01 The theory: „all what is said, is said by somebody“. The context and meaning

Lubomír Kostron

The course structure

1. Introduction
2. Perception, judgment (and behavioral activities) ; the story of Egon Brunswik
3. a) social judgment theory ,

   b) the nature of information
4. A model of personalisty – what is missing?
5. The theory o tasks, situations and the environment/ecology
6. The role of emotions and group support in ill defined problems solution

7. System dynamics - learning to „see“ processes
8. The decision-making under uncertainity
9. Interpersonal cognitive conflict solution (workshop with POLICY)
10. The eternal puzzle of consciousness.
11. The ultimate knowledge - the art of asking the smart questions

Students are expected to turn in a paper on one of the issues, listed above. For more detailes see the syllabus.

Simple definition of psychology

1 : the science or study of the mind and behavior
2 : the way a person or group thinks

Full Definition of psychology - plural psychologies

1 : the science of mind and behavior
2 a : the mental or behavioral characteristics of an individual or group
b : the study of mind and behavior in relation to a particular field of knowledge or activity
3 : a theory or system of psychology <Freudian psychology> <the psychology of Jung>

Source: Merriam-Webster's Learner's Dictionary

1.The Introduction:

* The history of psychology and its position within the system of science,
* Psychological states and processes,
* The problem of cosciousness (what are we aware of and is subconscious, subliminal?)
* The life story of psychologist, Egon Edler Brunswik of Korompa (Krompachy)

2. The Perception: the story of Egon Brunswik

18.3. 1903 – 7.7.1955

Egon´s parents.

Egon Brunswik´s father and his brothers. Austro-Hungarian nobility in Korompa (Krompachy), central Slovakia

The professional career of Egon Brunswik started with experiments on perception („the perception constancy“) in Psychological Institute of Karl Buhler, Vienna. Brunswik´s PhD disertation: second chair on the committee was Moritz Schlick.

The philosophy that came to dominate research in **psychology** in the first half of the 20th century was called **logical positivism**. ... The basic idea of **logical positivism** is that all knowledge is based on empirical observation, assisted by the rigorous use of **logic** and mathematics.

Logical positivism, also called **logical empiricism**, a philosophical movement that arose in Vienna in the 1920s and was characterized by the view that scientific knowledge is the only kind of factual knowledge and that all traditional metaphysical doctrines are to be rejected as meaningless.

The program of logical positivism gave inspiration to the unity of science movement. The movement carried the belief that all sciences, including the social sciences and the humanities, ought to share some common language if these disciplines were to be considered genuine sciences (*Wissenschaften*).

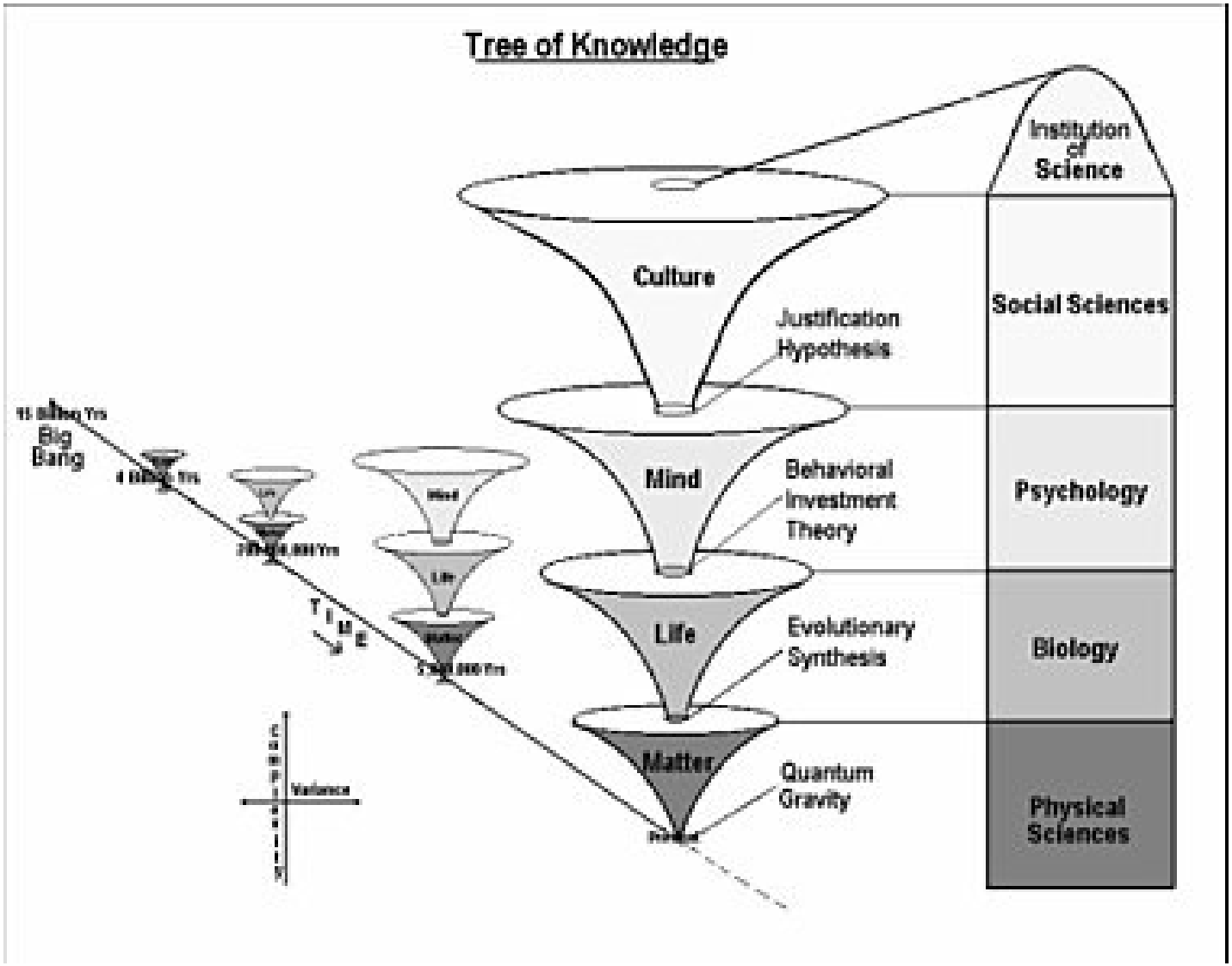
Overview of the members of the Vienna Circle

Inner Circle: Gustav Bergmann, Rudolf Carnap, Herbert Feigl, Philipp Frank, Kurt Gödel, Hans Hahn, Olga Hahn-Neurath, Béla Juhos, Felix Kaufmann, Victor Kraft, Karl Menger, Richard von Mises, Otto Neurath, Rose Rand, Josef Schächter, Moritz Schlick, Friedrich Waismann, Edgar Zilsel.

Periphery: Alfred Jules Ayer, Egon Brunswik, Karl Bühler, Josef Frank, Else Frenkel-Brunswik, Heinrich Gomperz, Carl Gustav Hempel, Eino Kaila, Hans Kelsen, Charles W. Morris, Arne Naess, Karl Raimund Popper, Willard Van Orman Quine, Frank P. Ramsey, Hans Reichenbach, Kurt Reidemeister, Alfred Tarski, Olga Taussky-Todd, Ludwig Wittgenstein.

Karl Popper In 1928, he earned a doctorate in psychology, under the supervision of Karl Bühler. His dissertation was titled *On Questions of Method in the Psychology of Thinking*.[In a book „The Logic of Scientific Discovery“ he criticised psychologism, naturalism, inductivism, and logical positivism, and put forth his theory of potential falsifiability as the criterion demarcating science from non-science.

The Unity of Science Movement



Gregg Henriques' Tree of Knowledge System

Jean Piaget's 1918 work *Recherche:* ...the unity of science can be considered in terms of a circle of the sciences, where logic is the foundation for mathematics, which is the foundation for mechanics and physics, and physics is the foundation for chemistry, which is the foundation for biology, which is the foundation for sociology, the moral sciences, psychology, and the theory of knowledge, and the theory of knowledge is based on logic.[1]
Science is a human endeavor, a part of human culture. It is unified in the sense that it is understood as a single endeavor, and there are no scientists studying alternative realities. To the extent that they do, however, one could argue that they are not unified. It is the perception of a single reality that results in a unity of science.

The unity of science thesis is most famously clarified and tentatively argued for by Ludwig von Bertalanffy's General System Theory, Paul Oppenheim and Hilary Putnam.
It is most famously argued against by Jerry Fodor, John Dupre and Paul Feyerabend.

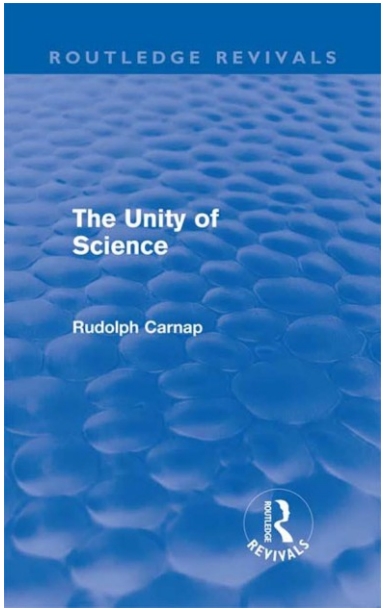
International encyclopedia of unified science

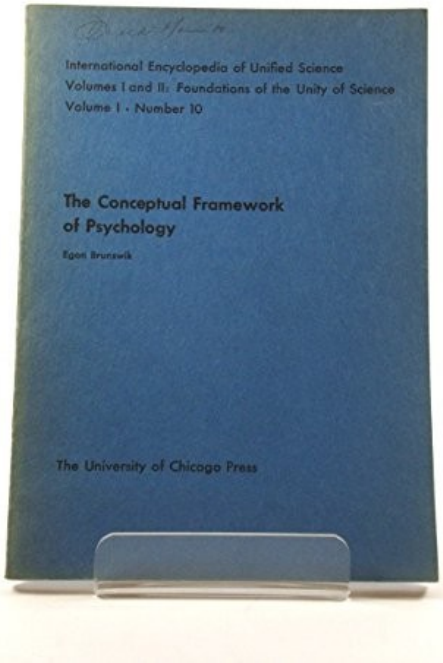
The IEUS was an output of the Vienna Circle to address the "growing concern throughout the world for the logic, the history, and the sociology of science...„

Only the first section *Foundations of the Unity of Science* (FUS) was published; it contains two volumes for a total of nineteen monographs published from 1938 to 1969.

Preliminary conference in Prague in 1934, the First International Congress for the Unity of Science was held at the Sorbonne, Paris, 16–21 September 1935.

The Third International Congress for the Unity of Science, which was devoted exclusively to the IEUS, was held in Paris 29–31 July 1937.





The Conceptual Framework of Psychology (FUS I-10)
Egon Brunswik

Much later, in the U.S., he introduced the concept of probability into psychological research; also, he was inspired by the then new theory of information.
He proposed his original theory of psychology : *probabilistic functionalism*.
He introduced several new concepts: ecological validity, conceptual isomorphism; promoted the idiographic approach to the research design (first understanding the nature of a problem studied, then may follow attempts to study causal relations, nomothetic approach).

Also, he offered an original research methodology :
***„representative design of experiments", as contrasted to the traditional „systematic design of experiments" (taken over from natural sciences)*;**

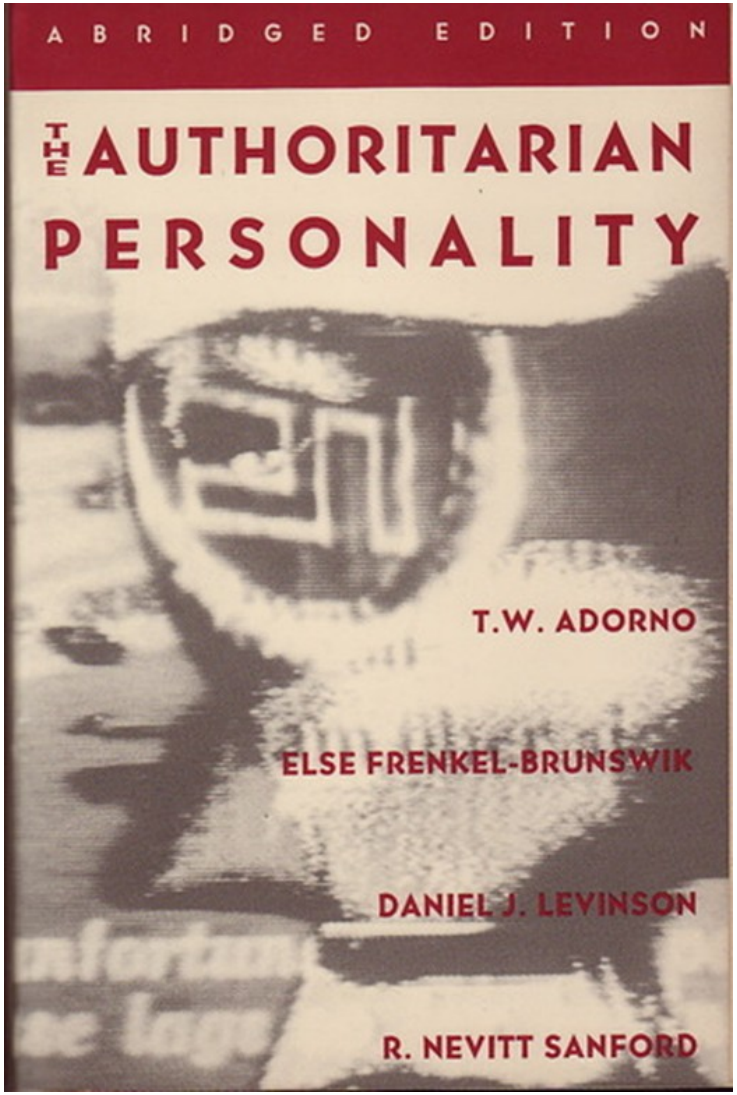
He is a forerunner of „Ecological psychology".

Psychoanalytic psychologist,
Else Frenkel-Brunswik,
Egon´s colleague and later his wife.

18.8.1908 – 31.3.1958
Lemberg (Lvov), Berkeley

La figura di Yastrow
commentata da L. Wittgenstein, da cui Else Frenkel-Brunswik, coautrice della ricerca di T.W. Adorno et al. (1950), *La personalità autoritaria*, costruì un filmato a cartoni animati per studiare l'intolleranza dell'ambiguità e la rigidità percettiva che ostacolano la ristrutturazione cognitiva

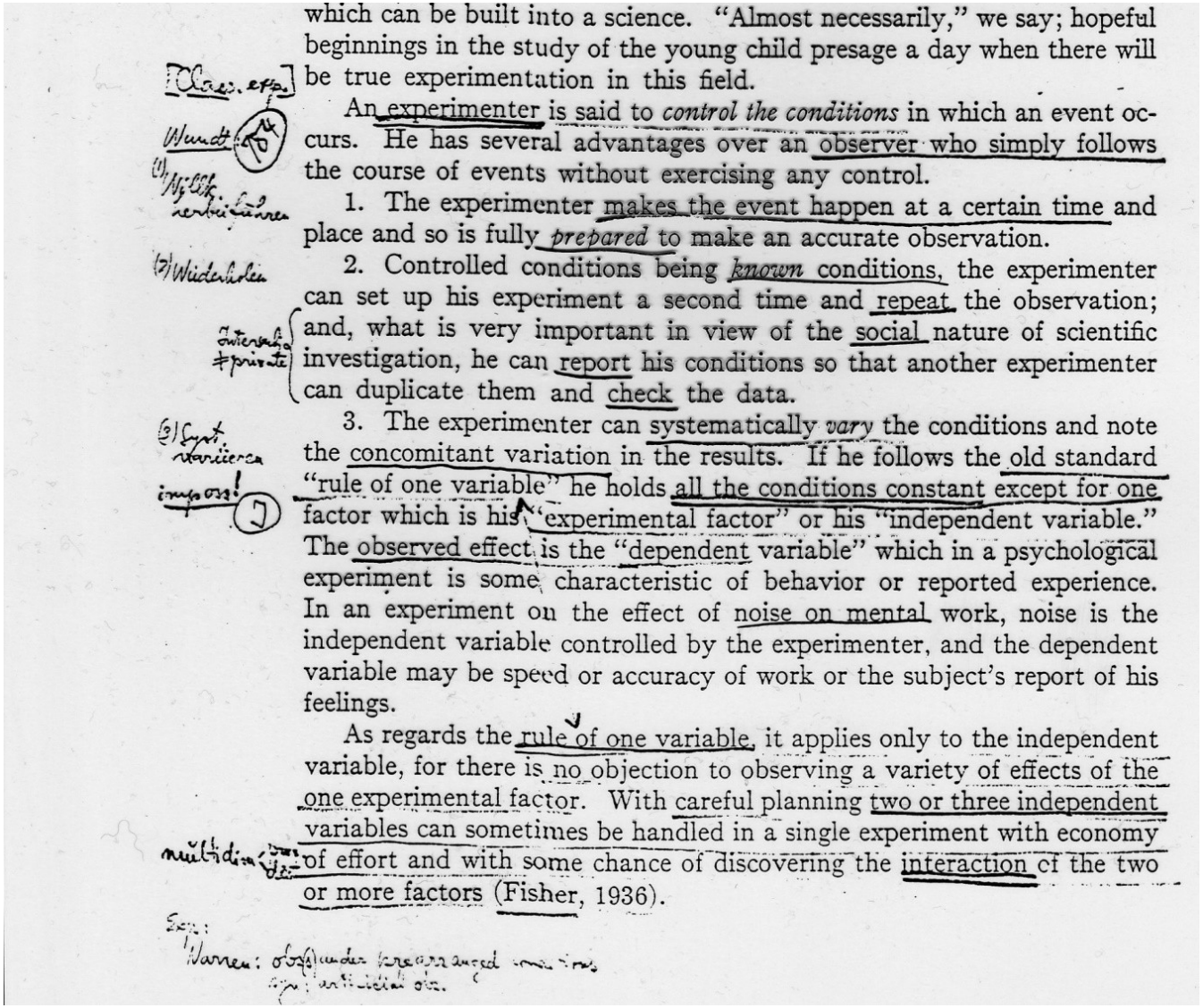
Else was involved into the intolerance of ambiguity research, the F scale



1950

After obtaining a position at the University of a Berkeley in California (U.S.A), Brunswik, (who was raised in a rather philosophical tradition of a logical positivism) was challanged with totally different approach to psychology: a pragmatical behaviorism

A transition cultural shock - from Vienna to Amerika: Brunswik´s notes in the textbook of Woodworth, Schlosberg´s „Experimental Psychology".



which can be built into a science. "Almost necessarily," we say; hopeful beginnings in the study of the young child presage a day when there will be true experimentation in this field.

