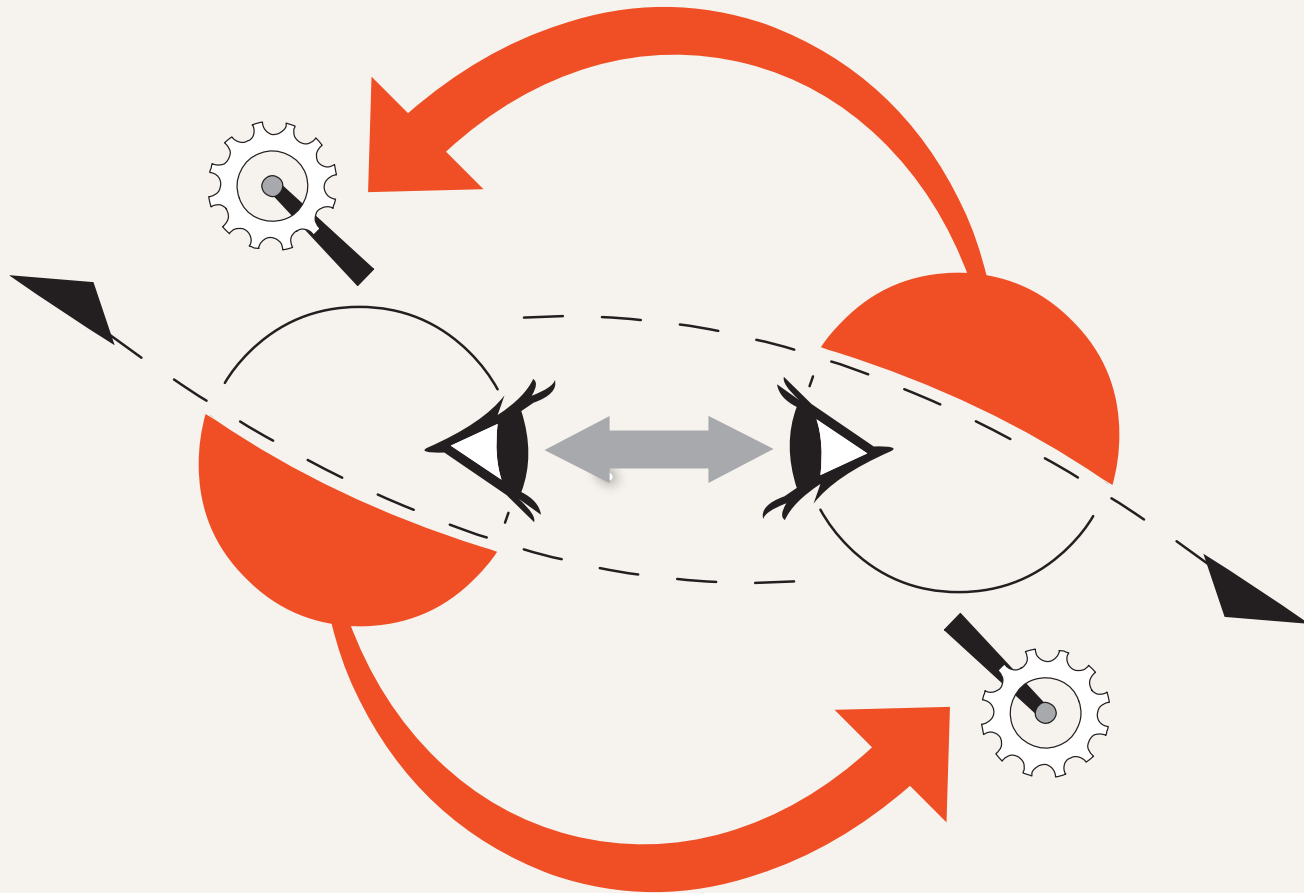


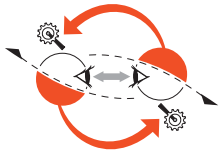
CYBERNETICS

CONVERSATION

DESIGN



CONVERSATION



cybernetics reviewed

Gordon Pask

double-loop architectures

conversation theory

applications

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CYBERNETICS

OR CONTROL AND
COMMUNICATION
IN THE ANIMAL
AND THE MACHINE

Norbert Wiener

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THE MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

THE TECHNOLOGY PRESS

JOHN WILEY & SONS, INC., NEW YORK

HERMANN et CIE, PARIS

CYBERNETICS

CIRCULAR CAUSAL AND FEEDBACK MECHANISMS
IN BIOLOGICAL AND SOCIAL SYSTEMS

*Transactions of the Tenth Conference
April 22, 23, and 24, 1953, Princeton, N. J.*

Edited by

HEINZ VON FOERSTER

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CHAMPAIGN, ILL.

Assistant Editors

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Research Laboratory of Electronics, Massachusetts Institute of Technology
Cambridge, Mass.

HEINZ VON FOERSTER, *Secretary*

Department of Electrical Engineering, University of Illinois
Champaign, Ill.

GREGORY BATESON

Veterans Administration Hospital
Palo Alto, Cal.

ALEX BAVELAS†

Department of Economics and Social Science, Massachusetts Institute of Technology
Cambridge, Mass.

JULIAN H. BIGELOW

Department of Mathematics, Institute for Advanced Study
Princeton, N. J.

HENRY W. BROSN

Department of Psychiatry, University of Pittsburgh School of Medicine
Pittsburgh, Pa.

LAWRENCE K. FRANK

72 Peery St., New York, N. Y.

RALPH W. GERARD†

Departments of Psychiatry and Physiology, University of Illinois College of Medicine
Chicago, Ill.

GEORGE EVELYN HUTCHINSON

Department of Zoology, Yale University
New Haven, Conn.

HEINRICH KLÜVER

Division of the Biological Sciences, University of Chicago
Chicago, Ill.

LAWRENCE S. KUBIE

Department of Psychiatry and Mental Hygiene, Yale University School of Medicine
New Haven, Conn.

RAFAEL LORENTE de NÓ†

Rockefeller Institute for Medical Research
New York, N. Y.

DONALD G. MARQUIS

Department of Psychology, University of Michigan
Ann Arbor, Mich.

MARGARET MEAD

American Museum of Natural History
New York, N. Y.

F. S. C. NORTHROP

Department of Philosophy, Yale University
New Haven, Conn.

* This is the final conference.

† Absent.

WALTER PITTS

Research Laboratory of Electronics, Massachusetts Institute of Technology
Cambridge, Mass.

ARTURO S. ROSENBLUETH†

Department of Physiology, Instituto Nacional de Cardiología
Mexico City, D. F., Mexico

LEONARD J. SAVAGE

Committee on Statistics, University of Chicago
Chicago, Ill.

T. C. SCHNEIRLA

American Museum of Natural History
New York, N. Y.

HANS LUKAS TEUBER

Department of Psychiatry and Neurology, New York University College of Medicine
New York, N. Y.

GERHARDT VON BONIN

Department of Anatomy, University of Illinois College of Medicine
Chicago, Ill.

GUESTS

VAHE E. AMASSIAN

Department of Physiology and Biophysics, University of Washington
School of Medicine
Seattle, Wash.

Y. BAR-HILLEL

Department of Philosophy, Hebrew University
Jerusalem, Israel

JOHN R. BOWMAN

Department of Physical Chemistry
Mellon Institute of Industrial Research, University of Pittsburgh
Pittsburgh, Pa.

YUEN REN CHAO

Department of Oriental Languages, University of California
Berkeley, Cal.

JAN DROOGLEEVER-FORTUYN

Department of Neurology, University of Groningen
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W. GREY-WALTER

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HENRY QUASTLER

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† Absent.

