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The Great Chain of Being: Manifesto on the Problem of Agency in Science Communication

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The Great Chain of Being: Manifesto on the Problem of Agency in Science Communication

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The urgency of the problem of agency in science communication is perhaps best exemplified in the 2012 trial of the L'Aquila Seven in Italy: Six seismologists and a public safety commissioner were convicted of manslaughter for failing to adequately warn residents of a 6.3-magnitude earthquake that killed hundreds. Though the conviction was overturned in 2014, L'Aquila nevertheless demonstrated the high stakes of answering questions such as these: Who has the right and/or obligation to speak in policy debates informed by science? What are the proper limits in these forums to the agency of scientists? And how do we mete out justice in disasters whose agency is distributed among specialists, bureaucracies, computer models, instruments, media, and citizens (not to mention geologic faults)?

While L'Aquila—and related controversies in climate change, stem cell therapy, and genetic modification—may have forced these agency-related dilemmas into high relief, they are hardly new to science communication. Humanist scholars who work on science studies have long been concerned with issues of representation, civil negotiation, and equity in public debates about science, technology, engineering, and medicine (STEM). The concept of agency sits at the heart of all these concerns.

Definitions of agency vary, but most begin with the idea of the freedom to make choices and take actions that benefit an agent. To that foundation, most rhetorical theories of agency add an acknowledgment of the social and political forces constraining the agent—often using Kenneth Burke's dramatisic pentad to attribute these forces to opposing "agents" or to elements of the "scene" (Burke, 1969). Other frameworks invoke Richard Vatz's or Jenny Edbauer Rice's models to attribute agency not just to particular actors but to *kairos*—the rhetorical exigence or drama as a whole (Burke, 1969; Vatz, 1973; Biesecker, 1989; Edbauer, 2005). Carolyn R. Miller, working in this vein, established what has proven to be the field's benchmark definition of rhetorical agency: "the kinetic energy of performance that is generated through a process of mutual attribution between rhetor and audience" (Miller, 2007, 137). In other words, to enact agency, a rhetor must both *intend* to act as an agent and be *recognized* as such by the other agents operating in the rhetorical situation.

This is how we have traditionally understood agency in the rhetoric and communication of STEM. However, recent crises have posed challenges to this understanding. Take, for example, the role that computer models played in the L'Aquila recommendations and the proliferation of conflicting information about the causes of climate change on Internet media: How do intention and

recognition operate in these emergent, cascading, networked *kairoi*?

Carl Herndl and Adela Licona welcome these challenges, deeming them a benefit of postmodern attention to “the rhetoric and cultural practices of non-dominant and subaltern subjects.” They propose re-defining agency as the combined action of all the elements of Burke’s pentad, as “a shifting relationship between constraints and resources” (Herndl and Licona, 2007, 27; 28). Celeste Condit and her co-authors stress the complexity of post-modern agency in their study of public understanding of genetic information (Condit *et al.*, 2009). They found that participants did not view individual agency and genetic determinism as mutually exclusive; rather, the relationship crucially depended on how genetic information was framed and delivered. Tom Goodnight has pointed out the layers that advocacy adds to agency (Goodnight, 2009). And Leah Ceccarelli presented several cases in which advocacy worked at cross purposes with the agency of citizens impacted by AIDs, climate change, and access to science education (Ceccarelli, 2011).

Untangling the complexities detailed by these researchers is an exigent task with real consequences, as we witnessed in the unfolding of the L’Aquila crisis. Being able to craft better communication about climate change policy, or knowing how to deliberate genetic engineering policies—these civic abilities crucially depend on the questions of who has a right to speak on those issues, and how those agents can best be heard. But answering those key questions also requires updating our understanding of rhetorical agency in a high-tech, media-saturated, world-risk context.

Accordingly, we convened at the National Communication Association’s 2015 meeting a preconference symposium on the issue of agency in science communication. The Association for the Rhetoric of Science, Technology, and Medicine (ARSTM) sponsored the symposium, at which peer-reviewed panels of junior and senior scholars presented their current research. From these presentations organizers gleaned four *topoi* around which the inquiry appeared to circulate: automation, biopolitics, risk, and publics. In the afternoon, discussion groups coalesced around these *topoi* and produced the following statements of terms, problems, and questions that we believe must be addressed in the next five years to promote and support equitable agency in science communication.

The symposium was convened in honor of the retirement of Carolyn R. Miller, who has, perhaps more than any other scholar, helped to call the attention of her STEM rhetoric and communication colleagues to the exigent problem of agency. Fittingly, therefore, this manifesto concludes with a response from Miller, in which she suggests the Great Chain of Being as a metaphor that may help us better appreciate the interlocked, organic complexity of rhetorical agency in STEM communication crises.

