Communication Theory and Typographic Research

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The term "typographic research" may be taken in three related but quite different senses: 1) as in testing scientific hypotheses, 2) as in artistic exploration, and 3) as in critical, historical, or analytic examination. Working primarily within the framework of scientific research, the authors attempt to sketch typographic research within the broader picture of scientific theory building. They recast a few familiar aspects of typographic decision-making into the framework of communication theory. The primary goal of the article is to suggest what might be useful for a theory of typographic communication, including research needs and criteria for arranging a hierarchy of research goals.

In the best of all scientific worlds, the researcher finds the "critical experiment" to perform, the situation where two competing theories lead to conflicting predictions, and an experiment can demonstrate which prediction is accurate. A complex theory, of course, is a hearty beast, and it seldom rises or falls on a single experiment.

The researcher, in his best form, also performs the "high information" experiment. He lines up all possible alternatives and then tries to do the crucial experiment which reduces the alternatives by half. If he can find these key forks in the path of discovery, he can eliminate huge areas of potentially time-consuming—but eventually fruitless—research.

Finally, of course, the researcher would like to do the socially significant experiment. The social scientist would dearly love to come up with an experiment which would demonstrate how to eliminate war, or erase poverty. Unfortunately, the path of science has typically led the researcher to molecular levels. The great intellectual questions of history have usually given way only after intense, and usually increasingly molecular, spade-work.

The classic scientist frequently ends up humbly adding his one brick to the intellectual stockpile from which someday—possibly not in his

lifetime—a new theoretic edifice will be constructed by some future Charles Darwin or Albert Einstein. The practitioner who wants some shelter from uncertainty today is likely to look at the bricks with scorn: "You call that a building?"

Admittedly, of course, some scientists discover things which are very useful to today's practitioners. In areas like communication research, the practitioner frequently complains that the scientist has discovered what bears signs of pertinence but has little interest in communicating the implications of his work. The scientist, meanwhile, expresses frustration that the practitioner does not learn a minimal scientific vocabulary so he can draw his own conclusions.

For the scientist then, typographic research suggests the testing of hypotheses. This is in contrast to the artist, who engages in his kind of typographic research when he creates new forms or explores new methods, such as computer-aided design. It is typically different also from historical or critical research, although increasingly, historical research has been framed in a hypothesis-testing context.

Working within the framework of scientific research, then, let us examine the current state of communication theory and its implications for typographic research. And, conversely, we'll explore the implications of typographic research for emerging communication theory and practice.

Communication Theory

In its broadest sense, communication involves that process whereby one system passes information to another system. Any system—whether a subhuman organism, a person, or a large institution—exists in terms of energy, matter, and information. A system typically needs: (a) information from within, to control and co-ordinate its parts; and (b) information from without, so it can adapt to and affect its environment.

Information can be thought of as that which reduces uncertainty. Uncertainty, in turn, is a function of the number of alternatives available, and the probabilities attached to those alternatives. Uncertainty increases as the number of alternatives increases; it's harder to select among three equally attractive possibilities than between two. Uncertainty also increases as the probabilities become more nearly equal; it's harder to choose in an equally weighted ("50–50") situation than in an unequally weighted ("90–10") one.

Information typically passes the boundary of a given system in coded form. It is a pattern of stimulation, in the form of matter or energy, which "means" something, i.e., it can be decoded for re-creation outside the system. The code, particularly in complex systems like the human being, can mean several things, on several levels, at the same time.

If we are talking about a human communication system, we can label the parts more specifically, as D. K. Berlo (1) does in his S-M-C-R model (Fig. 1). The model suggests a source, message, channel, and re-

S	M	C	R
Source	*Message*	*Channel*	*Receiver*
communication skills	elements	seeing	communication skills
attitudes	structure	hearing	attitudes
knowledge	code	touching	knowledge
social system	content	smelling	social system
culture	treatment	tasting	culture

Figure 1. SMCR Model of Communication

ceiver. For the source and the receiver, certain characteristics are seen as important to successful communication: knowledge, attitudes, communication skills, and the social-cultural context.