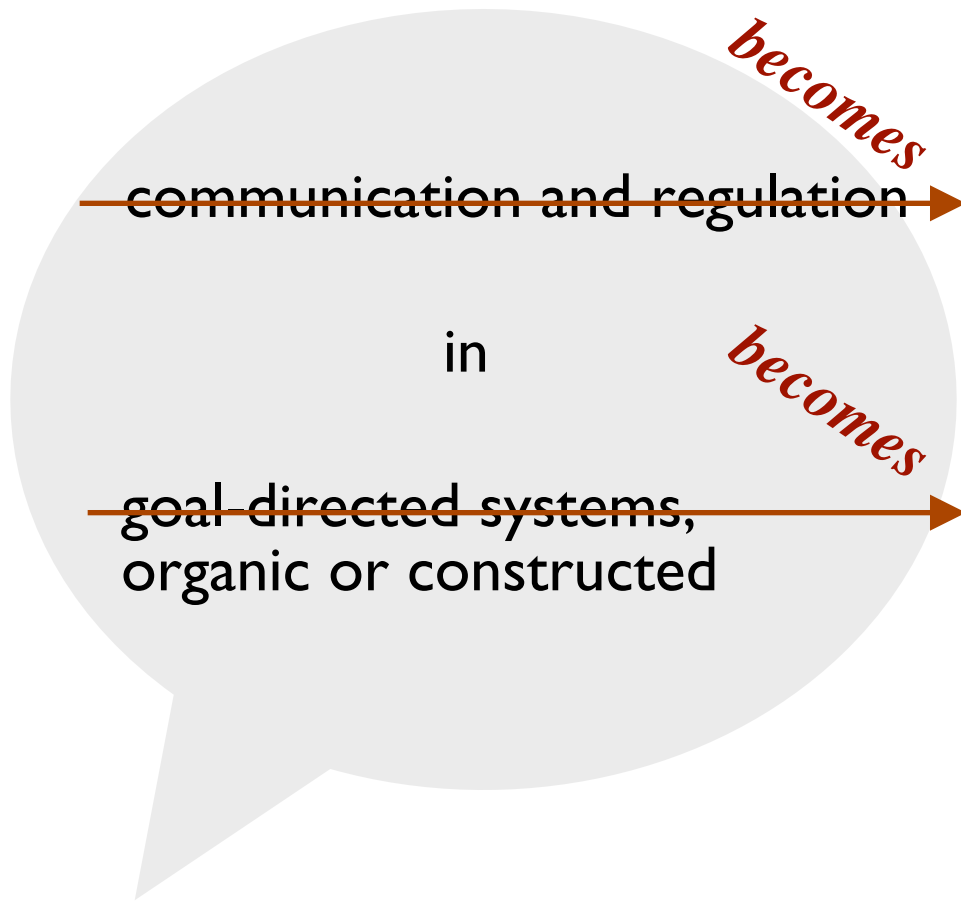


communication and regulation

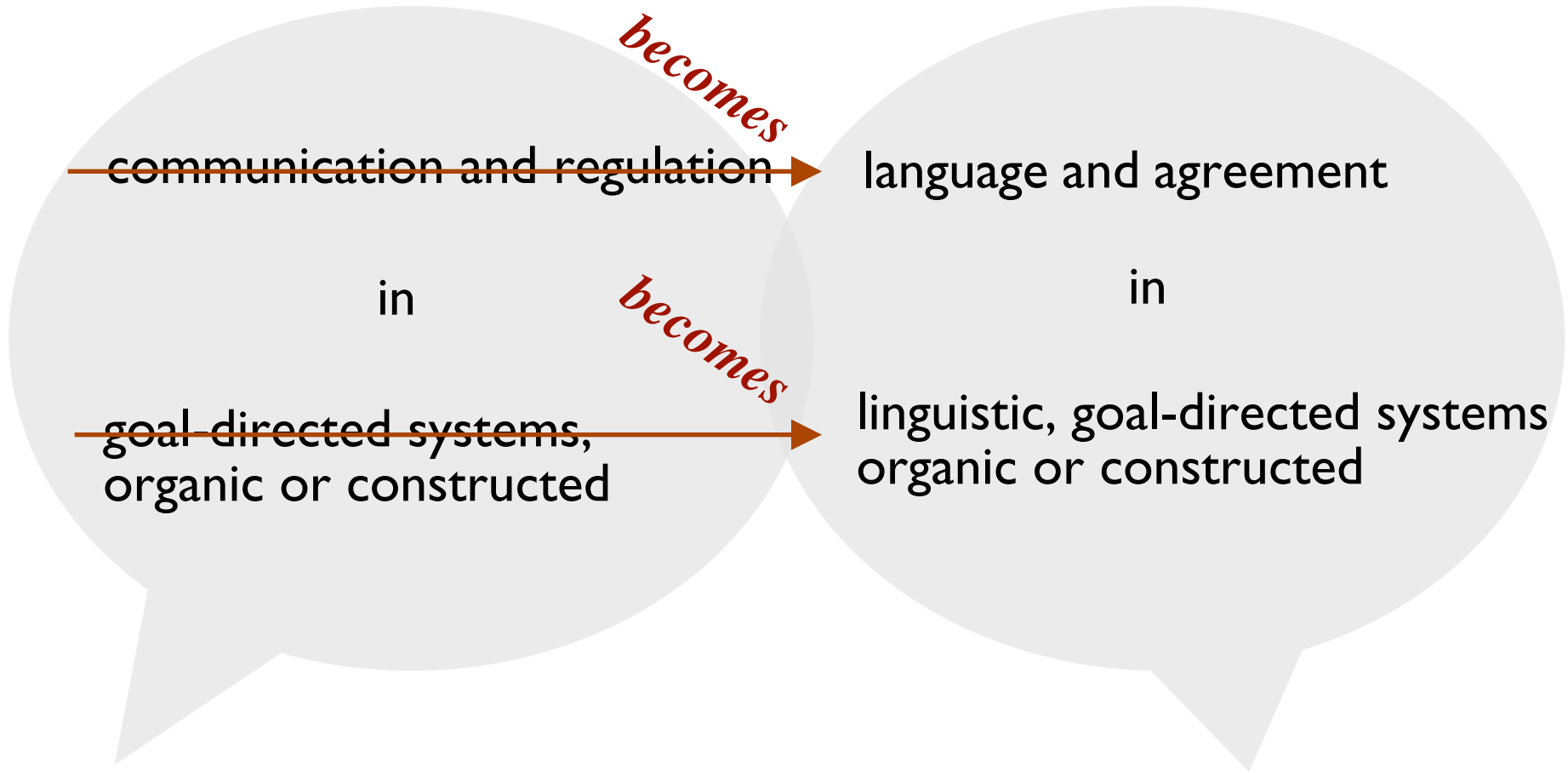
in

goal-directed systems,
organic or constructed

first-order cybernetics



first-order cybernetics



first-order cybernetics

The diagram consists of two overlapping light gray speech bubbles. The left bubble is associated with 'first-order cybernetics' and contains the text 'communication and regulation' and 'in goal-directed systems, organic or constructed'. The right bubble is associated with 'second-order cybernetics' and contains the text 'language and agreement' and 'in linguistic, goal-directed systems organic or constructed'. The bubbles overlap in the center.

communication and regulation

in

goal-directed systems,
organic or constructed

first-order cybernetics

language and agreement

in

linguistic, goal-directed systems
organic or constructed

second-order cybernetics

communication and regulation

in

goal-directed systems,
organic or constructed

science of
observed systems

language and agreement

in

linguistic, goal-directed systems
organic or constructed

science of
observing systems



CYBERNETICS

system has goal

system aims toward goal

environment affects aim

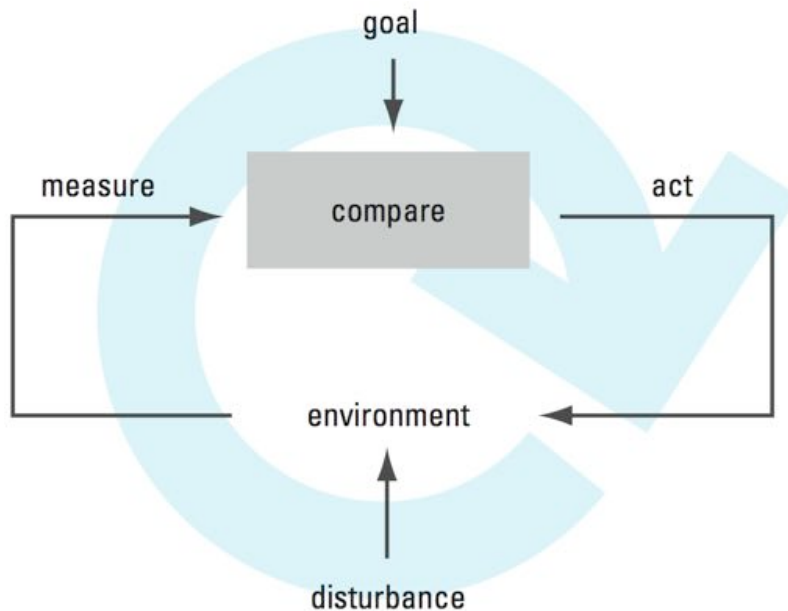
information returns to system—‘feedback’

system measures difference between state and goal
—detects ‘error’

system acts to correct the error, to achieve its goal

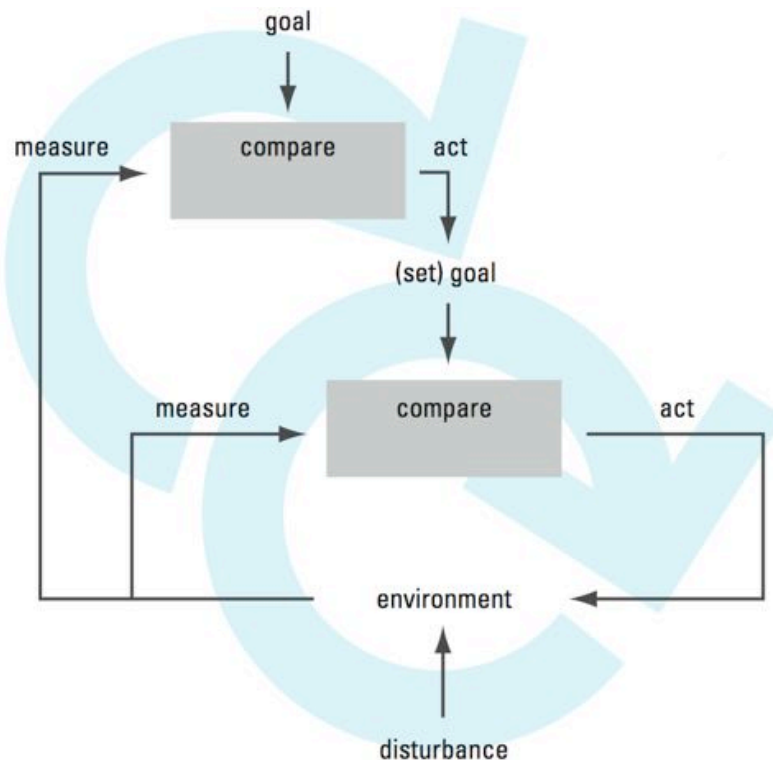
first-order cybernetics

cybernetics explains how
circular causal systems work — single loop



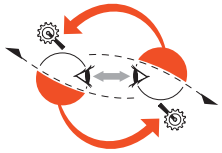
double-loop systems

cybernetics explains how circular causal systems work—even when they self-regulate and modify their goals.



CONVERSATION

cybernetics reviewed

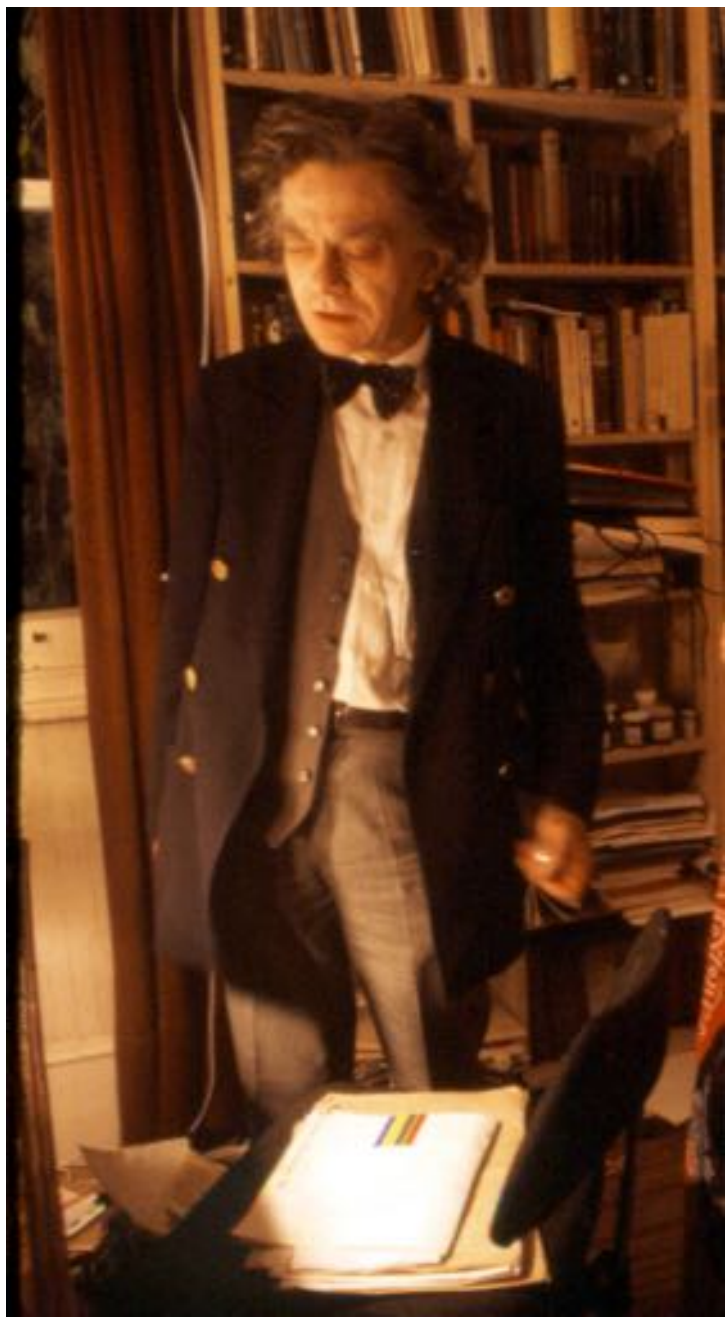


Gordon Pask

double-loop architectures

conversation theory

applications





concepts

double-loop interaction

uncertainty regulation in learning

conceptual learning style

coherence & the kinetics of thinking

entailment meshes

architecture of conversation

conversation theory / consciousness

Review Papers by Gordon Pask/Relatively Accessible

These materials are offered with the desire to make them available to the widest possible audience. The files are large PDFs with variable download times and variable visual quality. They may be searched using the usual "find" functions in PDF readers. Last updated April 19, 2011.

