

1 COMMUNICATION THEORY

Origins

Shannon and Weaver's *Mathematical Theory of Communication* (1949; Weaver, 1949b) is widely accepted as one of the main seeds out of which Communication Studies has grown. It is a clear example of the process school, seeing communication as the transmission of messages.

Their work developed during the Second World War in the Bell Telephone Laboratories in the US, and their main concern was to work out a way in which the *channels* of communication could be used most efficiently. For them, the main channels were the telephone cable and the radio wave. They produced a theory that enabled them to approach the problem of how to send a maximum amount of information along a given channel, and how to measure the capacity of any one channel to carry information. This concentration on the channel and its capacity is appropriate to their engineering and mathematical background, but they claim that their theory is widely applicable over the whole question of human communication.

Shannon and Weaver's model (1949; Weaver, 1949b)

Their basic model of communication presents it as a simple linear process. Its simplicity has attracted many derivatives, and its linear, process-centred nature has attracted many critics. But we must look at the model (figure 2) before we consider its implications and before we attempt to evaluate it. The model is broadly understandable at first glance. Its obvious characteristics of simplicity and linearity stand out clearly. We will return to the named elements in the process later.

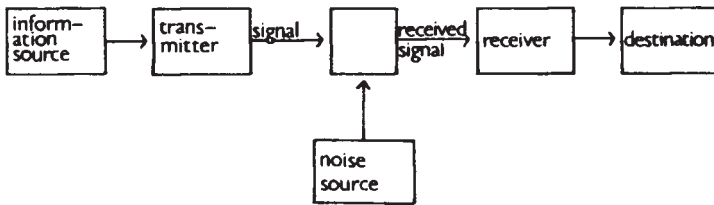


Figure 2 *Shannon and Weaver's model of communication*

Shannon and Weaver identify three levels of problems in the study of communication. These are:

Level A	How accurately can the symbols of
(technical problems)	communication be transmitted?
Level B	How precisely do the transmitted
(semantic problems)	symbols convey the desired meaning?
Level C	How effectively does the received
(effectiveness problems)	meaning affect conduct in the desired way?

The technical problems of level A are the simplest to understand and these are the ones that the model was originally developed to explain.

The semantic problems are again easy to identify, but much harder to solve, and range from the meaning of words to the meaning that a US newsreel picture might have for a Russian. Shannon and Weaver consider that the meaning is contained in the message: thus improving the encoding will increase the semantic accuracy. But there are also cultural factors at work here which the model does not specify: the meaning is at least as much in the culture as in the message.

The effectiveness problems may at first sight seem to imply that Shannon and Weaver see communication as manipulation or propaganda: that A has communicated effectively with B when B responds in the way A desires. They do lay themselves open to this criticism, and hardly deflect it by claiming that the aesthetic or emotional response to a work of art is an *effect* of communication.

They claim that the three levels are not watertight, but are interrelated, and interdependent, and that their model, despite its origin in level A, works equally well on all three levels. The point of studying communication at each and all of these levels is to understand how we may improve the *accuracy* and *efficiency* of the process.

But let us return to our model. The *source* is seen as the decision maker; that is, the source decides which message to send, or rather selects one out of a set of possible messages. This selected message is

then changed by the *transmitter* into a *signal* which is sent through the *channel* to the *receiver*. For a telephone the channel is a wire, the signal an electrical current in it, and the transmitter and receiver are the telephone handsets. In conversation, my mouth is the transmitter, the signal is the sound waves which pass through the channel of the air (I could not talk to you in a vacuum), and your ear is the receiver.

Obviously, some parts of the model can operate more than once. In the telephone message for instance, my mouth transmits a signal to the handset which is at this moment a receiver, and which instantly becomes a transmitter to send the signal to your handset, which receives it and then transmits it via the air to your ear. Gerbner's model, as we will see later, deals more satisfactorily with this doubling up of certain stages of the process.

