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MANIPULATION AND MASS COMMUNICATION: LESSONS FROM RESEARCH ON THE DIFFUSION OF INNOVATIONS¹⁾

The purpose of this paper is to draw certain lessons about manipulation via mass communication. We draw these lessons mainly from the past 40 years of social science research on the diffusion of innovations.

Diffusion research today represents over 3,000 publications, a huge and tremendously varied body of research reports. No other topic in communication research, and probably no other issue in behavioral science, has received so much research attention over so many years, in so many nations. Diffusion research began in the U.S., and has continued to flourish there, as one type of activity of the empirical school of communication research.²⁾

—HISTORICAL BACKGROUND OF DIFFUSION RESEARCH—

Research on the diffusion of innovations dates back to the 1930's, but the real growth spurt of diffusion studies began in the 1950's and a continued expansion in the number of diffusion publications continues to the present.

A dominant intellectual paradigm (the so-called "classical diffusion model") ruled these studies, giving a consistent coherence to the field but also somewhat limiting the scope and method of inquiry (Rogers, 1962; Rogers with Shoemaker, 1971; Rogers, in press). To a certain extent, many diffusion studies looked a great deal alike.

The Popularity of Diffusion Research

"Innovation has emerged over the last decade as possibly the most fashionable of social science areas" (Downs and Mohr, 1976). A variety of behavioral science disciplines are involved in the study of innovation. "This popularity is not surprising. The investigations by innovation research of the salient behavior of individuals, organizations, and political parties can have significant social consequences. [These studies] imbue even the most obscure piece of research with generalizability that has become rare as social science becomes increasingly specialized" (Downs and Mohr, 1976).

What is the appeal of diffusion research to scholars and to sponsors of such research? Why is there so much diffusion literature being produced today?

1. The diffusion model is a conceptual paradigm with relevance for many disciplines. The multidisciplinary nature of diffusion research cuts across various scientific fields; a diffusion approach provides a common conceptual ground

bridging these divergent disciplines and methodologies. There are few disciplinary limits on who studies innovation. Most social scientists are interested in social change; diffusion research offers a handy avenue to such understandings (or so it means). Economists are centrally interested in growth; innovation is one means to get to it, and its patterns of diffusion may provide an important indicator of development. Organization scholars are concerned with processes and patterns of change in and between institutions, and in how their relation to structure is altered over time. Social psychologists try to understand the sources and causes of behavior change. The diffusion approach offers something of value to each of these disciplines.

2. The apparent pragmatic appeal of diffusion research is high. A diffusion approach seems to promise to provide solutions to individuals and/or organizations (a) which have invested in research on some topic and seek to get it utilized, and/or (b) desire to use the research results to solve a particular social problem. This promise has attracted many researchers even though its fulfillment has yet to be fully proven in the arena of practice.
3. The focus of diffusion research on tracing the speed of an innovation (through a system in time and/or in space) has the unique quality of giving "life" to a behavioral change process.
4. The diffusion paradigm allows scholars to repackage their empirical findings in the form of higher-level generalizations. Such an orderly procedure in the growth of the diffusion research field has allowed it to progress in the direction of a gradual accumulation of empirical evidence.
5. The methodology implied by the classical diffusion model is clearcut and relatively facile. The data are easy to gather; the methods of data-analysis are well laid out. As Rogers (1962) stated, diffusion scholars have often dug where the ground was softest; they focused especially, and almost predominantly, on characteristics related to innovativeness through cross-sectional analysis of survey data. Although the methodological straightforwardness of diffusion studies encouraged many such investigations to be conducted, it also may have restricted theoretic advance.

The "Classical Model" of Diffusion

Communication has in the past often been defined as the process by which an idea or innovation is transferred.³⁾ Thus, the purpose of communication is to bring about certain desired effects on the part of the receiver; alteration of the receiver's knowledge of some idea, a change in attitude toward the idea, or a change in his overt behavior. Thus, a concern with communication implies an interest in behavioral change, as the purpose of most human communication is change. Although communication and social change are not synonymous, communication is an important element throughout the social change process. Essentially, the concept of social change includes, in addition to the communication process, the societal and individual consequences that result from the adoption or rejection of an innovation.