Details of Pask's cybernetic machines, Musicolour and Colloquy of Mobiles

"[A Comment, A Case History, and a Plan](#)", in Cybernetic Serendipity, J. Reichardt, (Ed.), Rapp. And Carroll, 1970. Reprinted in Cybernetics, Art and Ideas, Reichardt, J., (Ed.) Studio Vista, London, 1971, 76-99. (problem with prior PDF repaired on 30 December 2010)

Review of Pask's approach to conversation, its embodiment and representation

"[The Limits of Togetherness](#)", Proceedings, Invited Keynote address to IFIP, World Congress in Tokyo and Melbourne, Editor, S. Lavington. Amsterdam, New York, Oxford: North holland Pub. Co., 1980, 999-1012.

On the nature of goal-directed systems (Heinz von Foerster's favorite Pask paper)

"[The meaning of cybernetics in the behavioural sciences](#)", reprinted in Progress of Cybernetics, edited by J. Rose, 1969.

collaborators

Dionysius Kallikourdis

Bernard C. E. Scott

Ranulph Glanville

reliable reporters

Bernard C. E. Scott

Diana Laurillard

Usman Haque

Ranulph Glanville

The Architectural Relevance of Gordon Pask

Usman Haque reviews the contribution of Gordon Pask, the resident cybernetician on Cedric Price's Fun Palace. He describes why in the 21st century the work of this early proponent and practitioner of cybernetics has continued to grow in pertinence for architects and designers interested in interactivity.

THE ARCHITECTURAL RELEVANCE OF CYBERNETICS

Gordon Pask

It is easy to argue that cybernetics is relevant to architecture in the same way that it is relevant to a host of other professions; medicine, engineering or law. PERT programming, for example, is unequivocally a 'cybernetic' technique and it is commonly employed in construction scheduling. Computer assisted design is a 'cybernetic' method and there are several instances of its application to architecture, (for example, the WSCC's planning scheme in which the designer uses a graphic display to represent the disposition of structural modules on a grid and in which the computer summarizes the cost/effort consequences of a proposed layout). Of these cases the first (PERT programming) is a valuable but quite trivial application of cybernetics; the second is likely

them, criticizing them and evaluating them (in statements of stability or style). Indeed, when interpreted, the body of metalinguistic statements formed the theory of pure architecture. Consequently, architects did not need to see themselves as systems designers, even though they designed systems, and the evidence suggests that they did not do so.⁸ Instead the professional image was that of a sophisticated house, college or theatre builder.

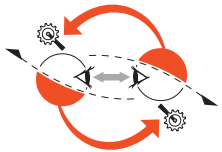
In the course of the Victorian era new techniques were developed too rapidly to be assimilated into pure architecture and new problems were posed and could no longer be solved by applying the rules of pure architecture for example, make a 'railway station' or make 'urban exhibitions'. The solution was to find a



CONVERSATION

cybernetics reviewed

Gordon Pask



double-loop architectures

conversation theory

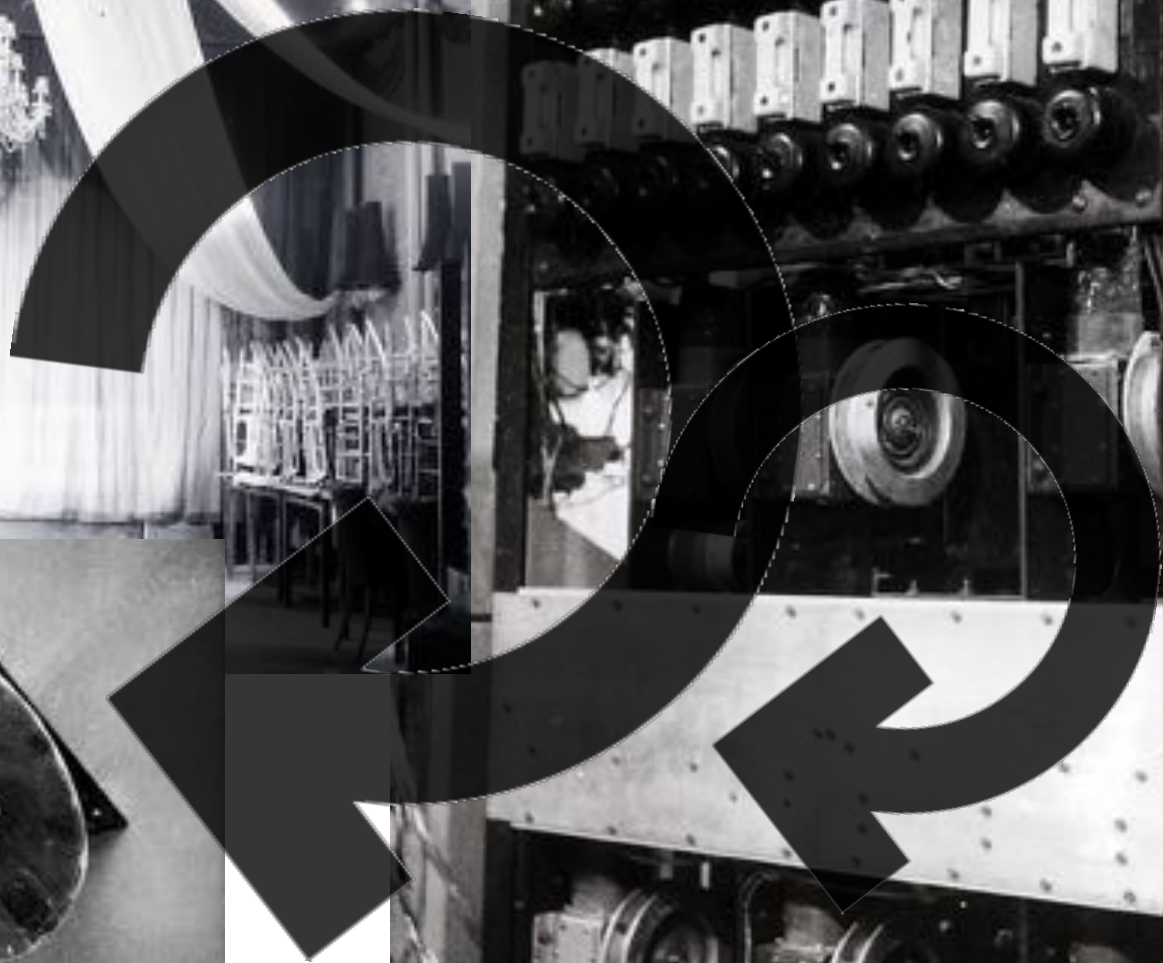
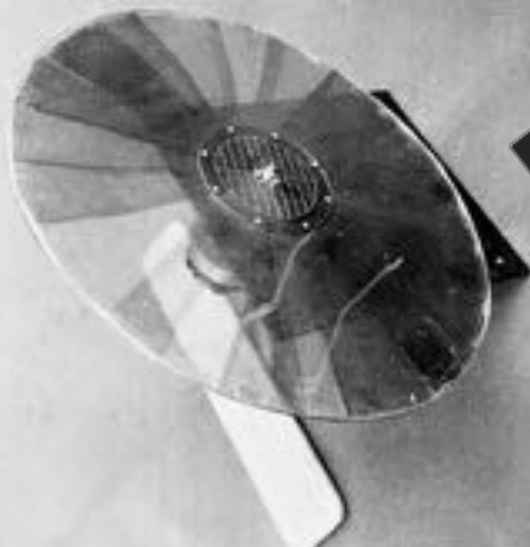
applications