An experimenter is said to *control the conditions* in which an event occurs. He has several advantages over an observer who simply follows the course of events without exercising any control.

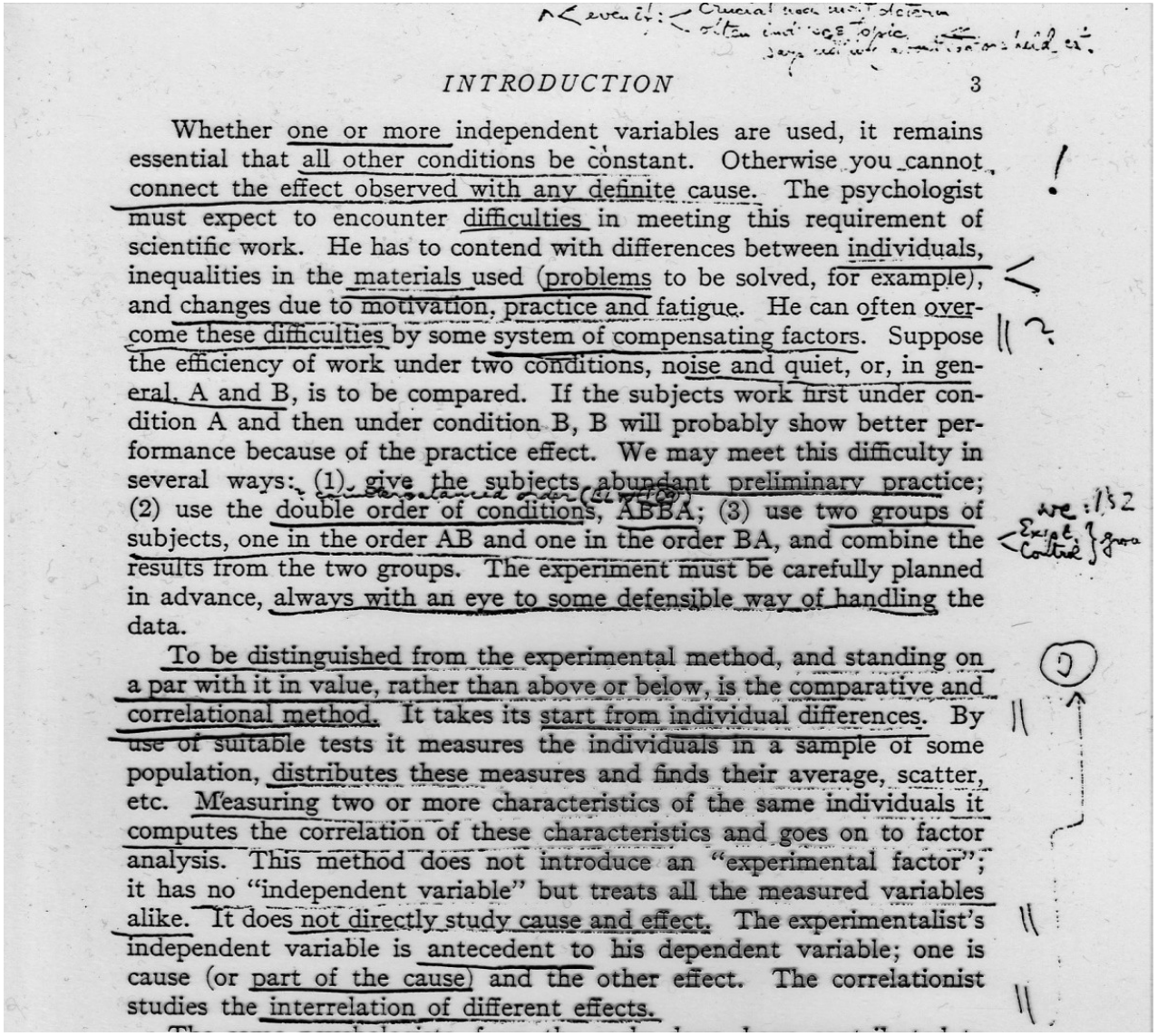
1. The experimenter makes the event happen at a certain time and place and so is fully *prepared* to make an accurate observation.

2. Controlled conditions being *known* conditions, the experimenter can set up his experiment a second time and repeat the observation; and, what is very important in view of the social nature of scientific investigation, he can report his conditions so that another experimenter can duplicate them and check the data.

3. The experimenter can systematically *vary* the conditions and note the concomitant variation in the results. If he follows the old standard "rule of one variable" he holds all the conditions constant except for one factor which is his "experimental factor" or his "independent variable." The observed effect is the "dependent variable" which in a psychological experiment is some characteristic of behavior or reported experience. In an experiment on the effect of noise on mental work, noise is the independent variable controlled by the experimenter, and the dependent variable may be speed or accuracy of work or the subject's report of his feelings.

As regards the rule of one variable, it applies only to the independent variable, for there is no objection to observing a variety of effects of the one experimental factor. With careful planning two or three independent variables can sometimes be handled in a single experiment with economy of effort and with some chance of discovering the interaction of the two or more factors (Fisher, 1936).

A cultural shock in Amerika: Brunswik´s comments in the textbook of Woodworth, Schlosberg „Experimental Psychology“.



Whether one or more independent variables are used, it remains essential that all other conditions be constant. Otherwise you cannot connect the effect observed with any definite cause. The psychologist must expect to encounter difficulties in meeting this requirement of scientific work. He has to contend with differences between individuals, inequalities in the materials used (problems to be solved, for example), and changes due to motivation, practice and fatigue. He can often overcome these difficulties by some system of compensating factors. Suppose the efficiency of work under two conditions, noise and quiet, or, in general, A and B, is to be compared. If the subjects work first under condition A and then under condition B, B will probably show better performance because of the practice effect. We may meet this difficulty in several ways: (1) give the subjects abundant preliminary practice; (2) use the double order of conditions, ABBA; (3) use two groups of subjects, one in the order AB and one in the order BA, and combine the results from the two groups. The experiment must be carefully planned in advance, always with an eye to some defensible way of handling the data.

To be distinguished from the experimental method, and standing on a par with it in value, rather than above or below, is the comparative and correlational method. It takes its start from individual differences. By use of suitable tests it measures the individuals in a sample of some population, distributes these measures and finds their average, scatter, etc. Measuring two or more characteristics of the same individuals it computes the correlation of these characteristics and goes on to factor analysis. This method does not introduce an "experimental factor"; it has no "independent variable" but treats all the measured variables alike. It does not directly study cause and effect. The experimentalist's independent variable is antecedent to his dependent variable; one is cause (or part of the cause) and the other effect. The correlationist studies the interrelation of different effects.

Everything from the beginning again: how does it fit together?

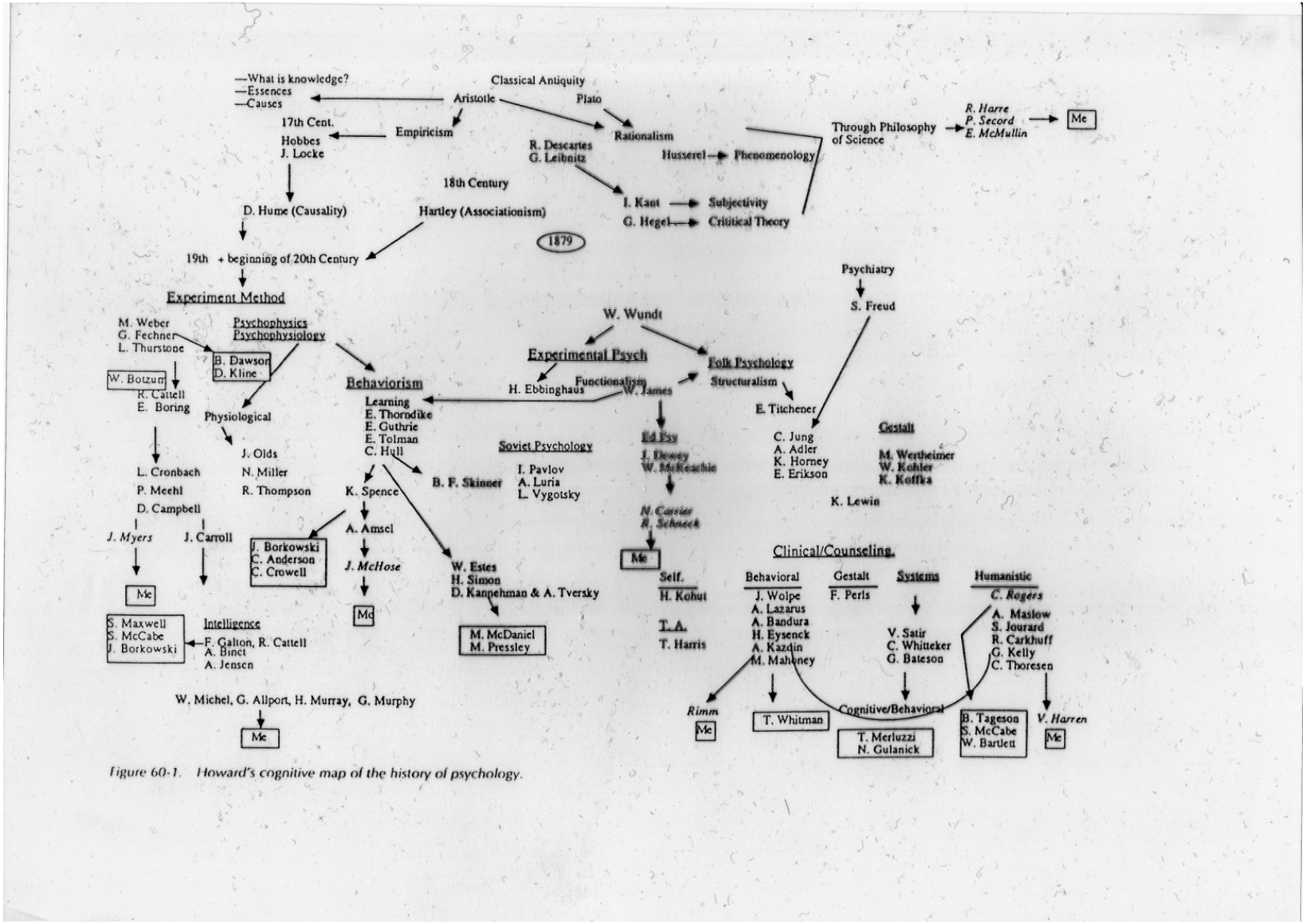


Figure 60-1. Howard's cognitive map of the history of psychology.

Brunswik had to rethink psychology anew.

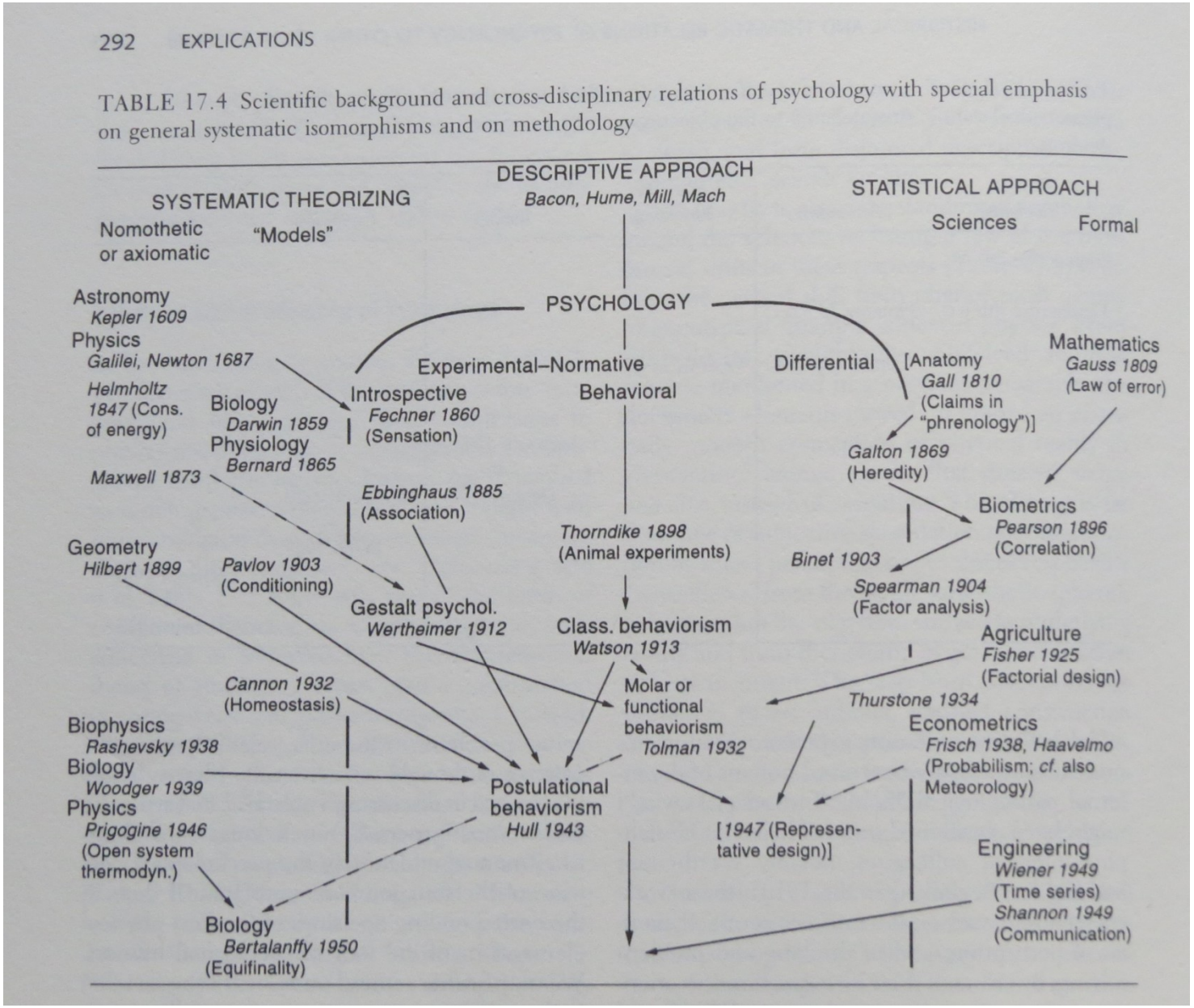


TABLE 17.4 Scientific background and cross-disciplinary relations of psychology with special emphasis on general systematic isomorphisms and on methodology