Diffusion is a special type of communication. *Diffusion* is the process by which innovations spread to the members of a social system over time. Diffusion studies are concerned with messages that are new ideas, whereas communica-

tion studies encompass all types of messages. As the messages are new in the case of diffusion, a degree of risk and uncertainty for the receiver is present, leading to somewhat different behavior on his/her part in the case of innovations than if he/she were receiving messages about routine ideas.

The "classical model" of the diffusion of innovation has the following main elements: (1) the *innovation*, defined as an idea perceived as new by an individual, (2) which is *communicated* through certain *channels*, (3) *over time*, (4) among members of a *social system*.

Studies of the diffusion of innovations increased from about 100 publications in 1952 to over 3,000 in 1981. Of these 3,000 publications, about two-thirds are empirical research studies. The early 1960's mark the beginning of a sharp take-off in the number of diffusion studies in developing countries.

During a 20-year period, the number of empirical diffusion researches conducted in developing nations increased from 54 in 1960 to over 1,000 in 1981. The diffusion of innovations model has had a very influential role in development activities in developing countries. The sharp growth of diffusion studies in developing countries after 1960 was due to the fact that technology was assumed to be at the heart of development, and innovativeness was thought to be one of the best single indicators of the multi-faceted dimension called modernization. So micro-level investigations of the diffusion of technological innovations (e.g., in agriculture, health, family planning, etc.) among villagers were of direct relevance to development planners and other government officials in developing countries.

– DIFFUSION AND LINEAR MODELS OF COMMUNICATION –

An assumption underlying research on the diffusion of innovations is that the innovation is a special kind of message being diffused from an expert source to a less-expert receiver. Thus a linear model of communication was implied.

Communication as it is conceived by most scholars and practitioners was greatly influenced by the models proposed in the late 1940's by Harold Lasswell, and by Claude E. Shannon and Warren Weaver. Lasswell's basic model consisted of "Who says what, in what *channel*, to whom, and with what effect?" The addition of the channel as a specific element was a response to the growth in new communication media, such as print, the telegraph, and radio. The inclusion of effects initiated the new field of communication research on human behavioral change.

The academic field of communication "took off" when Shannon and Weaver (1949) set forth their model in *The Mathematical Theory of Communication*. They defined communication as "all the procedures by which one mind may affect another," but the model itself was designed for purposes of electronic engineering. ⁴⁾ It is essentially a linear, left-to-right, one-way model of communication. It led to technical improvements in message transmission, and it served to bring together scholars from several disciplines to the scientific study of communication. The effort which it stimulated to create a unified model of human communication failed because the theory did not consider the semantic or the pragmatic levels of communication. ⁵⁾

Electronic communication usually is linear. But when the Shannon/Weaver model was followed by human communication researchers, they did not pay enough attention to feedback and noise as components in the communication process. Further, they tended to underestimate the subjectivity of communication, that a message usually means something quite different to a receiver than it did to the source.

Shannon and Weaver's most important contribution was their concept of information, which provided a central focus to the new field of communication research. It became the main conceptual variable around which the new intellectual approach began to grow.

The linear communication models of the 1950's and 1960's (like the S-M-C-R model of Berlo [1960], one of the most widely-known) were useful for purposes of designing laboratory experiments which assumed one-way causality of the components on communication effects, and for the study of propaganda and persuasion, especially as transmitted by the mass media. These models described a simple communication *act*, but not the *process* of communication.

Although Berlo's (1960) model of communication is essentially a linear model (source, message, channel, receiver), he warned that "It is dangerous to assume that one [of these elements] comes first, one last, or that they are independent of each other. This denies the concept of process, and communication is a process." Berlo (1960, p. 106) stated: "The behaviors of the source do not occur independently of the behaviors of the receiver or vice versa. *In any communication situation, the source and the receiver are interdependent*" (emphasis of the original author).

Most communication research has been conducted in light of these linear models. The usual approach has been to gather data from a sample of receivers about the effects of communication on their knowledge, attitudes, or overt behavior. Source variables, message variables, channel variables, and/or receiver variables are manipulated by the researchers as independent variables, in order to relate them to the dependent variables of communication effects.

Usually the individual receiver is a unit of analysis, as well as the unit of response. The linear communication models of the 1950's and 1960's were useful for designing experiments which assumed one-way causality of one or more of the components of the model on communication effects. Such an assumption may have been justified in the study of propaganda and persuasion, especially as such messages were transmitted by the mass media. But many important aspects of human communication do not fit linear models, and tend to be ignored by communication research based on linear models.

