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DISCOURSE ANALYSIS AND SOCIAL CONSTRUCTION

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Complex social activities—such as maintaining a legal system, fostering a literary system, or developing communally validated knowledge—rely on language as the medium through which these activities are accomplished. Law, literature, science, religion, politics, and even economics are socially constructed through discourse. Special language tools and uses have developed in conjunction with the rise of these activities. Thus, we may well say that the construction of legal language is part and parcel of the construction of the legal institutions that order our social lives, and that the language acts using legal language were developed in coordination with the elaboration of roles, responsibilities, and relationships of legal actors. Similarly, the construction of scientific language is part and parcel of the human construction of social modes of investigation and knowledge production. Those languages, which we have constructed to carry out those aspects of our social lives, embed the assumptions of the activities around which they are framed and dialectically provide the framework for the future development of socially cooperative endeavors.

The general intellectual movement known as social constructivism provides an entryway to considering how special languages have been developed as part of social activities, how the use of these languages reproduce and maintain social activities and relations, how the languages are sustained by social institutions, and how language enters into the continuing process of social negotiation that produces novel arrangements for our social future. This review will first give a thumbnail sketch of social constructivism as a general movement and how it has been applied in particular to scientific knowledge, and then focus on investigations into the role language and linguistic activity plays in the social construction of knowledge.

Social constructivism is a sociological movement, looking into the social formation of everyday knowledge and assumptions upon which our understanding and actions rest. The landmark text is Berger and Luckmann's *The Social Construction of Reality* (1966), which draws heavily on Schutz's theory of a social typification (Schutz and Luckmann 1973:229-233). Berger and Luckmann argue that our everyday sense of

reality is the product of an ongoing social negotiation over the meaning of objects, events, and actions. This negotiation achieves familiarity and stability through processes of habitualization and institutionalization that narrow our choices, particularly as we move out beyond the improvisatory relations of two or three individuals in order to find our place in the wider worlds of education, commerce, government, or religion. In order to understand our construction of the sense of reality, we should not concern ourselves so much with the specific contents of any "reality system" so much as with the processes by which that "reality system" is produced. Since language is one of the chief mechanisms by which our sense of reality is negotiated, the way language opens up or closes off various reality-productions deserves close attention.

Ethnomethodology and conversation analysis, already quite familiar to linguists and covered elsewhere in this volume, follow through on this research program as it applies to the everyday life-world. However, in recognition that much of the knowledge upon which our contemporary life-world is based comes from specialized knowledge-producing communities of science, another strain of social constructivism has developed within the sociology of science, which in some respects has become synonymous with the sociology of knowledge.

The earliest constructivist studies of science aimed primarily at stripping the veil of positivist epistemological security from modern science. Barnes (1974), Barnes and Shapin (1979), Bloor (1976), Collins (1983, Collins and Pinch 1982), and Wallis (1979) among others attempted to show that scientific knowledge is constructed rather than being the inevitable result of a discovery process. Attention was often given to the margins of science to examine how claims and areas of studies become included or excluded from orthodox acceptance, and the behavior of scientists in supporting or rejecting claims was often associated with individual or group interests rather than dispassionate procedures of science. The underdetermination of claims by evidence was a crucial battleground, for if evidence could not simply tell you what was true or not, then room for social involvement and social determination was opened up. Similarly scientific practice and the social transmission of craft knowledge was opened up as an area where social construction of knowledge could conceivably take place. Shapin (1982) and Collins (1983) review much of this early constructivist literature.