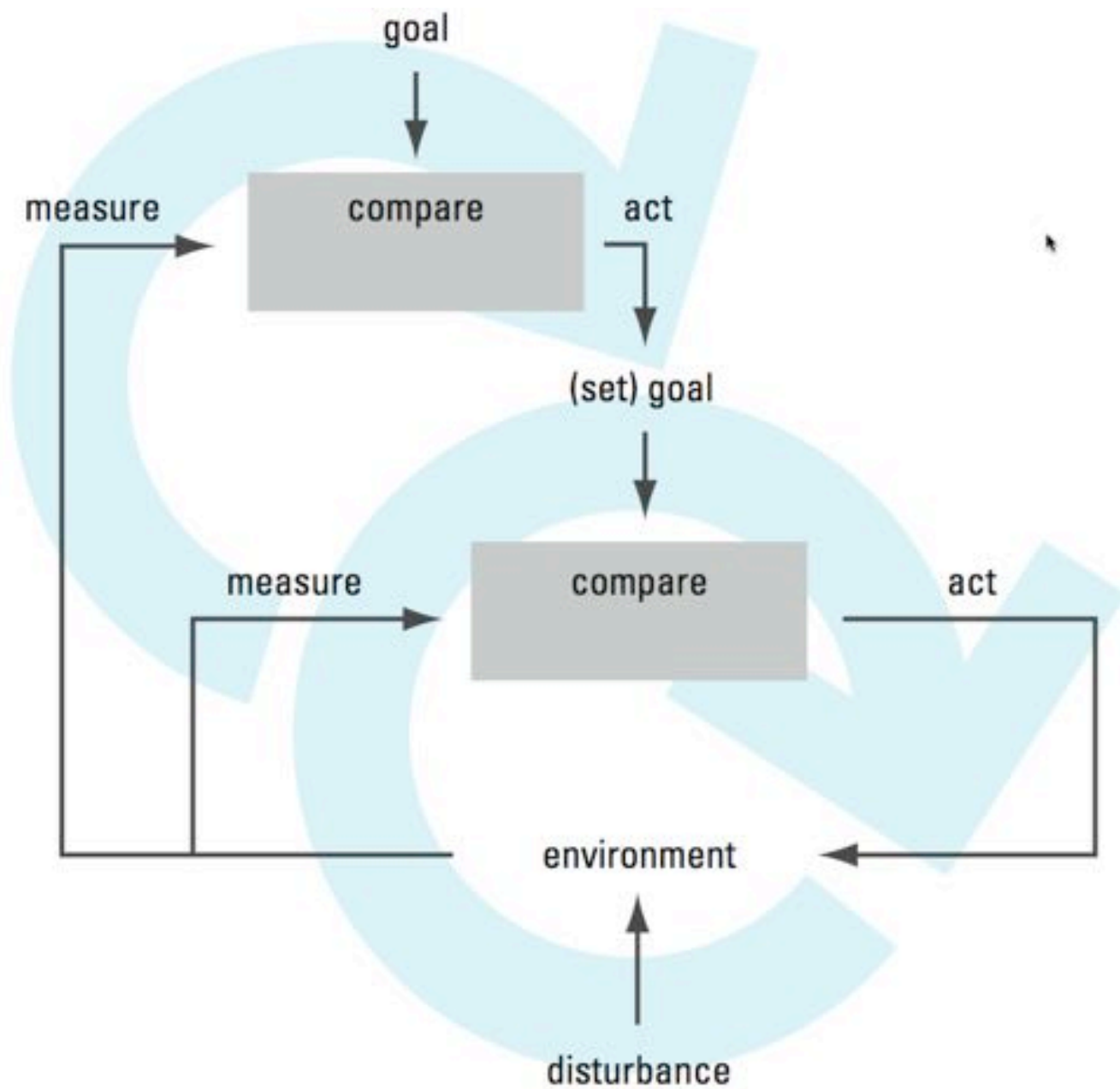
TEACHER
SIMULATOR

CONTROL
CONSOLE

PUPIL
SIMULATOR

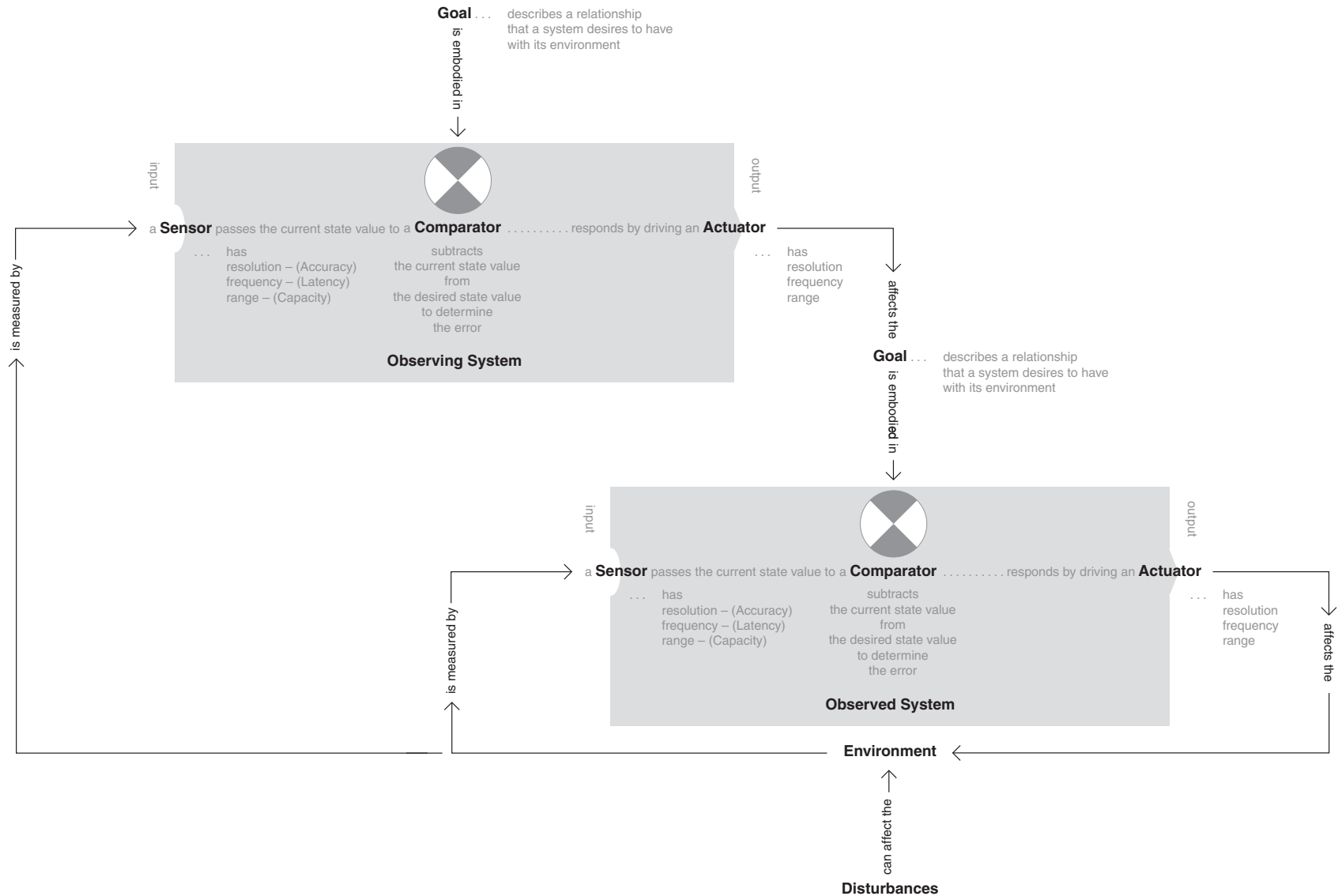


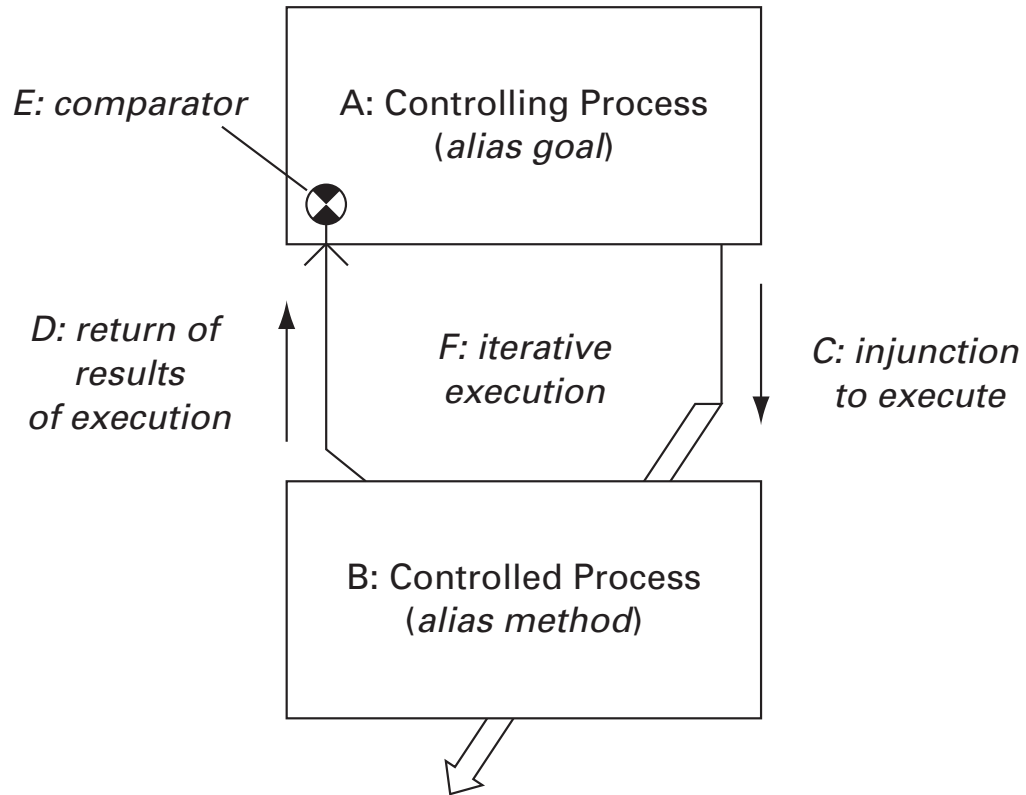


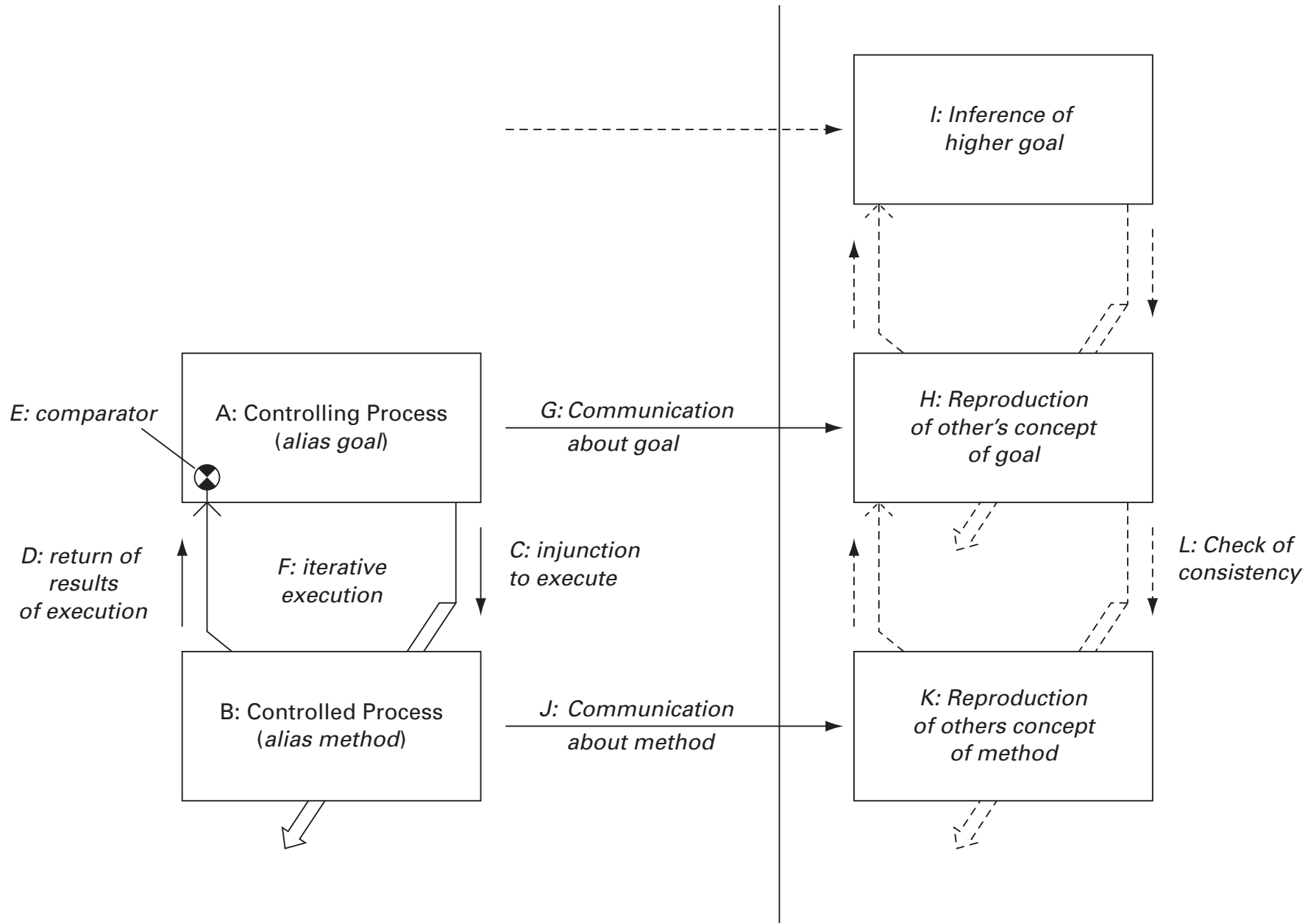


Second-order Feedback: Formal Mechanism

An automatic feedback system (first-order) is controlled by another automatic feedback system (second-order). The first system is 'nested' inside the second.



