

*Il ruolo non distruttivo del rumore  
nella comunicazione*

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Padova, 6 dicembre 2013

Università di Padova

*Il ruolo non distruttivo del rumore nella  
comunicazione*

Janus, Quaderni del circolo glossematico,  
n. XI-XII, 2013

**“Comunicazione” ?**



***The "Concept" of Communication***

FRANK E. X. DANCE

Journal of Communication; Jun 1970

**95** *definizioni* di comunicazione  
Secondo **15** *concetti* diversi

## 3 punti critici:

- (1) **oggetto** di osservazione: c. umana/  
c. della materia animata o inanimata ...
- (2) **intenzionalità** del mittente: c'è c. anche  
senza intento comunicativo?
- (3) **giudizio** normativo: "*successful interaction*":  
c'è c. se l'evento comunicativo risultante non  
rispecchia l'intenzione del mittente ?

# ***Communication Theory as a Field***

ROBERT T. CRAIG

Communication Theory; May 1999

Le diverse “teorie” della comunicazione (249 secondo Anderson 1996) sono raggruppate in 7 *tradizioni* che dialogano tra loro *sulla* pratica della comunicazione

«Communication theory is a coherent *field* of metadiscursive practice, a field of discourse about discourse with implications for the *practice* of communication» p.2

# 1. The **Rhetorical** Tradition

Communication as a Practical Art of Discourse

# 2. The **Semiotic** Tradition

Communication as Intersubjective Mediation by Signs

# 3. The **Phenomenological** Tradition

Communication as the Experience of Otherness

# 4. The **Cybernetic** Tradition

Communication as Information Processing

# 5. The **Sociopsychological** Tradition

Communication as Expression, Interaction, and Influence

# 6. The **Sociocultural** Tradition

Communication as the (Re)Production of Social Order

# 7. The **Critical** Tradition

Communication as Discursive Reflection

Table 1: Seven Traditions of Communication Theory

	Rhetorical	Semiotic	Phenomenological	Cybernetic	Sociopsychological	Sociocultural	Critical
Communication theorized as:	The practical art of discourse	Intersubjective mediation by signs	Experience of otherness; dialogue	Information processing	Expression, interaction, & influence	(Re)production of social order	Discursive reflection
Problems of communication theorized as:	Social exigency requiring collective deliberation and judgment	Misunderstanding or gap between subjective viewpoints	Absence of, or failure to sustain, authentic human relationship	Noise; overload; underload; a malfunction or "bug" in a system	Situation requiring manipulation of causes of behavior to achieve specified outcomes	Conflict; alienation; misalignment; failure of coordination	Hegemonic ideology; systematically distorted speech situation
Metadiscursive vocabulary such as:	Art, method, communicator, audience, strategy, commonplace, logic, emotion	Sign, symbol, icon, index, meaning, referent, code, language, medium, (mis)understanding	Experience, self & other, dialogue, genuineness, supportiveness, openness	Source, receiver, signal, information, noise, feedback, redundancy, network, function	Behavior, variable, effect, personality, emotion, perception, cognition, attitude, interaction	Society, structure, practice, ritual, rule, socialization, culture, identity, coconstruction	Ideology, dialectic, oppression, consciousness-raising, resistance, emancipation
Plausible when appeals to metadiscursive commonplaces such as:	Power of words; value of informed judgment; improbability of practice	Understanding requires common language; omnipresent danger of miscommunication	All need human contact, should treat others as persons, respect differences, seek common ground	Identity of mind and brain; value of information and logic; complex systems can be unpredictable	Communication reflects personality; beliefs & feelings bias judgments; people in groups affect one another	The individual is a product of society; every society has a distinct culture; social actions have unintended effects	Self-perpetuation of power & wealth; values of freedom, equality & reason; discussion produces awareness, insight
Interesting when challenges metadiscursive commonplaces such as:	Mere words are not actions; appearance is not reality; style is not substance; opinion is not truth	Words have correct meanings & stand for thoughts; codes & media are neutral channels	Communication is skill; the word is not the thing; facts are objective and values subjective	Humans and machines differ; emotion is not logical; linear order of cause & effect	Humans are rational beings; we know our own minds; we know what we see	Individual agency & responsibility; absolute identity of self; naturalness of the social order	Naturalness & rationality of traditional social order; objectivity of science & technology



Table 2: Topoi of argumentation across traditions

	Rhetorical	Semiötic	Phenomenological	Cybernetic	Sociopsychological	Sociocultural	Critical
Against rhetoric	The art of rhetoric can be learned only by practice; theory merely distracts	We do not use signs; rather they use us	Strategic communication is inherently inauthentic & often counterproductive	Intervention in complex systems involves technical problems rhetoric fails to grasp	Rhetoric lacks good empirical evidence that its persuasive techniques actually work as intended	Rhetorical theory is culture bound & overemphasizes individual agency vs. social structure	Rhetoric reflects traditionalist, instrumentalist, & individualist ideologies
Against semiotics	All use of signs is rhetorical	Langue is a fiction; meaning & intersubjectivity are indeterminate	Langue-parole & signifier-signified are false distinctions. Linguaging constitutes world	"Meaning" consists of functional relationships within dynamic information systems	Semiotics fails to explain factors that influence the production & interpretation of messages	Sign systems aren't autonomous; they exist only in the shared practices of actual communities	Meaning is not fixed by a code; it is a site of social conflict
Against phenomenology	Authenticity is a dangerous myth; good communication must be artful, hence strategic	Self & other are semiotically determined subject positions & exist only in/as signs	Other's experience is not experienced directly but only as constituted in ego's consciousness	Phenomenological "experience" must occur in the brain as information processing	Phenomenological introspection falsely assumes self-awareness of cognitive processes	Intersubjectivity is produced by social processes that phenomenology fails to explain	Individual consciousness is socially constituted, thus ideologically distorted
Against cybernetics	Practical reason cannot (or should not) be reduced to formal calculation	Functionalist explanations ignore subtleties of sign systems	Functionalism fails to explain meaning as embodied, conscious experience	The observer must be included in the system, rendering it indeterminate	Cybernetics is too rationalistic; e.g., it underestimates the role of emotion	Cybernetic models fail to explain how meaning emerges in social interaction	Cybernetics reflects the dominance of instrumental reason
Against sociopsychology	Effects are situational and cannot be precisely predicted	Sociopsychological "effects" are internal properties of sign systems	The subject-object dichotomy of sociopsychology must be transcended	Communication involves circular causation, not linear causation	Sociopsychological theories have limited predictive power, even in laboratory	Sociopsychological "laws" are culture bound & biased by individualism	Sociopsychology reflects ideologies of individualism, instrumentalism
Against sociocultural theory	Sociocultural rules, etc., are contexts & resources for rhetorical discourse	Sociocultural rules, etc., are all systems of signs	The social life-world has a phenomenological foundation	The functional organization of any social system can be modeled formally	Sociocultural theory is vague, untestable, ignores psychological processes that underlie all social order	Sociocultural order is particular & locally negotiated but theory must be abstract & general	Sociocultural theory privileges consensus over conflict & change
Against critical theory	Practical reason is based in particular situations, not universal principles	There is nothing outside the text	Critique is immanent in every authentic encounter with tradition	Self-organizing systems models account for social conflict & change	Critical theory confuses facts & values, imposes a dogmatic ideology	Critical theory imposes an interpretive frame, fails to appreciate local meanings	Critical theory is elitist & without real influence on social change