Since scientific claims are, however, linguistic objects, advanced through speech and written papers, a number of constructivists started more specifically examining the processes by which claims were produced and accepted or rejected. The social negotiation of knowledge would be found, they believed, in the very production of the words. Knorr-Cetina, and Latour and Woolgar provided the most thoroughgoing of these early analyses of scientific texts. Knorr-Cetina (1981) in *The Manufacture of Knowledge* argued that scientific discovery was more a process of tinkering than knowledge-guided search, and that the writing-up of results was more of an after-the-fact reconstruction to make one's results seem attractive, important, and true to the consumers of knowledge. Latour and Woolgar (1979), in *Laboratory Life*, argued that in the competition of texts there was an agonistic struggle whereby each text tried to gain the higher ground of general persuasiveness while trying to remove the ground of generalizability from the work of opponents, so that the opposition

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While this early work had a strong debunking tendency, to show that scientific knowledge was just a matter of mere words and appearances, continuing constructivist work granted more credit to the development of science as a powerful, empirically oriented system. Historical accounts of major turning points in the development of the rhetorical system of science helped reveal some of the assumptions and consequences carried with the adoption of modern scientific linguistic practices. Anderson's *Between the Library and the Laboratory* (1984), examining the eighteenth-century turn in France from encyclopedism to experimentalism as a form of scientific argument; Shapin and Schaffer's *Leviathan and the air pump* (1985), examining mid-seventeenth century debates within British natural philosophy; and Dear's consideration of "Rhetoric and authority in the early Royal Society" (1985) all contain extended discussions of the changing linguistic technology of knowledge production and its socio-psychological consequences.

One feature of scientific texts that reaches out into the entire social web of scientific knowledge—citation patterns—has come under particular scrutiny. Citation studies, although not coming from a constructivist perspective, have led to a constructivist examination of the entire intertextual system of science. It is within the intertextual system—the related web of claims and counter claims; attacks and responses; support and reliance; drafts, referees' reports and revisions; and syntheses, interpretations, and codifications—that the negotiation of knowledge is precisely carried out. Price (1965), Griffith and Mullins (1972) and Mullins, *et al.* (1977) looked at how citation and co-citation patterns can describe the evolving research specialties of leading-edge science; Small (1978) examined how citations act as concept symbols; and Cozzens (1985) looked at the processes by which citations are discussed and gradually incorporated into the accepted knowledge of science. More constructivist approaches to citations first led to studies of how citations were used strategically to bolster arguments (Gilbert, 1977), but eventually led to an examination of how one text evolves in relation to another. Myers (1990a) has looked at how both grant proposals and articles evolve in negotiation with referee's reports, and Bazerman (1990a) and Myers (1990b) have looked at how reviews of the literature construct a state of the literature with implied vectors for future development of the field.

Further richness was given to constructivist accounts of scientific knowledge production when examinations of scientific practice started to become linked with examination of scientific discourse, for practice was where language and empirical experience met, so that if any credit was to be given to empiricism it is here where it would be found. Ludwik Fleck, writing in Germany in 1935, provided an early precursor to this meeting of empiricism and socially formed language when in his *Genesis and Development of Scientific Fact* (translated 1979) he defined a fact as a passive resistance to an actively stylized claim within the thought style of a thought collective. For Fleck, active elements of the thought style were those symbolic and material practices that were actively socially constructed by a community, while the

passive elements were those constraints over which society had no control once the active practices were enacted; thus, once an object of attention was defined (such as minerals), symbolic measure identified (such as hardness), and a procedure for measuring had become common practical craft knowledge for skilled practitioners, then one had no control over what the hardness measure for any particular mineral would be. The results depended on what resulted from the active procedure's interaction with the passive object. Yet this was no simple return to direct word-object correlation, for the stylized terms and procedures of the thought collective were crucially important for what passive resistances were met and how they were represented. From a Fleckian point of view the interaction between language use systems and empirical precision become the crucial research site to display exactly what it meant to represent symbolically the various worlds of our experience.

