings through concrete social interactions.

To model the cognitive consequences of communication, in our model, when the listener receives a message favoring a certain opinion, the strength of that opinion increases. To model the "saying is believing" effect, in our model, after the speaker has formulated a message supporting a certain opinion, the strength of that opinion for the speaker also increases.

Note that in our model, both audience design and egocentric speech can facilitate construction of shared meanings. If the speaker and the listener hold the same initial opinion, either audience design or egocentric speech will strengthen the opinion for both parties. If the speaker and the listener hold different initial opinions, audience design will bring the speaker's opinion closer to that of the audience, and egocentric speech will bring the listener's opinion closer to that of the speaker. In short, there are two possible paths to construct shared meanings in interpersonal communication. In our study, we allow the likelihood that the speaker will engage in audience design versus egocentric speech to vary along a continuum from 0% to 100%. We also allow the likelihood that a

speaker will prefer talking to somebody with the same opinion as the self to vary. On the one hand, the preference to talk to others with the same opinion as the self can help to maintain cognitive diversity in the system by protecting the minority group from the influence of the majority group. On the other hand, this preference can also reduce the opportunity for minority influence and support gradual assimilation of the minority opinion into the majority opinion. Note that both topic choice and listener choice require the speaker to consider the opinions of their neighbors.

Figure 1 depicts the simulation results. When the agents strongly prefer to communicate with agents holding the same opinion as the self (75% or 100% likelihood), the distribution of opinions does not change. About 75% of the agents continue to hold the majority opinion when the model stabilizes. When the agents strongly prefer to communicate with agents holding dissimilar opinions, egocentric speech reinforces majority influence and wipes out minority opinions in the system. In other words, the level of opinion homogeneity or consensus in the cultural system increases when the agents are motivated to promote their opinion to dissimilar others. It is important to note that in this scenario, both the majority and minority opinion holders are eager to promote their opinions to their listeners. In contrast, practicing audience design when the agents are motivated to communicate to dissimilar others increases the level of cognitive diversity in the system, rendering the distributions of the two opinions more even.

Conclusions

Several conclusions can be drawn from our simulation results. First, the preference to talk to people holding the same opinions as the self at the individual level can stabilize the relative popularity of different opinions in the cultural system. Second,

the motivation to promote one's opinion to dissimilar others at the individual level increases the level of cognitive homogeneity in the system, particularly when the agents in the system are not cognitively conservative. In the language of complexity theory (Hatt, 2009), talking to dissimilar others, egocentric speech, and cognitive openness together form an *escalating loop* in the evolution of opinions in the system, leading to increased popularity of the dominant opinion.

Third, the willingness to talk to dissimilar others and engage in audience design at the individual level reduces the level of cognitive homogeneity in the system, allowing the minority opinion to grow. The effect is more pronounced when the agents in the system are not cognitively conservative. In the language of complexity theory (Hatt, 2009), talking to dissimilar others, audience design, and cognitive openness together form an equilibrating loop in the system, leading to more balanced distributions of the majority and minority opinions in the system.

In summary, contrary to Kashima's assumption, shared reality in a human group does not ensue merely from recursive, iterative repetitions of ground in interpersonal communication. Instead, evolution of opinions in a complex system is non-linear and path-dependent, and a small shift in communication preferences can send the system along different paths of opinion evolution.

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Figure 1. Popularity of the majority opinion when the model stabilizes or stops as a function of listener choice and topic choice. The model begins with 75% popularity for Opinion A.

