

way). Nonmaterial social facts (e.g., norms, values, social institutions) exist in the realm of ideas, while material social facts have a real, material existence. One type of material social fact is a social structure. Thus, social structures can be defined as real material social facts that are external to and coercive over actors. For example, the state is such a social structure, as is the market in the realm of the economy.

Durkheim's work played a key role in the development of both structural functionalism and structuralism. The latter, however, is based on Durkheim's later work (e.g., *The Elementary Forms of Religious Life*) and moves off in a different direction in search of the "deep" structures that undergird social thought and social action. Thus, structural functionalism played a key role in developing the notion of social structures (and social institutions), according to a central role in social analysis.

As the name suggests, structural functionalists were interested in the "functional" analysis of social structures. That is, they were interested in analyzing the consequences of given social structures for other social structures, as well as the larger society. The American sociologists Talcott Parsons and later Robert Merton provided the most extensive elaborations of the structural functionalist theory. Parsons developed a complex theory in which he argued that social systems are regulated by four functional needs: adaptation, goal attainment, integration, and latency (often abbreviated with the acronym AGIL). To survive, a social system must be structured to ensure that these needs are adequately and efficiently met. Although, as a student of Parsons, Merton shared many of the basic assumptions of structural functionalism, he was also critical of its more extreme functionalist views. For example, in contrast to the assumption that all elements in a social structure are functional for a society, Merton claimed that certain social beliefs and practices could be dysfunctional, or even non-functional. In elaborating this concept of dysfunction, he drew on Durkheim's famous concept of "anomie" to argue that certain social structures can lead to deviant behaviors. Critics outside the structural functionalist paradigm argued that structural functionalists tended to ignore agents or to see them as being controlled by social structures. Thus, structural functionalism was an extreme example of the tendency of some social theories to treat actors as what Harold Garfinkel called "judgmental dopes."

Of course, it is possible, even desirable, to look at the *relationship* between social structures and actors without giving priority to the former (or the latter as did, for example, phenomenologists, symbolic interactionists, and the like). Indeed, a great deal of recent social theory can be seen as according roughly equal weight to social structures and actors. Prime examples are Anthony Giddens's structuration theory and Pierre Bourdieu's work on the relationship between habitus and field. Indeed, the whole idea of

structuration (a term that is sometimes also associated with Bourdieu's approach) is that what are termed here (although not necessarily by Giddens) as social structures cannot be examined without simultaneously examining the agents who are involved in them and who are their creators.

In George Ritzer's integrated sociological paradigm, the argument is made that there is a need for a paradigm that focuses on the dialectical relationship among four "levels" of social analysis. The macro-objective level encompasses social structures (and more generally Durkheim's material social facts) and the macrosubjective encompasses social institutions (and Durkheim's nonmaterial social facts, more generally). These levels must be looked at in relationship not only to one another but also to the microlevels—micro-objective (behavior, action, and interaction) and micro-subjective (mind, self, thought, the social construction of reality). The key point from the perspective of this discussion is that social structures cannot be examined in isolation from all these "levels" of analysis.

Thus, social structure remains central to social theory, but the long-term trend has been away from treating it in isolation from the rest of social reality. Rather, today social structure is seen as one aspect of the social world that must be seen in relationship to all other aspects. It affects, but is affected by, all the others. Thus, contemporary social theory has a more balanced view of social structures and their role in the social world.

— George Ritzer

See also Durkheim, Émile; Merton, Robert; Parsons, Talcott; Ritzer, George; Social Facts; Structuration

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## SOCIAL STUDIES OF SCIENCE

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Social studies of science, or science studies, is a trans-disciplinary research field that investigates historical, political, cultural, conceptual, and practical aspects and implications of the sciences. Because modern sciences are deeply intertwined with technology, the more comprehensive

name science and technology studies (STS) is often used to identify the field. Regardless of which name is used, it is widely understood that social studies of science cover a broad range of historical and contemporary developments associated with natural and social science, pure and applied mathematics, engineering, and medicine. Social studies of science draw on the literature, concepts, and methods of philosophy, history, and sociology, but such studies make up an emergent field in its own right and not a branch or subfield of any other established social science or humanities discipline. The field has dedicated journals and professional associations, and numerous universities have STS departments, programs, and research centers. Participants in the field often hold appointments in history, sociology, anthropology, philosophy, and other university departments, but their research typically has a hybrid character.