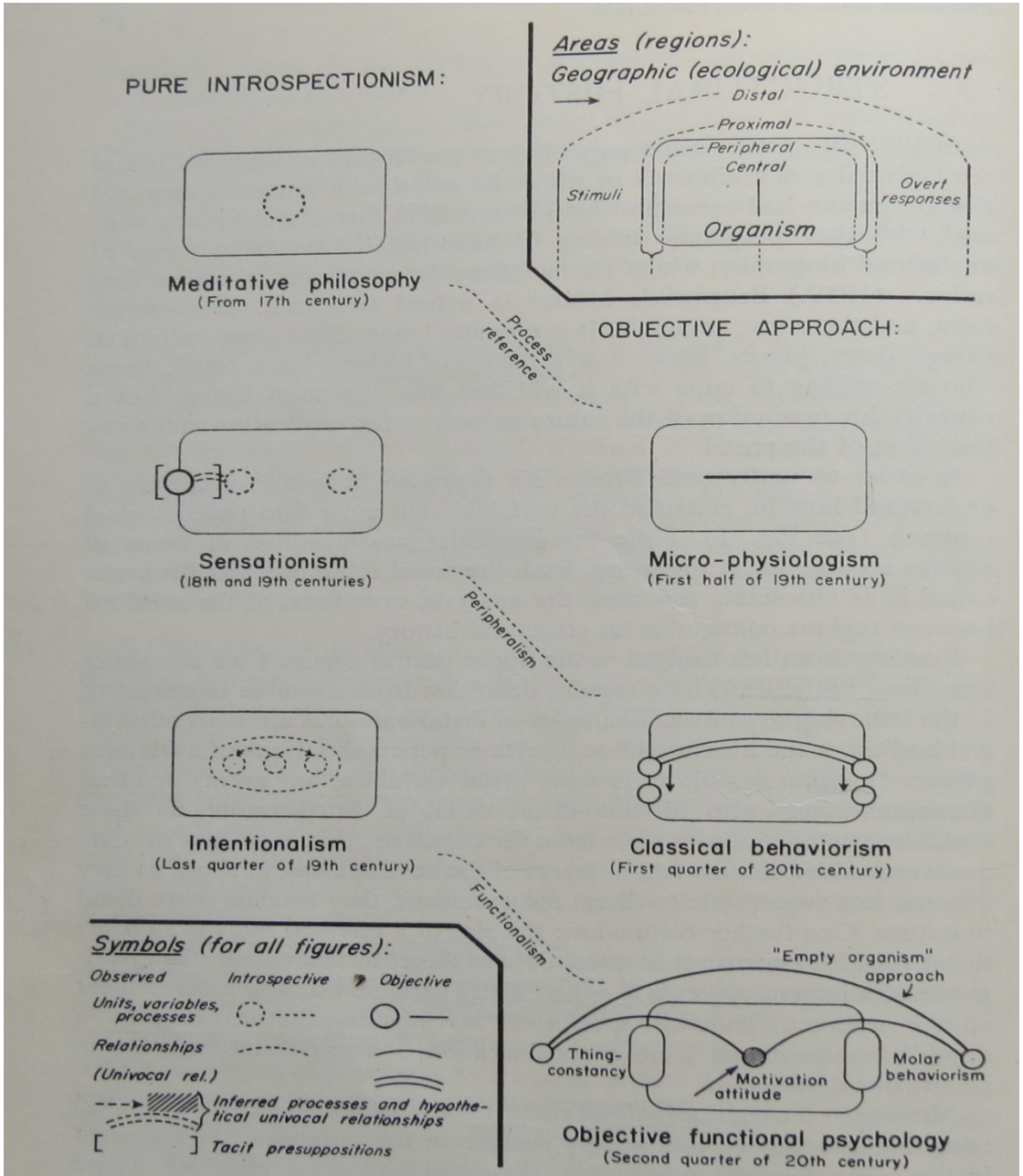
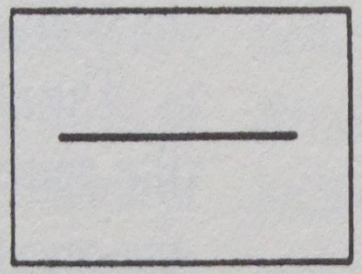
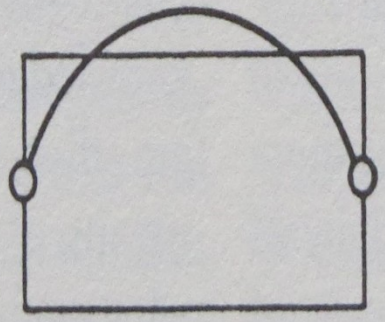
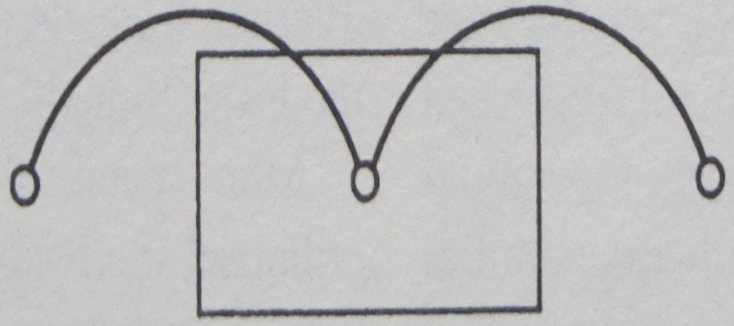
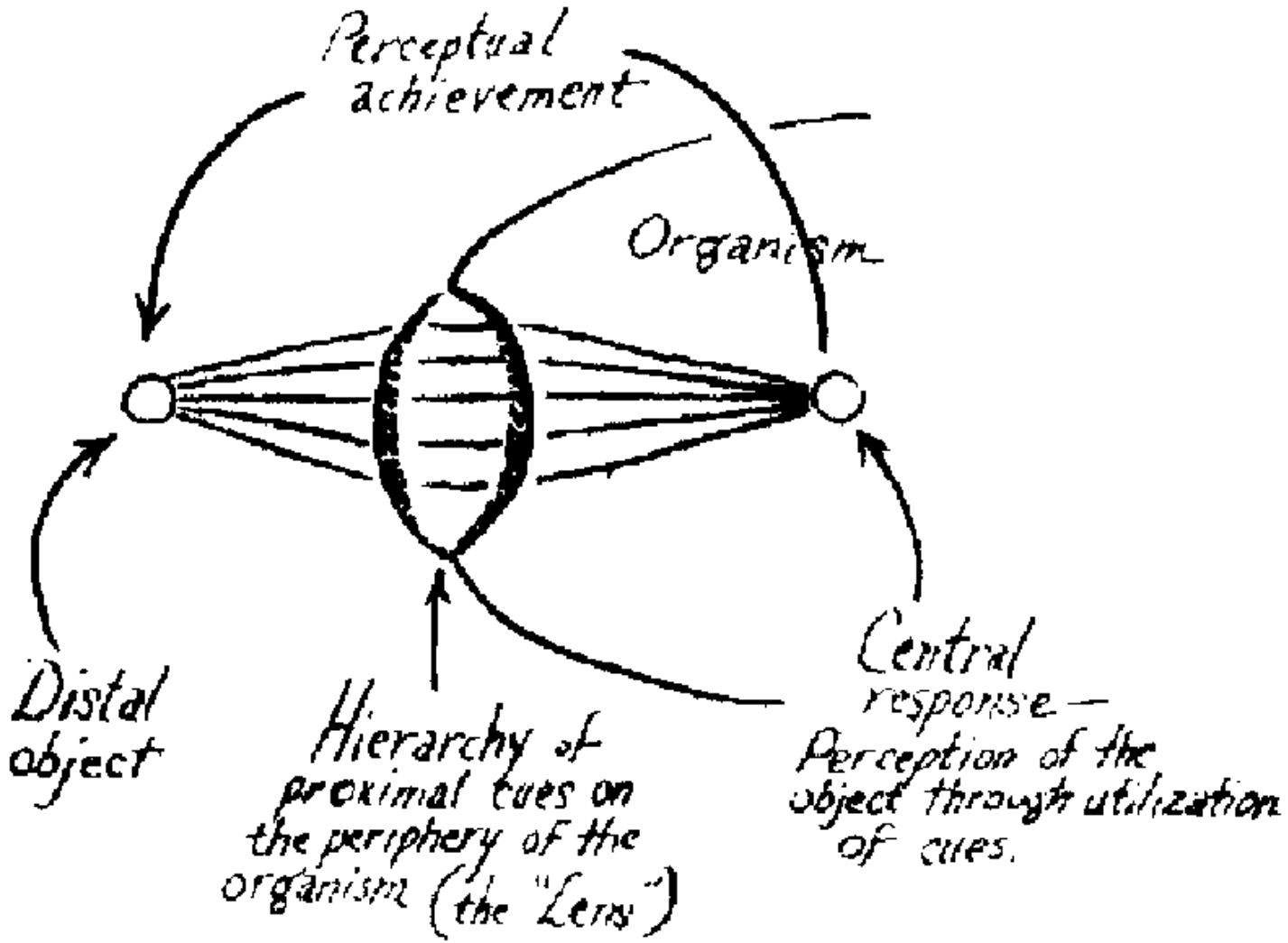


Fig. 1. Major stages of introspective and objective psychology. Reprinted from *The Conceptual Framework of Psychology 1952* by E. Brunswik by permission of the University of Chicago Press.

TABLE 17.1 The emergence of physiological psychology from physiology

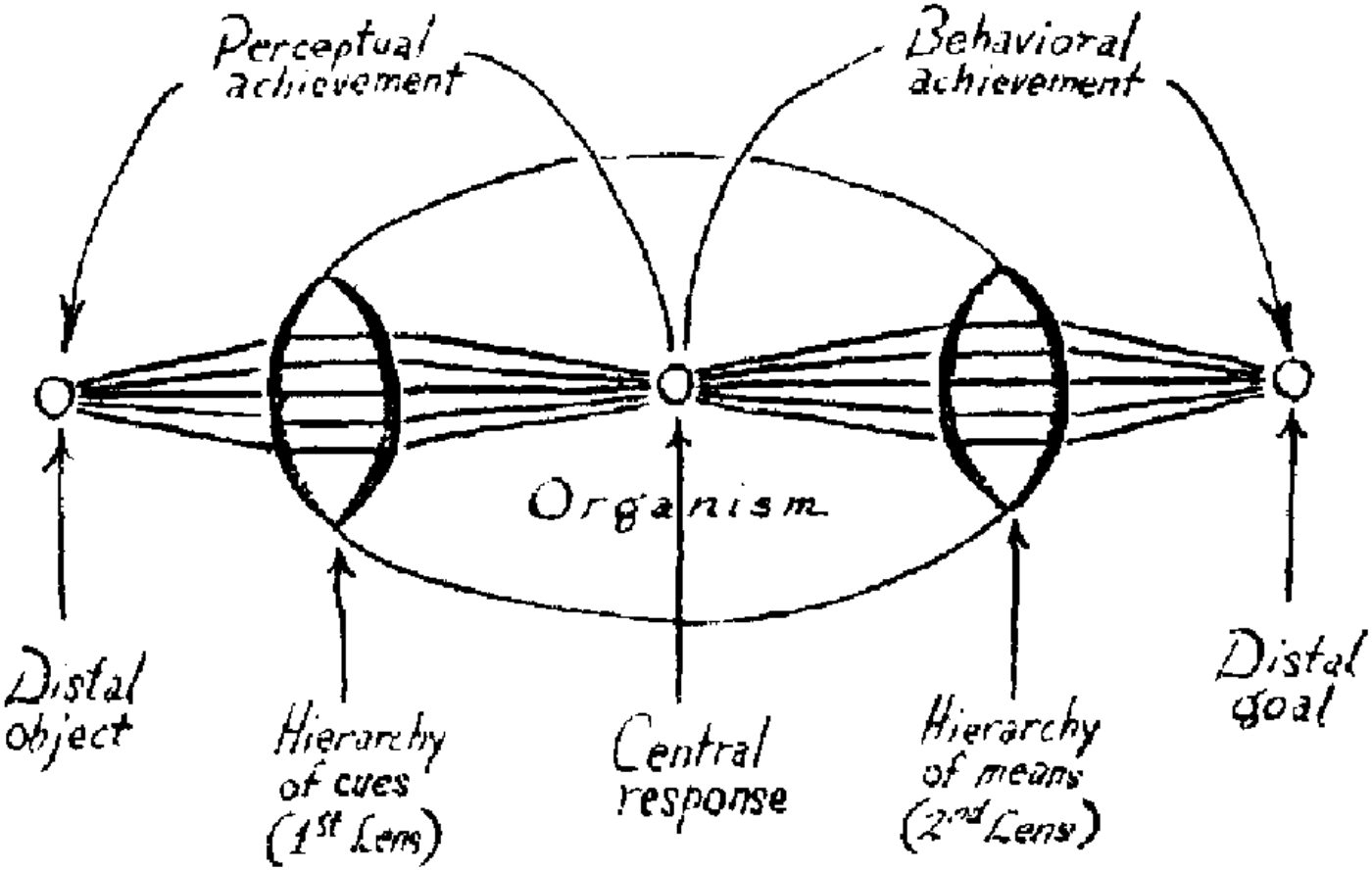
A. INTERNAL PROCESS TRACING		Specific nerve energies *Bell, Müller 1834* *Rate of nervous impulse *Müller, Helmholtz 1850*
B. PERIPHERAL ARC		Reaction time *Bessel 1822 Wundt, Cattell 1893* *Sensory-motor approach *Watson 1913, Skinner*
C. CENTRAL-DISTAL APPROACH		*Brain-and-achievement *Lashley 1929, Halstead* Hypothetical brain models *Köhler 1920, McCulloch*

The Brunswik´s „lens model" of a perception



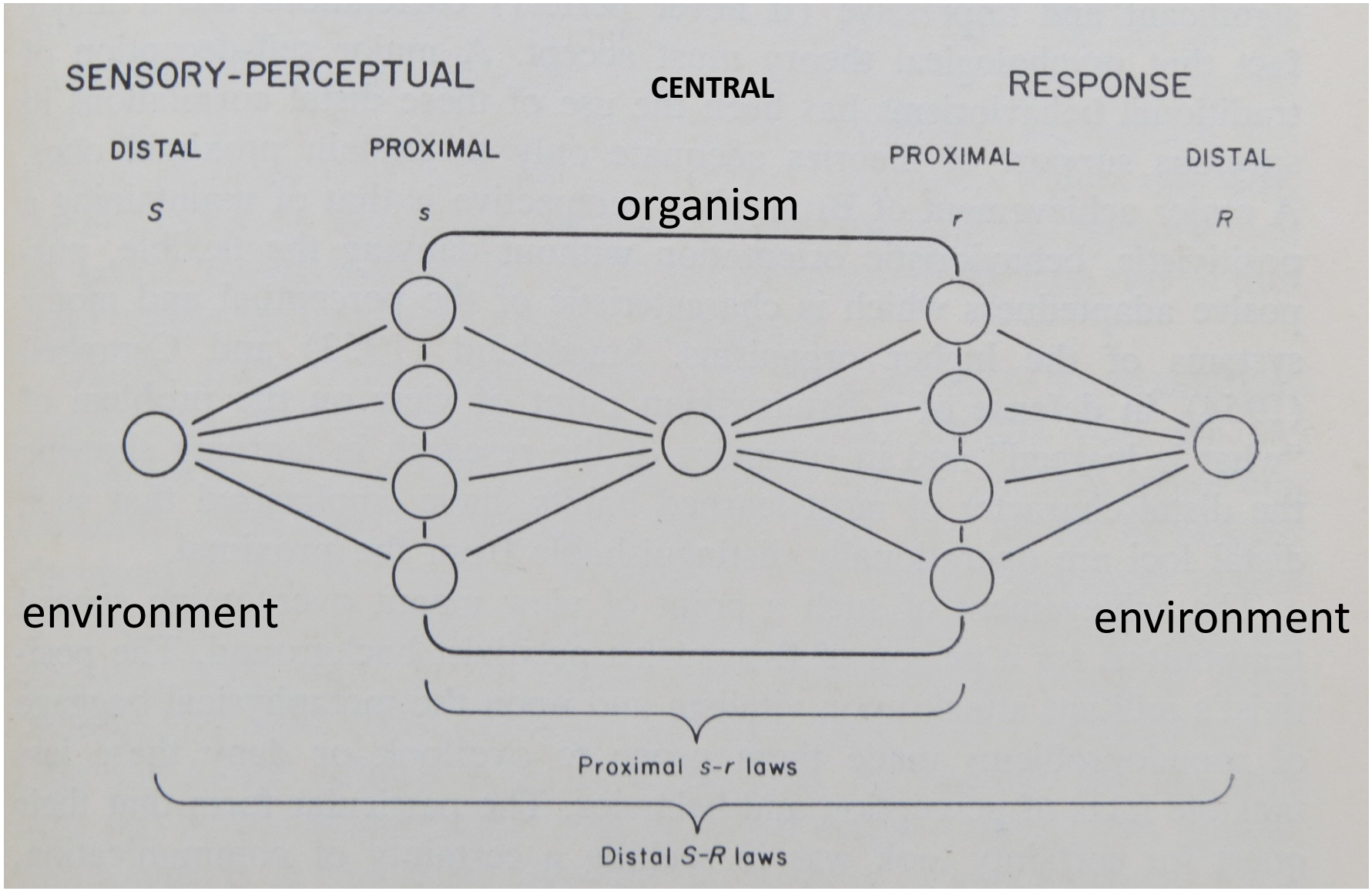
Working together with Edward C.Tolman, they realized, that the „lens model", may be mirror like reversed and the output side may be added. So, thus the lens contains *input with impulses*, stimulating receptors, and also *output*, which signifies *the choice of means of activities*, actual behavior.

