

ANALOGIES IN SOCIOLOGICAL THEORY**Daniel Rigney, St Mary's University, Texas****INTRODUCTION**

Through the history of the social sciences, theorists have summarized complex social phenomena by building simplified models, often constructed by means of analogy as a heuristic search-guiding strategy in which concepts established in one domain are applied to another. Sociology has been venturesome in using analogies and the history of sociological theory may be ordered by its dominant analogies. However, the literature in sociological theory construction says little about the logic of analogy as a method of model-building (Kapp 1961; Willer 1967; Sjoberg & Nett 1968; Galt & Smith 1976).

This neglect is the more surprising when we consider that analogical models are used with impressive success in the natural sciences (Russel 1948; Peirce 1957; Nagel 1961; Hanson 1961; Black 1962; Bronowski 1965; Schon 1967; Bunge 1970; Lorenz 1974; Gordon 1974; Hawes 1975). Philosophers of science do not dispute whether analogies help to develop scientific theories. Rather, they debate whether the logic of analogy is essential to develop deductive theory, and whether an analogy may be safely discarded once the theory is in place (Hesse 1966). A similar debate arises in the social sciences. Others prefer to treat analogy as one of several types of models, and to treat models as way-stations toward development of formal theory. There is general recognition that analogies play an important part in the process of scientific discovery.

We will use three arguments. 1) The logic of analogy has been the primary method of model-building through the history of sociology. 2) Most analogical models have been developed in an unsystematic way. 3) By codifying the analogical method we can more effectively develop the strength and identify the limits of our models.

METAPHOR, SIMILE, & ANALOGY

A metaphor figuratively asserts that one thing, A is another thing, B. Shakespeare said: "All the world's a stage." Such a poetic metaphor creates a fusion of images and as-

sociations between two distinct objects of thought, and invites viewing the one as if it were the other (Vaihinger 1925). A metaphor makes good poetry, but it suggests an identity where there is at best a resemblance. A simile is more literal, asserting that A is like B in some respect. Neither metaphor nor simile is very useful for theory until we begin to specify the ways in which A and B are similar. Analogy is the explication of points of resemblance which are only implicit in metaphor and simile. For our purpose, metaphors and similes are un-explicated analogies.

In a general sense, analogy asserts that A and B are alike with respect to some set of shared attributes or predicates (Stinchcombe 1978). Thus, social interaction is like a theatrical play in that they both include performers, roles, plans of action, and audiences. Social actors internalize social roles just as theatrical actors internalize theatrical roles. Aristotelian analogy calls attention less to resemblances in the properties and their relations, than Aristotelian analogy becomes a subclass of analogy.

To assert that A and B are alike in certain respects implies that they are not alike in other respects. It is proposed that we reserve the term positive analogy for the shared predicates, and the term negative analogy to be applied to predicates known to belong to A but not to B. For example, in everyday life, we are both author and actor, and all the world is not a stage. Finally, there may be a residual set of undiscovered attributes that A and B could have in common. Until research establishes the relation, they belong to the neutral analogy.

PHYSICAL ANALOGIES

Analogies drawn from the physical world have a prominent place in sociological theory. Comte would have called his new science social physics if Quetelet had not pre-empted that name. Marx uses a physical metaphor in this economic laws of motion. Engels described the dialectics of revolutionary change by analogy to natural qualitative changes like that of ice to water, and water to steam.

Pareto's concept of social equilibrium was an analogical extension of Willard Gibbs' chemical theories. Lewin built a social psychology from the terminology of physics with reference to force in the gravity models employed by demographers to predict patterns of migration (Stewart 1948; Arrow 1956). Commonplace references to social forces, bonding, and cohesion, tensions, pressures, and safety valves, strains, push and pull factors, critical mass, momentum, inertia, relativity, polarization, crystallization, sedimentation, and social strata illustrate the figurative connections between the physical and social sciences.

BIOLOGICAL ANALOGIES

Analogies to biological systems, including organismic, evolutionary and ecological, have been prominent in social theory. The functionalist idea that social groups resemble organisms in the internal differentiation and integration of parts has been criticized for its homeostatic implication, but the organismic analogy has dynamic implications as well. Social systems, like individual organisms, are attributed life cycles and staged development (Nisbet 1969). Evolutionary analogies were advanced by social Darwinists. Earlier versions have been discredited, but the evolutionary legacy survives in the more defensible works of contemporary theorists (Parsons 1966; Lenski 1970; Campbell 1975; Boulding 1978). Human ecology also owes a substantial debt to evolutionary biology in using terms like territorial invasion, dominance, succession, competition for scarce resources, and symbiosis. More recently, controversies surrounding the claims of sociobiology center on whether there are meaningful analogies between human and nonhuman social organization, and how they are to be interpreted.