Social studies of science include a number of different theoretical orientations. Some of these are offshoots of pre-existing schools of social theory. For example, during its heyday in American sociology, structural functionalism was the dominant approach to sociology of science (as represented by Robert Merton's and his students' research on institutional norms and rewards in science). Boris Hessen, J. D. Bernal, and other Marxist scholars and scientists also had leading roles in the early development of social studies of science, especially in Europe. More recently, critical theory, symbolic interactionism, ethnomethodology, semiotics, cognitive psychology, feminist cultural studies, post-structuralist literary theory, and various approaches to globalization have been represented in social studies of science and science policy. Two approaches that developed within the field in a distinctive way are the *sociology of scientific knowledge* (SSK) and *actor network theory* (ANT). These and some of the other current approaches often are labeled as *constructionist* or *constructivist* treatments of scientific knowledge.

### THE STRONG PROGRAMME AND SSK

SSK developed in the early 1970s and was strongly influenced by the writings of Thomas Kuhn, Paul Feyerabend, and other influential critics of positivist and logical empiricist philosophies of science. Several members of the Edinburgh University Science Studies Unit (which was founded in the 1960s) had a leading role in a successful effort to reorient the sociology of knowledge to engage the material practices and contents of the sciences. Leading figures in the Edinburgh School (also known as the "Strong Programme" in the *sociology of knowledge*) included David Bloor, Barry Barnes, David Edge, Steven Shapin, and Donald MacKenzie, who published a series of programmatic arguments and social-historical case studies starting in the early 1970s. In 1970, Edge and Roy MacLeod cofounded the journal *Science Studies* (renamed

*Social Studies of Science* after a few years), which provided an outlet for the new approach and became the leading journal in the field.

The "strength" of the Strong Programme lay in its proposal to extend the sociology of knowledge to cover even the most robust mathematical procedures, physical laws, and scientific facts. Conceived in the early twentieth century, the sociology of knowledge was an empirical research program that aimed to explain the historical formation and social distribution of collective beliefs and ideologies. Instead of evaluating the truth or rationality of beliefs, sociologists of knowledge endeavored to explain the connections between particular beliefs and the characteristics of the social groups that held them. Persons promoting a doctrine typically emphasize its intrinsic truth and rationality, but a sociologist of knowledge attempts to be noncommittal about inherent truth of a belief, while examining the history, socialization practices, and collective interests in the community of believers. Karl Mannheim, an early exponent of the sociology of knowledge, endowed the perspective with broad scope to cover religious and metaphysical systems, political ideologies of all kinds, and controversial scientific theories. However, Mannheim made an exception for the most robust, generally accepted scientific and mathematical knowledge. Mannheim held that because such knowledge no longer bears the imprint of the cultural and historical conditions of its emergence, the sociology of knowledge had no basis for explaining it as a function of particular traditions and practices. He recognized that modern science and mathematics were historically and culturally "conditioned," but he argued that "existential factors" were "merely of peripheral significance" for explaining the status of such knowledge (Mannheim 1936:271). Proponents of the Strong Programme refused to accept the idea that selected facts, laws, and procedures, which are currently accepted as invariant, rational, and true, should be exempted from social and cultural explanation. To set up the possibility of such explanation, Bloor, Barnes, and other adherents to the Strong Programme recruited philosophical arguments about the conventionality of mathematical practices, the theory ladenness of observation, the tacit underpinnings of experimental method, the incommensurability of competing paradigms, and the underdetermination of theory choice by empirical evidence. Such philosophical arguments were used to suggest that the resolution of controversies and the formation of consensus in scientific communities was not due to evidence alone. Empirical study of particular cases would then be used to identify historical conditions, social interests, and collective alignments that may have had some influence on the relevant scientific communities.