Noise

The one term in the model whose meaning is not readily apparent is noise. Noise is anything that is added to the signal between its transmission and reception that is not intended by the source. This can be distortion of sound or crackling in a telephone wire, static in a radio signal, or 'snow' on a television screen. These are all examples of noise occurring within the channel and this sort of noise, on level A, is Shannon and Weaver's main concern. But the concept of noise has been extended to mean any signal received that was not transmitted by the source, or anything that makes the intended signal harder to decode accurately. Thus an uncomfortable chair during a lecture can be a source of noise—we do not receive messages through our eyes and ears only. Thoughts that are more interesting than the lecturer's words are also noise.

Shannon and Weaver admit that the level-A concept of noise needs extending to cope with level-B problems. They distinguish between semantic noise (level B) and engineering noise (level A) and suggest that a box labelled 'semantic receiver' may need inserting between the engineering receiver and the destination. Semantic noise is defined as any distortion of meaning occurring in the communication process which is not intended by the source but which affects the reception of the message at its destination.

Noise, whether it originates in the channel, the audience, the sender, or the message itself, always confuses the intention of the sender and thus limits the amount of desired information that can be sent in a given situation in a given time. Overcoming the problems caused by noise led Shannon and Weaver into some further fundamental concepts.

Information: basic concept

Despite their claims to operate on levels A, B, and C, Shannon and Weaver do, in fact, concentrate their work on level A. On this level, their term information is used in a specialist, technical sense, and to understand it we must erase from our minds its usual everyday meaning.

Information on level A is a measure of the predictability of the signal, that is the number of choices open to its sender. It has nothing to do with its content. A signal, we remember, is the physical form of a message—sound waves in the air, light waves, electrical impulses, touchings, or whatever. So, I may have a code that consists of two signals—a single flash of a light bulb, or a double flash. The *information* contained by either of these signals is identical—50 per cent predictability. This is regardless of what they actually mean—one flash could mean ‘Yes’, two flashes ‘No’, or one flash could mean the whole of the Old Testament, and two flashes the New. In this case ‘Yes’ contains the same amount of information as the ‘Old Testament’. The information contained by the letter ‘u’ when it follows the letter ‘q’ in English is nil because it is totally predictable.

Information: further implications

We can use the unit ‘bit’ to measure information. The word ‘bit’ is a compression of ‘binary digit’ and means, in practice, a Yes/No choice. These binary choices, or binary oppositions, are the basis of computer language, and many psychologists claim that they are the way in which our brain operates too. For instance, if we wish to assess someone’s age we go through a rapid series of binary choices: are they old or are they young; if young, are they adult or pre-adult; if pre-adult, are they teenager or pre-teenager; if pre-teenager, are they school-age or pre-school; if pre-school, are they toddler or baby? The answer is baby. Here, in this system of binary choices the word ‘baby’ contains five bits of information because we have made five choices along the way. Here, of course, we have slipped easily on to level B, because these are semantic categories, or categories of meaning, not simply of signal. ‘Information’ at this level is much closer to our normal use of the term. So if we say someone is young we give one bit of information only, that he is not old. If we say he is a baby we give five bits of information *if*, and it is a big *if*, we use the classifying system detailed above.

This is the trouble with the concept of ‘information’ on level B. The semantic systems are not so precisely defined as are the signal systems of level A, and thus the numerical measuring of information is harder,

and some would say irrelevant. There is no doubt that a letter (i.e. part of the signal system of level A) contains five bits of information. (Ask if it is in the first or second half of the alphabet, then in the first or second half of the half you have chosen, and so on. Five questions, or binary choices, will enable you to identify any letter in the alphabet.) But there is considerable doubt about the possibility of measuring meaning in the same sort of way.

Obviously, Shannon and Weaver's engineering and mathematical background shows in their emphasis. In the design of a telephone system, the critical factor is the number of signals it can carry. *What* people actually say is irrelevant. The question for us, however, is how useful a theory with this sort of mechanistic base can be in the broader study of communication. Despite the doubts about the value of measuring meaning and information numerically, relating the amount of information to the number of choices available is insightful, and is broadly similar to insights into the nature of language provided by linguistics and semiotics, as we will see later in this book. Notions of predictability and choice are vital in understanding communication.