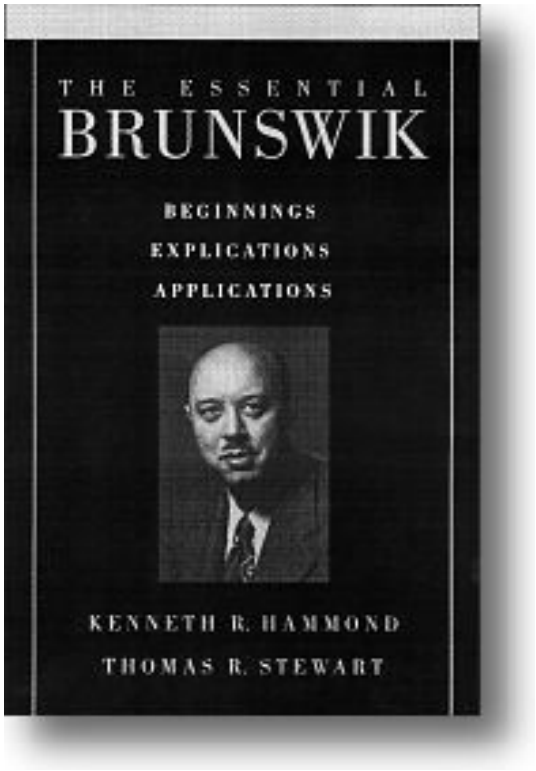
The choice of action, behavior: the extended lens model offered a common base for the co-operation with Edward C.Tolman



1856 - 1959

The organism and the environment (ecology) : two equally important systems in a mutual interaction





See www.brunswik.org

The organism and the causal texture of the environment [1935] Edward C. Tolman and Egon Brunswik

Psychology as a science of objective relations [1937] Egon Brunswik

Representative design and probabilistic theory in a functional psychology [1955] and In defense of probabilistic functionalism: A reply [1955] Egon Brunswik

The Conceptual Framework of Psychology [1952] Egon Brunswik

"Ratiomorphic" models of perception and thinking [1955] Egon Brunswik

Historical and thematic relations of psychology to other sciences [1956] Egon Brunswik

Perception and the representative design of psychological experiments [1956] Egon Brunswik


Colorado
University of Colorado at Boulder


Virginia Hammond


Kenneth R.Hammond

3 a: Judgment

K.R.H., 1917 - 2015

His student, Kenneth R. Hammond University of Colorado at Boulder), extended the focus of perception research on subsequent „reasoning": how do we arrive at judgments?

K.R.H: (1955) "Probabilistic Functionalism and the Clinical Method"

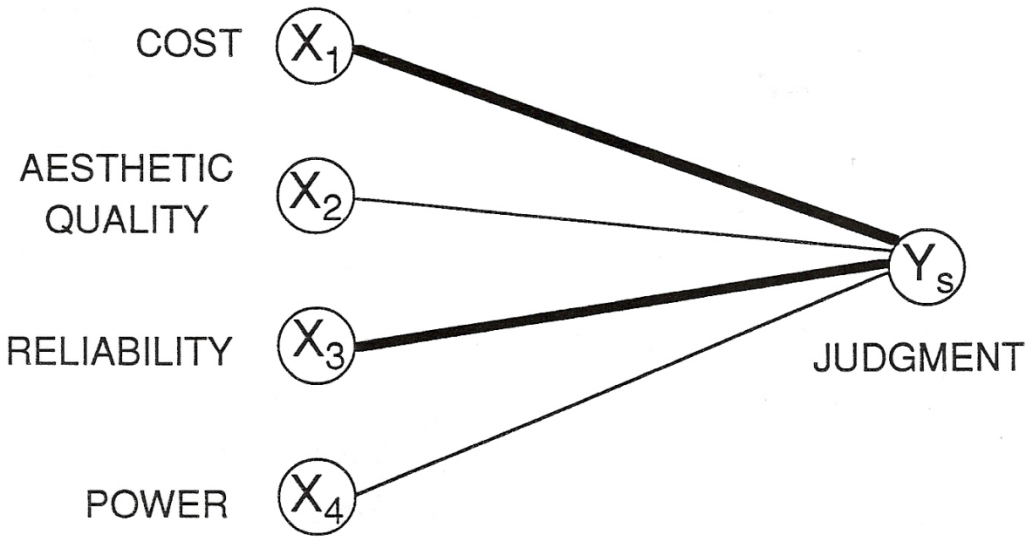
He with his colleagues, created a number of lens model versions; L.R. Tucker came up with regression equation, which makes possible to quantify the lens model, decompose the relations into linear and nonlinear components and to use it for a research in various settings.

***The lens model equation [*Hursch, Hammond, and Hursch, 1964; Tucker. 19641 expresses the correlation between two variables as the sum of a linear and a nonlinear component. The linear component reflects that part of the correlation which can be explained by the linear relation between the variables and a set of mediating variables, and the nonlinear component reflects the part of the correlation which cannot be accounted for by the linear component.**

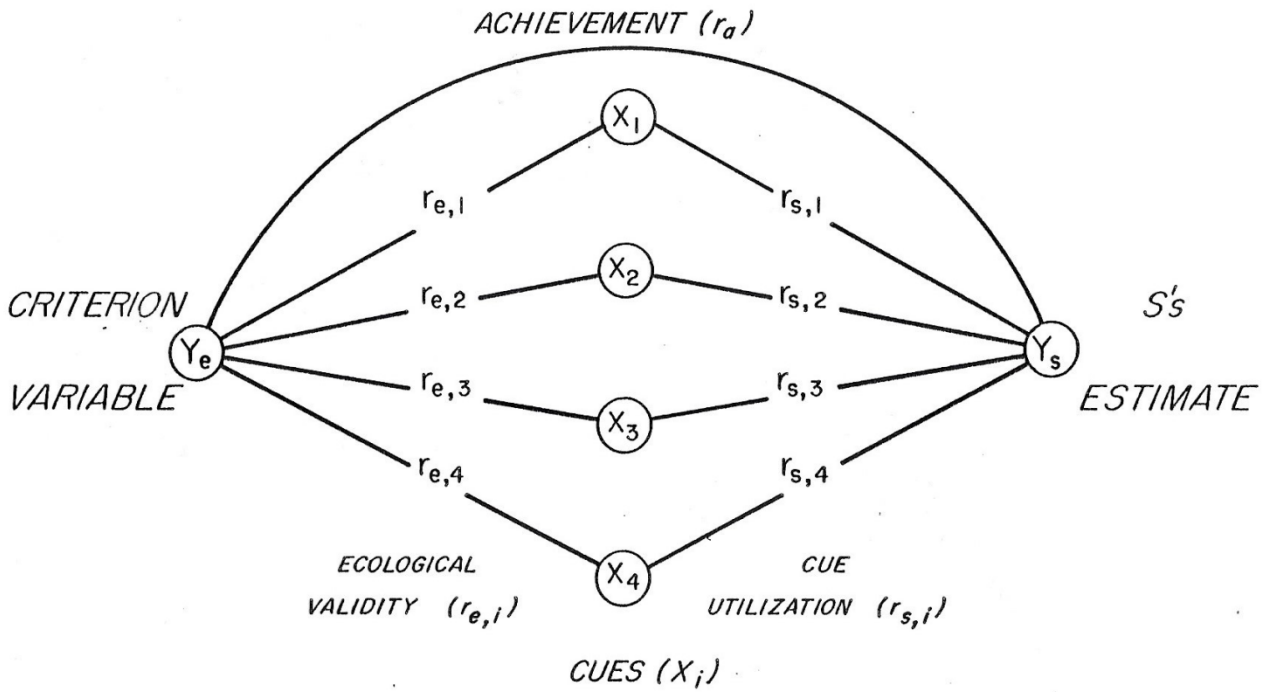
SINGLE-SYSTEM CASE

"POLICY CAPTURING"