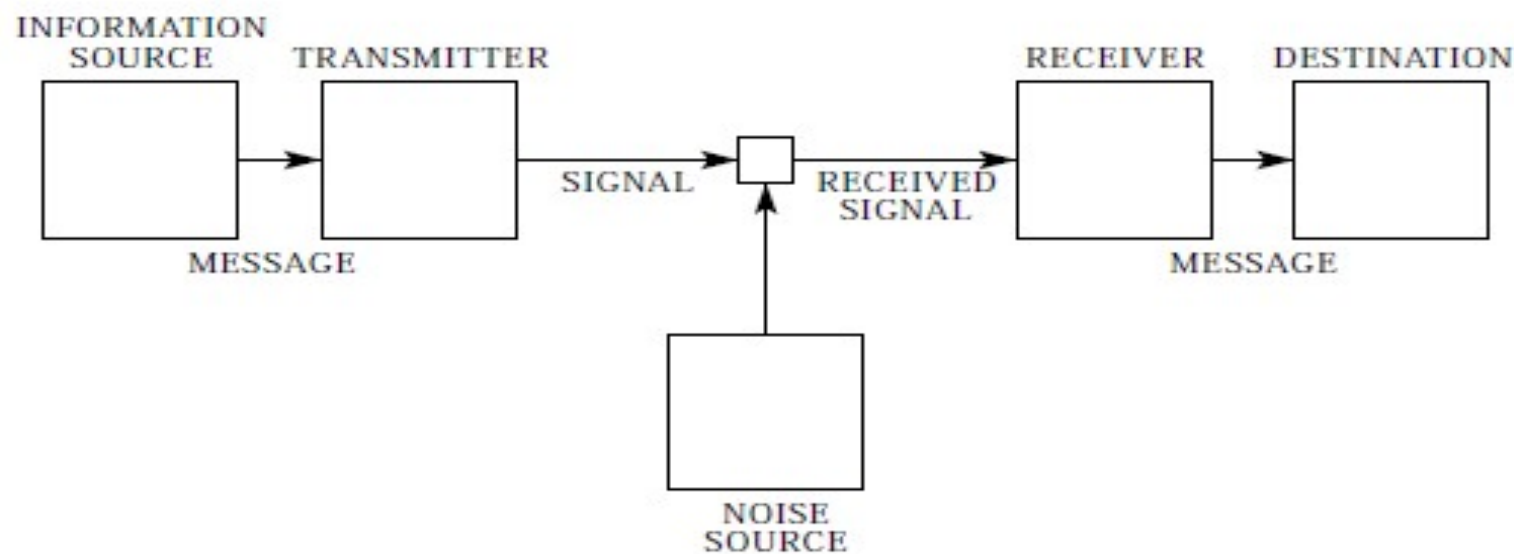


Fig. 1 — Schematic diagram of a general communication system.

# The Bell System Technical Journal

Vol. XXVII

July, 1948

No. 3

## A Mathematical Theory of Communication

By C. E. SHANNON

### INTRODUCTION

THE recent development of various methods of modulation such as PCM and PPM which exchange bandwidth for signal-to-noise ratio has intensified the interest in a general theory of communication. A basis for such a theory is contained in the important papers of Nyquist<sup>1</sup> and Hartley<sup>2</sup> on this subject. In the present paper we will extend the theory to include a



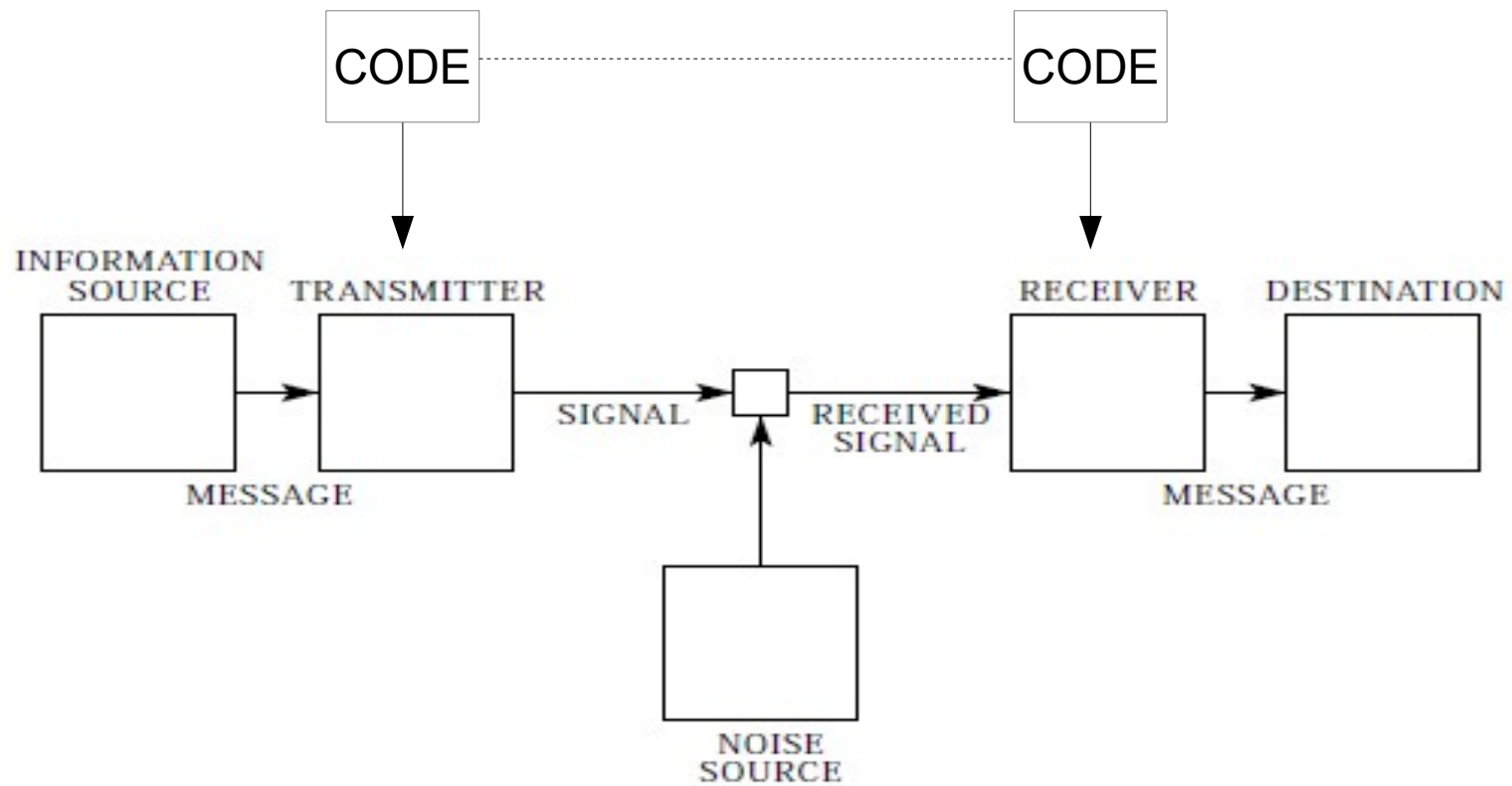


Fig. 1 — Schematic diagram of a general communication system.

Segnale o rumore ?



## Segnale o rumore ?

It must be noticed that *noise is in no intrinsic way distinguishable from many other form of variety.*

Only when some *recipient* is given, who will state which of the two is important to him, is a distinction between message and noise possible.

[...] 'Noise' is purely *relative to some given recipient*, who must say which information he wants to ignore (Ross Ashby 1957: 9/19).