Redundancy and entropy

Redundancy: basic concepts

Closely related to 'information' is the concept of *redundancy*. Redundancy is that which is predictable or conventional in a message. The opposite of redundancy is *entropy*. Redundancy is the result of high predictability, entropy of low predictability. So a message with low predictability can be said to be entropic and of high information. Conversely, a message of high predictability is redundant and of low information. If I meet a friend in the street and say 'Hello', I have a highly predictable, highly redundant message.

But I have not wasted my time and effort. The layman's use of the term to imply uselessness is misleading. Redundancy is not merely useful in communication, it is absolutely vital. In theory, communication *can* take place without redundancy, but in practice the situations in which this is possible are so rare as to be non-existent. A degree of redundancy is essential to practical communication. The English language is about 50 per cent redundant. This means we can delete about 50 per cent of the words and still have a usable language capable of transmitting understandable messages.

Redundancy: further implications

So what use is redundancy? It performs two main types of functions: the first is technical, and is well defined by Shannon and Weaver; the second involves extending their concept into the social dimension.

Redundancy as a technical aid

Shannon and Weaver show how redundancy helps the accuracy of decoding and provides a check that enables us to identify errors. I can only identify a spelling mistake because of the redundancy in the language. In a non-redundant language, changing a letter would mean changing the word. Thus 'comming' would be a different word from 'coming' and you would not be able to tell that the first word was a misspelling. Of course, the context might help. In so far as it did, the context would be a source of redundancy. In a natural language, words are not equiprobable. If I say 'Spring is...' then I am creating a context in which 'coming' is more probable and thus more redundant than, say, 'a pane of glass'. It is, of course, possible that a poet, or even an advertiser for new windows, might write 'Spring is a pane of glass', but that would be a highly entropic use of language.

We are always checking the accuracy of any message we receive against the probable; and what is probable is determined by our experience of the code, context, and type of message—in other words, by our experience of convention and usage. *Convention* is a major source of redundancy, and thus of easy decoding. A writer who breaks with convention does not want to be easily understood: writers who desire easy communication with their readers use appropriate conventions. We will return to this question of convention and redundancy later.

Redundancy also helps overcome the deficiencies of a noisy channel. We repeat ourselves on a bad telephone line; when spelling words on radio or telephone we say A for apple, S for sugar, and so on. An advertiser whose message has to compete with many others for our attention (that is, who has to use a noisy channel) will plan a simple, repetitious, predictable message. One who can expect to have our undivided attention, as, for example, with a technical advertisement in a specialist journal, can design a more entropic message which contains more information.

Increasing redundancy also helps overcome the problems of transmitting an entropic message. A message that is completely unexpected, or that is the opposite of what would be expected, will need

saying more than once, often in different ways. Or it may need some special preparation: 'Now, I've got a surprise for you, something you didn't expect at all...'.

Redundancy also helps solve problems associated with the audience. If we wish to reach a larger, heterogeneous audience we will need to design a message with a high degree of redundancy. A small, specialist, homogeneous audience, on the other hand, can be reached with a more entropic message. Thus popular art is more redundant than highbrow art. An advertisement for soap powder is more redundant than one for a business computer.

The choice of channel can affect the need for redundancy in the message. Speech needs to be more redundant than writing because the hearer cannot introduce his or her own redundancy as a reader can by reading something twice.

This first function of redundancy, then, is concerned with the way it helps to overcome practical communication problems. These problems may be associated with accuracy and error detection, with the channel and noise, with the nature of the message, or with the audience.

Entropy

Entropy as a concept is of less value for the general student of communication in that it constitutes a communication problem, whereas redundancy is a means of improving communication. But entropy can best be understood as maximum unpredictability. On level A, entropy is simply a measure of the number of choices of signal that can be made and of the randomness of those choices. If I wish to communicate the identities of a pack of playing cards visually by showing all the cards singly, each signal will have maximum entropy if the pack is completely shuffled. If, however, I arrange the cards in order in their suits, each signal will have maximum redundancy, provided that the receiver knows, or can identify, the pattern or structure of a pack of cards.