The general picture that emerges from communication research is that the mass media have relatively modest direct effects except in the case of certain audiences, certain effects, etc. One example of an audience where mass media effects are frequently reported is television effects (such as from violent program content and/or advertising of toys, sweet drinks/candies, and "junk food") on young children. Presumably this special television audience in the U.S. has not yet learned that certain advertising claims are exaggerated. In very recent years, U.S. communication scholars have investigated the effects of televised advertising on children, and have also evaluated the effects of special messages (like

the "Six Billion Dollar Sell", a short film distributed by the *Consumers' Union*) intended to alert children to the exaggerated claims of certain advertisements.

—CRITICISM OF THE LINEAR MODELS—

Writing 17 years after his original statement of the S-M-C-R model, Berlo (1977, p. 12) accepted the criticism of his linear S-M-C-R model that our view of research as focusing on communication effects and our view of communication as a process have been contradictory. Berlo (1970, p. 12) still claimed that linear models of "do-it-to-others" processes like persuasion are appropriate for much of human communication, although not for some of the most important communication: "I did not recognize that the assumptions underlying linear causal determinism may account for the major proportion of communication events, but not account for the portion that makes a significant difference in our lives." Berlo concluded that our interests in communication are changing, mainly from directional persuasion where linear models may have been more satisfactory, to "communication-as-exchange."

The limitations of linear models became apparent in their application to the study of mass communication and to the diffusion of innovations. But the simple, linear model was appended, rather than replaced. The two-step flow hypothesis was proposed to explain why the mass media did not achieve their expected effects in political behavior, which soon gave way to the idea of multi-step flows.

The main problem with the linear models of communication stemmed from their basic metatheoretical or epistemological assumptions about the nature of information, how it is transmitted, and what we do with it. In our daily experience there is a tendency to treat information as if it could be carried from a source to a receiver like "a bucket carries water," like a dumptruck carrying sand across a city, like a hypodermic needle injection a vaccine, or like a "bullet" short at a target. All of these analogies were created to criticize the treatment of information as if it were entirely a physical entity which could be moved around like other material objects. There *is* a physical aspect to information and so this assumption "works" in many situations. But this supposition about the nature of information is in part responsible for another theoretic error: That the individual mind is an isolated entity, separate from the body, separate from other minds, and separate from the environment in which it exists (Bateson, 1972). The context of human communication was thus ignored.

These assumptions, (1) that information is only a physical substance and (2) that individual minds are separate, led to seven biases that we identify in past communication theory and research (Rogers and Kincaid, 1981).

1. A view of communication as a linear, one-way act (usually vertical), rather than a cyclical, two-way process over time.
2. A source bias based on dependency, rather than focusing on the relationship of those who communicate and their fundamental interdependency.
3. A tendency to focus on the objects of communication as objects, at the expense of the context in which they exist.
4. A tendency to focus on the messages per se at the expense of silence, and

the punctuation and timing of messages.

5. A tendency to consider the primary function of communication to be persuasion, rather than mutual understanding, consensus, and collective action.
6. A tendency to concentrate on the psychological effects of communication on separate individuals, rather than on the social effects and the relationships among individuals within networks.
7. A belief in one-way mechanistic causation, rather than mutual causation which characterized human information systems that are fundamentally cybernetic.

These seven biases are interrelated and cumulative. Each tends to support the others and create a rather coherent image of communication behavior in spite of the limitations and problems that this image produces. When communication is perceived as one-way and vertical, and when one takes the point of view of sources as subjects who use communication to produce a change in receivers as objects, biases toward psychological effects and mechanistic causation are created.

—A CONVERGENCE MODEL OF COMMUNICATION—

Communication should be defined as a process in which the participants create and share information with one another in order to reach a mutual understanding. A model of communication which only suggests the analysis of one participant's understanding of a message is incomplete. Communication is always a joint occurrence, a mutual process of information-sharing between two or more persons. *Communication networks* consist of interconnected individuals who are linked by patterned flows of information. Such information sharing over time leads the individuals to converge or diverge from each other in their mutual understanding of reality. By "reality" we do not mean physical reality itself, to which individuals have no direct access, but rather information about physical reality. An individual's interaction with his environment is mediated by information, much of which refers not to physical reality but to other sets of information. An adequate, mutual understanding and agreement about symbolic information which is created and shared is a prerequisite for any other social and collective activity.

