A Study of Communication Errors

Author(s): Ivar J. Tõnisson

Proceedings of the Seventh Annual Meeting of the Berkeley Linguistics Society (1981), pp. 303-307

Please see “How to cite” in the online sidebar for full citation information.

Please contact BLS regarding any further use of this work. BLS retains copyright for both print and screen forms of the publication. BLS may be contacted via <http://linguistics.berkeley.edu/bls/>.

The Annual Proceedings of the Berkeley Linguistics Society is published online via [eLanguage](#), the Linguistic Society of America's digital publishing platform.

A Study of Communication Errors

Ivar J. Tönisson

Naval Postgraduate School

Roger Weissinger-Baylon

Naval Postgraduate School

Recurring disasters in air traffic control, man-machine aspects of nuclear power technology, and military operations demonstrate the need for an applied theory of communication.

We have developed a model of communication based on the analysis of a hundred errors similar to those above. Although the philosophical and linguistic literatures are full of studies of such failures, we know of no previous attempts to investigate them through the systematic collection of empirical data. The most closely related work is Donald Norman's study of slips of the mind and the literature on speech error analysis.

In a paper entitled "Slips of the Mind and an Outline for a Theory Action," (Norman 1974), Norman treated errors of action in a systematic manner. For a number of reasons, however, his taxonomy is not directly applicable to the cases we have studied. His "slips of selection," for example, include actions that are immediately and easily correctable. Examples of these slips are buckling your watchband, for instance, instead of your seat belt, or intending to put your toothbrush in a glass, but placing it where your hairbrush belongs. The main difficulty, however is that action is a broader domain than communication. For our needs, his framework is incomplete, and some of his categories are inessential.

Good representations of the large body of literature about speech error analysis are the anthologies edited by Victoria Fromkin: Speech Errors as Linguistic Evidence (Fromkin 1973) and Errors in Linguistic Performance (Fromkin 1980). This literature is concerned with how erroneous linguistic forms are spoken, written, heard or uttered by hand signals; these are, however, considerably different from communication errors. A correct form may lead to a communication error, while an incorrect form may not because it is still easy to understand. Nevertheless there is some common ground among these methodologies.

Now let us consider models of communication errors. According to our basic model of communication, the causes of error are connected with the performance of a sender who encodes a message about a topic and sends it via a channel to a receiver who decodes it. The sender, the topic and the receiver each function in an environment that may disturb the process of communication. Other factors closely related to the elements mentioned may also contribute to communication failures. Some of them are easy to define in a general way, while others may be peculiar to a specific communication situation. For example, a message may be too unspecific about what happened when a ship was sunk. This type of influencing factor is hard to capture by general rules describing sources of communication errors. The communication may be verbal or nonverbal, and the interaction real or expected.

In the figure below, arrows represent interactions and both represent elements that are present in the communication process. In this basic model, both the sender and receiver are single individuals, or single groups of individuals. It is necessary to assure

The Basic Model of Communication

Universe of discourse

that the environment of the sender, topic and receiver are distinct, since these elements can belong to different space-time and/or cultural spheres. Furthermore the topic can be an abstract or concrete entity, while, of course, the sender and receiver must always themselves be a concrete object. This means that the environments that the sender, object and receiver are embedded in are totally different. For example, the sender could be an ancient Egyptian writing about the topic of Babylonian gods, and the receiver could be a modern archeologist reading the text. Neither does the universe of discourse need to be that of total reality: all this could happen in the world of a novel where an archeologist reads the text.

This model of communication is in principle falsifiable as any scientific theory should be. For example, if there existed no case where the topic could interact with the channel, then this model would be false. However, experience shows that there are many such cases. If the topic is an enemy and the channel is radio transmission then the topic could disturb the radio transmission between the sender and receiver, i.e., interact with the channel.

Let us consider some factors that contribute or whose absence contributes to communication errors:

Sender Related Factors

- 1) Model of self and environment of sender
- 2) Model of topic and environment of topic
- 3) Model of receiver and environment of receiver

Receiver Related Factors

- 1) Model of self and environment of receiver
- 2) Model of topic and environment of topic
- 3) Model of sender and environment of sender

Encoding/Decoding Related Factors

- 1) Redundancy/Repetition
- 2) Form e.g., phonological, graphemic
- 3) Ambiguity

Channel Related Factors

- 1) Time
- 2) Channel Capacity
- 3) Noise

Other Characteristics

- 1) Feedback
- 2) Age of information
- 3) Possible absence of non-verbal communication
- 4) Prestige of channel

External Restrictions

- 1) Environment of sender
- 2) Environment of topic
- 3) Environment of receiver

The models here are models in the mind of the sender and receiver. Both the sender and receiver have models of each other and of the topic, but such models are neither explicit, complete, nor accurate.