Although Fleck's idea of the thought style of a thought collective was more recently and influentially re-elaborated as paradigms or disciplinary matrices by Kuhn in *The Structure of Scientific Revolutions* (1962), not until the work of Latour (1987; 1988) and Bazerman (1988) was the role of the material object within the scientific formulation considered from a constructivist perspective. Latour in *Science in Action* (1987) and then in *The Pasteurization of France* (1988) considers objects as much as actants and potential allies within scientific debate as he does any of the human participants; a successful scientist marshalls crucial allies into an unbreakable network, so that Pasteur's success depended on the cooperation of the microbes, cows, hygienists, colonial physicians, farmers, government policy makers, journalists, industrialists, scientific colleagues, and many other actants who were robustly drawn together through Pasteur's procedures. Latour as well points out the differences in argumentation and practice between the time when the alliances are being formed (science-in-the-making) and once the links are indissolubly made and black-boxed (made-science).

Bazerman (1988), in studying the rise of modern forms of scientific communication, examined how empirical experience became both an end and a resource in scientific debate; the scientific discourse at many junctures became accountable to procedures of empirical experience for author, audience, gatekeepers, and consumers of knowledge. Given the system of language and material activity within which claims were made, the validity or force of claims depended on them encapsulating reliably reconstitutable phenomena of sufficient interest for others to want to try to reconstitute these phenomena for their own end. From this perspective, what became important was how language practices developed within systems of activity. Gooding (1990), in studying the discoveries of Faraday, has closely traced the interaction of concepts, linguistic and visual formulations, design of experiments, physical constructions, and empirical results; Faraday only could be said to have developed a robust theory when he was able to instantiate that theory into a standard experimental device that he was able to ship through the mails to his colleagues. In addition, he had to provide a textual account of his claims and a discussion of how the experiment should be carried out to reproduce reliably the reconstitutable phenomenon.

This approach suggests the study of the development of regularized genres and features of language as part of the rise of regularized social systems of practice (e.g., Bazerman 1988, examining the evolving features of the experimental report). Following the idea of heterogeneous systems as developed within the sociology of technology (Callon, Law and Rip 1986, Bijker, Hughes and Pinch 1987), this notion of system can be extended to include all kinds of symbolic representations, relationships, practices, and objects that must be brought into alliance for any technology or scientific knowledge to take hold. Bazerman has recently been working on how textual representations serve within these heterogeneous systems by examining the textual representations that were part of the emergence of Edison's light into the public world of the late nineteenth century (1990b), and by examining the public displays of Otto von Guericke now taken as the discoverer of electrical repulsion, even though Guericke was working in a very different religious-political-economic-philosophical configuration than modern science (1989).

Given how intertwined linguistic representations are with all the other practices and the overall task of knowledge production of academic disciplines, it should not be surprising that many practitioners of different disciplines, dissatisfied with the methods of knowledge production and/or the knowledge produced within their field, would turn to the analysis of their field's discourse from a social constructivist perspective. Thus anthropologists, deeply concerned about the imperialist power relationships embodied in the history of the field, would turn to ethnographic critique—who is representing whom in what way for what purposes and thereby establishing what socio-political-economic divisions and relationships (Clifford and Marcus 1986)? Similarly economists, concerned about the constraints to reason imposed by the artifice of quantitative modeling and the pretence of deductive argument, have called for a deeper rhetorical examination of what is accomplished in economics texts (McCloskey 1986). Equally, sociologists (Brown 1977, Mulkay 1985) and psychologists (Potter and Wetherell 1987, Shotter and Gergen 1989), concerned about the reification of conceptual categories despite them being only the result of processes of social negotiation, have turned to a reflexive examination of their disciplines' means of representation, and the relationship of those means to disciplinary goals and practices.

The examination of disciplinary language, therefore, provided us with the means to examine how fundamentally representations of knowledge are socially constructed out of language and how the process of linguistic construction is intertwined with social and material practices and relationships; it has also provided us with the means for reconstructing knowledge socially so as to produce more of the kind of knowledge that fits our vision of how society should evolve. This social reconstruction of knowledge cannot be realistically accomplished simply by wishing away existing social arrangements and material experience, but only by understanding the way disciplinary practices bring the material, social, and linguistic resources into active relation.

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