RELATIVE IMPORTANCE



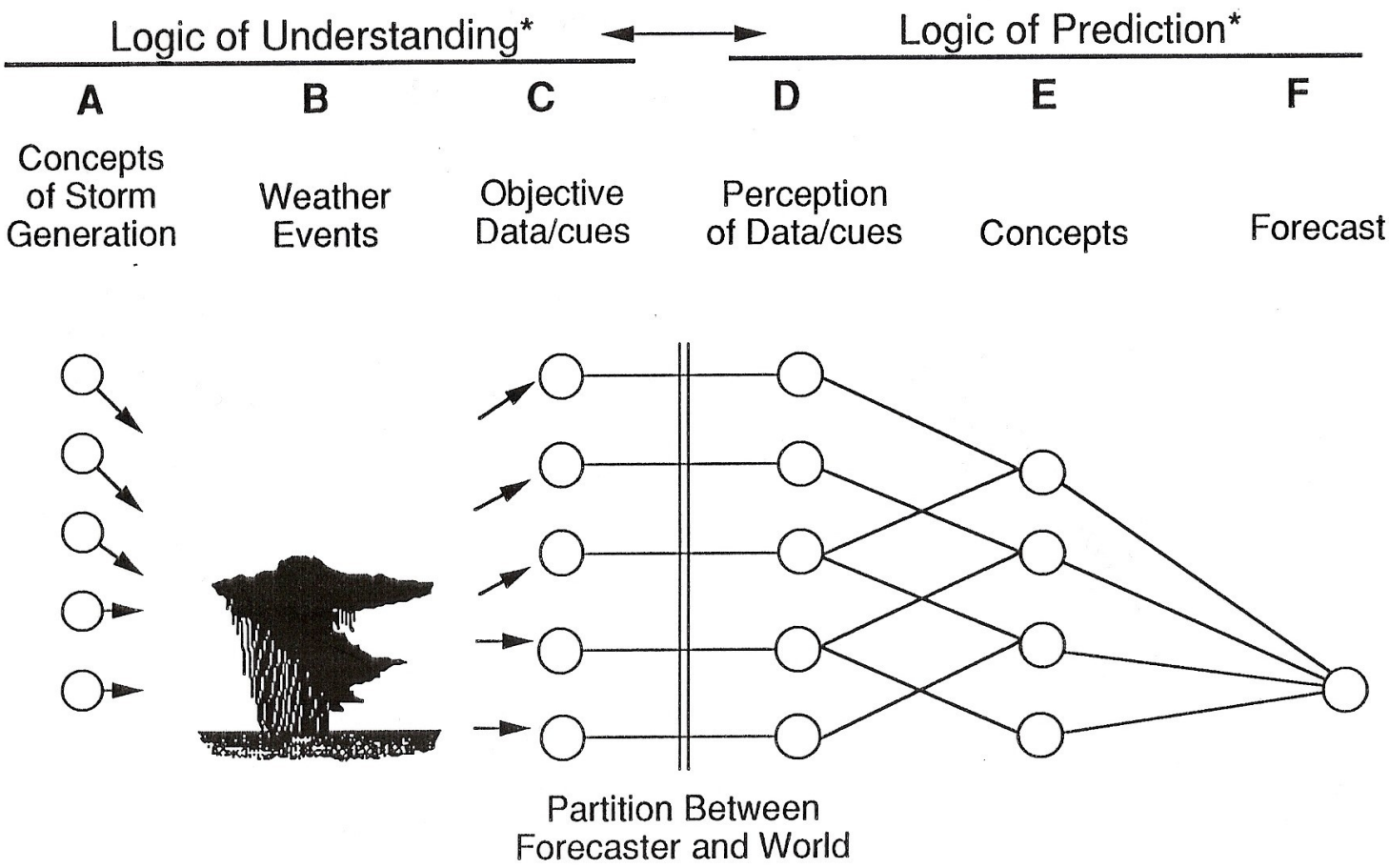
DOUBLE SYSTEM CASE



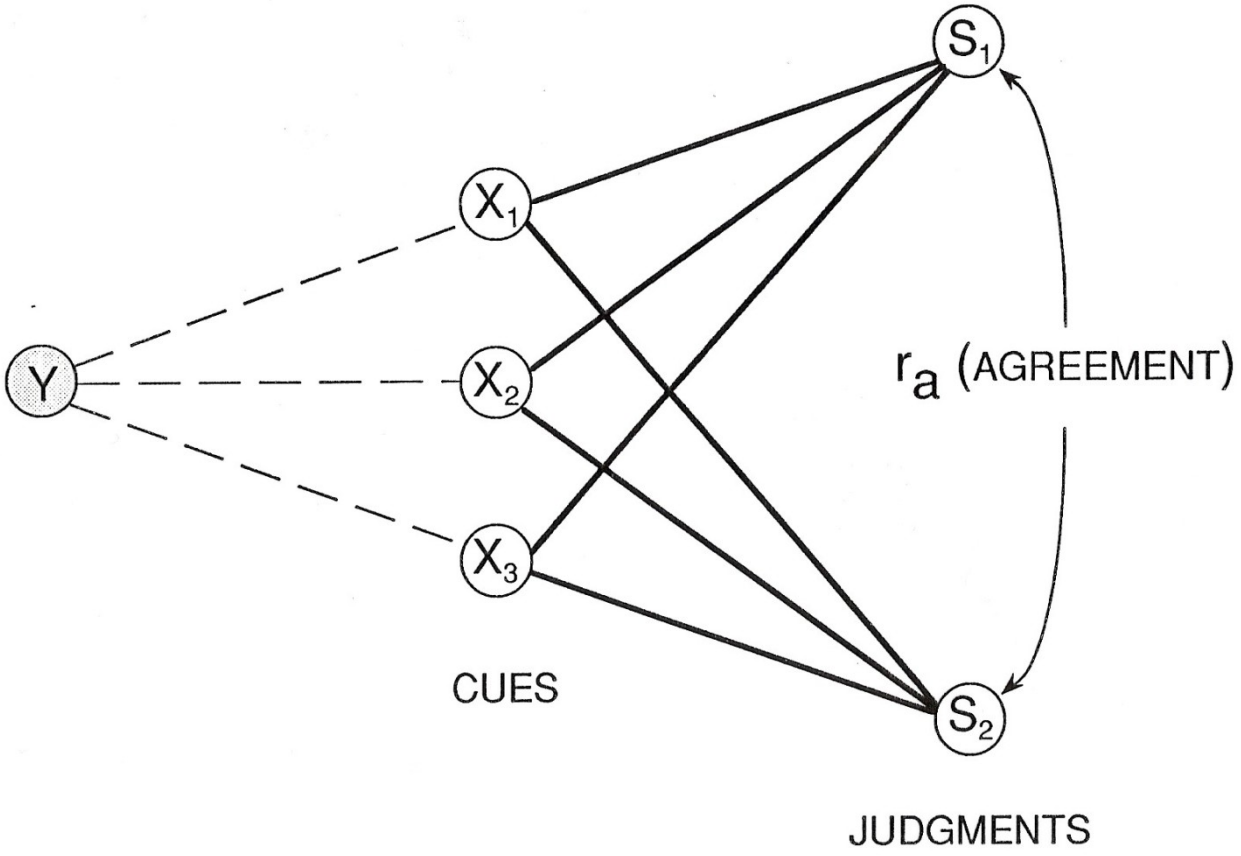
BRUNSWIK'S LENS MODEL

DOUBLE SYSTEM CASE

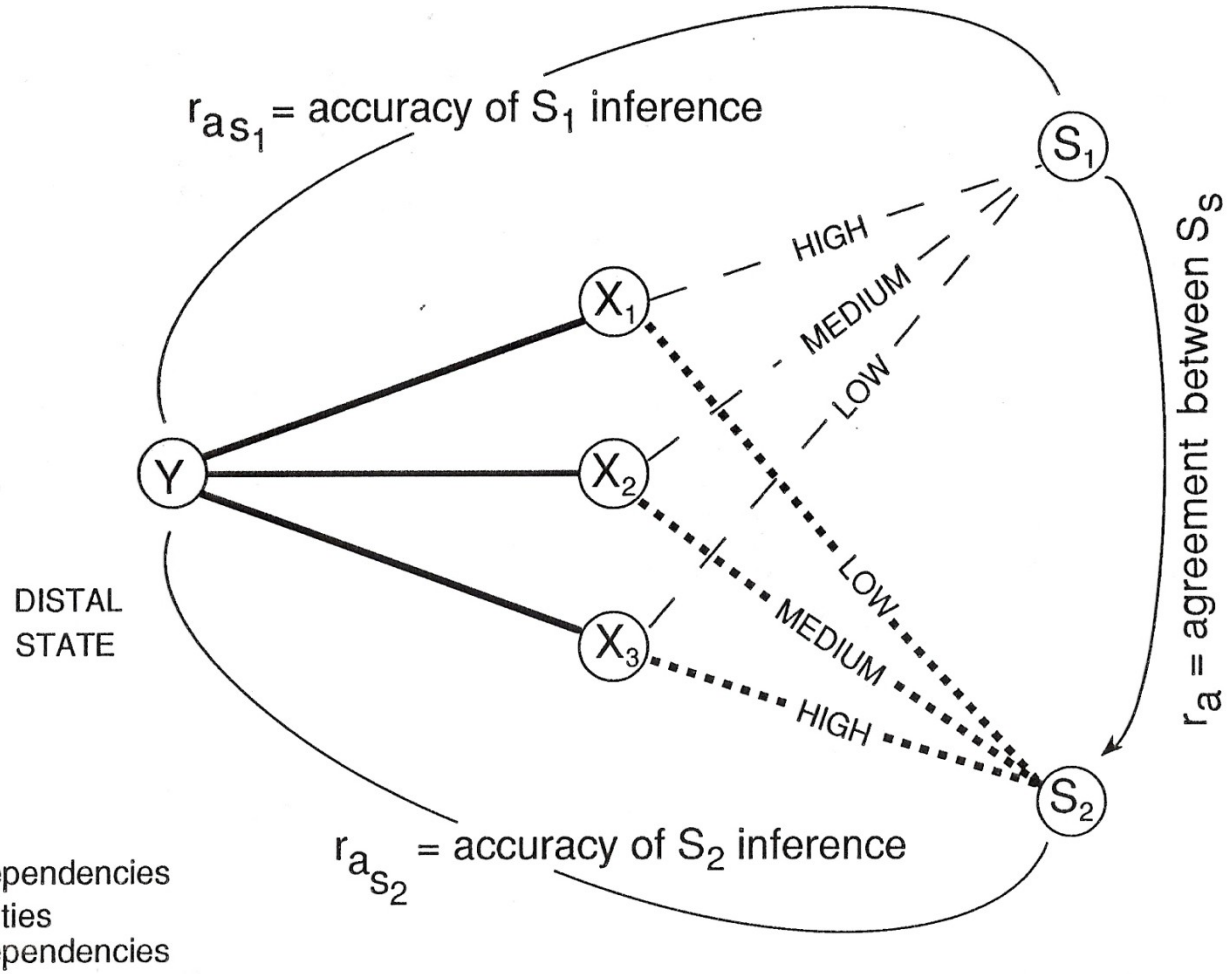
HIERARCHICAL MODEL



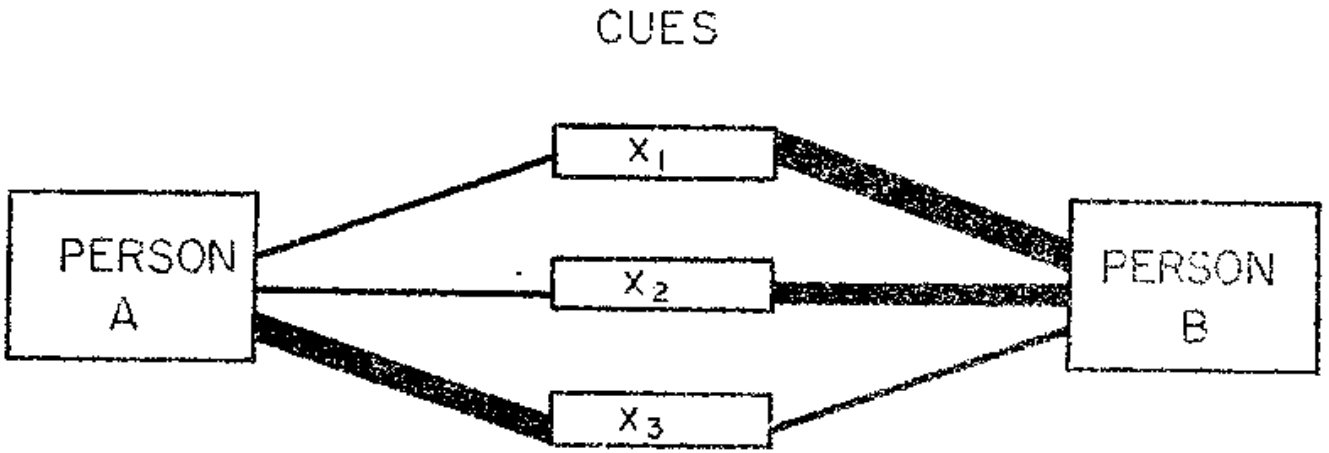
TRIPLE SYSTEM CASE



TRIPLE SYSTEM CASE
INTERPERSONAL LEARNING, INTERPERSONAL CONFLICT

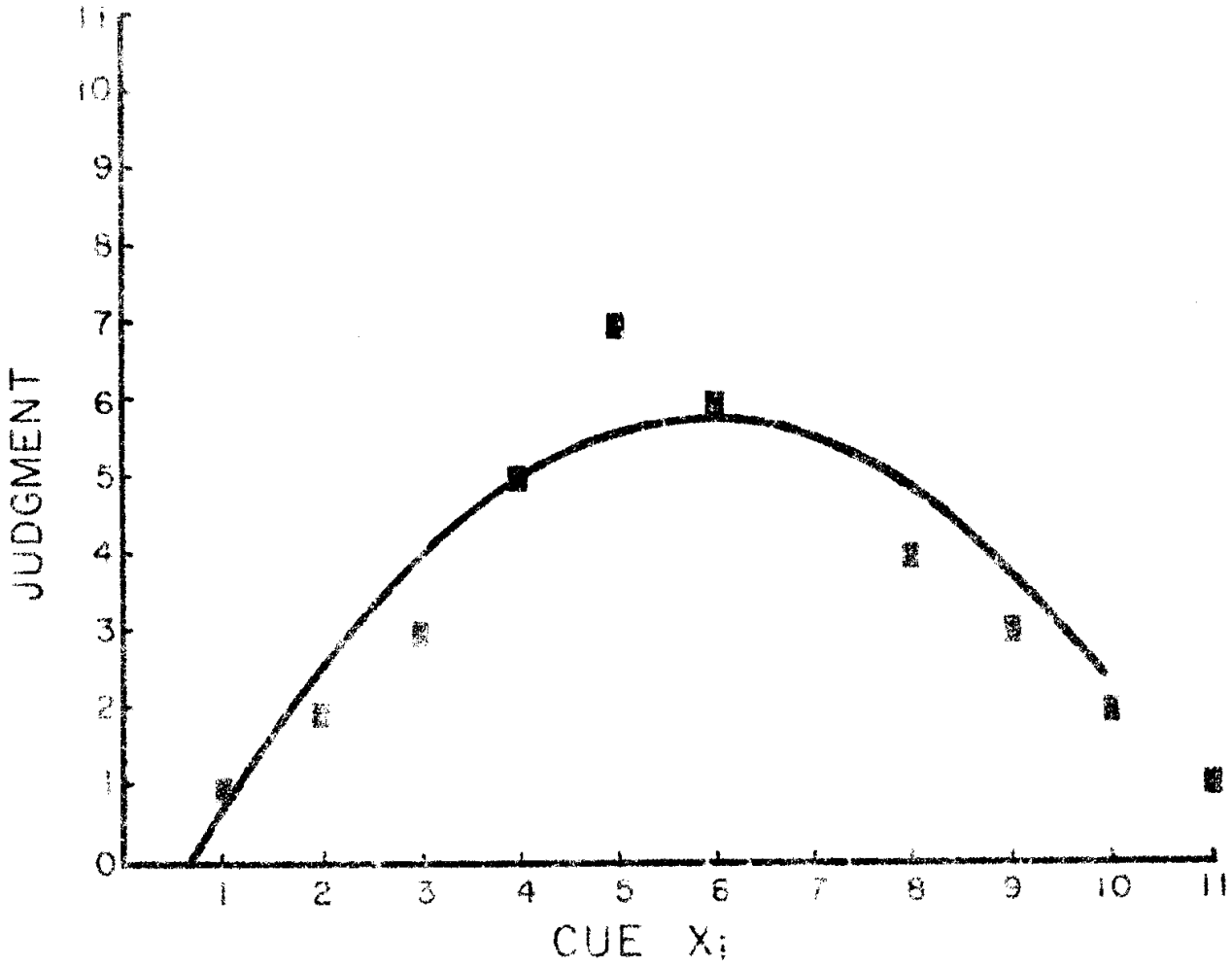


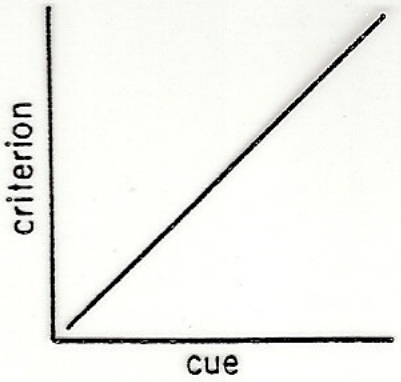
The POLICY program calculates the weights (the degree of utilization), which judges ascribe to individual cues



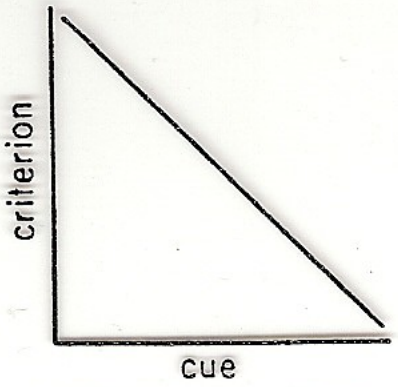
TOTAL ACHIEVEMENT	.290
LINEAR ACHIEVEMENT	.424
NONLINEAR ACHIEVEMENT	.399
DEPENDENCY MATCHING	.649
LINEARITY OF PERSON A	.090
LINEARITY OF PERSON B	.789

The POLICY program calculates by means of a regression analysis the realtions between cues and the distal variable (the goal)