Redundancy and convention

Structuring a message according to shared patterns, or conventions, is one way of decreasing entropy and increasing redundancy. Imposing an aesthetic pattern or structure on material does precisely the same thing. Rhythmic poetry, by imposing repeatable and therefore predictable patterns of metre and rhyme, decreases entropy and therefore increases redundancy.

Shall I compare thee to a summer's day?
 Thou art more lovely and more temperate:
 Rough winds do shake the darling buds of...

The convention or form of the sonnet has determined that the next word must, on level A, have a single syllable and must rhyme with 'day'. The choice of signal is restricted. Another convention which increases redundancy here is syntax. This reduces the possible choice further—to a noun. On level B, where we expect the word not only to fit the form but also to make sense, we restrict the choice even further. It could not really be 'hay', or 'way'. The word Shakespeare chose, 'May', must in fact be nearly totally redundant. But it feels absolutely right and is aesthetically satisfying. Redundancy is a critical part of the satisfaction provided by the form or structure of a work of art.

The more popular and widely accessible a work of art is, the more it will contain redundancies in form and content. Traditional folk-song or a television series provide obvious examples. Does it therefore follow that highbrow art is necessarily more entropic, in either or both level A (form) and level B (content)? It certainly may do, though communication theory would lead us to conclude that the crucial factor is not the 'level of brow', but the accessibility of the work of art to a wide audience. In other words, there can be popular, highbrow works of art, but these are nearly always conventional—think of Jane Austen or Beethoven as popular highbrows.

When we are dealing with entropy and redundancy in relation to works of art we must remember that we are not dealing with something static and unchanging. An art form or style may break existing conventions, and thus be entropic to its immediate audience, but may then establish its own conventions and thus increase its redundancy as these conventions become learnt and accepted more widely. The way that the Impressionist style of painting was at first rejected by its audience but has now become chocolate-box and calendar cliché is a good example.

Broadly, we may say that encoders, whether artists, preachers, or politicians, who build redundancy into their messages are audience-centred. They care about communicating. Those who do not are more concerned about subject matter, or (if they are artists) form. So redundancy is concerned primarily with the efficiency of communication and the overcoming of communication problems.

Redundancy and social relationships

But I said that there was an extension of this concept that could well perform a different, though related, function. Saying 'Hello' in the street is sending a highly redundant message. But there are no communication problems to solve. There is no noise; I do not wish to put over an entropic content; the audience is receptive. I am engaging in what Jakobson (see below) calls *phatic communication*. By this, he refers to acts of communication that contain nothing new, no information, but that use existing channels simply to keep them open and usable. In fact, of course, there is more to it than that. What I am doing in saying 'Hello' is maintaining and strengthening an existing relationship. Relationships can only exist through constant communication. My 'Hello' may not alter or develop the relationship, but not saying 'Hello' would certainly weaken it.

Social psychologists talk of the ego-drive, a need to have our presence noticed, recognized, and accepted. Not saying 'Hello', that is, cutting someone dead or looking right through them, is frustrating this need. It is socially necessary that I say 'Hello'. Phatic communication, by maintaining and reaffirming relationships, is crucial in holding a community or a society together. And phatic communication is highly redundant; it must be, because it is concerned with existing relationships, not with new information. Conventional behaviour and words in interpersonal situations, such as greetings, are phatic, redundant communication that reaffirms and strengthens social relationships. We call it politeness.

This points to similarities between the two functions of redundancy. The polite person, who indulges in phatic communication, is audience- or receiver-centred in the same way as the communicator who builds redundancy into his or her work. It is no coincidence that the word convention refers to both the behaviour of the polite person and the style of a popular artist.

We can extend this similarity further. A highly conventional art form such as folk-song performs a phatic function. Nothing can be more redundant than the refrain of a folk-song, but in singing it we reaffirm our membership of that particular group or subculture. Indeed, subcultures are often defined partly, if not mainly, by their shared taste in art. Teenage subcultures in our society are identified by the type of music they enjoy or the dance steps they perform. The music or dance is conventional: the shared conventions bind the fans into a subculture. Other forms of music or dance are excluded in so far as they deviate from the accepted conventions. The point is that it is the use of the

conventional, redundant aspects of the music or dance that determines and affirms membership of the group. Individual variations are permissible only within the limits of the conventions—or entropic original elements are acceptable only within the redundancy of the form.