# *Esiti possibili della decodifica di rumore o segnale*

Il ricevente:



	decodifica	non decodifica
Un segnale codificato	1) Comunicazione efficace	2) Comunicazione fallita
Rumore	3) Falsa comunicazione o " <i>comunicazione</i> "	4) Nessuna comunicazione

# *Esiti possibili della decodifica di rumore o segnale*

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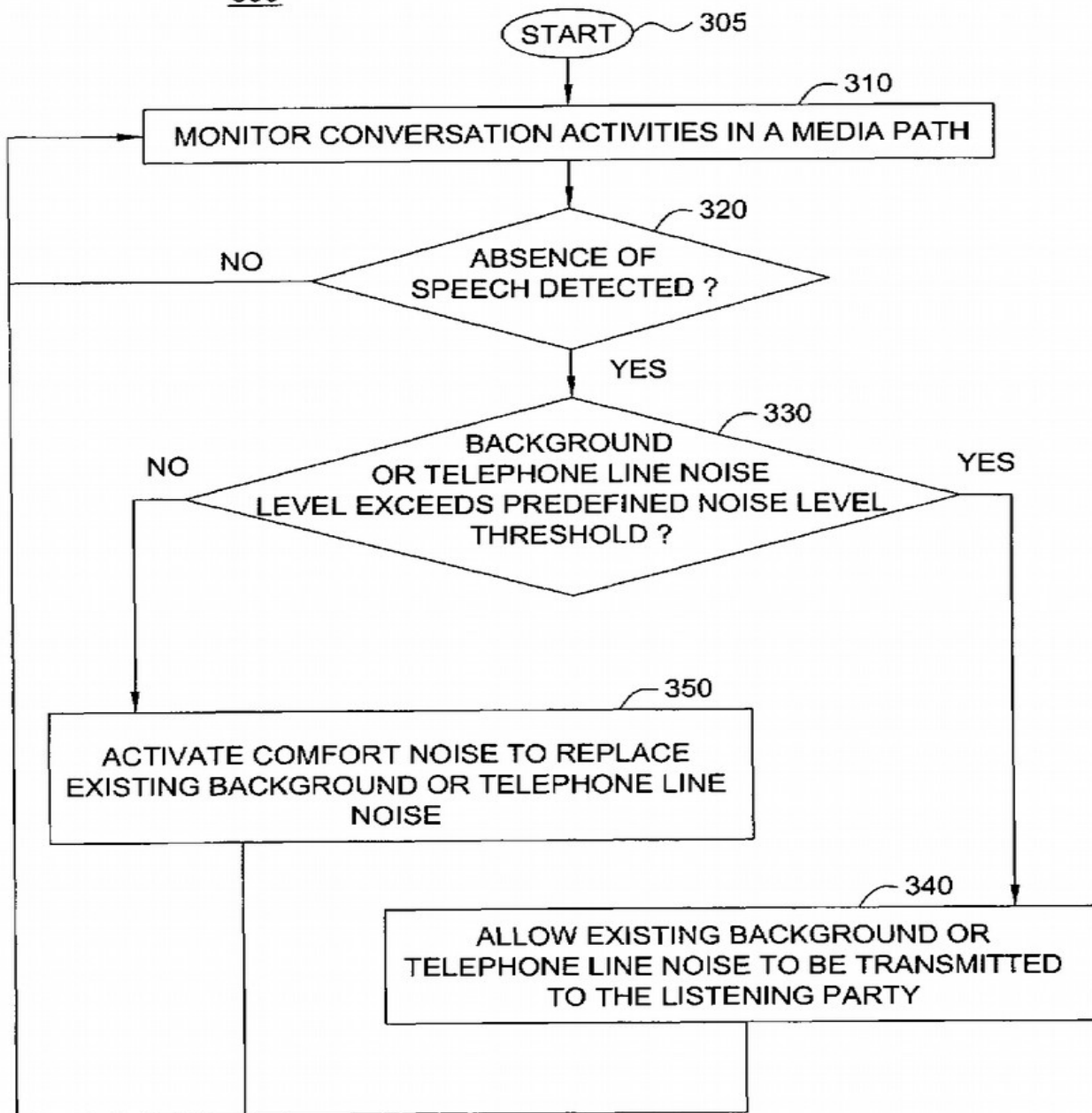
(4) Il ricevente non decodifica rumore

Il rumore ha comunque un ruolo nella comunicazione:

(a) comfort noise

(b) stochastic resonance





## COMFORT NOISE

United States Patent 7,668,714  
Croak, et al. February 23,  
2010

Method and apparatus for  
dynamically providing comfort  
noise

Inventors: Croak; Marian (Fair  
Haven, NJ), Eslambolchi;  
Hossein (Los Altos Hills, CA)  
Assignee: AT&T Corp. (New  
York, NY)

Appl. No.: 11/239,740  
Filed: September 29, 2005

## **Stochastic resonance in climatic change**

By ROBERTO BENZI, *Istituto di Fisica dell'Atmosfera, C.N.R., Piazza Luigi Sturzo 31, 00144, Roma, Italy,*

GIORGIO PARISI, *I.N.F.N., Laboratori Nazionali di Frascati, Frascati, Roma, Italy,*

ALFONSO SUTERA, *The Center for the Environment and Man, Hartford, Connecticut 06120, U.S.A.*

and ANGELO VULPIANI, *Istituto di Fisica "G. Marconi", Università di Roma, Italy*

(Manuscript received November 12, 1980; in final form March 13, 1981)

### **ABSTRACT**

An amplification of random perturbations by the interaction of non-linearities internal to the climatic system with external, orbital forcing is found. This stochastic resonance is investigated in a highly simplified, zero-dimensional climate model. It is conceivable that this new type of resonance might play a role in explaining the  $10^5$  year peak in the power spectra of paleoclimatic records.

## Visual Perception of Stochastic Resonance

Enrico Simonotto,<sup>1,3</sup> Massimo Riani,<sup>1</sup> Charles Seife,<sup>2,\*</sup> Mark Roberts,<sup>2</sup> Jennifer Twitty,<sup>3</sup> and Frank Moss<sup>3</sup>

<sup>1</sup>INFM-Unità di Genova and Dipartimento di Fisica, Università di Genova, 16146 Genova, Italy

<sup>2</sup>The Economist, 25 St. James's Street, London, SW1A 1HG, England

<sup>3</sup>Center for Neurodynamics, University of Missouri at St. Louis, St. Louis, Missouri 63121

(Received 31 October 1996)

Stochastic resonance can be used as a measuring tool to quantify the ability of the human brain to interpret noise contaminated visual patterns. Here we report the results of a psychophysics experiment which show that the brain can *consistently and quantitatively* interpret detail in a stationary image obscured with time varying noise and that both the noise intensity and its temporal characteristics strongly determine the perceived image quality. [S0031-9007(97)02344-2]