The message may present content in one or more codes. The human source in his selection of codes and contents gives the message a unique "treatment." In code, content, and treatment we can identify elements and structure. Typically, elements at one level, such as letters, join together to form a structure, such as a word, which becomes an element at the next highest level of analysis; the word is an element in a sentence.

When we think of human code systems we usually think first of alphabetic or numeric codes. But man can and does use a wide variety of code systems. Figure 2 shows a set of code systems suggested originally by Martin Krampen. In addition to these, Edward Hall (5) (6) suggests that time and space can be patterned into code systems. The latter he calls "proxemics."

Related to the problem of codes and content is the notion of "metacommunication." Metacommunication is communication about communication, messages about the message which are often transmitted simultaneously. In other words, a source may encode a message about some topic, some content area. At the same time, through his tone of

voice, through his gestures and expressions, he makes some statements about his message and how it should be interpreted. "This is important." "I mean this especially for you." "I'm very serious about this." Or, "I'm just kidding."

Fundamental motor act	*Basic (differential) unit produced*	*Combined into*	*Studied by*	*Typical act or skill*
uttering	phoneme	morpheme	linguistics	poetry
scratching	glyph	glytomorph	glyptics	writing
	pict	pictomorph	pictics	drawing
molding	plasm	plastomorph	plastics	sculpture
building	technem	technomorph	tectonics	architecture
moving	kine	kinemorph	kinesics	dance
sound	tone	melos	melodics	music
touch	hapton	haptomorph	haptics	fondling
produce smell	ozone	aroma	aromatics	perfumery
produce taste	edon	edomorph	edetics	cooking

Figure 2. Code Systems

Alongside linguistics has grown up an area called "para-linguistics" which studies rhythm, pitch, tone, and the other qualities of a spoken message which often provide metacommunication. Originally, kinesics, the study of gesture, was subsumed under para-linguistics. But now it appears that there may be a kinesics and a para-kinesics. Pounding the table with a fist may indicate anger. But the force and speed of the pounding may be a para-kinesic cue which indicates just how much anger.

Similarly, there may be a para-graphemic area. Bold-facing, changes in size, and alterations in space may provide metacommunication just as para-linguistics or para-kinesics.

Uncertainty in the Communication System

When we examine a communication system as objective observers, we may have certain questions about the system itself, certain types of uncertainty that we would like to resolve. We may wonder, first, if the system actually works. Is it possible for one component to pass information to another? If the source and receiver do not share a common code system, a common language, we might predict that our system will not last long.

We may be interested in predicting the longevity or stability of our communication system. To test this we might want to know the source's and receiver's attitudes toward each other. What is the receiver's attitude about the messages he receives? What is the source's attitude toward the messages he encodes? Do they fill him with expressive joy? Or are they ground out with painful effort?

We may also ask questions about the effectiveness of the system. When one component passes information to another component, does the information produce the desired effect promptly? Does the system acquire relevant information from its environment, and communicate back to its environment?

Given some reading on effectiveness, we may raise the question of efficiency. Is information passed with a minimal expenditure of energy and matter, with the least possible wear and tear on the components?

In theorizing about communication systems, we frequently move within the system to take the point of view of one of the components, typically the receiver, with an eye to eventually providing more information to sources about the communication process. If we examine the source, we may ask questions like: What leads him to select the messages he does? How does he choose content? Why does he select that particular code, or channel? Then we may go on to ask how he receives feedback from his receiver, or how he can be more creative or more productive.

Examining the communication process from the viewpoint of the receiver, we can identify several types of uncertainty, and we can find examples within typography. First may be the uncertainty of what was sent. This is the problem W. Weaver (13) has called the "technical problem," and it is dealt with explicitly in Shannon's mathematical theory of information.

In typography, this kind of uncertainty relates most directly to legibility. The course of this uncertainty may be (a) an ambiguous coding system, such as an ornate typeface where *C* can be confused with *G,* or (b) channel "noise," such as smeared printing, or even poor lighting conditions for the reader. Shannon used the term "noise" originally for audio channels, and of course, in television, we have "snow." Sir Cyril Burt (3) has suggested that in typography we should call the same phenomenon "blur."