Although mutual understanding is the purpose or primary function of communication, it is never reached in any absolute sense due to the inherent uncertainty of information. Several cycles of information sharing about a topic may increase mutual understanding, but not complete it. Fortunately, for most purposes, perfect mutual understanding is not required. Generally, communication ceases when a sufficient level of mutual understanding has been reached for the task at hand. The amount of mutual understanding that results could be depicted as a set of two or more overlapping circles which represent each participant's estimate of the other's meaning that overlaps with the other's actual meaning. The convergence of each participant's understanding is never complete, never perfect. The codes and concepts that one has available for understanding are learned through experience. Therefore, the conceptual systems that participants use for understanding can only approximate one another within some

limits of error or uncertainty.

Convergence is always *between* two or more persons. The model compels us to study relationships, differences, similarities, and changes in these relationships over time. The minimal unit of analysis is the dyad, dyads linked in some manner through the exchange of information. From dyads, the researcher can extend his analysis outward to the participant's personal networks and to cliques and to large, intact networks.

How does communication lead to the formation of cliques? How does communication contribute to the formation of divergent factions within a network? What types of communication (and other events) are capable of reversing a trend towards divergence, or vice versa? These questions are generated at the interface between the convergence model of communication and the network approach to communication research.

—IMPLICATIONS OF THE CONVERGENCE MODEL FOR COMMUNICATION RESEARCH—

The convergence model represents human communication as a dynamic, cyclical process over time, characterized by (1) mutual causation rather than one-way mechanistic causation, and (2) emphasizing the interdependent relationship of the participants, rather than a bias towards either the "source" or the "receiver" of "messages." Mutual understanding and mutual agreement are the primary goals of the communication process. They are the points towards which the participants either converge or diverge over time. The immediate purpose for which information is shared by individuals is to reach mutual understanding, a prerequisite for the successful achievement of other human purposes.

The convergence model of communication leads to a relational perspective of human communication because of the shift to *information* as opposed to *messages* as the content that is created and shared by participants. *Information* is defined as a difference in matter-energy which affects uncertainty in a situation where a choice exists among a set of alternatives. Information is about objects and events in the environment and about relationships in the environment, interpreted through the application of available codes and concepts. Once the interpretation and understanding of information is raised to the level of shared interpretations and mutual understanding, what was considered as individual information-processing becomes human communication among two or more persons who hold the common purposes (if only for a brief moment) of understanding one another. The participants may converge or diverge, that is, reach a mutual understanding or a misunderstanding.

Toward Relationships as Units of Analysis

One of the most basic questions for communication theory and research is whether to study the information-exchange *relationship* between two or more persons as the unit of analysis, or to study the participants as *individuals*.

The S-M-C-R model of communication, for example, explicitly separated the source and the receiver. It treated messages as objects (as opposed to information) which one individual sends to the other. Research based on this linear

model broke up the communication process into a set of isolated variables, each associated with one of the four component elements (S, M, C and R) in the model (plus feedback). The model proved useful for designing and organizing experiments on the individual effects of messages on receivers. Such components research exemplifies the atomistic/mechanistic approach of physical science, which was borrowed too directly by communication scholars.

In comparison to the focus of past communication research on a components approach to communication effects on individuals as the units of analysis, we advocate a different approach. The convergence model of communication calls for a different kind of communication research than did the linear models of the past. First, the unit of analysis is usually the information-exchange relationship between two individuals, or some aggregation of this dyadic link to the level of the personal communication network, the clique, or to the network. For instance, the data-set that we utilize throughout our future chapters to illustrate communication network analysis, consists of 21,072 informationexchange links among 1,003 women living in 24 Korean villages. Our unit of analysis is these 21,072 links in certain analyses; elsewhere it consists of the hundred or so cliques composed of these 21,072 links, or else the 24 systems. Rarely do we utilize the 1,003 respondents as units of analysis, and even then we use network variables to explain their behavior. The individuals provided the data, so they are the units of response. But the typical respondent reported about 21 communication links with her fellow villagers. These 21,072 links are our basic unit of analysis. Links, not individuals, are the fundamental unit in any type of research based on the convergence model of communication.

Network data have an unusual quality. The basic data, of course, are a type of information about individual respondents: the other individuals in their system with whom they communicate. The solution to any network analysis problem requires that we discover certain properties of the communication structure of the system, composed of the aggregate of the individual respondents.