PACS numbers: 87.10.+e, 05.40.+j

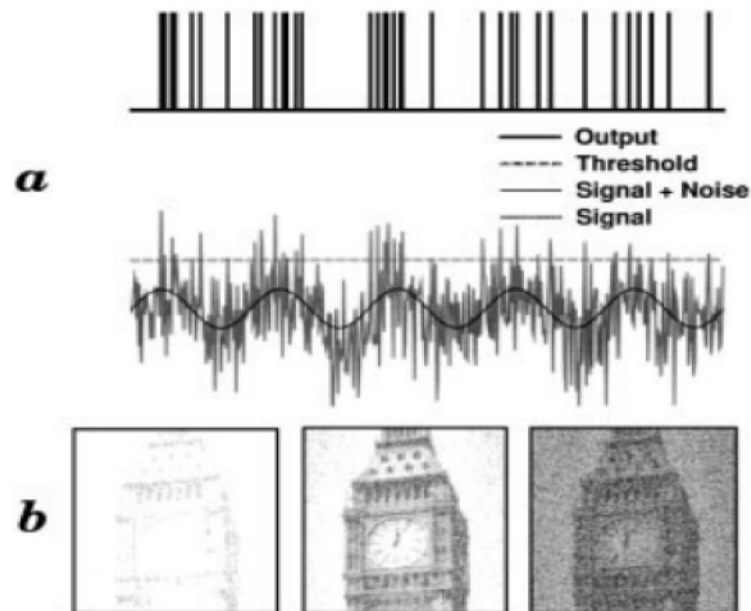
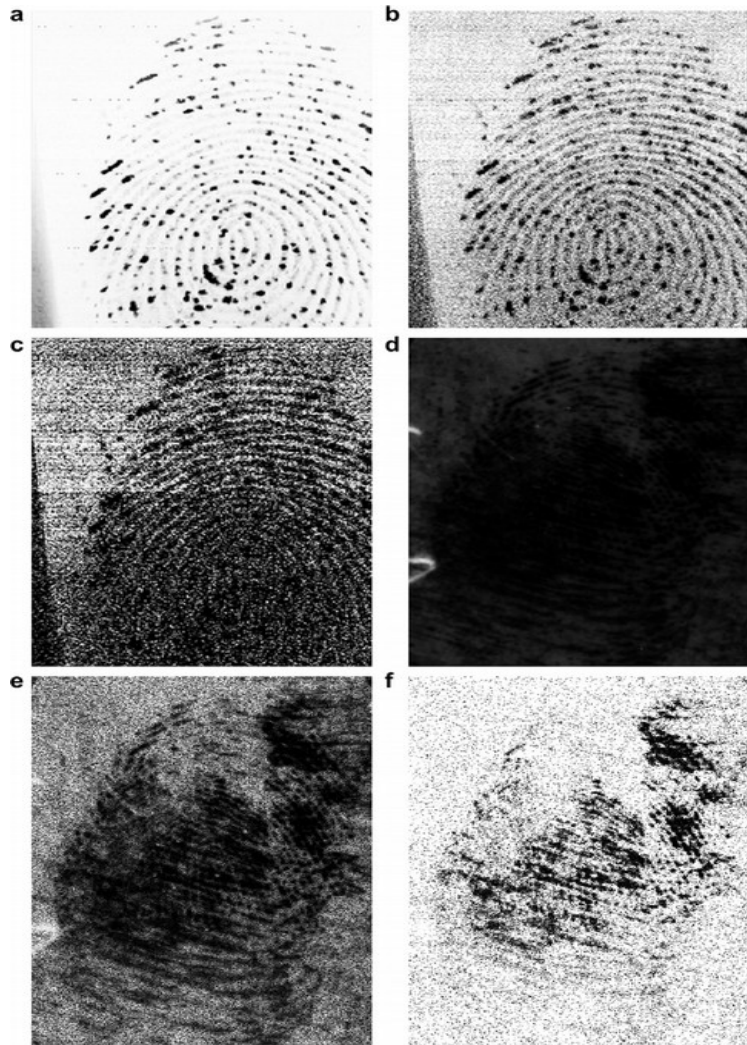


FIG. 1. (a) The threshold paradigm of SR. A subthreshold signal is shown by the sine wave plus Gaussian noise whose mean lies  $\Delta$  below the threshold (horizontal line). Each positive going threshold crossing is marked by a standard pulse as shown above, the temporal sequence of which transmits the only information available about the signal through the system. (b) Visual images composed of a single signal—the picture of Big Ben—digitized on a 1 to 256 gray scale with a spatial resolution of 256 by 256 pixels. A random number  $\xi$ , from a Gaussian distribution with zero mean and standard deviation  $\sigma$ , is added to the original gray value  $I$ , in every pixel. Thus the noise in each pixel is incoherent with that in all other pixels though the standard deviation is the same for all. The resulting image is then threshold filtered according to the rule: if  $I + \xi < \Delta$ , the gray value in that pixel is replaced with 256 (white), otherwise with 1 (black), in this example. The pictures shown were made for  $\Delta = 30$  and for  $\sigma = 10, 90$ , and 300 on the gray scale (left to right).



Enhancement of feature extraction for low-quality fingerprint images using stochastic resonance  
Choonwoo Ryu, Seong G. Kong, Hakil Kim  
Pattern Recognition Letters; Volume 32 Issue 2, January, 2011

# *Esiti possibili della decodifica di rumore o segnale*

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(3) il rumore viene decodificato come fosse segnale

Esempi:

(a) in errori dei sistemi tecnologici  
(di distruzione di massa)

(b) in certe psicopatologie umane

(c) nella divinazione (cfr articolo)



# LAUNCH DETECTION





9 novembre, 1979  
TRAINING TAPE INCIDENT

3 giugno 1980  
COMPUTER CHIP INCIDENT

26 settembre 1983  
AUTUMN EQUINOX INCIDENT

25 gennaio 1995  
NORWEGIAN ROCKET INCIDENT



~~TOP SECRET~~

~~SENSITIVE~~

THE SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

JUN 7 1980

MEMORANDUM FOR THE PRESIDENT

SUBJECT: False Missile Alert (U)

INTRODUCTION

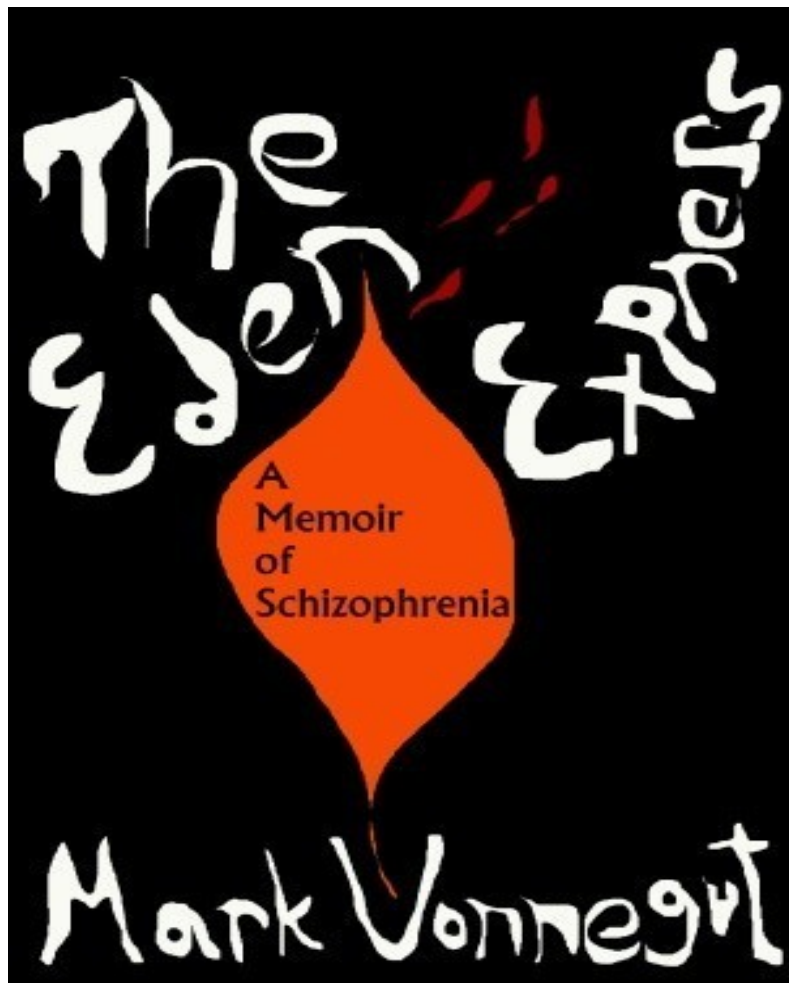
During the last two weeks we have had three ~~false missile warning~~ incidents,

~~4~~  
**DOD / DFOISR**  
**TOP SECRET CONTROL**  
Copy No. \_\_\_\_\_  
Case No. 98-7-2338  
T.S. No. 99-75-026  
Document No. 40

(b) Casi patologici

«We tolerate the unexplained but not the inexplicable»

(E. Goffman 1974: 30)