"Technical uncertainty," as we might call it, is usually reflected, first,

in the receiver's error rate, i.e., his misreadings, and, second, in his decoding time, his reading speed. It may be possible to reduce this type of uncertainty, but frequently only at the expense of introducing other types of uncertainty.

A second kind of uncertainty Weaver called the "semantic problem." It is uncertainty about what was meant. In other words, the code is received pretty much as it was transmitted, but now we come to the problem of decoding, matching the symbols with some referent system.

In typography, the semantic problem has typically focused on typeface connotation. At one level, the individual symbol "means," or stands for, a certain letter of the alphabet, or for perhaps a certain sound in the spoken language. But in addition, the typographer can select a type style which communicates certain connotations. The typeface may be modern or old-fashioned, masculine or feminine, formal or informal, expensive or cheap, frivolous or stolid.

Frequently, the typographer must worry about connotative congruence. The message itself—with its particular content and treatment—frequently gives rise to certain connotations. The typographer in his encoding choices can (a) reinforce these connotations, (b) provide new and independent connotations, (c) offer neutral, or at least minimal, connotations, and (d) introduce conflicting connotations.

The latter choice may sound like poor encoding, but a conflicting connotation may be selected to provide counter-point, to heighten some hoped for effect. Usually, of course, a direct conflict would be expected to produce confusion, and it would most likely dilute the original connotation of the treatment and content.

A third type of uncertainty may be called the "syntactic problem." Particularly in complex messages which permit more than one decoding sequence, this uncertainty becomes important. Roughly, the syntactic problem is uncertainty about symbol-to-symbol organization. What do I look at first? What is most important? If I'm skimming, what can I skip? In general, how do I get from the beginning to the end?

Print is, of course, a linear code. You usually start at the upper left, scan across, then drop a line, and so on. But in any complex layout, typography can be used to guide, emphasize, and organize.

A fourth kind of uncertainty relates to arousal and to the aesthetic response. D. E. Berlyne (2) suggests that arousal can be stimulated by

patterns which are complex, novel, conflicting, intense, colorful, and so on. Moderate rates of arousal, in turn, can be related to pleasurable feelings which may be at the core of the aesthetic response: "I like it."

Usually, the aesthetic response is thought to be a function of connotations, i.e., pleasant associations from the past, and perhaps congruence, a particularly appropriate organization of elements. In the area of typographic preference, some individuals may demonstrate a liking for that which is easy to read. If we add connotation, congruence, and legibility to arousal, we may have accounted for the key facets of typographic preference.

A fifth and final type of uncertainty may be proposed: response uncertainty. Given our knowledge of what was sent, how to decode it, what it meant, and our immediate pleasure or displeasure in it—now what is the appropriate response?

In one sense, this question is at the fringes of the decoding process and tends to be less under the control of the message and more under the control of the individual's psychological state and social-cultural context. But we have suggested that, through metacommunication, the source can tell the receiver how to interpret the message, and, by inference, how to respond.

At one level, a message may contain explicit instructions. "Turn to page 320." "Clip along the dotted line." "Give this coupon to your grocer." At a subtler level, a magazine may use a specific typographic treatment for one type of article or feature, so that the reader will tune in again next time to the right place. Or the advertiser may invest great meaning in his logo so that at some future time the reader will "turn in at the sign of. . . ."

Typographic Decisions in the Communication System

In a mass-media communication system, the typographer is usually a member of the encoding team. He stands between the original source of the message and the channel which will carry the message to an audience. He may exercise relatively little control over certain aspects of content but considerable control over certain code and treatment options.

The original source of the message probably holds certain goals, a set of outcomes he deems desirable for his message. He probably hopes for, first, attention. He would like a set of receivers to select his message

out of the array they have available. Next, he would like some measure of comprehension. Then, he would probably like acceptance, favorable attitudes for his position and ideas. Next, he may want recall of this information at some future point. And finally, he may hope that the information is used in some specific way.