ARTIFACT ANALOGIES

Human artifact analogies arise in the study of organization structures and processes. Weber caricatures bureaucracy as an apparatus that harnesses human energies to the impersonal attainment of ends. Organizations are depicted as powerful tools in the hands of their masters, creating and shaping environments. The current vogue is to regard organizations as cybernetic systems by analogy to the computer. Cast at a high level of generality, cybernetic models provide an idiom for analysis of the entire spectrum of human

phenomena, from the micro-processes of cognition to the macro-processes of socio-cultural change. The history of technological analogies is contingent on the history of technology itself. We create machines, then recognize ourselves in them. When a new technology like holography appears, the social order will be discovered to resemble it. Already the holographic analogy serves as a model for mental process (Pribram 1971).

ECONOMIC ANALOGIES

Analogies between economic and other social transactions are a major impetus in developing social exchange theory. Homans (1961) and Blau (1964) admit the limitations of the analogy, but find it useful to transport such concepts as profit and cost, supply and demand, diminishing marginal utility, and monopoly across disciplinary lines for heuristic purposes. Economic metaphor is not confined to exchange theory. Berger's social phenomenology of religion uses the idea of economic markets for spiritual products (1967). Symbolic interactionists use the metaphor of the marketable self. Economic analogies frequently appear in functionalist writings. Parsons' concept of power is built on an explicit analogy to money (1967). Merton suggests that persisting social and cultural forms have a net balance of positive consequences, though some of the costs and benefits may be latent and unrecognized. The functionalist theory of social strata is a disguised supply-and-demand model of reward allocation (Grandjean 1975). Though functionalist and exchange theories are regarded as rivals, they have deep similarities.

WAR ANALOGIES

War analogies account for relations of coercion and conflict, which Boulding called quids with quos (Coser & Rosenberg 1976). Often social relations are better captured by the metaphor of warfare and a sanguinary state. Hobbes described the state of nature as a war of each against all. Marx called the relations among social classes a ceaseless, now hidden, now open fight between two hostile camps, of the bourgeoisie and the proletariat. Modern conflict theorists include struggles among non-economic groups as well, but the battlefield imagery persists.

GAME ANALOGIES

The metaphor of the game, with emphasis on the rule-governed and reward-oriented features of social life contains suggestions of play and spontaneity along with cynical calculation of the winning strategy. A calculative version of the game metaphor is given in the formal rationalist theory of games proposed by Neuman and Morgenstern (1944). It is modeled on games of chance and strategy like poker and chess. The game metaphor had a popular influence in clinical psychology, organizational analysis, and social systems simulation (Berne 1964; Maccoby 1976; Gamson 1972). The team game has been used to illustrate role-taking and self-presentation (Mead 1935; Goffman 1959).

DRAMA ANALOGIES

Casual allusions to social actors and their roles are now so commonplace that their metaphorical connections to the theater are obscured (Brisset & Edgley 1974; Lyman & Scott 1975). Some attention is given to dramaturgic scripts, but less attention is paid to the complementary concept of improvisation. And the relation between scripted and improvisational action has been neglected, perhaps because most dramaturgic models take the traditional theater as their base. Contemporary forms of experimental theater emphasize improvisation, and would yield more fluid conceptions of social action as base models.

LANGUAGE ANALOGIES

The notion that social interaction can be construed as language is not new. Thomas' classic discussion of the defining of the situation implies that processes of creating and sustaining meanings in social interaction resemble semantic and definitional processes of natural language (1923). Cicourel (1970) suggests that the basic rules enabling the social actor to improvise novel but appropriate performances and to make sense of others' performances are based on deep grammatical rules. Levi-Strauss proposes to treat myth, etiquette, kinship and other cultural expressions as linguistic systems (Jameson 1972).

Since mathematics is a special kind of language, mathematical models may be considered a subclass of linguistic analogies. Such

models are elegant analogies between formal properties of number systems and the empirically inferred properties of social systems. Simmel (1950) proposed a geometry of social forms. Geometric imagery is implied when we speak of dyads, triads, social hierarchies, vertical and horizontal mobility, center and periphery, and social distance. Diagrams of non-spatial social forms such as those of sociometry apply the geometric analogy. In the sociology of knowledge, the principle that one's locus is social space conditions one's point of view is also a geometric application.