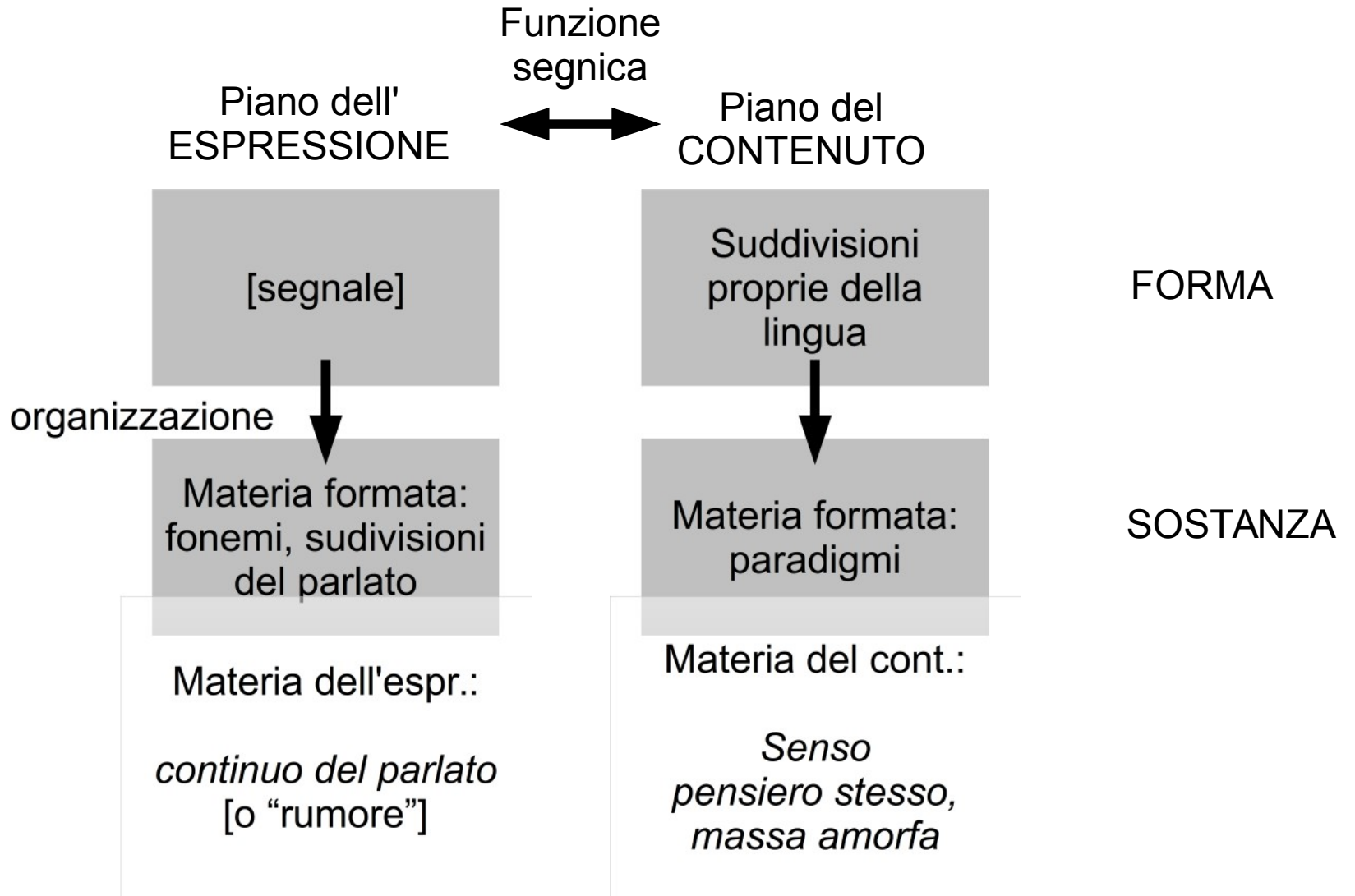


*«Ormai le voci erano diventate molto chiare. All'inizio facevo fatica a sentirle o capirle. Erano ovattate e utilizzavano codici molto complessi. Schiocchi-crepitii-scoppi, il rumore del vento con luci intermittenti e clacson come punteggiature. Decifrai il **codice** e riuscii a interiorizzarlo al punto che era quasi come sentire delle parole. All'inizio sembravano per lo più frasi senza senso, ma via via acquisirono sempre più significato. Una volta che senti le voci ti rendi conto che ci sono sempre state. Tutto sta nel sintonizzarsi»*

M. Vonnegut 2008: 170



Il segno è una unità generata dalla connessione tra Espressione e Contenuto



Un problema assente nel modello di Shannon:

*trasmissione dei codici*

non tutti i sistemi di comunicazione hanno codici  
incorporati.

Come si trasmettono i codici?

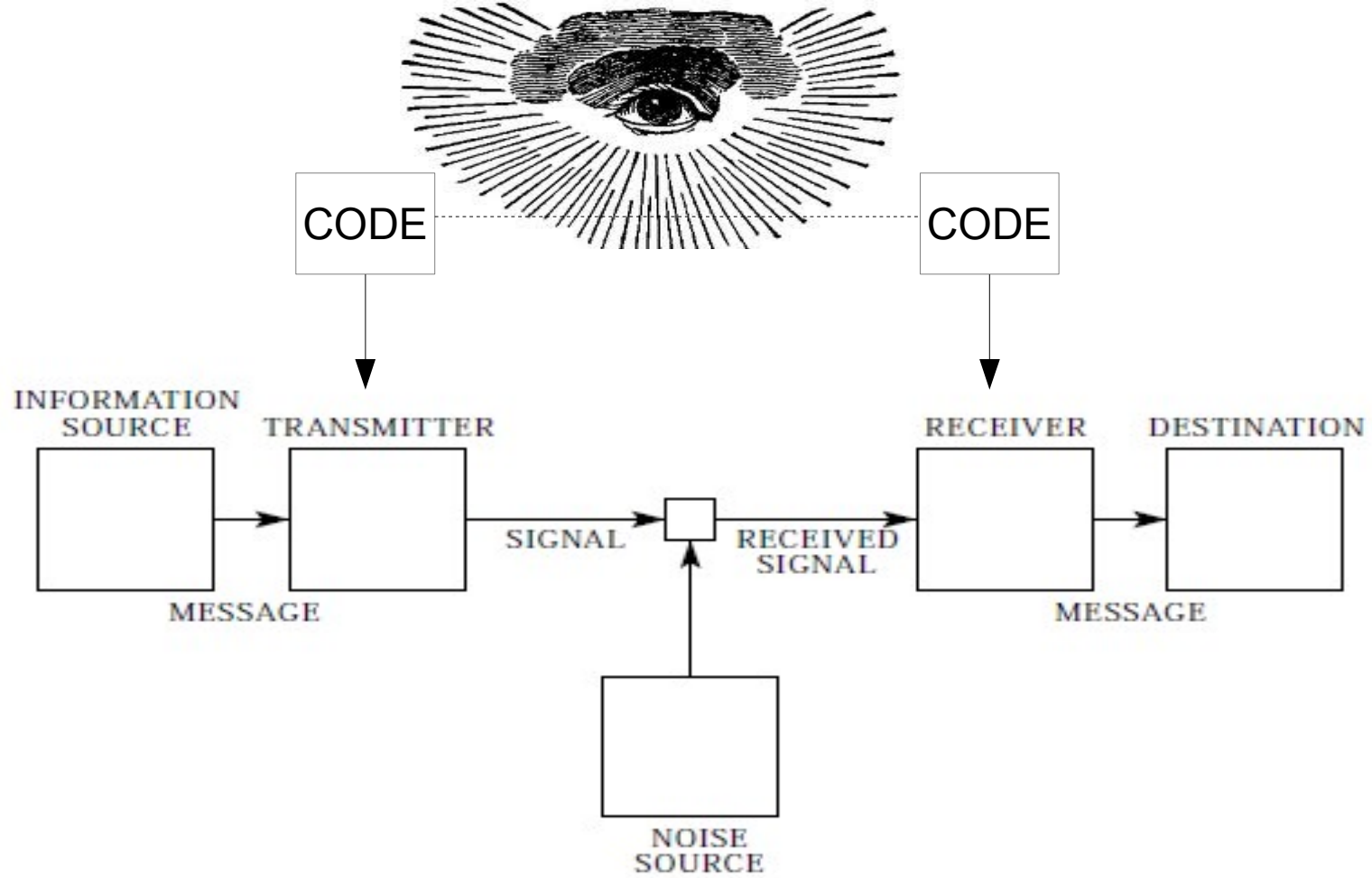


Fig. 1 — Schematic diagram of a general communication system.