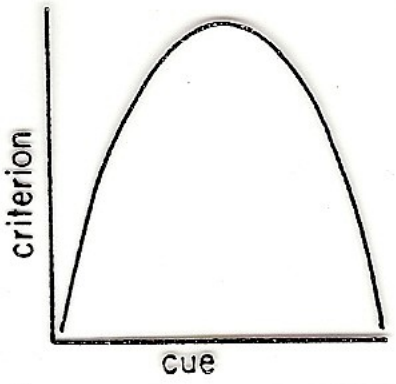




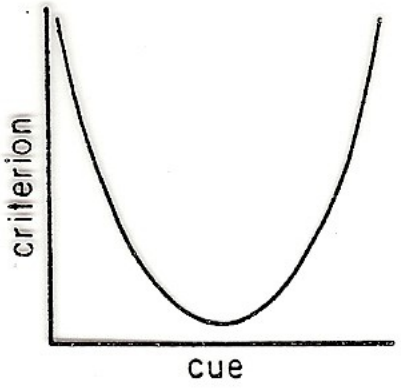
POSITIVE LINEAR



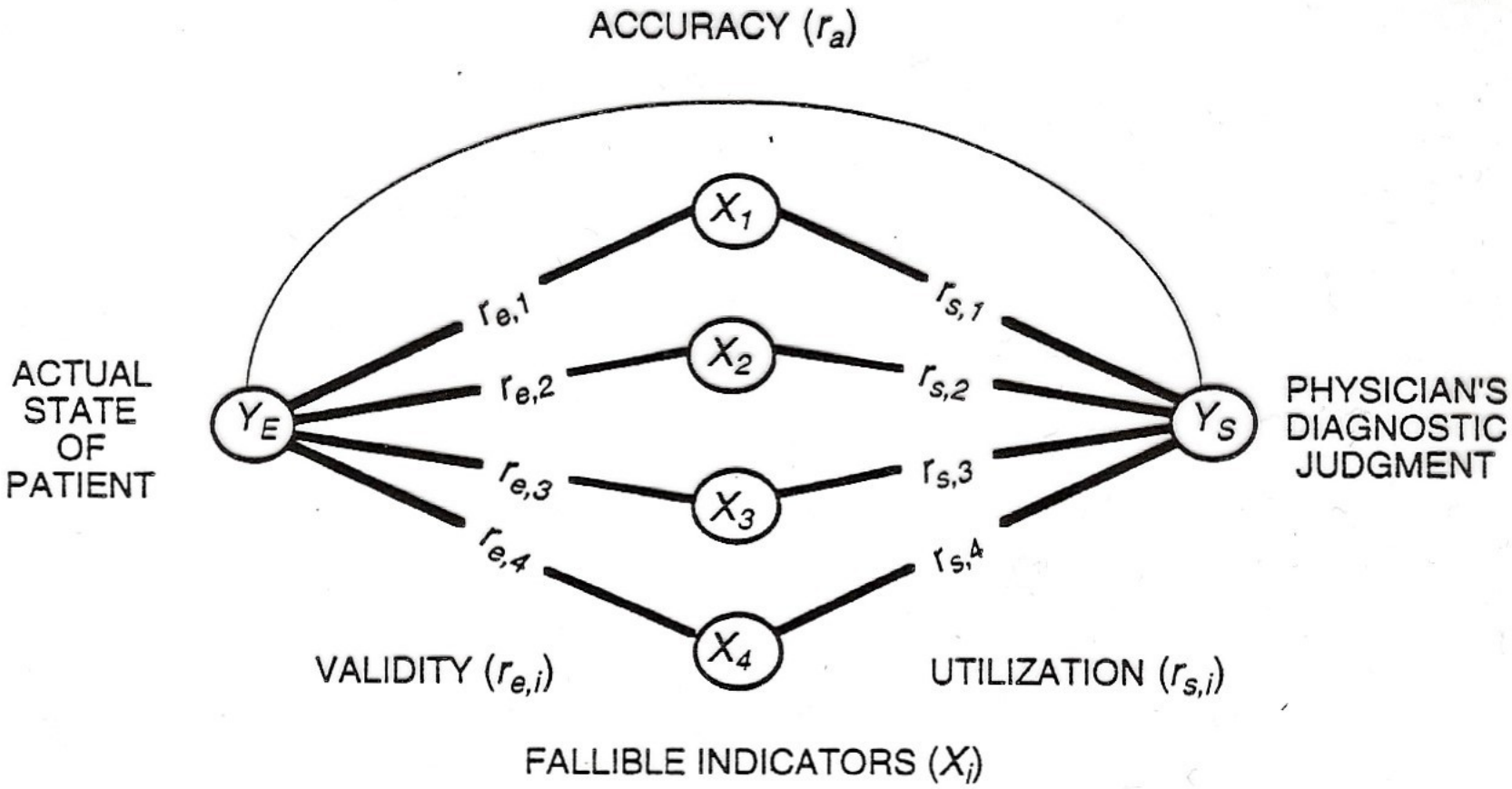
NEGATIVE LINEAR

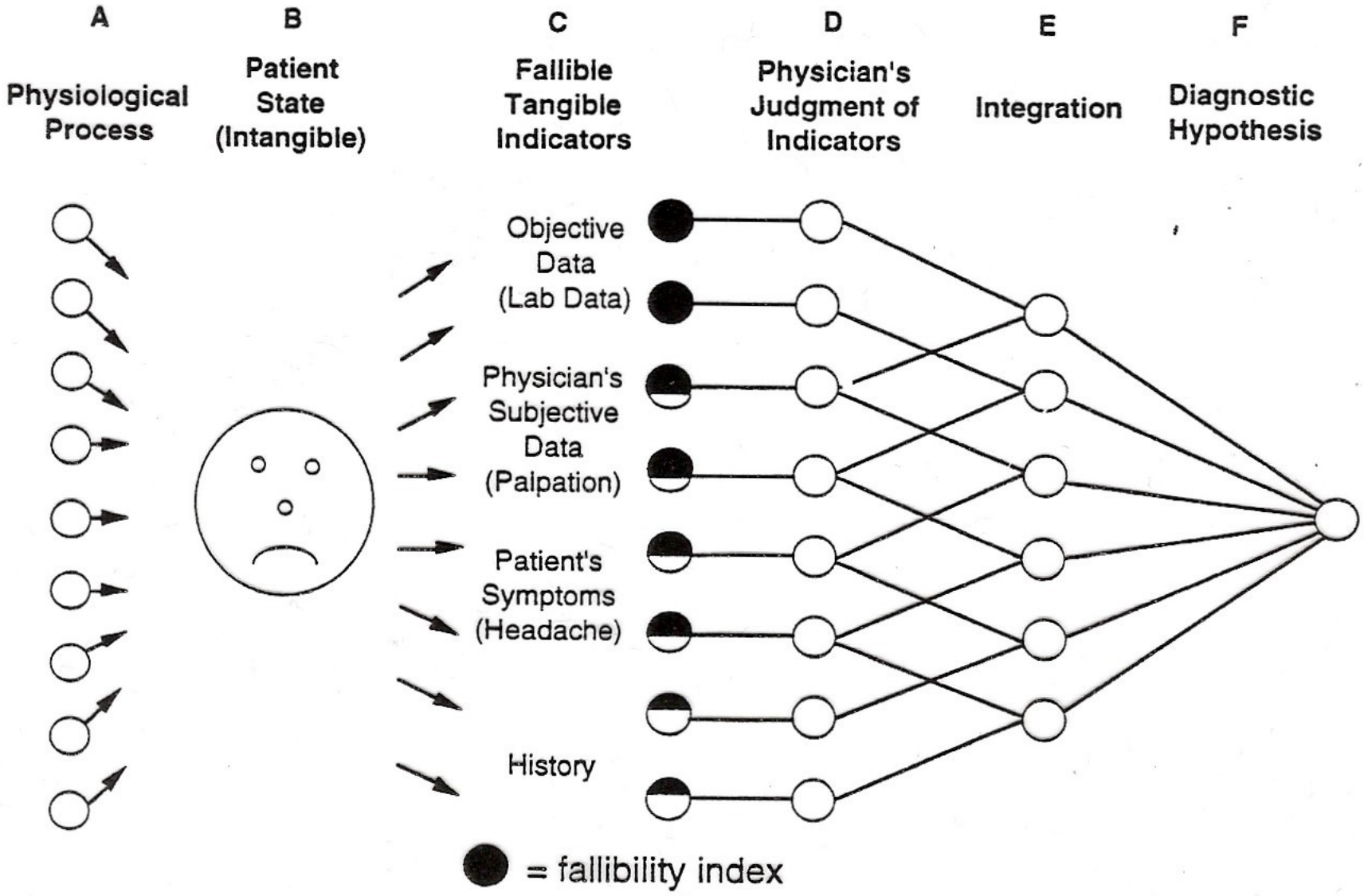


INVERTED U-SHAPED

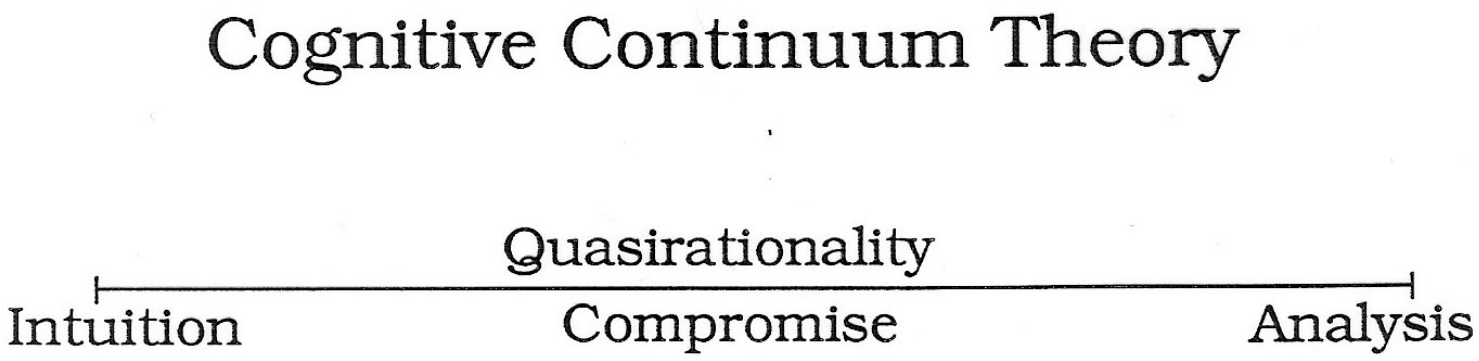


U-SHAPED


ACCURACY (r_a)
ACTUAL STATE OF PATIENT
Y_E
X_1
X_2
X_3
X_4
$r_{e,1}$
$r_{e,2}$
$r_{e,3}$
$r_{e,4}$
$r_{s,1}$
$r_{s,2}$
$r_{s,3}$
$r_{s,4}$
Y_S
PHYSICIAN'S DIAGNOSTIC JUDGMENT
VALIDITY ($r_{e,i}$)
UTILIZATION ($r_{s,i}$)
FALLIBLE INDICATORS (X_i)


A
Physiological Process
B
Patient State (Intangible)
C
Fallible Tangible Indicators
D
Physician's Judgment of Indicators
E
Integration
F
Diagnostic Hypothesis
Objective Data (Lab Data)
Physician's Subjective Data (Palpation)
Patient's Symptoms (Headache)
History
= fallibility index

Hammond came up with the following „cognitive continuum theory“:

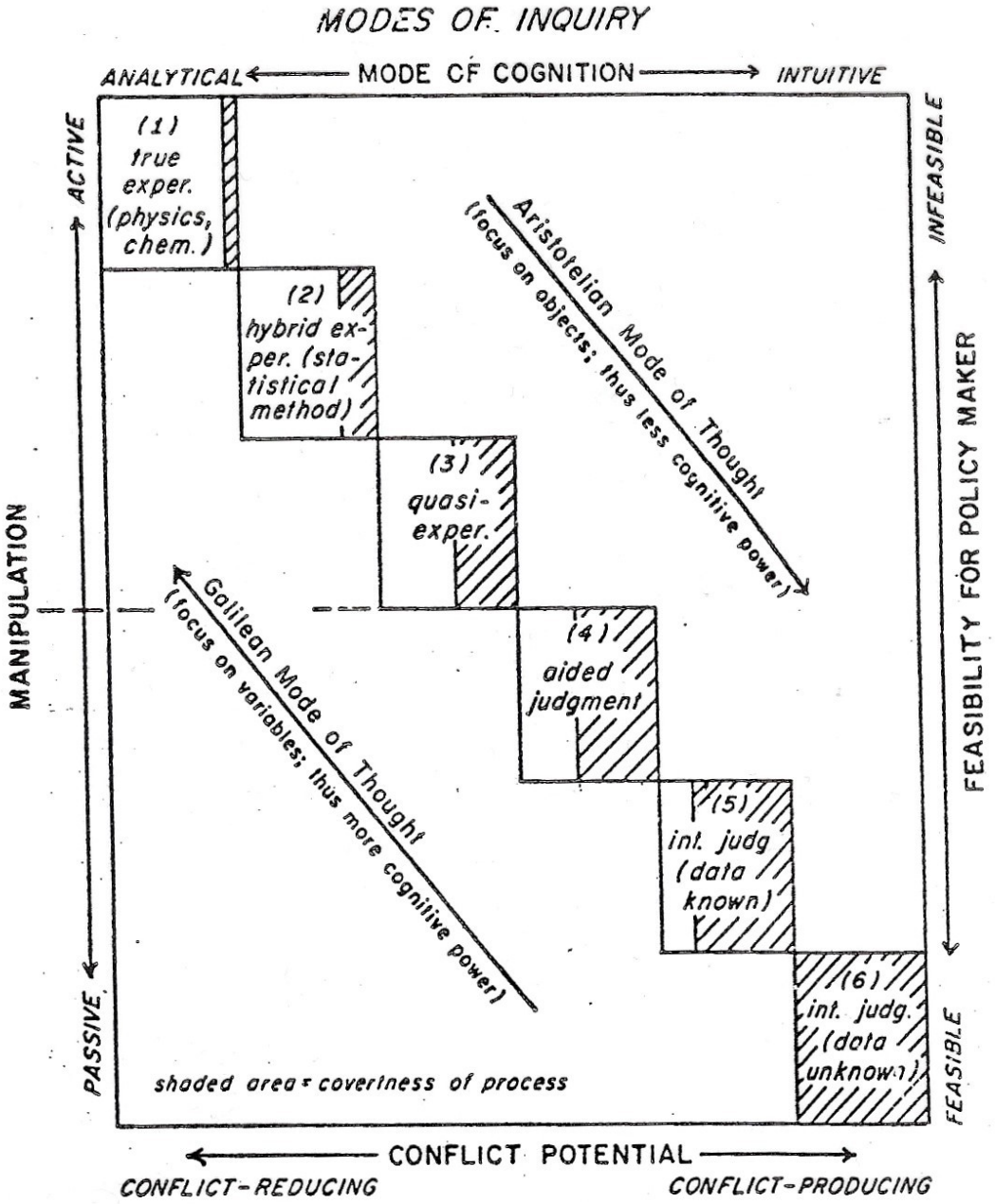


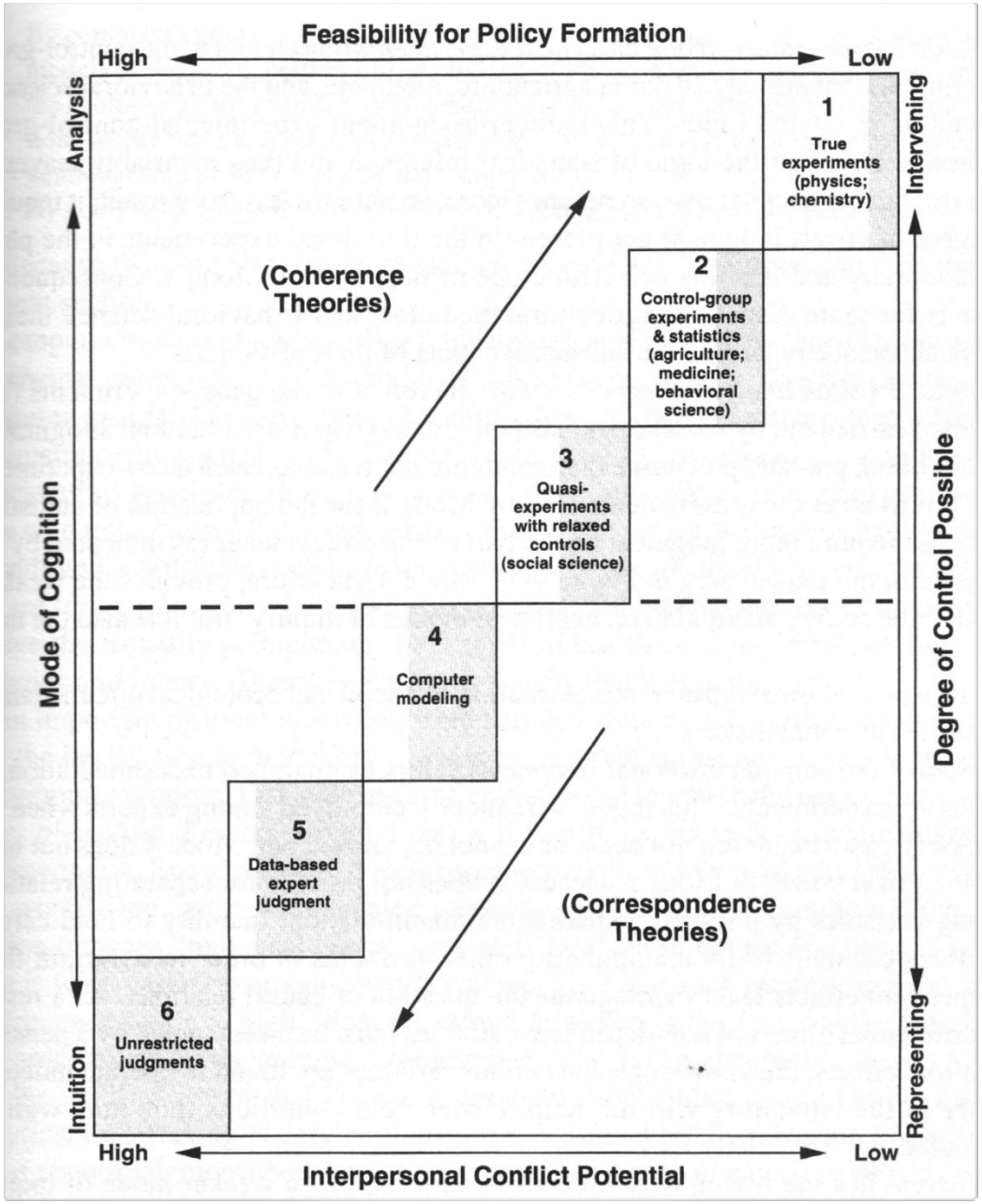
Three Premises

Various modes, or forms, of cognition can be ordered in relation to one another on a *continuum* that is marked by intuitive cognition at one pole and analytical cognition at the other, in contrast to the traditional dichotomy, and antinomy, that has existed between these modes of cognition.

The forms of cognition that lie on the continuum between intuition and analysis include elements of *both* intuition and analysis and are included under the term *quasirationality*. This is the most common form of cognition: It is known to the lay person as "common sense."

Cognitive *tasks* can be *ordered* on a continuum with regard to their capacity to induce intuition, quasirationality, and analytical cognition.


MODES OF INQUIRY
ANALYTICAL
MODE OF COGNITION
INTUITIVE
ACTIVE
PASSIVE
MANIPULATION
INFEASIBLE
FEASIBLE
FEASIBILITY FOR POLICY MAKER
(1) true exper. (physics, chem.)
(2) hybrid exper. (statistical method)
(3) quasi-exper.
(4) aided judgment
(5) int. judg (data known)
(6) int. judg. (data unknown)
Aristotelian Mode of Thought (focus on objects; thus less cognitive power)
Galilean Mode of Thought (focus on variables; thus more cognitive power)
shaded area = coerciveness of process
CONFLICT POTENTIAL
CONFLICT-REDUCING
CONFLICT-PRODUCING



Kahneman´s „slow" System 2

Kahneman´s „fast" System 1

Properties of Intuition and Analysis

(Hammond, Hamm, Grassia, & Pearson, 1987)

	Intuition	Analysis
Cognitive Control	low	high
Rate of Data Processing	rapid	slow
Conscious Awareness	low	high
Organizing Principle	weighted average	task specific
Errors	normally distributed	few, but large
Confidence	high confidence in answer; low confidence in method	low confidence in answer; high confidence in method

ELABORATION OF TASK-COGNITION RELATION

(Hammond, Hamm, Grassia, & Pearson, 1987)

TASK CHARACTERISTIC	INTUITION-INDUCING STATE OF TASK CHARACTERISTIC	ANALYSIS INDUCING STATE OF TASK CHARACTERISTIC
1. Number of Cues	large (> 5)	small
2. Measurement of cues	perceptual measurement	objective, reliable measurement
3. Distribution of cue values	continuous, highly variable distribution	unknown distribution; cues are dichotomous; values are discrete
4. Redundancy among cues	high redundancy	low redundancy
5. Decomposition of task	low	high
6. Degree of certainty in task	low certainty	high certainty
7. Relation between cues and criterion	linear	nonlinear
8. Weighting of cues in environmental model	equal	unequal
9. Availability of orga-izing principle	unavailable	available
10. Display of cues	simultaneous display	sequential display
11. Time period	brief	long

Some Predictions

1

Task properties induce corresponding cognitive processes; closer correspondence results in better performance.

2

Errors produced by analytical cognition (or systems) will be extreme; not so for intuitive cognition.

3

Analytical cognition does not always provide a ceiling for performance

[See Hammond, K. R., Hamm, R. M., Grassia, J., & Pearson, T. (1987). Direct comparison of the efficacy of intuitive and analytical cognition in expert judgment. *IEEE Transactions on Systems, Man, and Cybernetics, SMC-17*(5), 753-770.]

Goals

Correspondence Theories

Study *accuracy* of judgments of empirical events from multiple fallible indicators.

Lens Model
Cognitive Continuum Theory
e.g., highway engineers' judgments of highway safety

Coherence Theories

Study match of probability judgments with answers from mathematical models (e.g., Bayes' Theorem)

e.g., Gambler's Fallacy
Similarity

Kahneman (Twersky): „Thinking Slow and Fast“

Need for Expansion

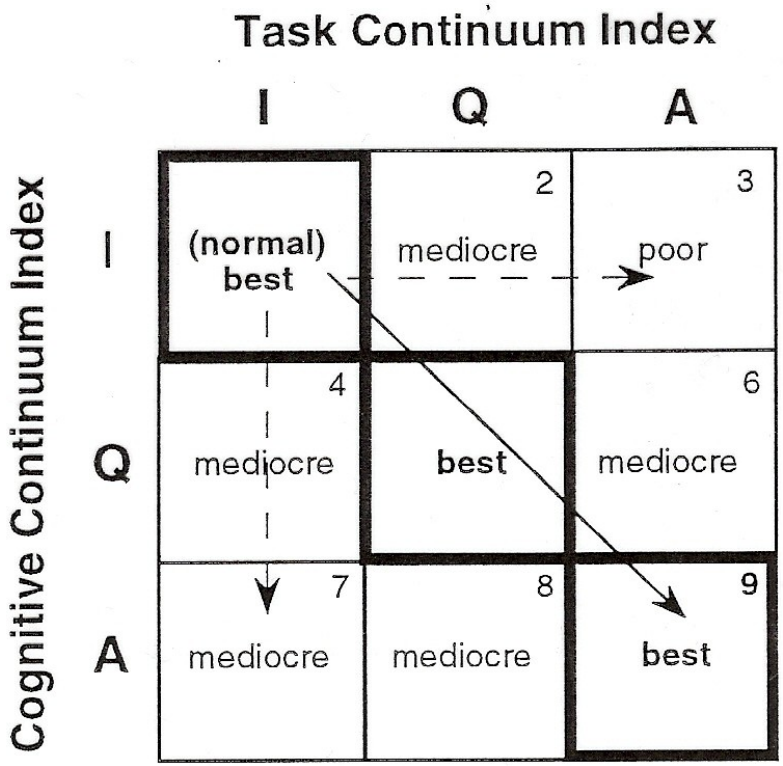
Dynamic Cognition

Cognitive activities *move* along the intuitive-analytical continuum over time; as they do so the relative contributions to cognition of intuitive and analytic components of quasirationality will change. Successful cognition inhibits movement, failure stimulates it.

Inclusion of Coherence Research

Human cognition is capable of pattern recognition and the use of functional relations.