Another example of the way that the concept of redundancy enables us to link social behaviour and the form of messages may be seen in the common reception of avant-garde, unconventional, entropic art. The audience is frequently offended or outraged by the way an artist has broken artistic conventions, in just the same way as they would be if the artist had been socially impolite to them. The original reception of the Impressionists or of the early performances of *Waiting for Godot* are obvious instances of this.

If I have dwelt rather longer on redundancy than on other aspects of Shannon and Weaver's model, it is because I find it one of their most fruitful concepts. It does, I believe, offer unique insights into human communication in that it enables us to relate apparently very different elements of the process.

Analysis

Let us test this assertion. Look at plate 1a. Do you find it entropic or redundant? In *form* it is redundant, for it looks like a conventional news



Plate 1a '*A Mirror of Reality*'?

photograph, a moment of hot action caught by the camera. But a closer look at its *content* may give us second thoughts. We do not often see a ring of policemen apparently attacking a respectably dressed young lady (even if she is black). Conventionally, we think of our police as *defenders* of law and order, not as aggressors. Photographs are never as easy to decode as they may appear, and are usually open to a number of readings: one clearly possible reading of this one is that the police are aggressors and the blacks are victims. If this is the message it would be entropic for the typical *Daily Mirror* reader—though probably highly redundant for some urban blacks.

So, when the *Daily Mirror* decided that the dramatic impact of the photo was strong enough to front-page it, they had to do something to decrease the entropy and increase redundancy. In other words, they had to make this image of the police fit more closely with the way we conventionally think of them. Remember that the *Daily Mirror* is a mass-circulation popular newspaper whose stories will therefore be relatively predictable, relatively redundant. So what the editor did was to balance this picture with another one and to surround it with words (plate 1b).

The headlines push our understanding of who were the aggressors and who were the victims back towards the conventional. 'CONFRONTATION' suggests that the balance of aggression was at least equal. 'Demo blacks clash with London police' pushes the balance firmly over to the blacks, as does the picture of the injured policeman. The editor has given the original picture a context that makes it fit better into conventional attitudes and beliefs. (In chapter 8, pp. 147ff., I reproduce the results of an audience survey which support this assertion.) He has given it a higher degree of redundancy. We can see both types of redundancy at work here. On the technical level, the context simply makes the picture easier to decode, especially at a quick, first glance. On the level of social relationships we can see it reinforcing social bonds. It shows that we (the readers) are a community who share the same attitudes, the same social meanings. We see things in the same way. This reinforces both our social links with others and our sense of the rightness of our view of the world.

Redundancy is generally a force for the status quo and against change. Entropy is less comfortable, more stimulating, more shocking perhaps, but harder to communicate effectively.



Plate 1b The *Daily Mirror*

Channel, medium, code

Basic concepts

There are two other important concepts in the model that we have not yet commented on: these are *channel* and *code*. We can really only define them properly in relation to a word that Shannon and Weaver do not use, but that later authorities have found useful. This word is *medium*.

Channel

The channel is the easiest of the three concepts to define. It is simply the physical means by which the signal is transmitted. The main channels are light waves, sound waves, radio waves, telephone cables, the nervous system, and the like.

Medium

The medium is basically the technical or physical means of converting the message into a signal capable of being transmitted along the channel. My voice is a medium; the technology of broadcasting is what constitutes the media of radio and television. The technological or physical properties of a medium are determined by the nature of the channel or channels available for its use. These properties of the medium then determine the range of codes which it can transmit. We can divide media into three main categories.