EVALUATING ANALOGICAL MODELS

In trying to provide an integrative framework, sociology has imported analogies from such a variety of external sources that its own house is in a state of anomic disorder which reflects the disorder of the broader culture to which most theoretical ideas are applied. This may be a necessary price to the community for a diversified pluralist society. Some theorists meet the problem by attempting a master synthesis of several analogies at once. Parsons sought to incorporate physical, biological, cybernetic, economic, and dramaturgic metaphors in a coherent theoretical system. Symbolic interactionists have relied simultaneously on the metaphor of the game, theater, and language system for a rounded understanding of self and society. Such mixing of metaphors is condemned in literary circles, but among social theorists, it marks high ambition.

Sometimes, metaphor is used merely to lend a touch of literary decoration to a text without any serious intent to use its implications. The allusion to lions and foxes by Machiavelli and Pareto is meant to make the discussion of elites more lively and memorable. The social classics are strewn with invisible hands, specters haunting Europe, and Oedipal conflicts. Usually the context indicates that nothing literal is intended.

Matters are more serious when metaphors, similes and analogies are used to guide entire lines of inquiry, to organize large bodies of evidence, and to provide the conceptual tools for analysis. Vocabularies imported from other disciplines often bear hidden cargoes of assumptions and implications that may continue to influence sociological discourse long after

their origins are forgotten. Analogies and models and all theoretical idealisms or ideal types exaggerate some features of the subject while suppressing others (Lopreato & Alston 1970; Weber 1949). Every analogy presents a verbal caricature of its subject. The responsible use of these devices demands that we recognize their limits. Uncritical use of a favored analogy can breed a trained incapacity to view the subject from other vantages, tempting us to mistake our model for the thing itself (Thurbane 1962; Rigney 1979). Even critics of metaphor seem unable to resist its appeal. Aristotle, in the *Poetics*, cautions against the excesses of metaphor and analogy. Then he asserts that to be a master of metaphor is a mark of genius, for to be good at metaphor is to be intuitively aware of hidden resemblances. Hobbes argues that reasoning by metaphor and other such senseless and ambiguous words is wandering among innumerable absurdities. Then he develops the familiar metaphor of the leviathan. Another author studying social power laments that previous studies have moved very little beyond metaphor, and then builds a theory of power based largely on the metaphorical use of thermodynamics in a social system. (Adams 1975).

The hazards of metaphor and analogy are real enough, but reside less in the nature of the tools than in the carelessness of their application in social analysis. To guard against abuse while exploiting their positive potential, we need criteria to evaluate, criticize, and develop analogical models systematically. A minimal set of criteria should include: 1) adequate explication; 2) heuristic potential; 3) predictiveness; and 4) explanatory power. Rarely does an analogic model succeed in all four respects. By applying these criteria to our models, we can better see their limits and their strengths.

ADEQUATE EXPLICATION

Metaphors and similes are not very informative until we begin to explicate the points of resemblance that they leave implicit. We thus transform metaphors and similes into analogies. To explicate the positive analogy, we must specify the set of salient predicates that are shared by A and B. Generally, analogy means "positive analogy". Most models disregard the negative analogy, which may ignore much of the phenomenon. Early efforts to

develop Darwinian models amounted to an arbitrary transfer of biologic terminology to the social sciences, with little attention to the substantive differences between organic evolution and socio-cultural change. The negative analogy should not be ignored, for it is sometimes as enlightening as the positive analogy. A weak analogy may be useful if it forces us to articulate the grounds of its inadequacy, because we are forced to bring our hidden assumptions and preconceptions to the awareness and criticism.

To explicate an analogy one can begin by drawing up a simple inventory of shared attributes which constitutes the positive analogy. The processes of cultural evolution and biologic change share several predicates. Both processes involve the production of variations, the selection of variations in the environment, the retention of selected traits, their transmission through successive generations, their migration or drift, and the extinction of traits that are maladaptive. These claims may or may not be correct, but they afford a good first attempt to outline what they take to be a positive analogy. The negative analogy can be explicated similarly.

A single metaphor often incorporates multiple possibilities for development. Two theorists, working from the same metaphoric base, may arrive at very diverse analogic outcomes. In developing the dramaturgic metaphor it makes a big difference whether we adopt classic or modern improvisation theater as the base model; whether we view life as comedy or tragedy; whether we follow a "technique acting" model in which players rationally control expression to convey their roles, or a "method acting" model in which players spontaneously lose themselves in the imagined lives of their characters. The theorist must define characteristics of the base model on which the analogy is built, and must specify key points of agreement and disagreement as precisely as possible.