If a message contains no redundancy or repetition, it naturally increases the risk of communication error. Errors arising from the phonological similarity between "air crew" and "air screw", for example, led to the renaming of air screws as propellers in many contexts. Thus the form of a message may contribute to uncertainty. Ambiguity and its effect on the reception of a message are a well-known problem; time available, channel capacity, and noise also affect communication efficiency. Likewise, feedback on communication is clearly important. For example, the age of information is crucial in rescue operations, since a message might be delayed by atmospheric conditions. Non-verbal communication often comes into play, since it can often correct false impressions. The prestige of the channel is also often significant: since national television advertisements are too expensive for very small companies, customers assume that nationally advertised products are made by large, reliable firms.

A simple illustration of the application of the model is appropriate here. In 1964, the captain of the USS Navaro handed a junior officer the inspection and survey report for the ship and

its machinery, with immediate instructions to take this to the ship's office and "burn it". Conscious of the importance of this argument, the officer borrowed a cigarette lighter from the ship's office chief and carefully watched the flames as he burned the document in a garbage can. After the chief's shouts of alarm, the officer quickly learned that "burn" is a navy term for making a photocopy. This is an example of a common type of cognitive error in communication. The charred report on this ship illustrates a source ambiguity that is frequent in military communication. The sender and receiver possessed conflicting ideas of what kind of activity the verb "burn" referred to. Although the transmission of the phonological form was successful, the speaker's intention obviously did not carry over to the receiver, i.e., the semantic message was lost.

Multiple senders and receivers pose special problems. To decompose all multiple senders and receivers into single senders and receivers would lead to unnatural results although it could be done. One could view each interaction in terms of a single sender/receiver pair, though such a move would not yield much of importance. A more useful approach would be to study some typical situations involving multiple senders and receivers. One of the most typical situations that comes in mind is that in which the receivers are unspecified. Consider, for example, a newspaper article or a TV speech. The audience consists of multiple receivers whose exact identity the sender typically does not know. Famous communication mistakes in this category include the radio broadcast of the War of the Worlds. People who switched on their radios after the beginning of the program thought the play was real and panicked. This communication failure consisted in not making the listeners aware that the alarming reports were mere fiction. Naturally, since the radio station had no specific receiver in mind, it could not expect when it broadcasted the program that everybody would start listening at the same time. Nevertheless, that is exactly what the radio station seems implicitly to have assumed. This common sense analysis shows that special demands have to be met by media supplying information to the public; which represents a large number of unspecified receivers. In diplomatic or military communication, for example, an adversary may represent another potential receiver who may decode an important message. Thus, in military and diplomatic correspondences, messages are sometimes coded to present or delay their use by unintended additional receivers. In animal communication, certain birds must solve the problems of giving predator warnings to other birds of their species without revealing their own locations. Such calls give less position information than predator mobbing calls for which location information is essential to the message. All these can involve multiple senders or receivers.

In any of our communication models, the encoding done by the sender and the decoding done by the receiver are executed at many levels. Both encoding and decoding are typically performed at the

graphemic/phonological, syntactic/morphological, and semantic/pragmatic levels. Various interactions between these levels naturally occur. To reiterate, the phonological similarity between air screw/air crew leads to difficulties. Hence the term "air screw" was replaced by the word "propeller" in many contexts. Again the phonological similarity between the words "larboard" and "starboard" lead to semantic/pragmatic decoding difficulties. Therefore "larboard" was replaced by "port" in modern nautical terminology. Not all confusions lead to replacement of terms: pranksters induce inexperienced sailors to misinterpret "male buoy" as "mail buoy". In a different type of level confusion, the graphemic form CG4 suggested to Koreans the phonological form "commanding general 4." However, Americans intended the reading "carrier group 4." The handwritten graphemic form 7 suggests the semantic reading of "seven" in America, but means "one" in Europe, where the handwritten seven has a slash: 7. The handwritten letter ö is read like the printed letter ø in, for example, Swedish, but as printed ô in Estonian. The reason is that in Estonian handwriting one has to differentiate between ö and ô by writing ö and õ respectively. This contrast is not necessary in Swedish handwriting, since the Swedish alphabet does not contain the letter ô. Hence the graphemic handwritten form ö suggests different phonological forms in different languages. Thus encoding and decoding at different levels can go wrong and lead to communication errors.