1. The presentational media: the voice, the face, the body. They use the 'natural' languages of spoken words, expressions, gestures, and so on. They require the presence of the communicator, for he or she is the medium; they are restricted to the here and now, and produce *acts* of communication.
2. The representational media: books, paintings, photographs, writing, architecture, interior decorating, gardening, etc. There are numerous media that use cultural and aesthetic conventions to create a 'text' of some sort. They are representational, creative. They make a text that can record the media of category 1 and that can exist independently of the communicator. They produce *works* of communication.
3. The mechanical media: telephones, radio, television, telexes. They are transmitters of categories 1 and 2. The main distinction between categories 2 and 3 is that the media in 3 use channels created by engineering and are thus subject to greater technological constraints and are more affected by level-A noise than those in category 2.

But the categories do leak into each other and you may find it convenient at times to merge them into one. Categorization involves identifying differences, but it is as important to think of the similarities between media as their differences.

Medium: further implications

A good example of an exploration of media similarities and differences is a study by Katz, Gurevitch, and Hass (1973). They explained the interrelationships of the five main mass media with a circular model (see figure 3). They used a large-scale audience survey to find out why people turned to a particular medium in preference to the others. They investigated the needs that people felt and their reasons for turning to a particular medium to satisfy them. People's responses enabled the researchers to arrange the media in the circular relationship shown in figure 3. The audience felt that each medium was most similar to its two neighbours, or, to put it another way, they felt that if one medium were not available, its functions would be best served by the ones on either side of it.



Figure 3 *Media relationships*

People tended to use newspapers, radio, and television to connect themselves to society, but used books and films to escape from reality for a while. The better-educated tended to use the print media; those with less education were inclined towards the electronic and visual media. Books were the medium most used for improving one's understanding of self.

If we look at the main needs that people use the media to satisfy, and then relate them to people's preferred choice of actual medium to provide that satisfaction, we can produce a table like table 1.

Code: basic concepts

A code is a system of meaning common to the members of a culture or subculture. It consists both of signs (i.e. physical signals that stand for something other than themselves) and of rules or conventions that determine how and in what contexts these signs are used and how they

Table 1 *Audience needs*

Needs	Media order of preference for satisfying needs				
	1st	2nd	3rd	4th	5th
A. Personal needs					
1. Understanding self	B	N	R	T	C
2. Enjoyment	C	T	B	R	N
3. Escapism	B	C	T	R	N
B. Social needs					
1. Knowledge about the world	N	R	T	B	C
2. *Self-confidence, stability, self-esteem	N	R	T	B	C
3. Strengthen connections with family	T	C	R	N	B
4. Strengthen connections with friends	C	T	N	R	B

* This need is articulated in three main ways: the need to feel influential and the need to feel that others think in similar ways and hold similar aspirations. *Key:* B=books, C=cinema, N=newspapers, R=radio, T=television

can be combined to form more complex messages. The way codes relate to and develop within their parent culture is complex. In chapter 4 we will study codes in some detail. Here I wish to do no more than to define the term, and to consider the basic relationships between codes, channels, and media.

The simplest is between code and *channel*. Clearly the physical characteristics of channels determine the nature of the codes that they can transmit. The telephone is limited to verbal language and paralanguage (the codes of intonation, stress, volume, etc.). We have evolved a number of *secondary codes* simply to make an already encoded message transmittable along a particular channel. A message in the primary code of verbal language may be re-encoded into a variety of secondary codes—morse, semaphore, deaf-and-dumb sign language, handwriting, Braille, printing. All of these secondary codes are determined by the physical properties of their channels, or mechanical media of communication.

The relationship between *medium* and code is not so clear cut. Television is a medium which uses the channels of vision and sound. Buscombe (1975) notes that a programme like *Match of the Day* uses both channel-specific codes and medium-specific codes. The channel-specific codes are:

visual channel—live action, studio shots, and graphics;
aural channel—recorded noises, speech, and music.

He then analyses the medium-specific codes used in the visual channel. These are the codes of lighting, colour, speed, definition, framing, camera movement and placing, and editing. He demonstrates that while the technical constraints of the medium define the range of possible uses open to each code, the actual use made of them is determined by the culture of the broadcasters.