The basic difference in the unit of analysis is the point of departure between communication research based on linear models and that based on a convergence model.

Implications for Diffusion Research

The shift from linear to convergence models of communication implies that diffusion research should concentrate on the interpersonal communication networks through which a new idea flows, rather than concentrating on the individual characteristics associated with innovativeness.

Further, and more generally, diffusion scholars should consider reconceptualizing their model of diffusion to one that is more decentralized. The contrasting characteristics of centralized versus decentralized models of diffusion are described in Table 1.

I intend to devote my future research efforts to synthesizing a model of decentralized diffusion out of various decentralized diffusion systems that I have identified.

Table 1. Characteristics of centralized and decentralized diffusion systems.

Centralized Diffusion Systems	Decentralized Diffusion Systems
1. Overall control of decisions by national government administrators and technical subjectmatter experts.	1. Wide sharing of power and control among the members of the diffusion system; client control by local community officials/leaders.
2. Top-down diffusion from expert to local users of innovations.	2. Peer diffusion of innovations through horizontal networks.
3. Innovations come from formal R&D conducted by technical experts.	3. Innovations come from local experimentation by non-experts, who often are users.
4. Decisions about which innovations should be diffused are made by top administrators and technical subject-matter experts.	4. Local units decide which innovations should diffuse on the basis of their informal evaluations of the innovations.
5. An innovation-centered approach; technology-push, emphasizing needs created by the availability of the innovation.	5. A problem-centered approach; technology-pull, created by locally-perceived needs and problems.
6. A low degree of local adaptation and re-invention of the innovations as they diffuse among adopters.	6. A high degree of local adaptation and re-invention of the innovations as they diffuse among adopters.

NOTES:

1. Janet M. Peck Professor of International Communication, Stanford University.
2. Elsewhere (Rogers, 1981), I have described this empirical school as characterized by quantitative empiricism, functionalism, and positivism. It contrasts with the critical school of communication research, characterized by a more philosophical emphasis, a focus on the broader social structural context of communication, Marxist origins (although many critical scholars are not critical of Marxism), and a central concern with who controls a communication system.
3. This definition implies essentially a linear model of one-way communication acts, as compared to a convergence model of the communication process through which information is shared between two or more individuals as they move toward greater convergence or divergence in their view of some event (Rogers and Kincaid, 1981).
4. Looking backward to 1948-49 from the advantageous viewpoint of today, one wonders why the Shannon and Weaver (1949) book had such a much greater impact on the scientific study of human communication than did Norbert Weiner's (1948) *Cybernetics*, a book which appeared at about the same time. Evidently a linear model of communication better fit the needs of the then-emerging field of communication than did a cybernetic model. Professor Wilbur Schramm was especially influential in the 1950's in facilitating use of linear models, and later led the move to relational models in the 1970's.
5. Although Shannon and Weaver (1949) did discuss the semantic problem of "the interpretation of meaning by the receiver, as compared with the intended meaning of the sender."

References cited

- Gregory Bateson (1972), *Steps to an Ecology of the Mind*, New York, Ballantine.
- David K. Berlo (1960), *The Process of Communication*, New York, Holt, Rinehard and Winston.
- David K. Berlo (1977), "Communication as Process: Review and Commentary," in Brent R. Ruben (ed.), *Communication Yearbook 1*, New Brunswick, New Jersey, Transaction.
- George W. Downs, Jr. and Lawrence B. Mohr (1976), "Conceptual Issues in the Study of Innovation," *Administrative Science Quarterly*, 21:700-714.
- Everett M. Rogers (1962), *Diffusion of Innovations*, New York, Free Press.
- Everett M. Rogers with F. Floyd Shoemaker (1971), *Communication of Innovations: A Cross-Cultural Approach*, New York, Free Press.
- Everett M. Rogers (1981). "The Empirical and the Critical Schools of Communication Research," in Michael Burgoon (ed.), *Communication Yearbook 5*, New Brunswick, New Jersey, Transaction.
- Everett M. Rogers and D. Lawrence Kincaid (1981), *Communication Networks: A New Paradigm for Research*, New York, Free Press.
- Everett M. Rogers (in press), *Diffusion of Innovations*, New York, Free Press.
- Claude E. Shannon and Warren Weaver (1949), *The Mathematical Theory of Communication*, Urbana, University of Illinois Press.
- Norbert Weiner (1948), *Cybernetics*, New York, MIT Press and Wiley.