The source may, of course, be interested only in expressive success. He may be venting feelings with little concern whether they have an instrumental effect on an audience. Or, he may appear to be concerned primarily with pleasing his employer and collecting his check. Even here, however, his message must have some of the desired effects on an audience.

Various sources can be typed by the relative importance they place on attention, comprehension, acceptance, recall, and use. The entertainer, for instance, may be primarily concerned with attention. The educator may be concerned with comprehension and recall. The politician may emphasize acceptance, while the recipe writer may worry about comprehension and use.

The typographic encoder typically works within—and frequently sharpens—these goals. In addition, he may have a set of goals of his own. They may be sub-goals related to the source's goal, such as the goal of creating novelty which in turn will attract attention. Or, they may be independent goals; the typographer may be interested in creating an aesthetic experience, while the original source didn't care.

These sub-goals can, of course, conflict with goals of the encoding team. If, in a film, for instance, we are led to remark, "My, what lovely music," it probably means that the musicians have overdone their bit. If we become conscious of the music as a separate entity, it is probably not integrated into the whole in the way that it should be.

Usually, the communication goals are so inter-related that manipulating one influences the others. We can increase attention, for instance, by introducing novelty. However, at least certain kinds of novelty may work against comprehension. We may have to weigh the potential gains in attention against the potential loss in comprehension.

The typographer works very directly to reduce the types of receiver uncertainty outlined earlier. In addition to these receiver constraints, he probably has to work within constraints imposed by resources, the amount of time available, the channel to be used, and decisions made by other members of the encoding team.

Implications for Typographic Research

Given this laborious recasting of the familiar into an abstract and abstruse form, have we gained anything by our efforts? Hopefully, we have a clearer vision of what should be necessary for an emerging theory of typographic communication. We should have a more orderly array of research needs, and some criteria for arranging a hierarchy of research goals.

Some future theory of typographic communication, it is to be hoped, will be expressed in terms of high-level propositions that apply to the total communication system, incorporating the source, the typographic encoder, the message, the channel, and the receiver. Then we may expect propositions about the source and typographic encoder components and their interactions. Similarly, we could expect propositions about each of the other components and their interactions.

Within each component we will probably find additional variables that will influence each other and the effect of the component. We may expect, for instance, that research on metacommunication in other areas will illuminate that problem in typographic communication. Conversely, typographic research may be an efficient way to throw light on the broader problem of metacommunication.

In relating theories of typographic communication to broader communication theory, we will probably be faced with questions such as: In predicting the outcomes for a communication system, how much of the variance is accounted for by typographic decisions?

This, in turn, may vary as we control additional factors. We may hypothesize, for instance: As the receiver perceives competing content to be increasingly equal in value, typographic factors will increase in importance. If we find that typographic decisions account for a large amount of the variance under specified conditions, we may hypothesize: As encoder investment (in time, energy and resources) increases, decoder selection increases.

While we can frame long-range questions of theory, immediate research, of course, must build with today's methodology on the footings raised by earlier theory and research. Fortunately, several significant probes have already been made by researchers such as C. Burt (3), M. A. Tinker (12), J. B. Haskins (7), M. E. Wrolstad (14), R. Martin (8), and P. H. Tannenbaum, et al. (11).

Beside these direct probes, typograhic research should be able to feed

on theorizing in related areas. P. H. Tannenbaum (10), for instance, has discussed what he calls the "indexing process," which seems to bear on typographic questions as well. J. L. Fischer (4) has suggested that the use of space in pictorial matter reflects deep cultural patterns which should be understood by encoders. E. T. Hall (5) (6), of course, has made extensive explorations into the use of space as a communication code. And J. Ruesch and W. Kees (9) suggest an approach to nonverbal communication which subsumes typographic factors under "object language."

In summary, we have attempted to sketch typographic research within the broader picture of scientific theory-building. We have recast a few familiar aspects of typographic decision-making into the more abstract framework of communication encoding. Briefly reviewing existing research and related theorizing, it appears that much good spade-work has already been done, but the building of a coherent theory has just begun.

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