But if we take a medium such as ‘dress’, for example, we find it difficult to distinguish between the codes and the medium. Is it useful to talk of different codes of dress, or simply of different messages being sent by the same code? The formally agreed meaning of a button or piece of braid on a military uniform differs certainly in degree but not necessarily in kind from the informally agreed less precise meaning of denim jeans. The medium and the code have the same boundaries, but the code is what we need to study, because the code is the significant use to which the medium is put. All cultures and societies have the medium of dress (including nudists, who are defined by its absence): communication occurs through the culturally based codes that the medium conveys.

Dress also has a non-communicative function—that of protection from the elements. Most cultural artefacts have this dual function—a physical, technological one and communication. Houses, cars, furniture are defined first by their technological function and second, through their design, by their communicative function. The constraints of the medium are technological: the codes operate within them.

Feedback

Basic concepts

Like medium, *feedback* is a concept that Shannon and Weaver do not use, but is one that later workers have found useful. Briefly, feedback is the transmission of the receiver’s reaction back to the sender. Models that emphasize feedback are ones with a cybernetic bias.

Cybernetics is the science of control. The word derives from the Greek word for helmsman and its origin can provide us with a good illustration. If a helmsman wishes to steer to port, he moves the tiller to starboard. He then watches to see how far the ship’s bow will swing round to port and will adjust the extent to which he pushes the tiller to starboard accordingly. His eyes enable him to receive the feedback—that

is, the response of the bow to his initial movement of the tiller. In the same way, the thermostat in a central-heating system sends messages to the boiler, and receives messages from the thermometer measuring the room temperature. This feedback enables it to adjust the performance of the boiler to the needs of the room. The same is true in human communication. Feedback enables the speaker to adjust his or her performance to the needs and responses of an audience. Good speakers are generally sensitive to feedback; pompous, domineering bores manage to filter out feedback almost entirely.

Some channels of communication make feedback very difficult. Two-way radios and telephones allow alternating transmission which can perform some of the functions of feedback, but the feedback is clearly of a different order from the simultaneous feedback that occurs during face-to-face communication. This is determined mainly by availability of channels. In face-to-face communication I can transmit with my voice and simultaneously receive with my eyes. Another factor is access to these channels. The mechanical media, particularly the mass media, limit access and therefore limit feedback. We cannot have constant access to the BBC, though its audience research unit tries to provide the Corporation with a formalized system of feedback. In the same way, when I am giving a lecture, my students' access to the channel of sound waves is limited—they give me less feedback than in a seminar, where they have a far greater share of the speaking time.

Feedback, then, has this one main function. It helps the communicator adjust his or her message to the needs and responses of the receiver. It also has a number of subsidiary functions. Perhaps the most important of these is that it helps the receiver to feel involved in the communication. Being aware that the communicator is taking account of our response makes us more likely to accept the message: being unable to express our response can lead to a build-up of frustration that can cause so much noise that the message may become totally lost. Though feedback inserts a return loop from destination to source, it does not destroy the linearity of the model. It is there to make the process of transmitting messages more efficient.

Suggestions for further work

1. Apply Shannon and Weaver's levels A, B, and C to the analysis of different examples of communication, e.g. a job interview, a news photograph, a pop song. How widely are they applicable? How useful do you find this sort of analytical exercise?

2. What are the problems of taking the concept of 'information' which originated in level A and referring it to level B? Can meaning be numerically measured? See Smith (1966), pp. 15-24, 41-55 and Cherry (1957), pp. 169-78, 182-9, 228-34, 243-52.
3. What do we mean by saying that the English language is 50 per cent redundant? See Cherry (1957), pp. 117-23, 182-9 and Smith (1966), p. 21.
4. Outline the main communicative functions of redundancy. See also Cherry (1957), pp. 278-9.
5. Discuss the ways in which convention can be said to facilitate understanding. Collect examples of writers/artists who either break or extend specific conventions. How does this affect their desire to communicate or the audience that they reach?
6. Consider a book, a photograph, a record, a live play and a filmed version of it. How can we categorize them as media? See Guiraud (1975), pp. 15-21.
7. Take a number of examples of media and channels. Clearly one medium can use more than one channel and one channel can convey more than one medium: is there therefore any significant relationship between medium and channel or are they independent concepts?

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