Il codice viene introdotto nel sistema all'origine

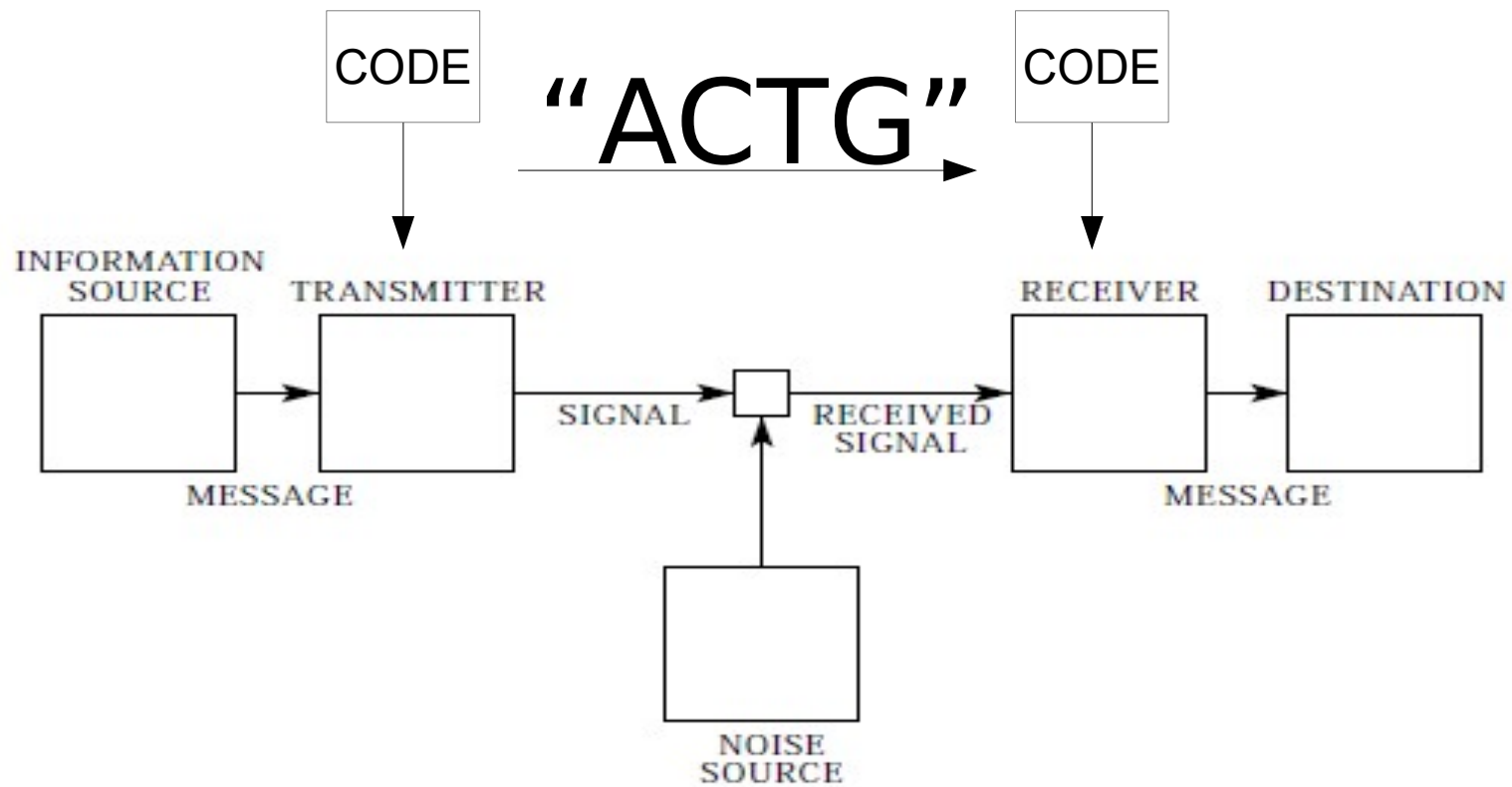


Fig. 1 — Schematic diagram of a general communication system.

Il codice viene trasmesso come un messaggio



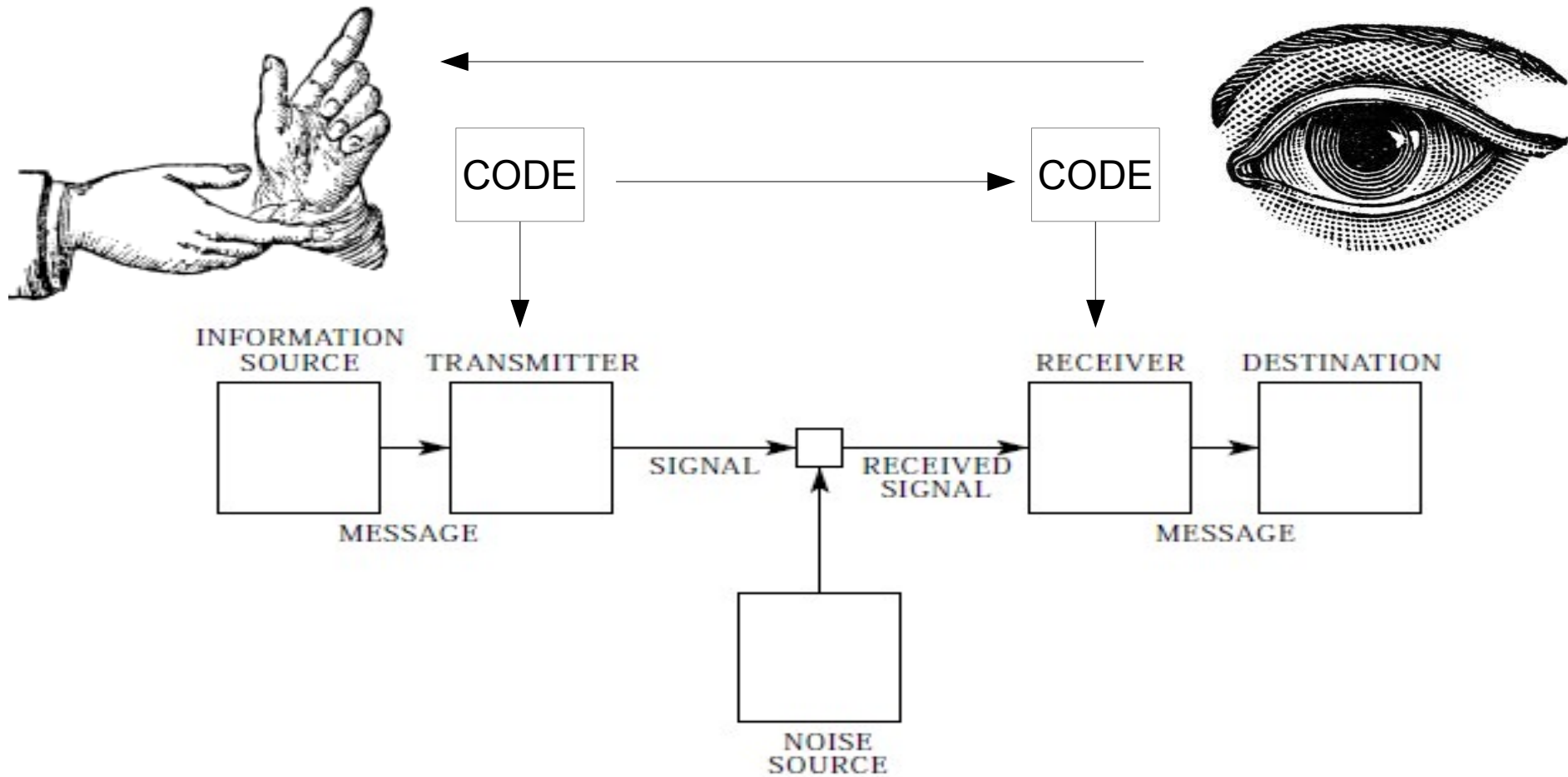


Fig. 1 — Schematic diagram of a general communication system.