Film strips – intuition inducing
Bar graphs – quasi Rationality inducing
Fomulas – analysis inducing



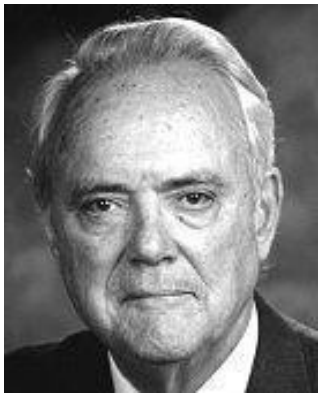
The highway design study

DEPTH TASK CHARACTERISTICS		SURFACE TASK CHARACTERISTICS		
		Film Strips (Intuition Inducing) I	Bar Graphs (Quasi Rationality Inducing) Q	Formulas (Analysis Inducing) A
	Aesthetics (Intuition Inducing) E	IE	QE	AE
	Safety (Quasi Rationality Inducing) S	IS	QS	AS
	Capacity (Analysis Inducing) C	IC	QC	AC

Design of Study

Other approaches to judgment and decision making.

Ward Edwards
(1927 – 2005)



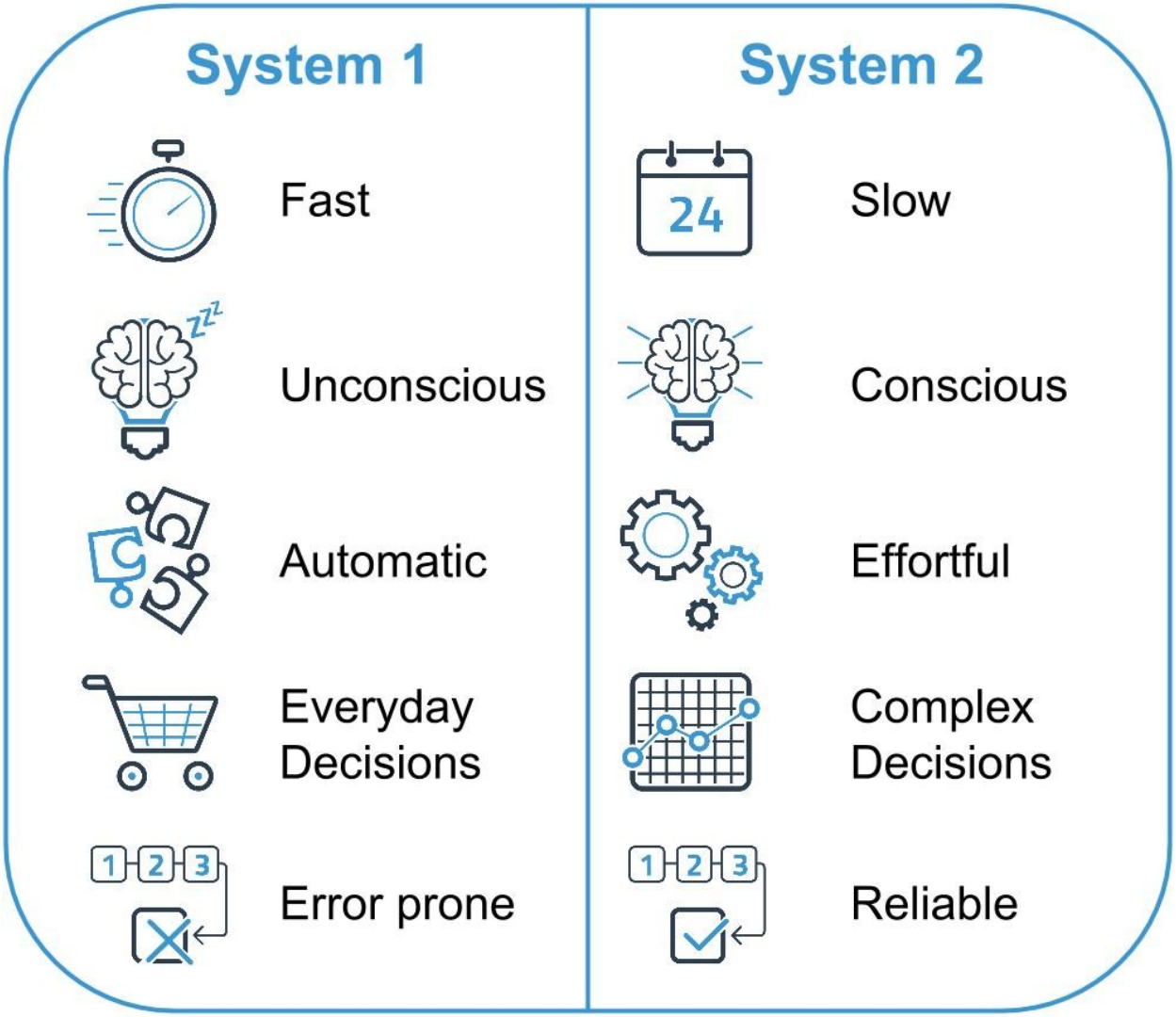
An American psychologist, prominent for work on decision theory and on the formulation and revision of beliefs. For twenty-two years, he directed the university's Social Science Research Institute as a professor of psychology and of industrial and systems engineering. Edwards retired from USC in 1995.
Edwards published more than one hundred journal articles and books including Decision Analysis and Behavioral Research and Utility Theories: Measurement and Applications.

Ward Edwards (1954) „The Theory of Decision Making"

In 1962, Edwards founded the Bayesian Research Conference with the aim to incorporate and apply Bayesian statistical methods and ideas to decision theory. His approach was adopted by many leading psychologists of the time including future Nobel Prize laureate, Daniel Kahneman. In the 1970s, Edwards began to look at social utilities and how to use their measurement for social decision making.

Daniel Kahneman´s and Amos Twersky´s study of judgment and decisions:

D.Kahneman: „Thinking Fast and Slow"



	System 1	System 2
Characteristics	Fast Effortless Unconscious Triggers emotions Associative Looks for patterns Looks for causation Creates stories to explain events	Slow Effortful Conscious Logical Deliberative Can handle abstract concepts
Advantages	Speed of response in a crisis Creativity through associations, so good for expansive thinking Easy completion of routine or repetitive tasks	Allows reflection and consideration of the "bigger picture", options, pros and cons, consequences Can handle logic, maths, statistics Good for reductive thinking
Disadvantages	Jumps to conclusions Unhelpful emotional responses Can make errors that are not detected and corrected, such as wrong assumptions, poor judgements, false causal links	Slow, so requires time Requires effort and energy, which can lead to decision fatigue

Mats Bjorkman: human judgment as related to Carl Popper´s „Three Worlds“

K.R.Hammond.: Human Judgment and Social Policy – Irreducible Uncertainity, Inevitable Error, Unavoidable injustice, Chapter.8

World 1 : the world of physical objects and states, the ecology

The correspondence competence; cccuracy of judgment (KRH) , intuition inclined, (System 1), pattern recognition ,

World 2 : Our subjective world. Perception, thinking, our cogitive systems, dispositions to act

The coherence competence; Rationality of judgment (Ward Edwards); functional analysis inclined (System 2),

World 3: the world of scientific concepts, problems and theories, „objective objects of thought“

Methodology:

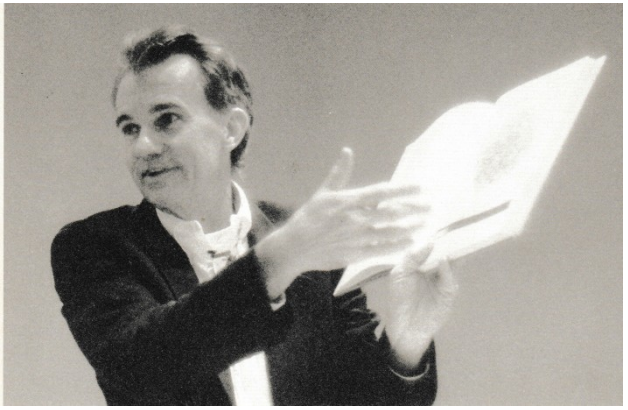
Representative design of experiments; *E.Brunswik. Modern computer „flight“ simulators*

Systematic design of experiments; *R.A.Fisher. one experimental variable…, exper. and control groups*

Helping to synthetize:
pictorial presentations as a tool to reveal non obvious relationships.

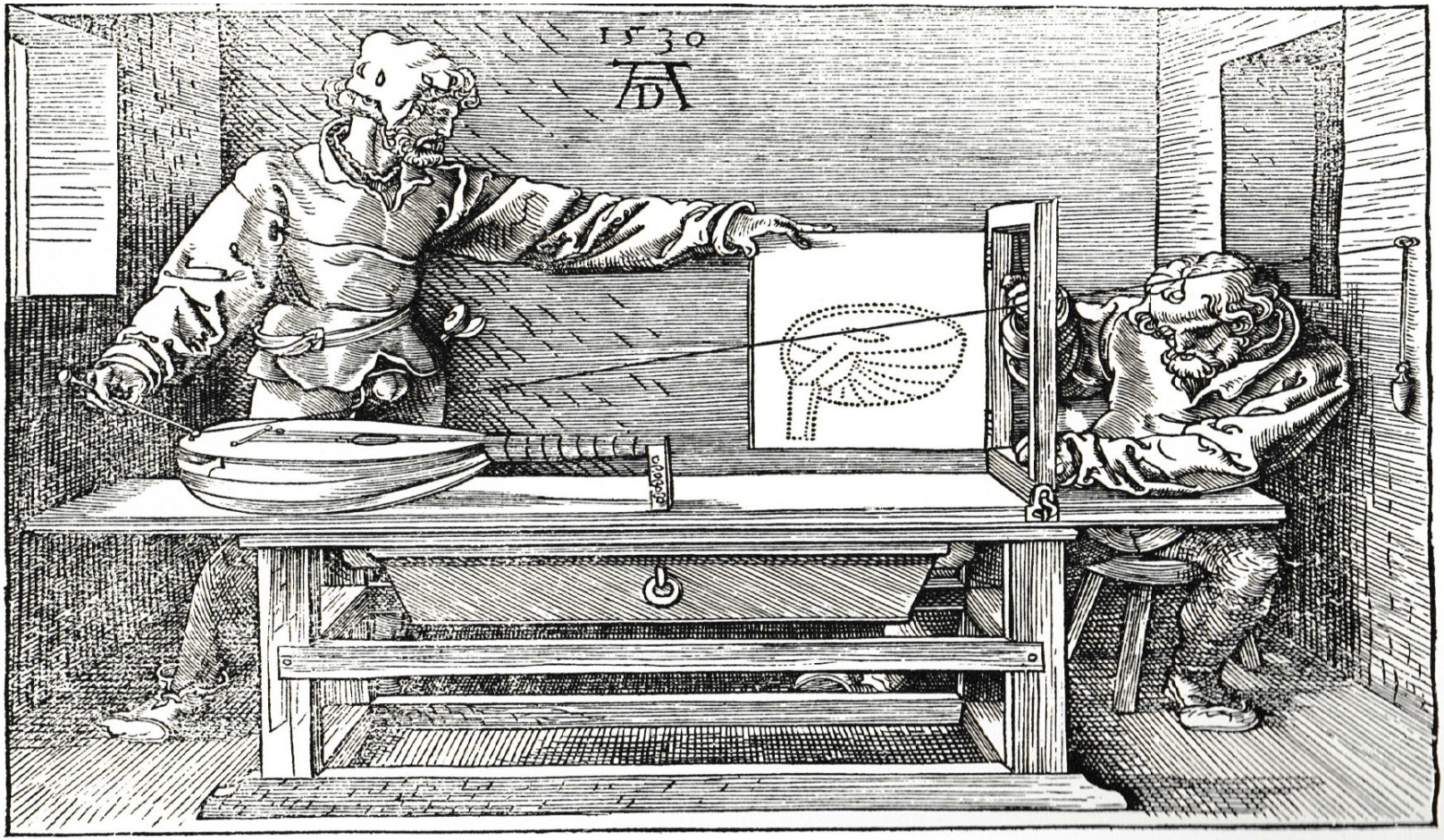
Three books

Graphic Press, Cheshire, Conn. :



Edward R. Tufte
1942 -

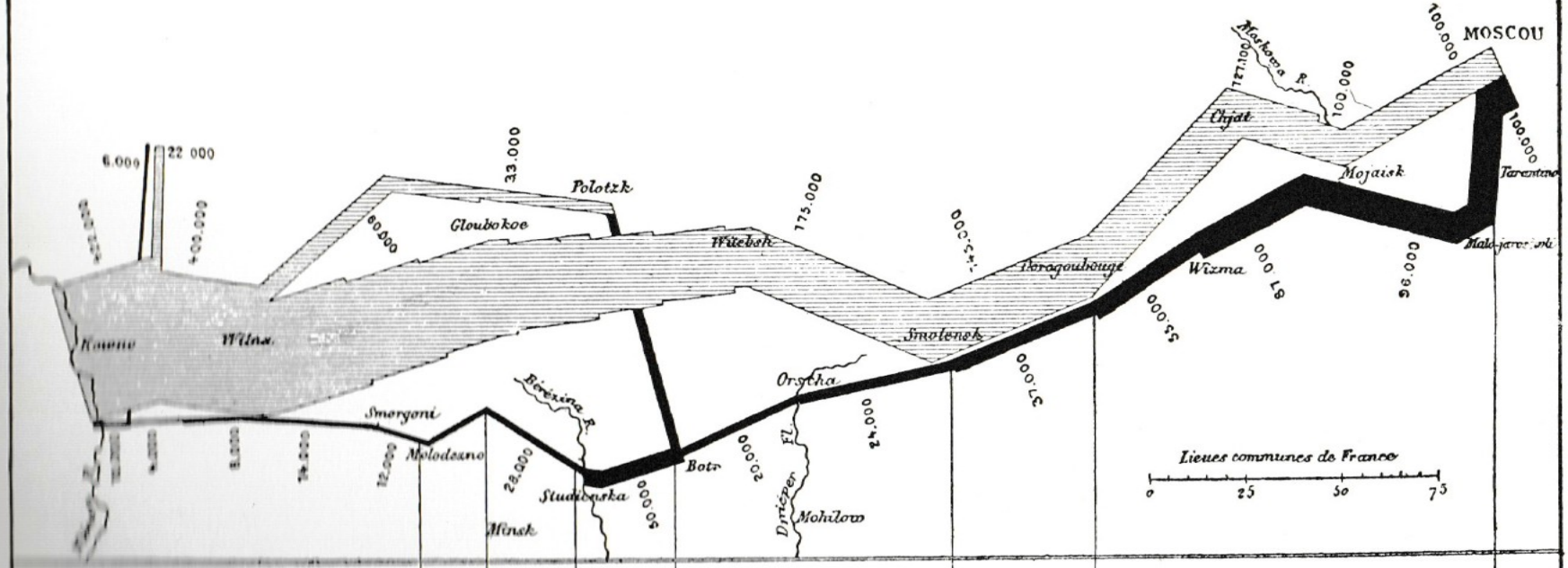
- **The Visual Display of Quantitative information (1983)**
- **Envisioning Information (1990)**
- **Visual Explanations images and quantities, evidence and narrative (1997)**



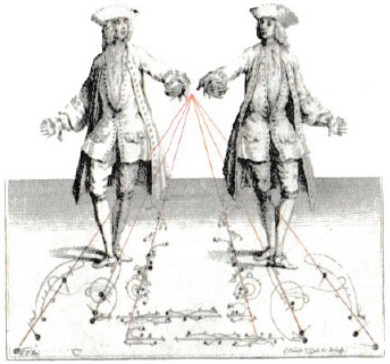
Albrecht Dürer, *Institutiones geometricae* (Paris, 1532), p. 185; the Latin edition of *Underweysung der Messung* [*A Course in the Art of Measurement*] (Nuremberg, 1525).