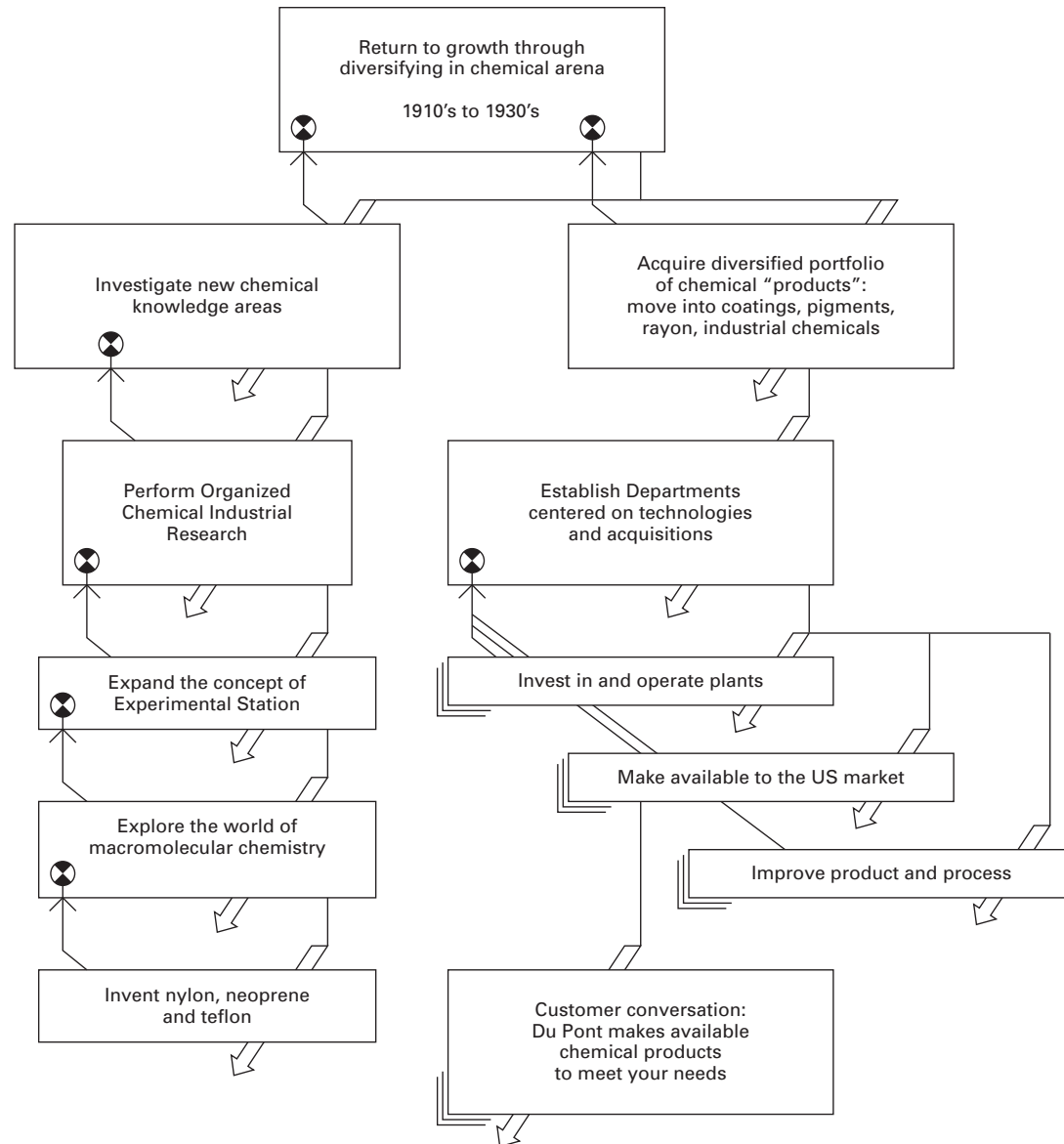


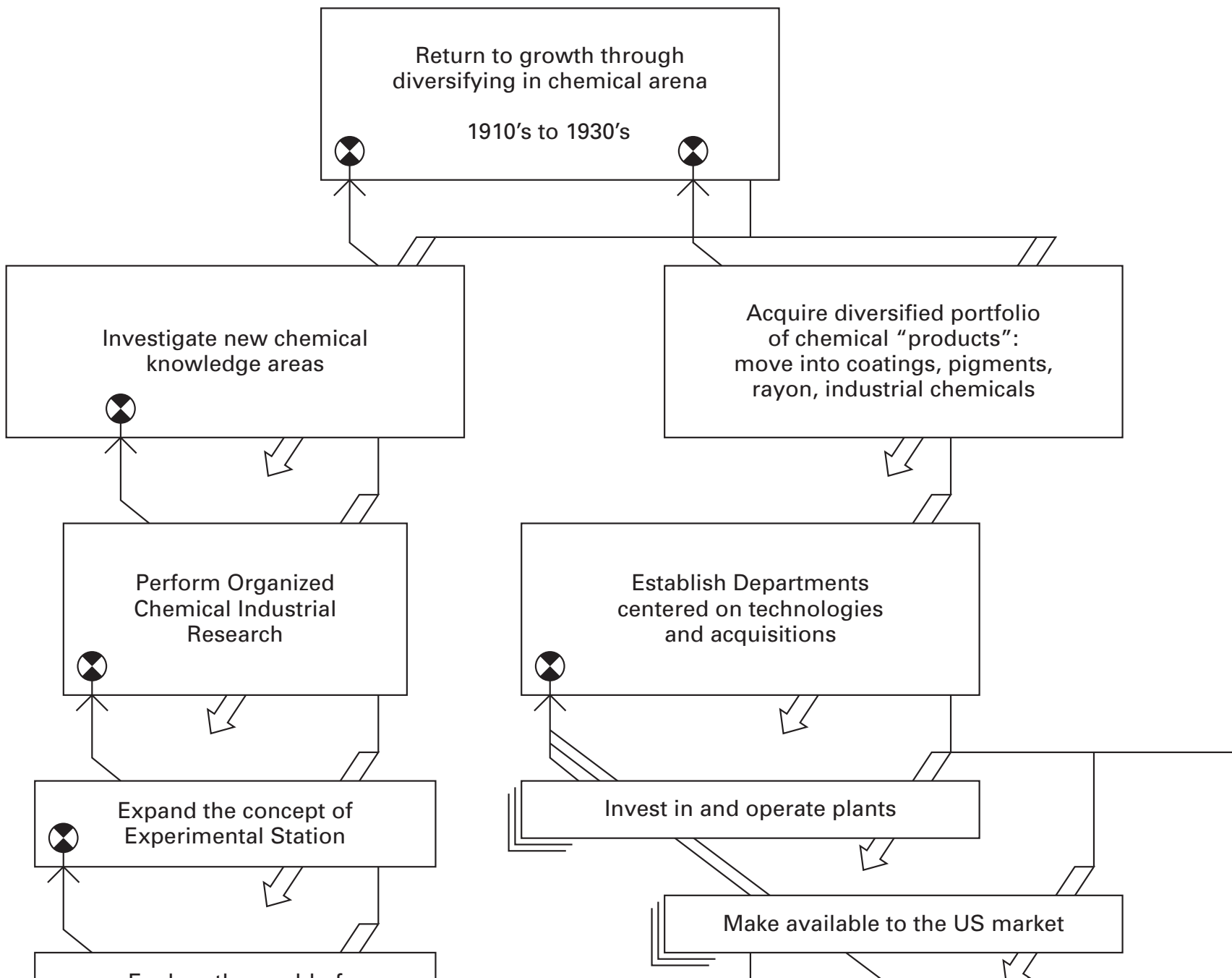


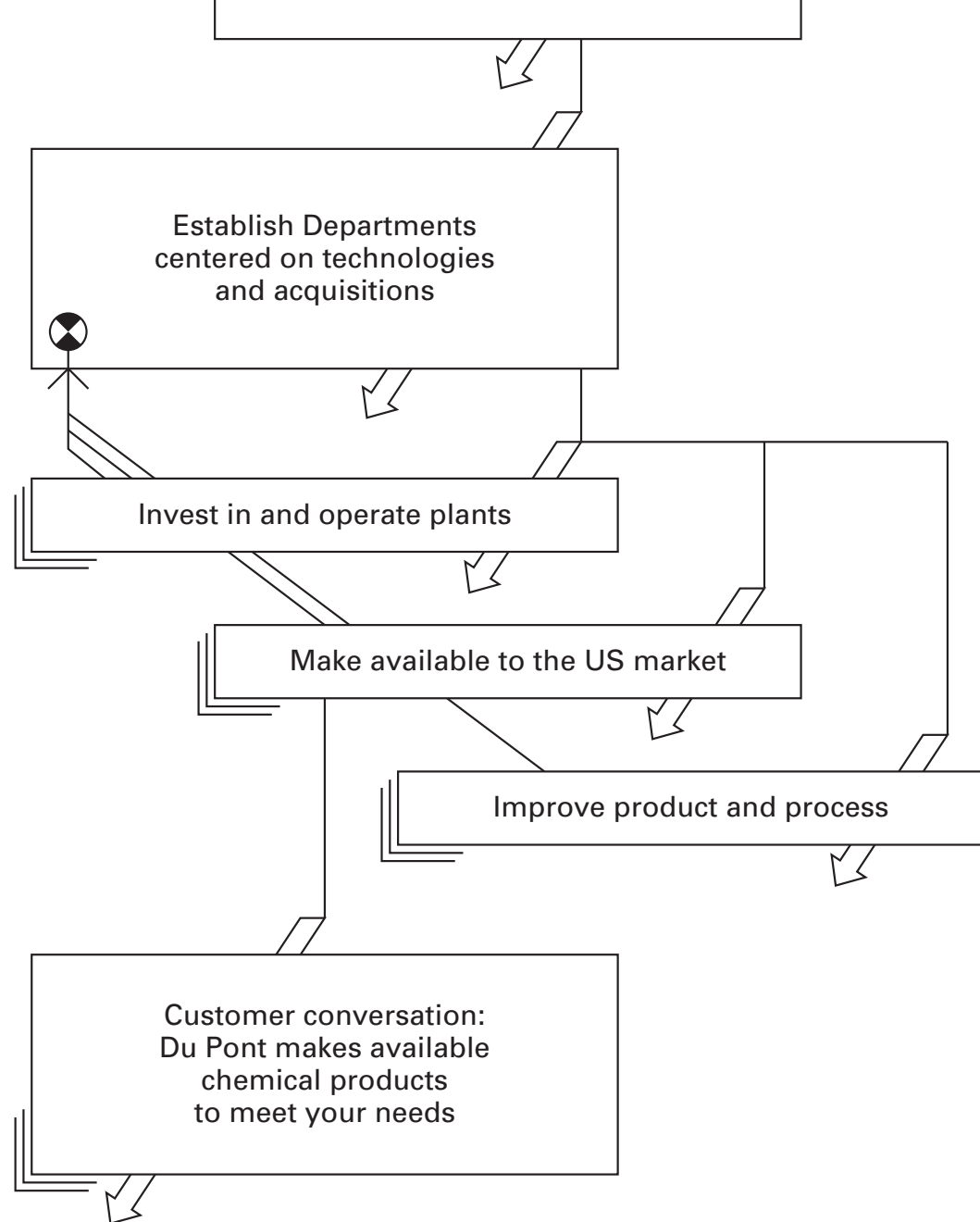
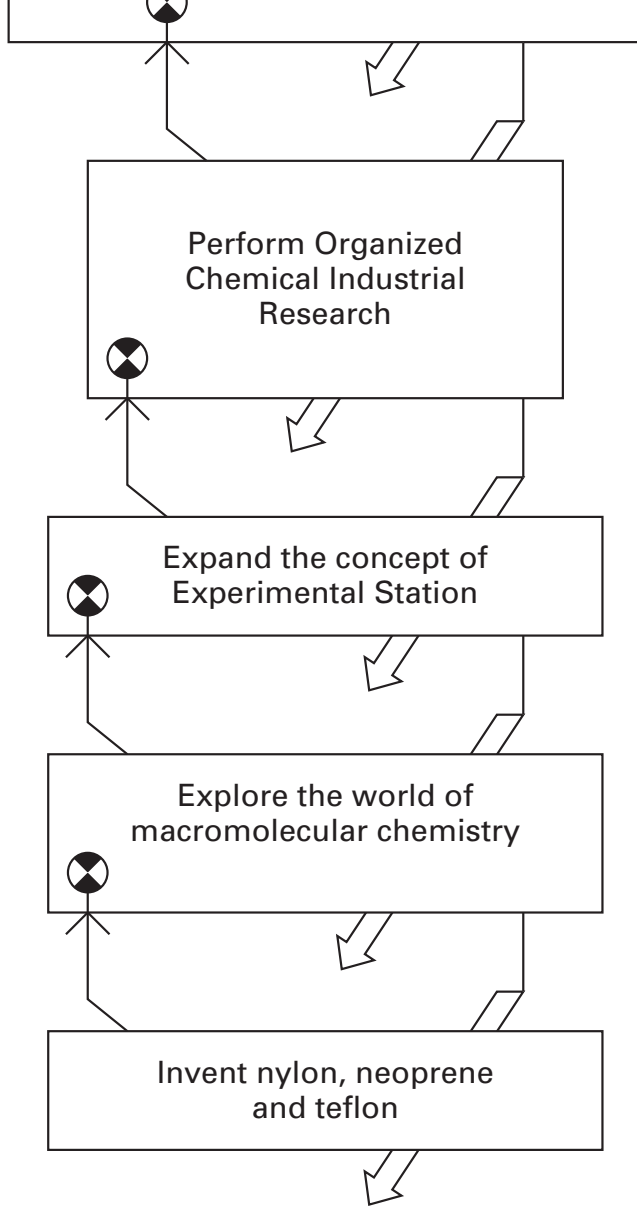
Du Pont Goal Structure