Il codice viene acquisito per imitazione

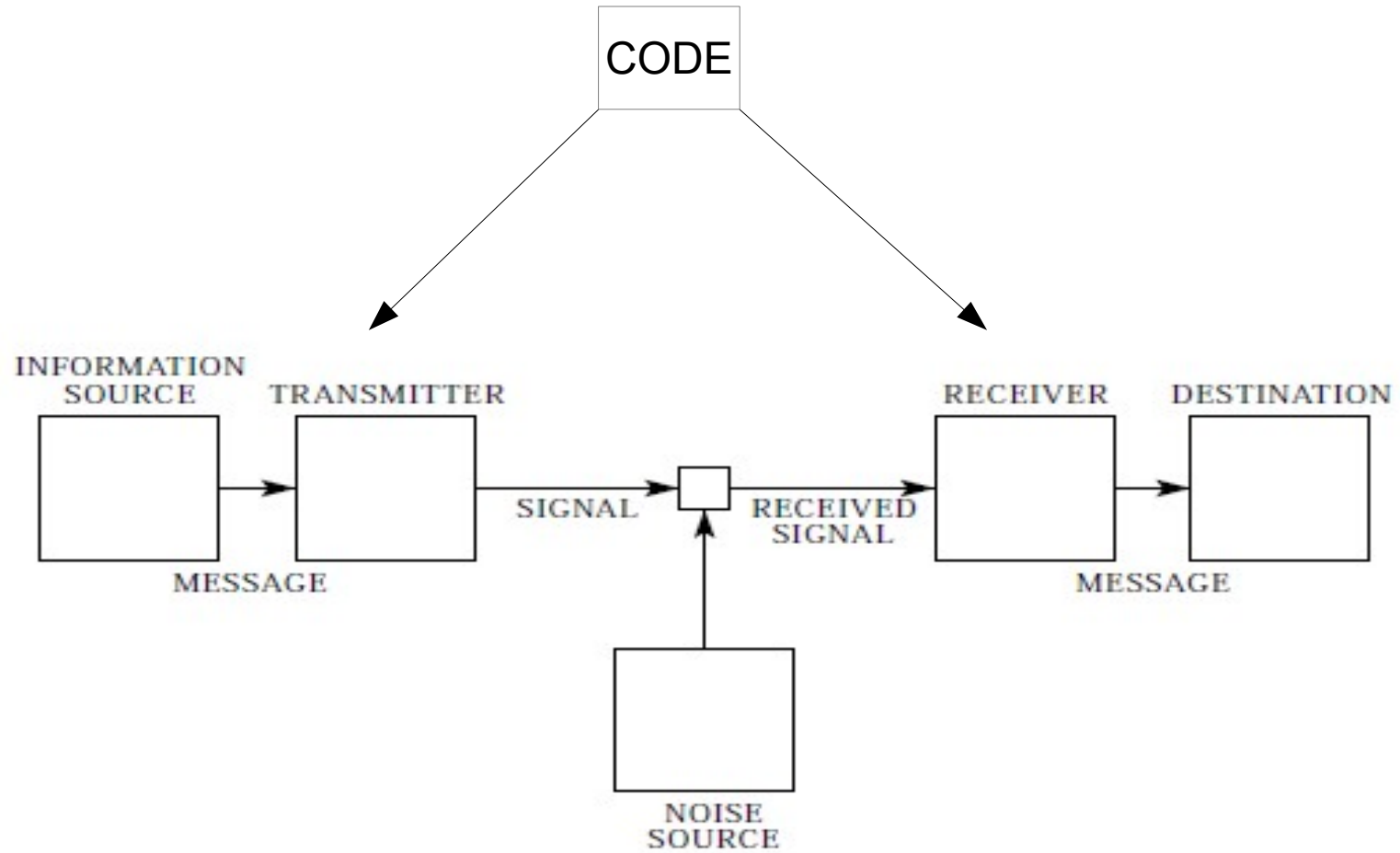


Fig. 1— Schematic diagram of a general communication system.

Il codice viene acquisito dall'ambiente

**CLAUDE  
LÉVI-STRAUSS**

*de l'Académie française*

**anthropologie  
structurale**

**PLON**



Magie et religion

IX. Le sorcier et sa magie (1949)

X. L'efficacité symbolique (1949)

*Lo sciamano fornisce alla sua ammalata un linguaggio nel quale possono esprimersi immediatamente certi stati non formulati, e altrimenti non formulabili. E proprio il passaggio da questa espressione verbale (che permette, nello stesso tempo, di vivere in forma ordinata e intellegibile un'esperienza attuale, ma che sarebbe senza quel passaggio anarchica e ineffabile) provoca lo sbloccarsi del processo fisiologico, ossia la riorganizzazione, in senso favorevole, della sequenza di cui l'ammalata subisce lo svolgimento (Levi-Strauss 2009: 222)*

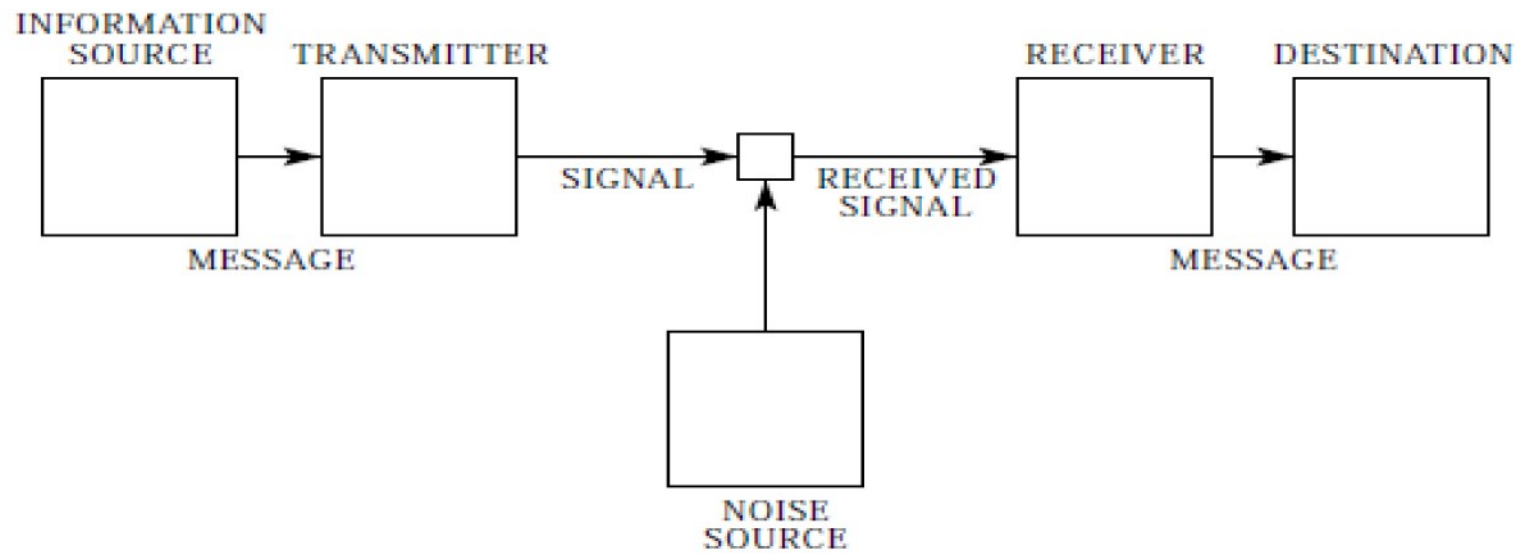
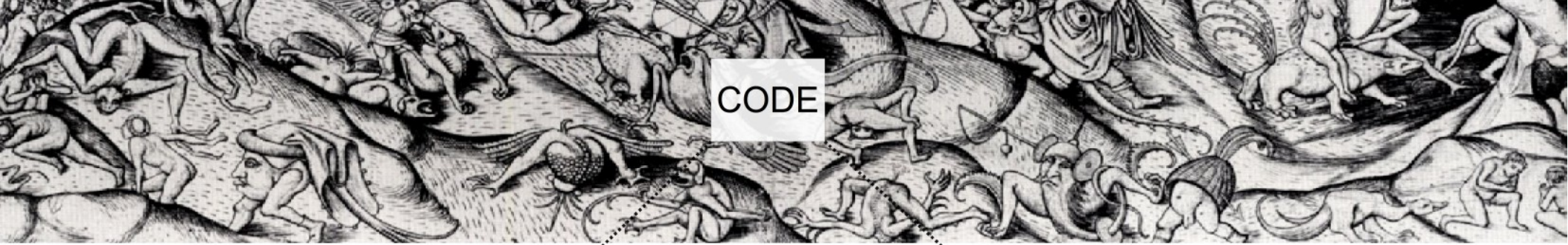