AUTOMATION

In the past two decades, complex models and computerized systems have become increasingly influential in our lives in areas such as economic decision-making, weather forecasting, and community planning. However, the processes and judgments built into these automated systems are not transparent.

Rhetoricians of science and technology interested in how strategic choices shape understanding and action are uniquely positioned to address the questions of automation and agency that arise from the newest phase of automation. In deliberations on this subject at ARSTM's 2105 preconference, we considered two directions of inquiry—critical and methodological—that might guide further scholarly development of these subjects. A critical program of inquiry would investigate the ways in which arguers enact agency in relation to automation. Carolyn R. Miller explains and thus demonstrates how automation mediates agency and how agency is mutually attributed in the interplay of rhetor and audience (Miller, 2007). James Wynn has investigated how non-expert citizen groups have used Internet-connected devices to measure noise pollution and radiation to gain agency in arguments about risk (Wynn, 2016; see also Kelly and Miller, 2016). Jacob Rawlins and Greg Wilson have also looked at how interactive data displays constrain and enable the rhetorical agency of users (Rawlins and Wilson, 2015). Additionally, Ian Bogost has shown how game designers shape the actions and attitudes of players through design choices (Bogost, 2007).

Despite these efforts to critically explore agency and automation, a number of topics still deserve attention. For example, scholars have yet to substantively investigate how choices of and assumptions in mathematical algorithms impact the outputs and the interpretation of outputs in automated systems. Cases in point are algorithms that calculate global temperature measurements and drive search engines. These systems significantly impact public arguments about privacy and security, and raise issues about

disparities between public and technical agents (Galloway, 2004; Ingraham, 2014; Roundtree, 2013).

Our working group also recognized the capacity of automation to invent and support new methods for analysis. Rhetorical scholars have already begun developing machine-assisted projects to identify figures in argument and assess affect in discourse (Kaufer and Ishizaki, 2012; Ridolfo and Hart-Davidson, 2015). As we begin to use automated analytic methods, safeguards need to be developed to ensure the transparency of data and to clarify assumptions inherent in the methods. Mixed-methods approaches pairing automated methods with more traditional rhetorical analyses can likely help expose such inherent assumptions and subjectivities; methodological disclosure and transparency are essential for training the next generation of scholars.

BODIES, EMBODIMENT, AND BIOPOLITICS

Although our group initially formed to discuss the relationship between agency and biopolitics, the conversation required us to expand our theme to *bodies*, *embodiment*, and *biopolitics*. These terms not only accommodated key points of difference between the theoretical orientations of the bodies participating in the ARSTM preconference; they also reflected inherent tensions between the theoretical touchstones that have inspired inquiry in rhetorical studies of science, technology, and medicine.

To be sure, scholars have long contested what “counts” as a body (Haraway, 1991). Increasingly at the heart of this question is the evolving definition of “materiality” as mediating the relationship between bodies and agency. A key theoretical incommensurability exists between a perspective that partially locates agency in the relational capacity of sensing and feeling humans; a perspective that construes human and nonhuman bodies as actants in an institutional network; a perspective that places a body “with” agency as an effect of a larger biopolitical regime; and a perspective that defines agency as provisional and radically relational arrangement between objects (Condit, 2013; Latour, 2005; Foucault, 2010; Keränen, 2007; Foley, 2010; Barad, 2007). Notably, several participants in our symposium identified rhetorical studies’ anthropocentric tendency as ignoring the agency of animal and other non-human, non-linguistic entities (Bennett, 2010).

While there were disagreements in some of our basic operational definitions of bodies and agency, a number of critical terms productively tethered the disparate theoretical traditions implicit in our discussion. The questions of agency, bodies,

embodiment, and biopolitics have been perennially connected to rhetorical concepts of attributive voice (and voicelessness); collective and distributed subjectivity; and affect (Miller, 2007; Foley, 2010; Deleuze, 1980/1987; Massumi, 2002).

As we meditated upon a necessary and just trajectory for the next five years, we recognized the importance of addressing why we insist upon returning to bodies as a theoretical site of invention. How will theories of agency change based on technologies that trouble the boundaries of bodies and embodiment? How might sensory perception constrain and enable rhetorical action within imminent spatio-temporal contexts? Participants left hopeful that agency can remain a shared problematic as our entanglement with bodies becomes increasingly diverse.