Snapshot 1910 to 1940

Laid the foundation for a new business—
“invention” phase.



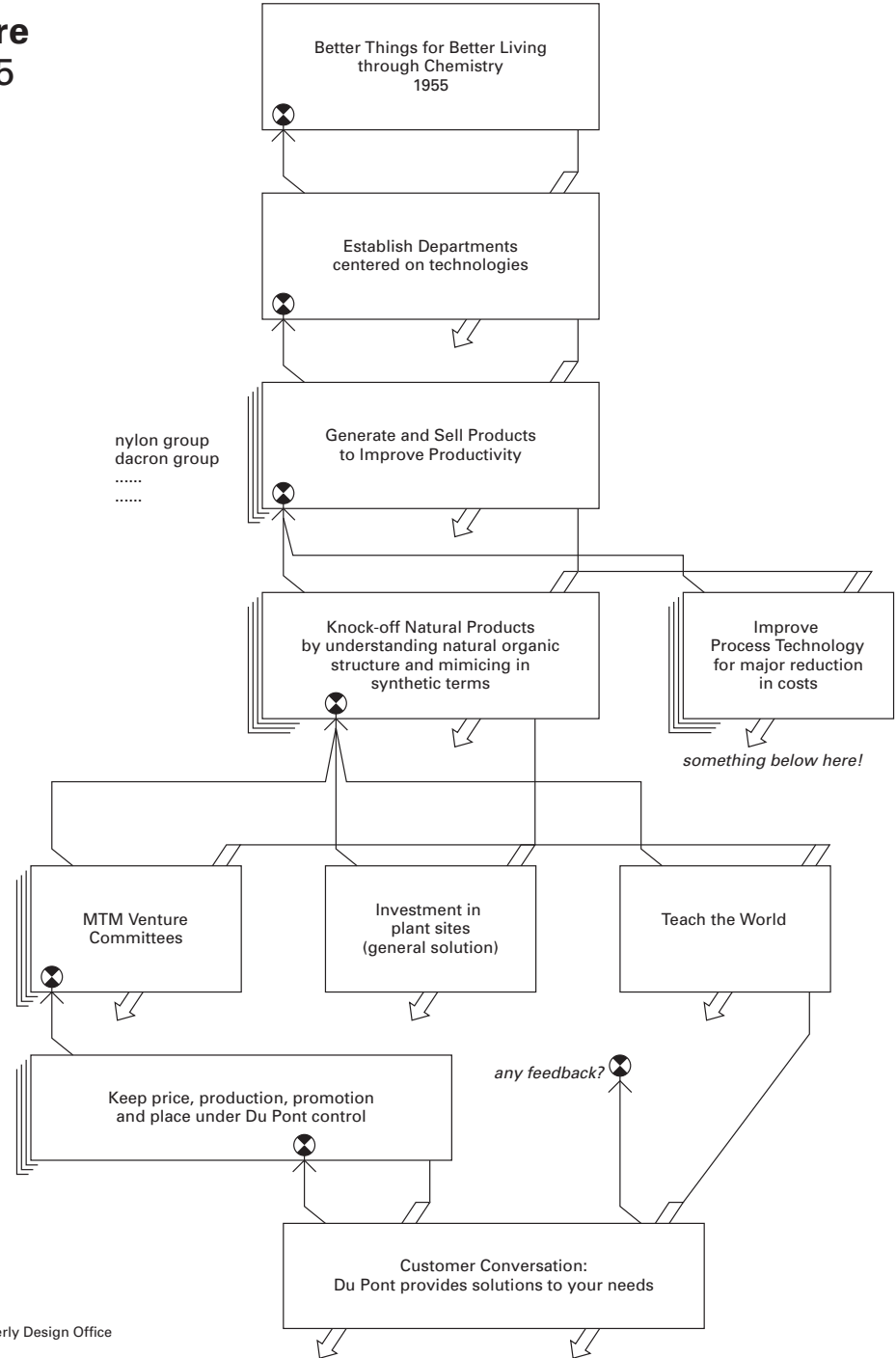




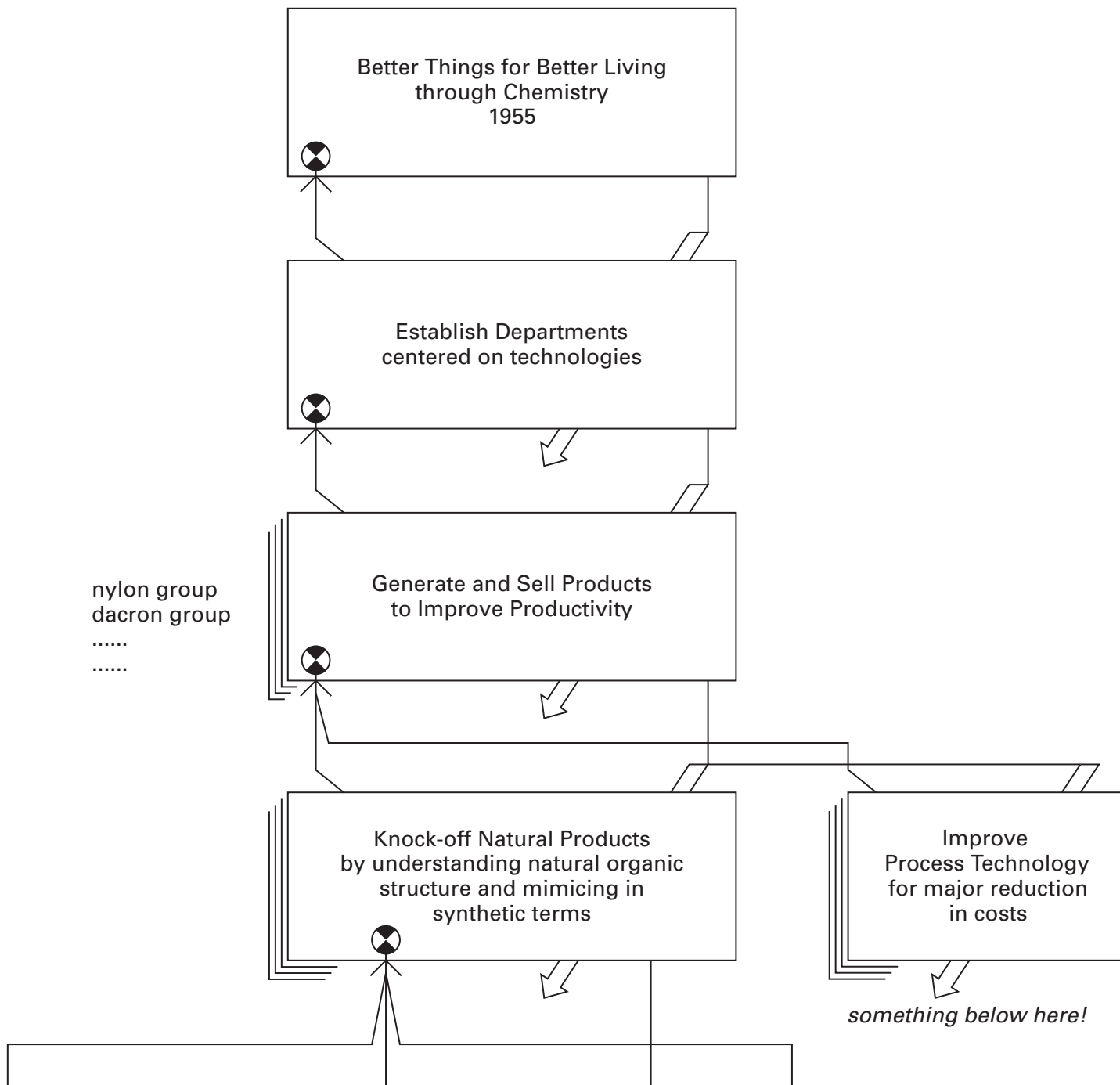
Du Pont Goal Structure

Snapshot 1940 to 1975

Built on the foundation—
“discovery” phase.