CARTE FIGURATIVE des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

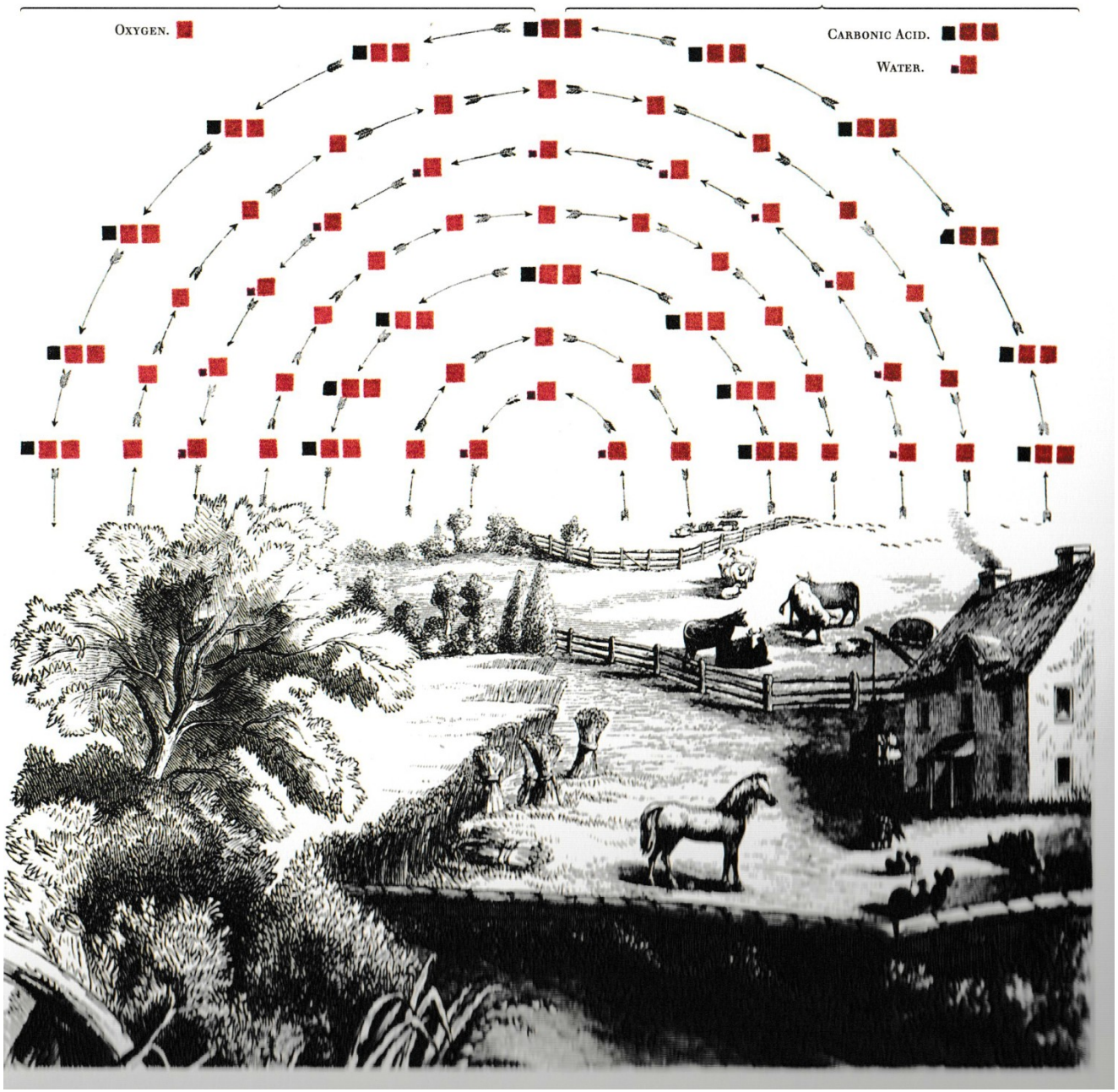
Dressée par **M. Minard**, *Inspecteur Général des Ponts et Chaussées en retraite.*



A comprehensive narrative description of a transport system requires a record of both time and spatial experiences. Here a complex network of routes is brought together with flight times and identification numbers in a brilliant map/schedule for the Czechoslovakia Air Transport Company in 1933. A playful and polished cover makes the brochure an exceptional union of graphic and information design.

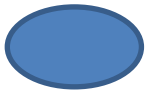


Kellom Tomlinson, *The Art of Dancing, Explained by Reading and Figures* (London, 1735), book I, plate XII.


Changes impressed by the Vegetable World upon the Atmosphere.
Changes impressed by the Animal World upon the Atmosphere.
Oxygen.
Carbonic Acid.
Water.

3 b: The nature of information and its processing; some related opinions ….

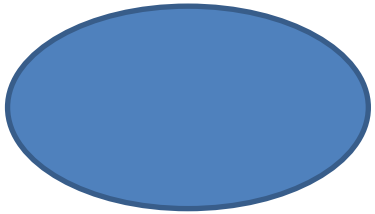
Analysis.



„Tangible", explicit kind of infomation, diffused by means of communication. The meaning of information is usually less dependent upon the context.

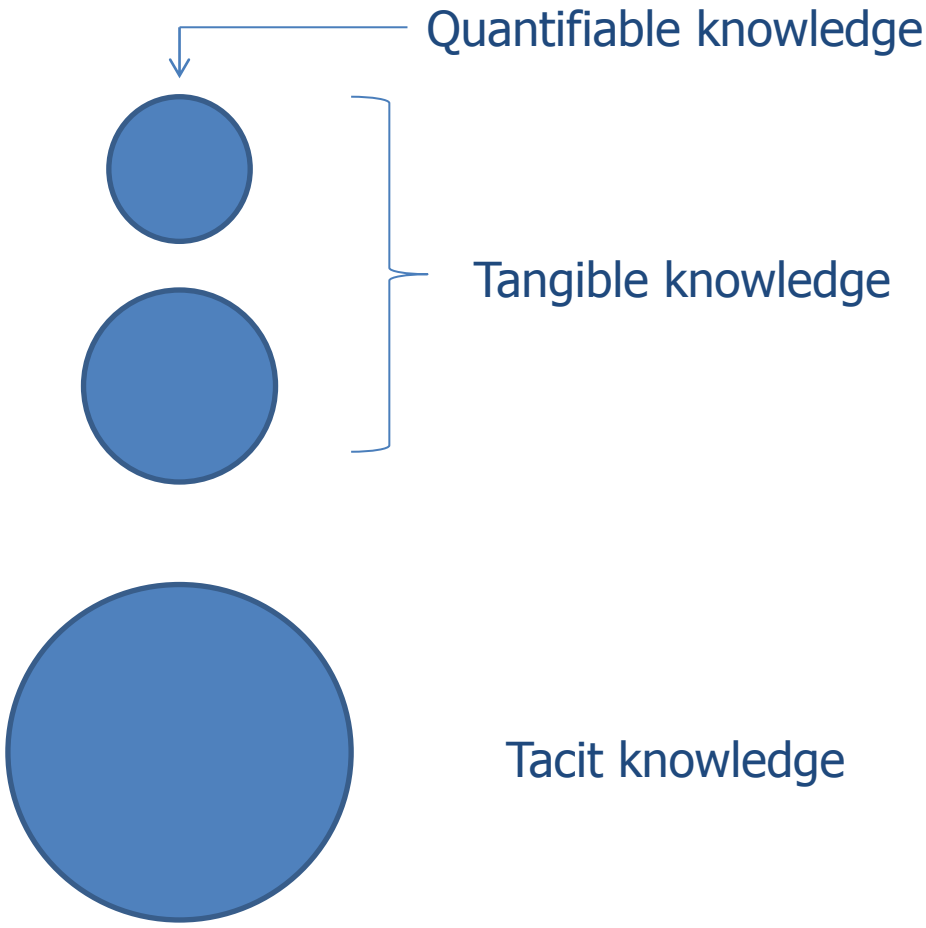
Michael Polanyi
1891-1976

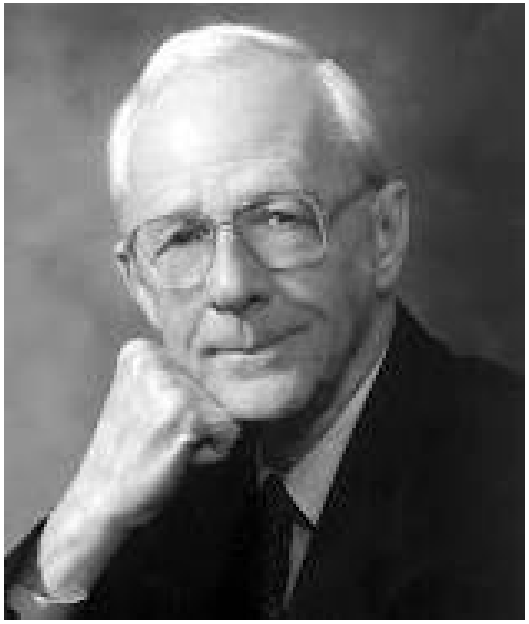
Intuition.



„Tacit" knowledge, skills, is rather of a very personal experience nature. It is difficult to communicate it, it gets shared differently. Most often it is story telling, metaphors, skills by dsimply imitation. The meaning may to a considerable extent depend upon the context.

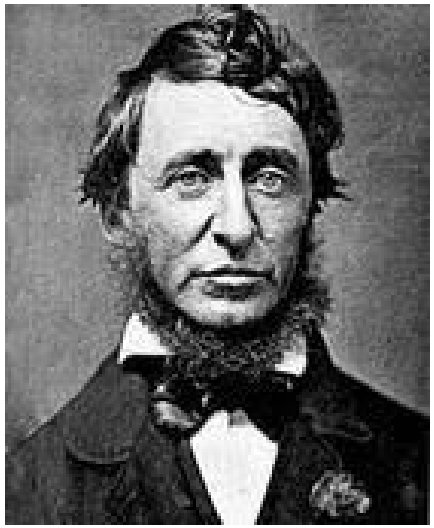
System dynamics modelling: systems´behavior is given by the structure of process interaction.
In the case of complex systems, most often we are not even eware of.





Jay Wright Forrester
1918 - 2016

„A percept turns into an information when we are able to ascribe any meaning to it. The meaning is, of course, determined by the econtext, the situation – which changes most of the time…“ (Lem, 1964, pp.?)
Summa Technologiae, published 1964

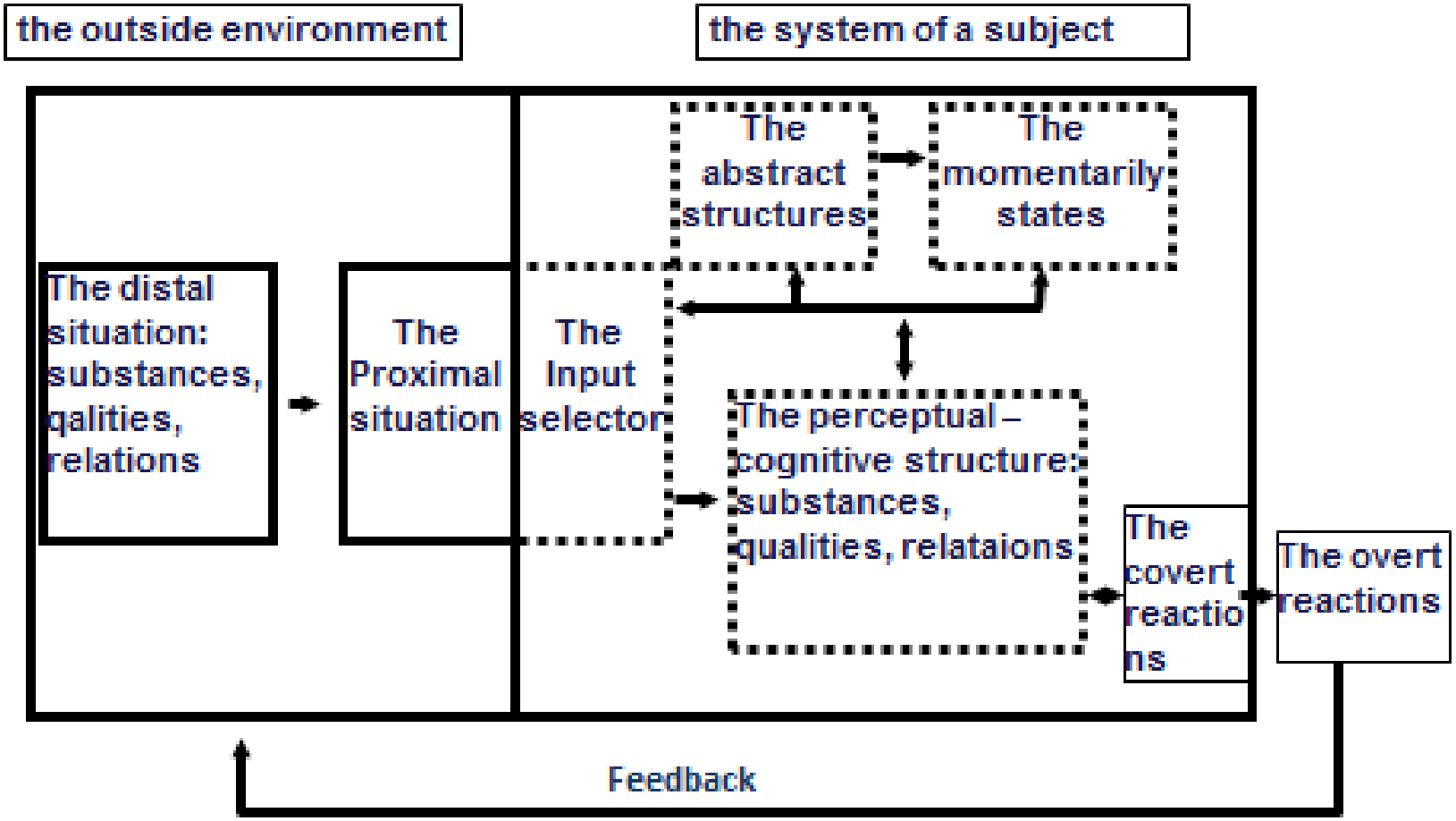


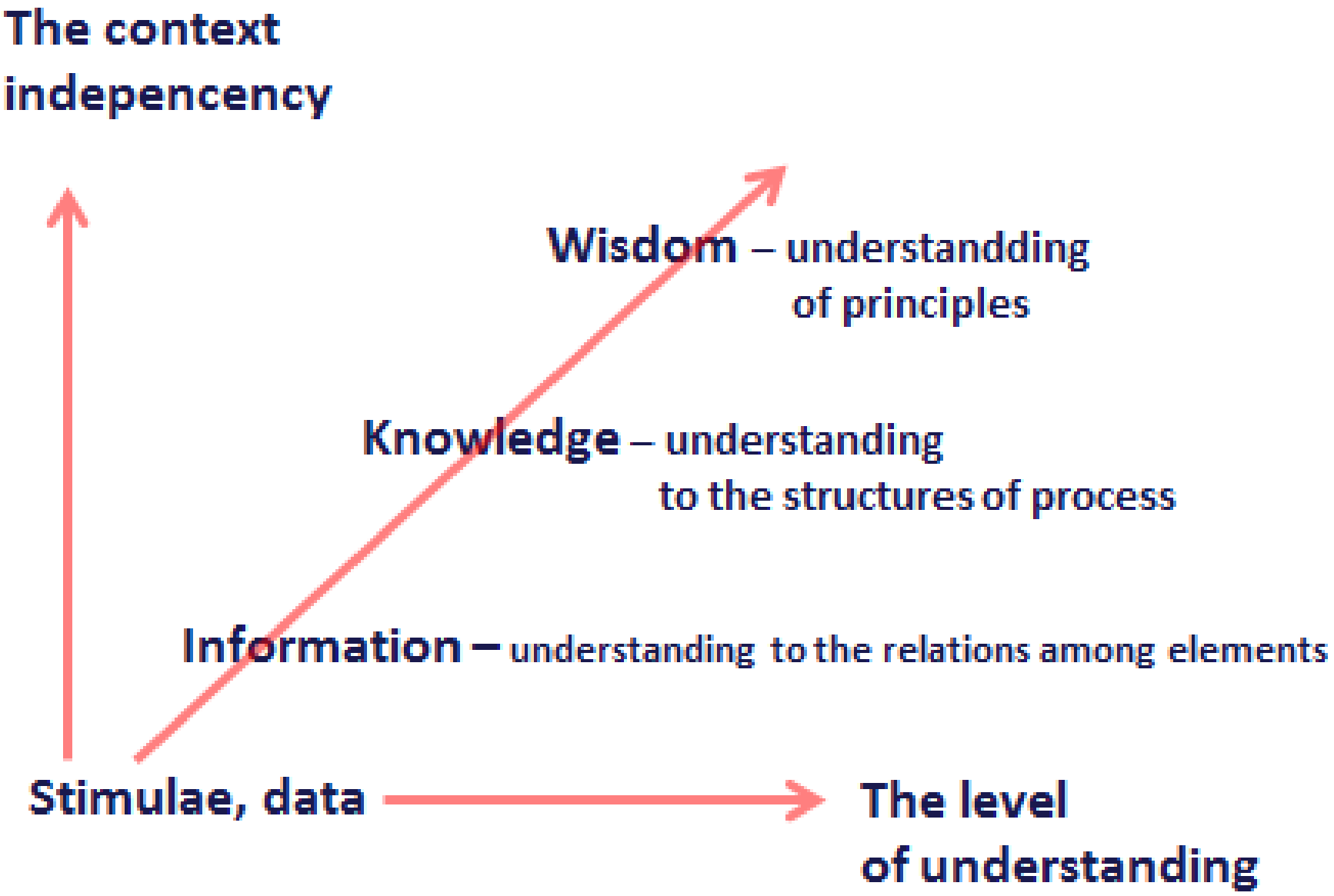
Henry David Thoreau
1818 - 1862

Stanislaw Lem
1932 - 2006

„What we look at is not that important. Important is what we see…“

An example of other model of perception (one of many simmilar ones (Nysted 1972)




The context
indepencency
Wisdom – understandding
of principles
Knowledge – understanding
to the structures of process
Information – understanding to the relations among elements
Stimulae, data
The level
of understanding