HEURISTIC POTENTIAL

In the course of explication, it is not always clear whether a given predicate properly belongs to the positive or the negative analogy. Predicates with uncertain dispositions constitute the neutral analogy. They represent those respects in which the analogy's validity is un-

known and in need of further investigation.

One might suppose that the most valuable analogies are those that establish the highest degree of isomorphism between the two domains, but this is not necessarily so. The heuristic value of an analogy often depends on a high degree of apparent dissimilarity between the two domains. It is not isomorphism per se, but rather the unexpected isomorphisms that make an analogy interesting. A heuristic analogy is one that has the capacity to surprise us with a fresh view of a familiar subject, to suggest fruitful concepts, and to generate novel lines of inquiry. Analogical models typically undergo a predictable series of development stages through which their heuristic potential is gradually exhausted (Jameson 1972 v). In Stage One, an analogical model triggers an explosion of intellectual energy by offering a fresh and exciting perspective on the world, presenting old problems in new dress, and bringing a host of new problems into view. In Stage Two, the analogy's inadequacies gradually become apparent, and the model is readjusted to bring it into line with its object of study. In Stage Three, with its opportunities exploited and its limits apparent, the weary analogy is abandoned in favor of a new analogy, and the cycle repeats.

PREDICTIVE CONSEQUENCES

Ideally, an analogy does not merely raise new questions but also yields specific hypotheses or predictions which can be tested. The process of deriving testable hypotheses by means of analogy was a central concern of Peirce, who terms this mode of inference "abduction" to distinguish it from strictly deductive and inductive modes of inference. In abduction "we find that in certain respects, two objects have a strong resemblance, and infer that they resemble one another in other respects." (1957 129) In short, we make inferences from facts on one kind to facts of another kind. Peirce is careful to note that abduction is a weaker form of inference than either deduction or induction. It commits us to nothing. It merely lets us put the hypothesis in the set of cases to be tried by induction. Peirce is impatient with forced or untestable analogies in science, and recommends that the predictive consequences of an analogy be stated clearly and distinctly beforehand, and that its failures as

well as its successes be reported honestly after testing.

The predictive consequences of analogical models in sociology can be derived and tested. Stewart (1948) proposed that the Newtonian gravity equation stating that the gravitational attraction between two bodies is equal to the product of their masses divided by the square of the distance between them might be used to predict the volume of interaction between cities. Stewart's model has clear implications. It generated a considerable body of research which led to the modification and refinement of the model. Here is a clear case of abduction.

EXPLANATORY POWER

While the analogy between Newtonian gravity theory and urban interaction is useful for predictive purposes, it does not pretend to subsume gravitation and inter-city migration under a common set of explanatory principles. The resemblance is formal, not substantive. There is no deep analogy that would lead us to believe that they are separate manifestations of the same underlying process.

Some analogies do lead their authors to make such claims. Campbell argues that biological and cultural change are subsumed under a common set of evolution principles. He remarks that the analogy to cultural cumulations will not be from organic evolution per se, but rather from a general model of adaptive fit . . . for which organic evolution is but one instance (1965 26). Homans examines the analogy between economic exchange and other forms of social transaction, and concludes that similarities shine through the differences, and that the law of supply in economics is equivalent to the proposition: "The more valuable the reward gotten by an activity, the more often a man will emit it." (1961 69) In each case, identifying positive analogies between the principles of one domain and those of another leads to the abstraction of a set of more general principles that purport to explain phenomena in either domain.

It is important to emphasize that the use of analogy for explanation need not imply reductionism. Many social theorists including Durkheim and Parsons have relied on biological analogies while at the same time staunchly resisting any suggestion that sociocultural forms are reducible to biological principles. In some

respects, analogy is an alternative to the reductionist strategy.

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(Concluded on p 34)

power relationships on their heads. Or we can create a science driven by informed humanism. We have thus far seen the conservative and actionist sociologists make intradisciplinary war upon each other. We have thus avoided allowing either group to dominate this discipline so as to create a major impact on policy for the long-run future, although we have seen some limited consequences of overdog and underdog sociology. We have not yet birthed monsters. Before we lose all credibility with a stillbirth, it is time to put together a viable sociological offspring to face the future as an informed scientific humanist.

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