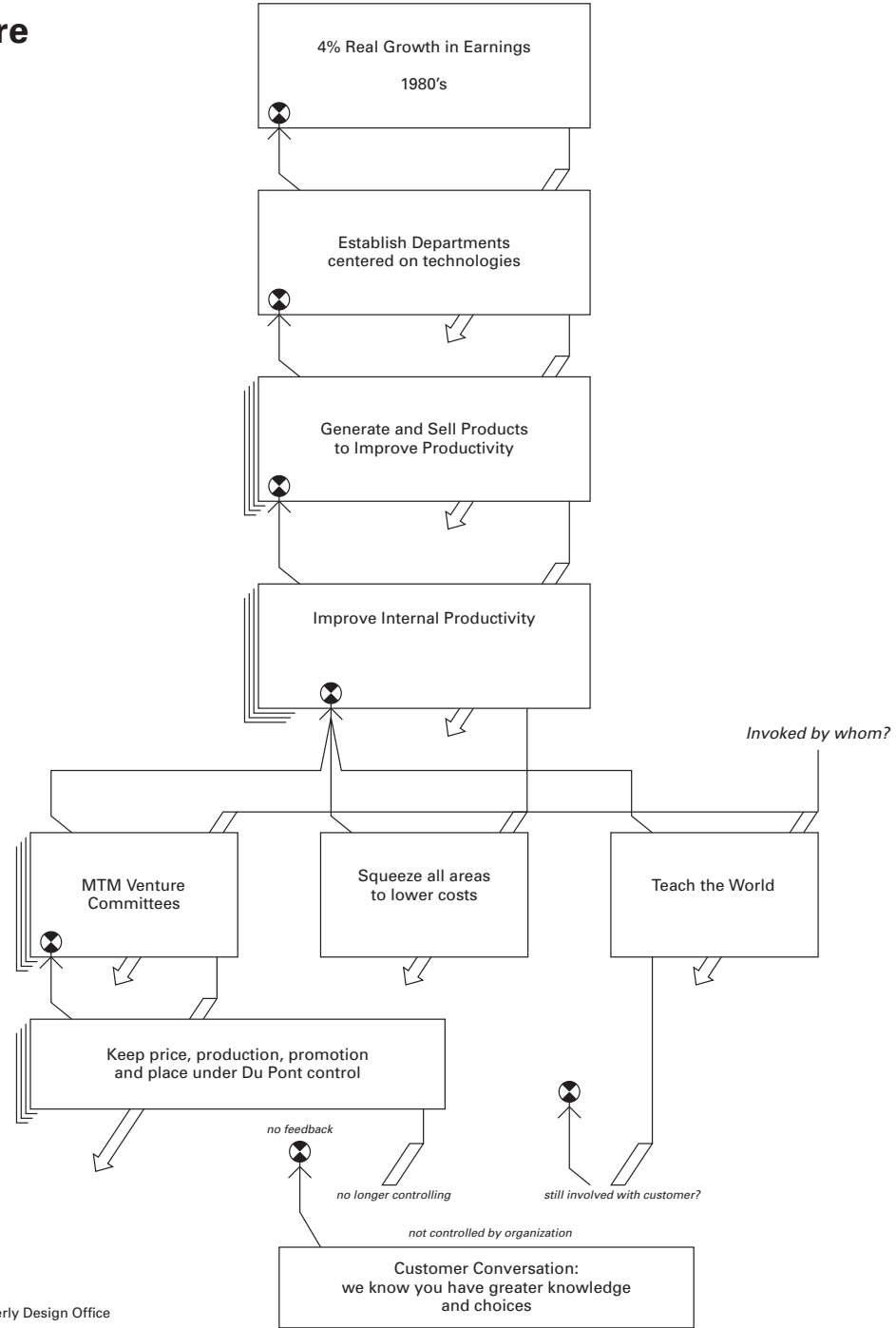
Structure to 1975



Du Pont Goal Structure

Snapshot of 1980's

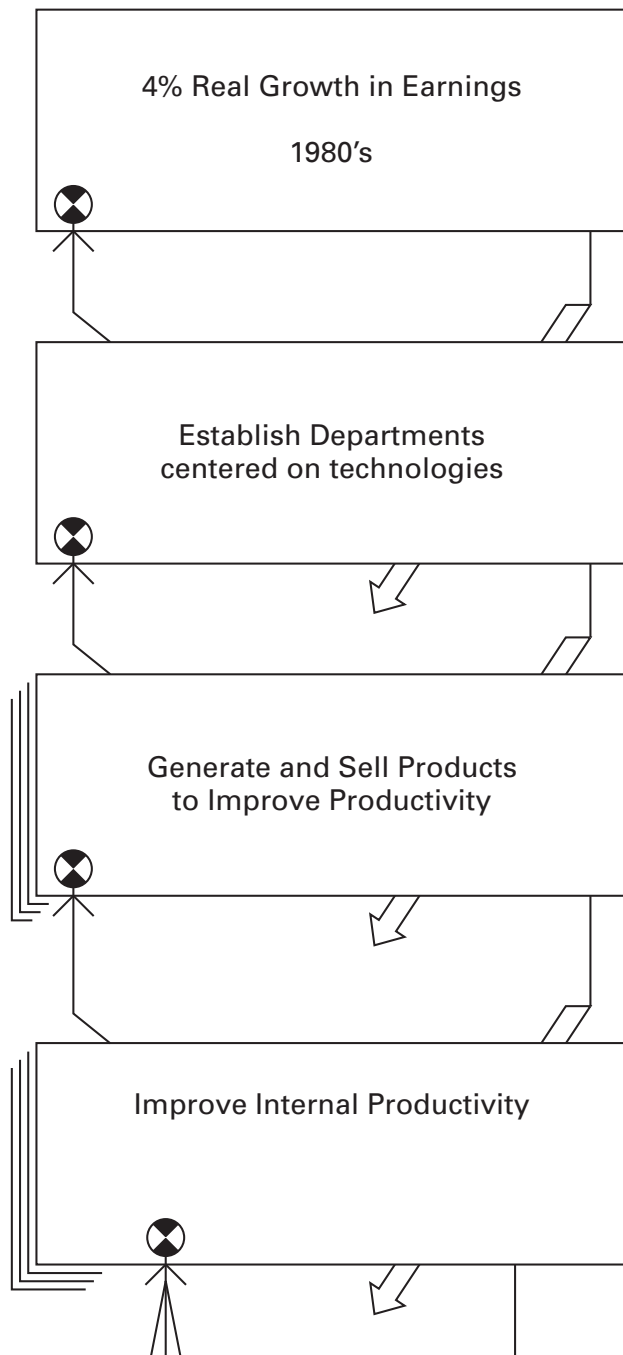
Milked the existing structure—
“efficiency” phase.