PUBLICS

Rhetoric has traditionally been understood to maintain a humanistic conception of agency that can mistake an individual speaker as “the point of origin rather than a point of articulation” for persuasive acts (Gaonkar, 1993, 263). The ideal of a public sphere, with its powerfully constraining structural effects, can correct origin myths about individual rhetorical agency (Goodnight, 2012; Habermas, 1989). Indeed, Carolyn Miller reminds us to gauge the contribution of context and community to every rhetorical action (Miller, 1993a, b; 1994). But the interaction of publics and agency is complex (Miller, 2005).

Our group was led to formulate three key questions about public agency in science communication: First, how do we deal with epistemological differences between experts and lay publics? The “deficit model” of public understanding of science has itself proven deficient (Hart and Nisbet, 2012). Citizen science is frequently touted as an alternative model, but these projects are still almost entirely controlled by scientists themselves (Bonney, Phillips, Ballard, and Enck, 2016). So, the search for a rhetorical model of the public understanding of science must continue (Goodnight, 2005).

Second, how do we cope with denialism, manufactured controversies, and other self-interested challenges to scientific authority in our theories of publics and of agency (Ceccarelli, 2011; Mooney, 2005)? Understanding these encounters requires parsing out the ways in which expertise and lay knowledge are articulated and then validated or invalidated by authorities (Katz and Miller, 1996; White, 2008). But some rhetoricians feel compelled to go further, to assist in the public demarcation of science from pseudo-

science and other problematic knowledge domains. This demarcation can be understood as a fundamentally rhetorical process (Taylor, 1996). It can be read as hostile to civic deliberation or as hostile to science (Fuller, 2013; Gross, Levitt, and Lewis 1996). A fundamental question for rhetoricians is thus their role in mediating public arguments about science.

Finally, how do we ensure substantive public engagement and participation in science-based policy discourse? This may require a remodeling of the public sphere as a “discursive realm in which individuals and groups may transcend their private concerns to interact freely in ways conducive to forming a common sense of reality in order to highlight the *multiplicity* of public spheres and the value of *dissensus* in establishing group identity and solidarity within a broader public (Hauser, 1987, 438; Fraser, 1990; Phillips, 1996).

High-level problems in the theory of publics need not be solved before answers to these questions can be formulated. For example, as Miller observes, genres instantiate the values of the publics that employ them and thus can serve as productive sites for investigation and intervention (Miller, 1994, 68). We noted a need, however, to engage scholars outside the orbit of rhetoric of science to make progress in solving the problem of public agency. Scholars from fields including public relations and critical theory have recently attempted to initiate just such a conversation (Heath, Waymer, and Palenchar, 2013; Asen, 2015). Sociology, anthropology, and philosophy also conceptualize publics in ways that may help rhetoricians. Finally, integrating rhetorical criticism with “big data” methods may help both augment our capacity for imagining publics and complicate our definitions of them—thereby revising our approaches to agency in public deliberation over science.

RISK AND UNCERTAINTY

Building on nearly two decades of scholarship, risk continues to be an arena in which scholars in RSTM productively investigate the concept of agency (Beck, 1999). For rhetoricians, a fundamental problem in risk deliberation is an over-reliance on technocratic reasoning, which fails to recognize broader forms of expertise and decision-making. Whereas other disciplines have construed risk within frameworks that reduce complexity and limit deliberative performance (e.g., risk assessment, decision theory), rhetorical scholars have increasingly embraced the indeterminacy, contingency, and precarity inherent in the concept of risk (Walsh and Walker, 2016).

In this way, the rhetorical scholarship on risk can be usefully distinguished by treatments of uncertainty that expand rather than restrict possibilities for creative, just, and participatory forms of agency. Early studies applied rhetorical analysis to reveal the limitations of traditional risk discourses; more recent work has revealed the ways in which boundary work around risk and uncertainty both enables and disables lay agency (Miller, 2003; Danisch, 2010; Paroske, 2009; Sauer, 2003; Scott, 2006).

Gaining further precision and consistency in the rhetorical effects of “managing uncertainty” is a productive area of inquiry in reclaiming rhetorical agency, particularly when uncertainties are viewed as inventive performances both facilitated and constrained by the sites and events of risk (Miller, 2007). To this end, we might consider how to leverage rhetorics of risk and uncertainty to expand the reach of rhetorical research. How could rhetorical agency be harnessed to help inform innovative policy forums, civic participation models, or public-facing communication through well-designed usability documentation or interactive media? Answers to these questions can help manage uncertainties in risk so that rhetoric becomes fundamental in expanding the possibilities for public deliberation and decision-making.