Fig. 1 — Schematic diagram of a general communication system.

Il codice viene acquisito dall'ambiente

# Tre cose che sappiamo dei codici

Hanno un ruolo:

1) descrittivo del sistema codificato

2) prescrittivo e quindi

3) predittivo

rispetto al comportamento dei suoi elementi  
e del sistema nel suo complesso

## In conclusione:

Il rumore ha un ruolo non sempre distruttivo  
nella trasmissione del messaggio

I codici possono essere trasmessi in vari modi e  
anche risiedere nell'ambiente comunicativo

Il messaggio può anche essere/contenere un  
codice, che consente nuove decodifiche

I codici sono descrittivi, predittivi, prescrittivi

Grazie

Alberto @ cammozzo.com

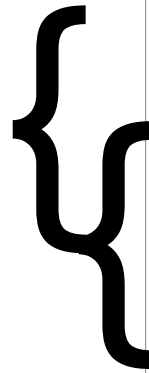
<http://cammozzo.com>  
twitter: mmzz



## *Codice per Eco (1975)*

- (1) sistema *sintattico*: serie di segnali regolati da leggi combinatorie interne
- (2) sistema *semantico*: serie di stati e nozioni che possono essere oggetto di comunicazione
- (3) sistema *pragmatico*: serie di possibili risposte comportamentali da parte del destinatario
- (4) una *regola* che associ:  
elementi di codici del primo tipo a  
quelli del secondo tipo (segnali – nozioni) o del terzo tipo (segnali–comportamenti).

Regola o  
“quadro di  
significazione”



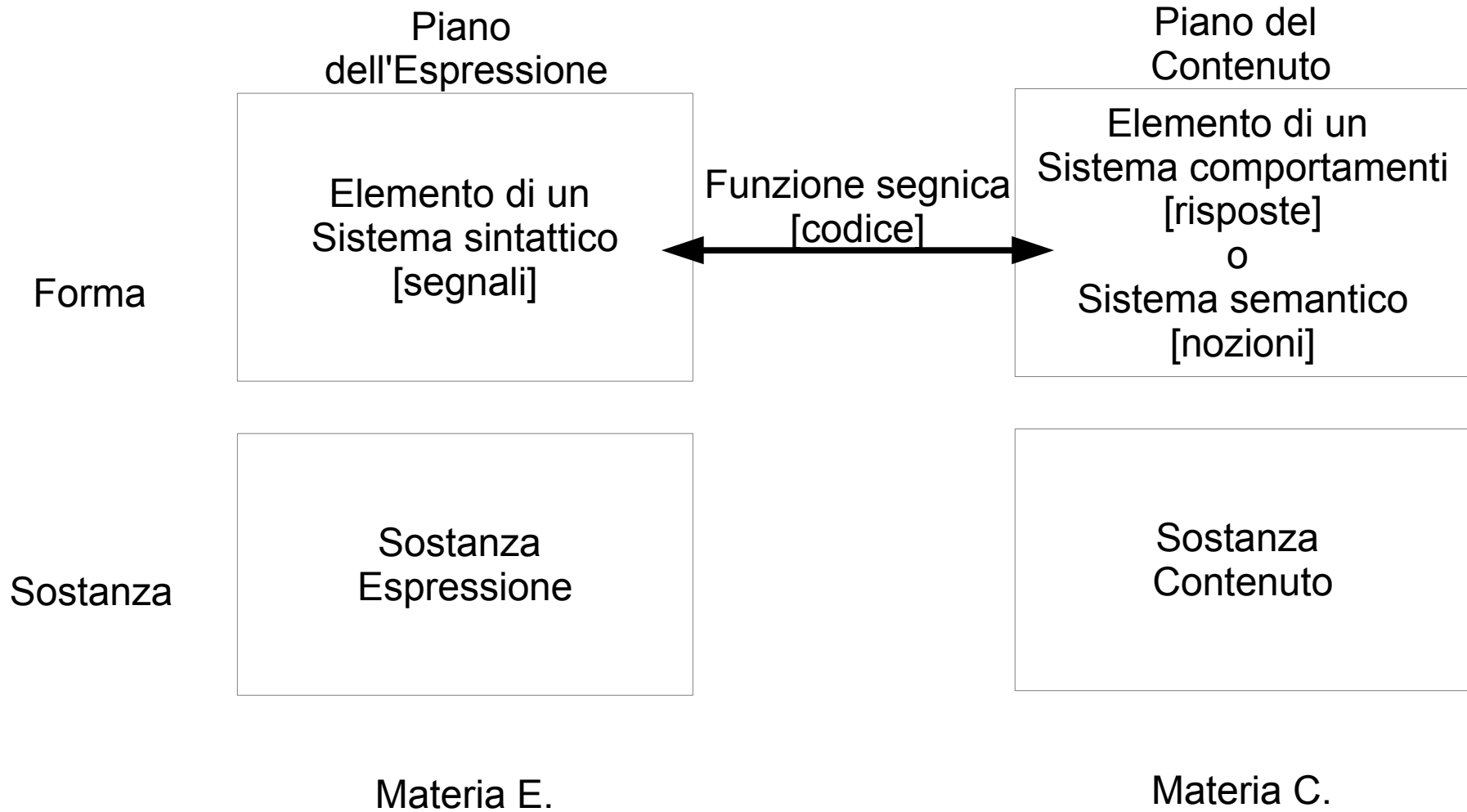
Sistema *sintattico*  
segnali – segnali

Sistema *semantico*  
segnali – nozioni

Sistema *comportamentale*  
segnali – comportamenti

S-codici  
(sistemi)

codice



Charles William Morris (1901 – 1979)  
divide i segni in base al loro rapporto con:

Cose (semantics)

Persone: origine, uso ed effetto dei segni  
(pragmatics)

altri Segni (syntactics)

Morris, C.: 1946, *Signs, Language and Behavior*, Englewood Cliffs, N. L., Prentice Hall.

Morris, C.: 1938, *Foundations of the theory of signs*, in Morris, *Writings on the General Theory of Signs*, The Hague, Mouton, (1971).