The Strong Programme is often summarized by a set of four principles that were formulated by David Bloor (1976) in his influential *Knowledge and Social Imagery*: causality,

ANT research and argumentation, studies proliferated in the 1980s and 1990s that politicized the idea that the very nature and contents of science were “socially constructed” (see Haraway 1991). The earlier argument that scientific representations (facts, laws, etc.) were not inevitable or determined by “nature” alone was compounded by explicit denunciations of particular scientific representations (of gendered bodies, racial characteristics, normal and pathological conditions, etc.) and of conceptions of scientific objectivity (as “male,” exploitative of “female” nature, expressing cultural privilege and domination). Social construction—both the SSK version and the more politicized cultural studies version—became a target of a flurry of books, articles, conferences, and a massive number of Web postings in the 1990s. The *science wars* were epitomized by the publication in the cultural studies journal *Social Text* of a “hoax” article by physicist Alan Sokal, which argued for a conceptual affinity between poststructuralist literary theory and current theories in quantum gravity physics. Sokal’s hoax was celebrated by many opponents of constructionism and related “relativist” trends in the humanities and social sciences, and for a short time it attracted unwanted media attention to the social studies of science field. During the science wars, debates about the “construction” of science were rarely argued with much care or philosophical sophistication, and by the end of the 1990s, the heated rhetoric began to be toned down (see Labinger and Collins 2001). The field of social studies of science continued to thrive, despite the highly charged polemics about it in the 1990s, and much (indeed most) research in the field consists in uncontroversial studies of (often controversial) developments in science, engineering, and medicine. Consistent with the tendency to question conceptual boundaries between science and nonscience and between science and technology, current research explores the complex way in which science has become embedded in, and inflected by, popular social movements, legal cases and regulations, economic institutions, and systems of governance.

— Michael Lynch

*See also* Actor Network Theory; Ethnomethodology; Feminism; Feminist Epistemology; Garfinkel, Harold; Latour, Bruno; Merton, Robert; Postcolonialism; Postmodernism; Social Constructionism; Symbolic Interaction

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## SOCIAL WORLDS

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Combining notions of culture, social structure, and collective action, *social worlds* are collections of actors with shared understandings and shared institutionalized arrangements that convene, communicate, and coordinate behaviors on the basis of some shared interest. The conceptualization originally stems from work by Tamotsu Shibutani, Anselm Strauss, and Howard Becker, with roots traceable to John Dewey.

Social worlds is a symbolic interactionist concept that distinguishes social actors as they negotiate interactions with one another. Actors negotiate conflict when their perspectives are different, since they represent different social worlds within the same *arena*. When their perspectives are shared, the actors develop and maintain a social world as they communicate with one another and coordinate their behaviors in regard to the phenomenon of interest. Whether it is a baseball game, a soap opera, an advertising campaign, or a medical treatment program, a social world emerges as those with shared perspectives on the phenomenon interact with one another about that phenomenon. In contrast, as those with different perspectives experience conflict over it, different social worlds within a single arena can be identified.

As an interactionist concept, social worlds can be applied at micro-, meso-, or macro-levels of interaction. However, most research using the social worlds concept has been either at the micro-level, such as research on “serious leisure”—including studies on role-playing computer games, bridge playing, and bass tournament fishing—or at the meso-level in science and technology studies (STS). While the former body of research has tended to focus on how social worlds are developed and maintained, the latter STS research has tended to describe how conflicts between social worlds are negotiated at the organizational and institutional levels.

The social worlds analysis in STS is most attributable to Strauss, who thought of social worlds as the unit of interaction in society. The concept allows the analyst to account for any actor involved in a contested phenomenon. Actors