RESPONSE FROM CAROLYN R. MILLER

“Agency” has become one of those conceptual boundary objects that shape-shifts its way across conversations, both adaptively plastic and robustly identifiable, enabling synergy among disciplinary social worlds and producing definitional polysemy. In the presentations and discussions at the 2015 Association of Rhetoric, Science, Technology, and Medicine (ARSTM) meeting, we heard agency associated with matters of trust, responsibility, expertise, authority, guilt, duty, *ethos*—and at each turn it looked different and participated in a different conversation.

Agency raised many issues for us—theoretical, practical, and social. *Theoretical*: Is agency a capacity or an effect, a possession or an attribution? Is it associated with the human only or also with the non-human? Is agency a symbolic or material force? *Social*: in what ways is agency individual, collective, distributed? Can we delegate agency? For example, in working with big data and quantitative analysis, what happens to the agency of the researcher? *Practical*: How do we locate, identify, and cultivate agency—within ourselves, within others? How do we identify and take on the social roles with which agency operates? What, for example, is the role-agency of scientists, citizen-scientists, scientists-as-citizens, rhetorical critics?

Finally, we might ask whether *rhetorical* agency is distinctive or different from other forms of agency. Does any social role necessarily carry with it some form of rhetorical agency? Is rhetoric a prerequisite for agency as a scientist or as a citizen? Does rhetorical power itself create the possibility of social agency? As scientific research, technological development, health and safety risks, and policy-making become automated and globalized, understanding agency—and with it the possibilities of action—become ever more urgent.

A visual epitome of many of these issues is the Neoplatonic Great Chain of Being, or *scala naturae* (“ladder of nature,” Figure 1), which orders all existence in a fixed hierarchy, with God at the top of the chain and successive levels of angels, humans in their various ranks, wild and domestic animals, plants, minerals and metals, and the underworld at the very bottom. This image brings before our eyes questions about the location and distribution of agency, the sources of authority, and the possibility of rhetoric (though the answers it offers likely differ from those we post-moderns would favor).

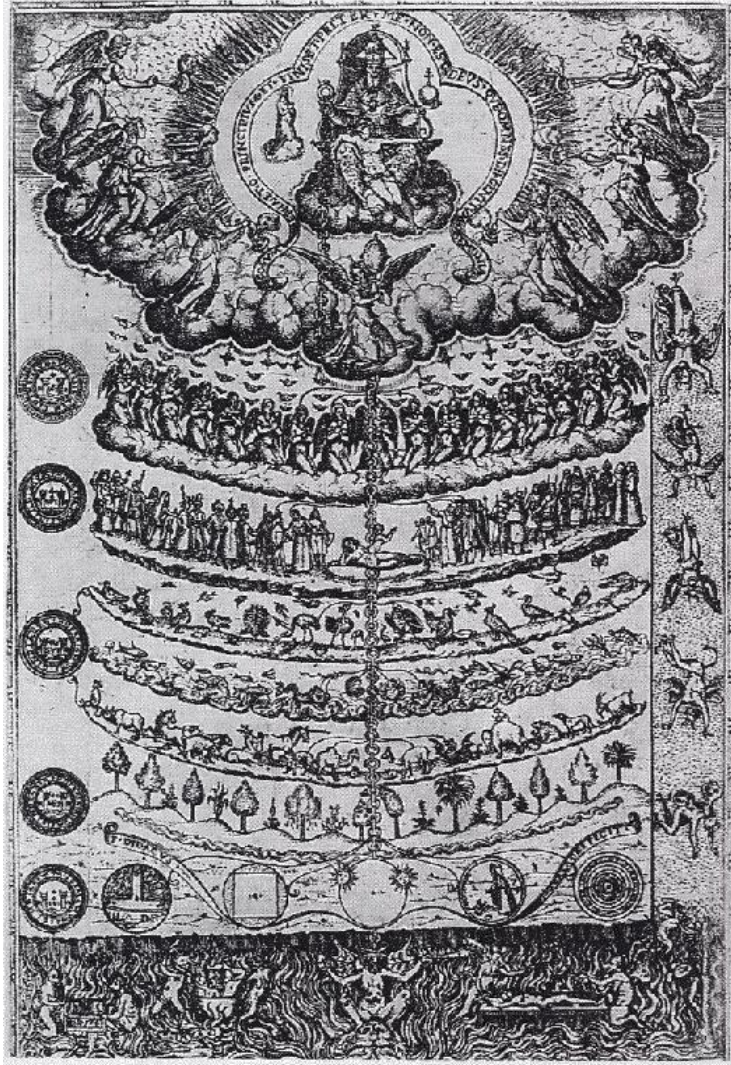


Figure 1: Visualization of the Great Chain of Being, Didacus Valades, *Rhetorica Cristiana*, published in Perugia, Italy, 1579, plate 2 after page 220. (Available at <https://commons.wikimedia.org>)

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