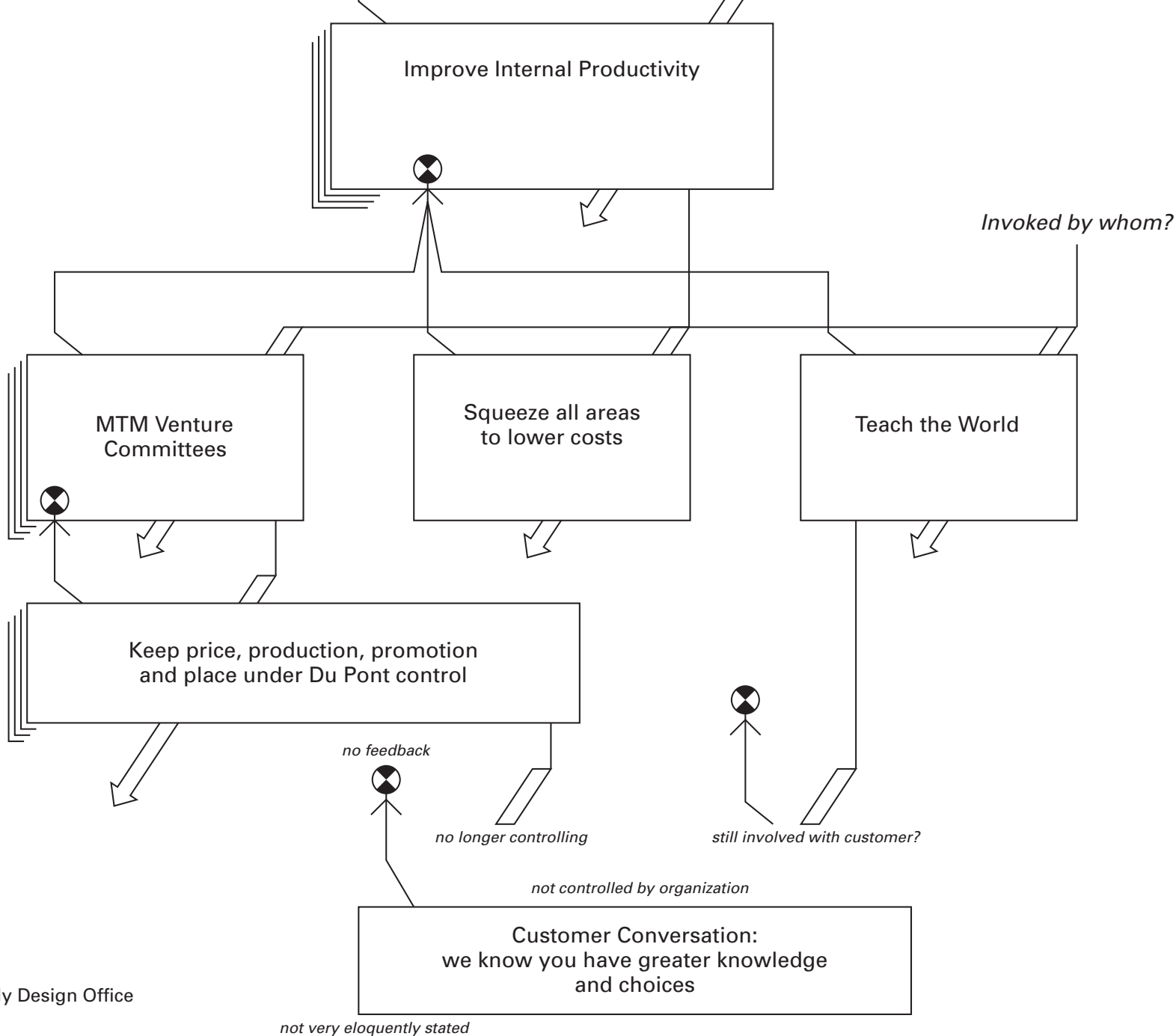
Structure

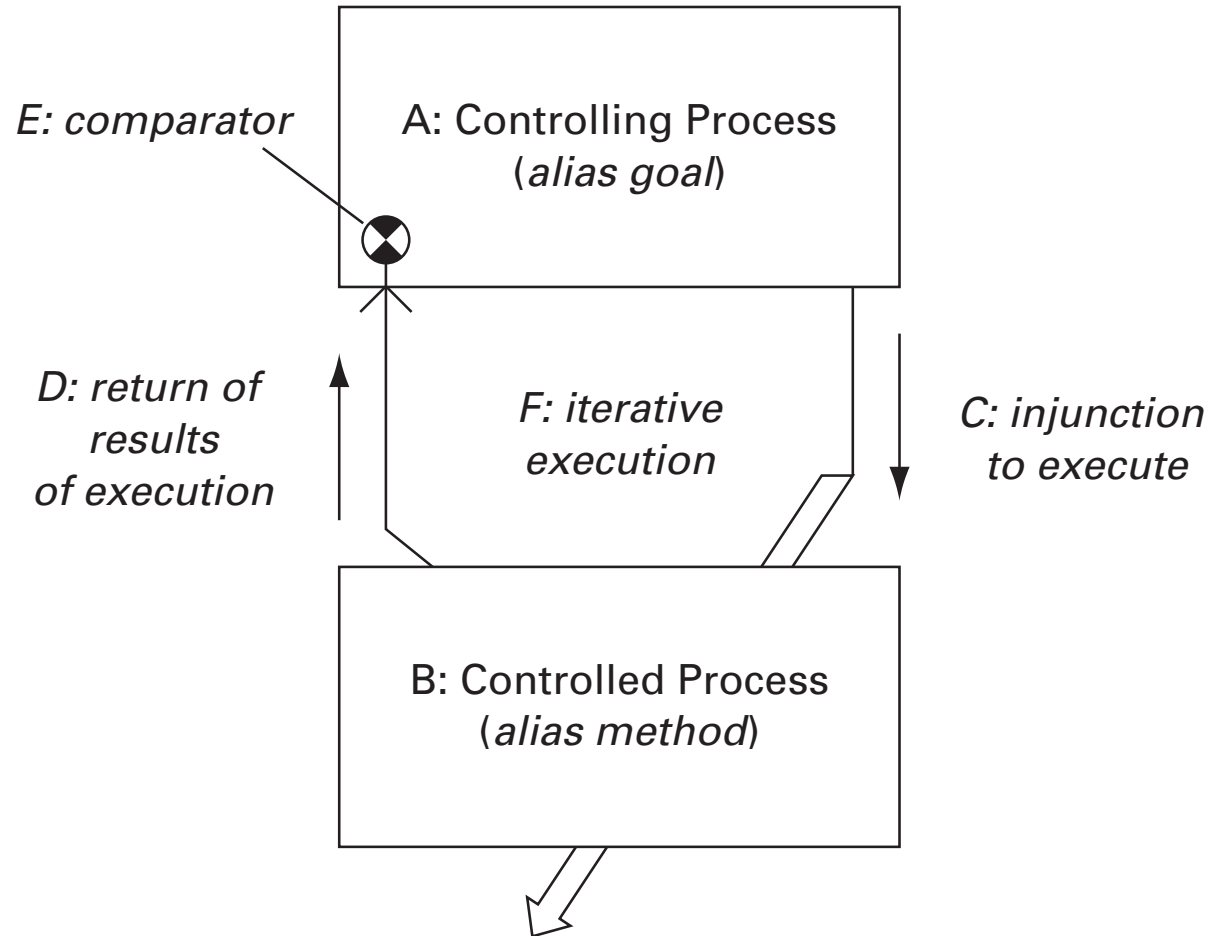
0's

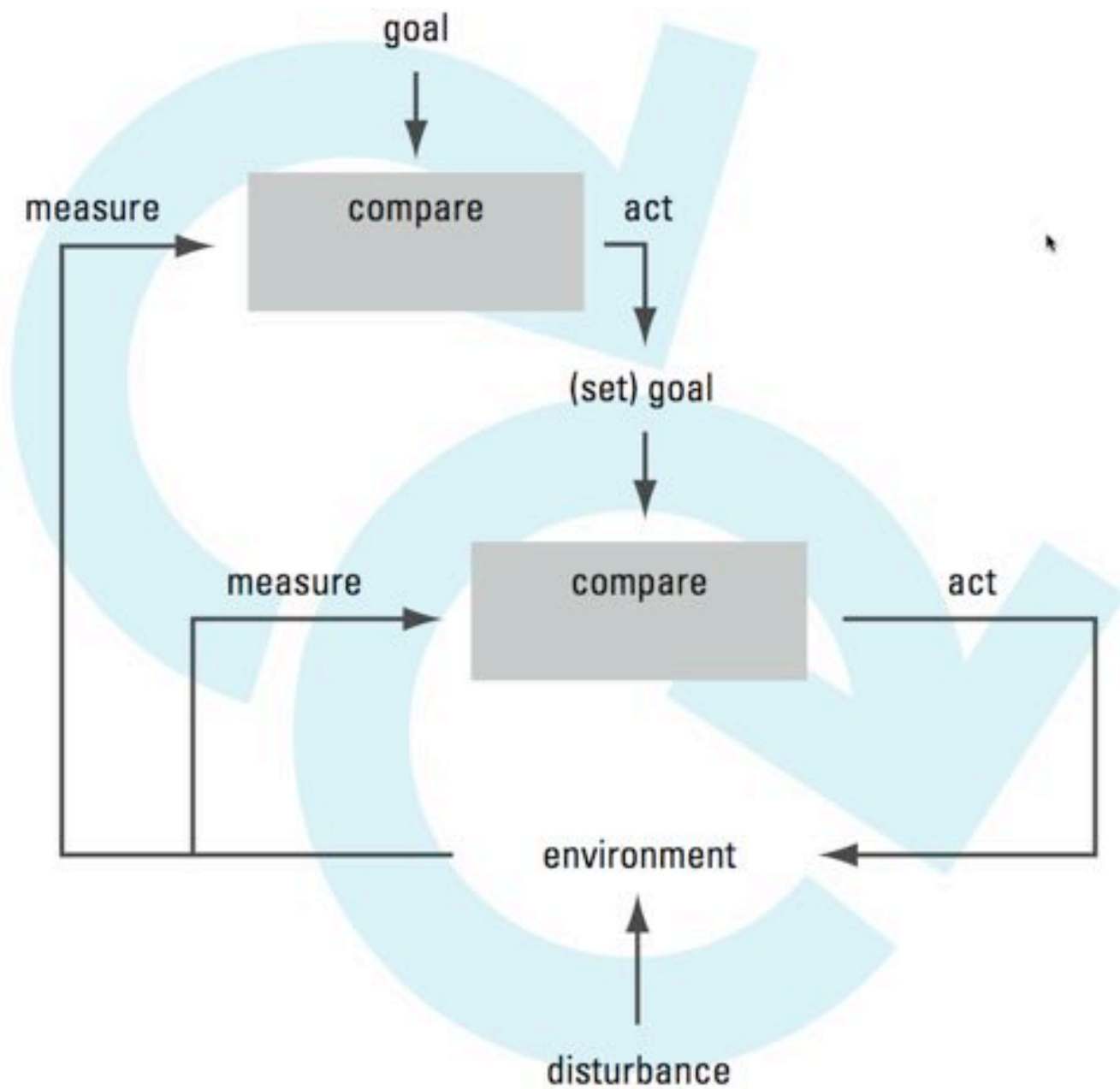
re—

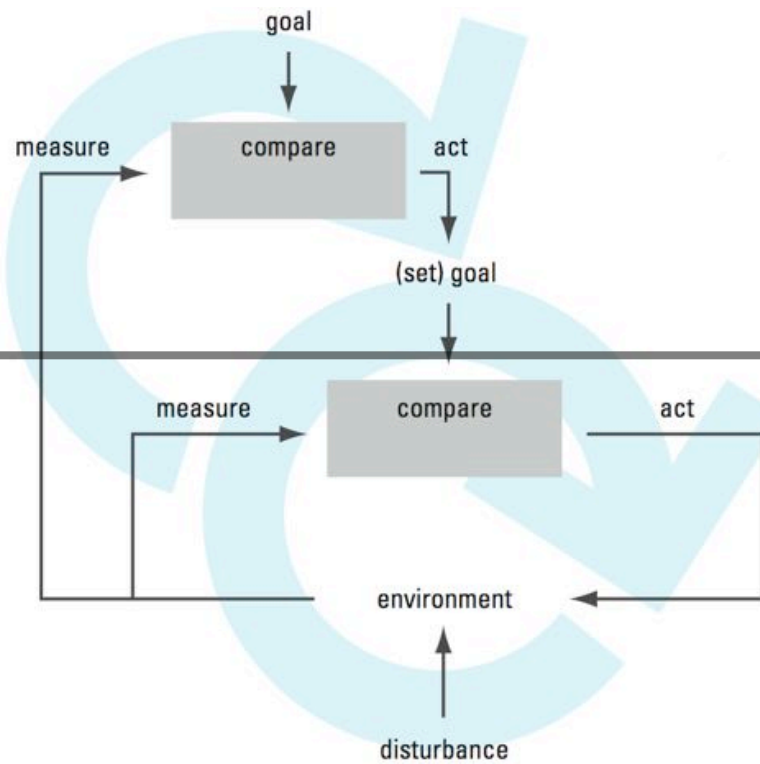
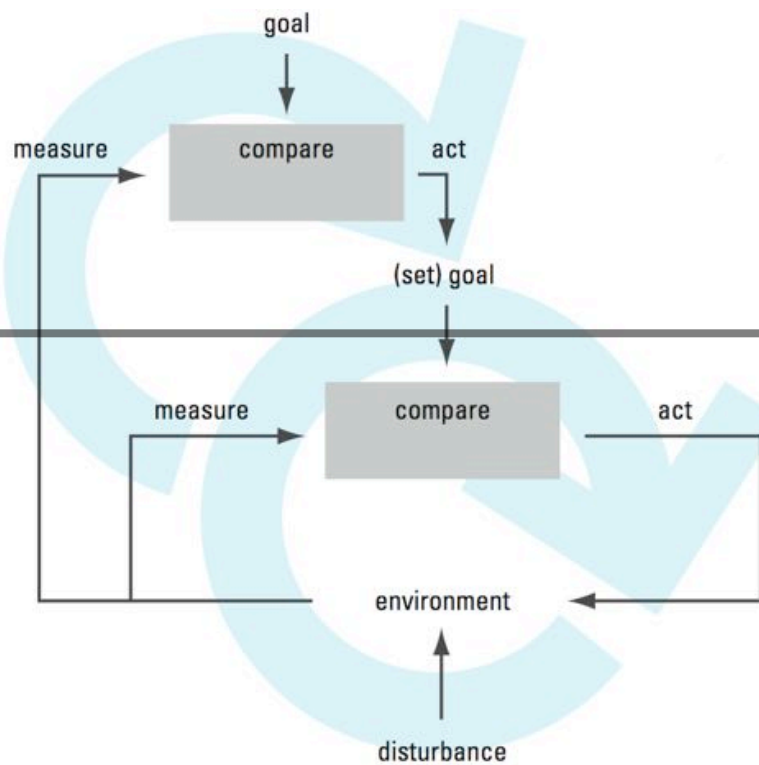


Invoked by whom?









CONVERSATION

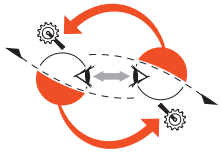
cybernetics reviewed

Gordon Pask

double-loop architectures

conversation theory

application



GORDON PASK

CONVERSATION, COGNITION AND LEARNING



A CYBERNETIC THEORY-
AND METHODOLOGY

ELSEVIER

GORDON PASK

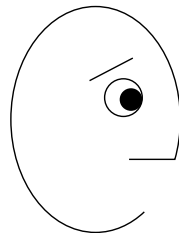
CONVERSATION THEORY



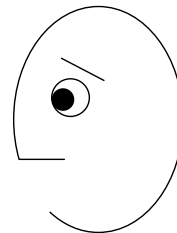
APPLICATIONS IN EDUCATION
AND EPISTEMOLOGY

ELSEVIER

how does conversation work?

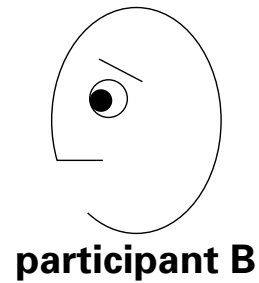
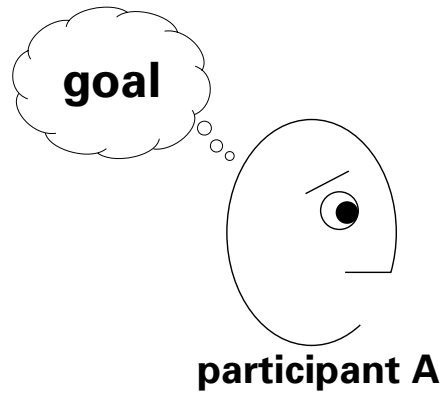


participant A

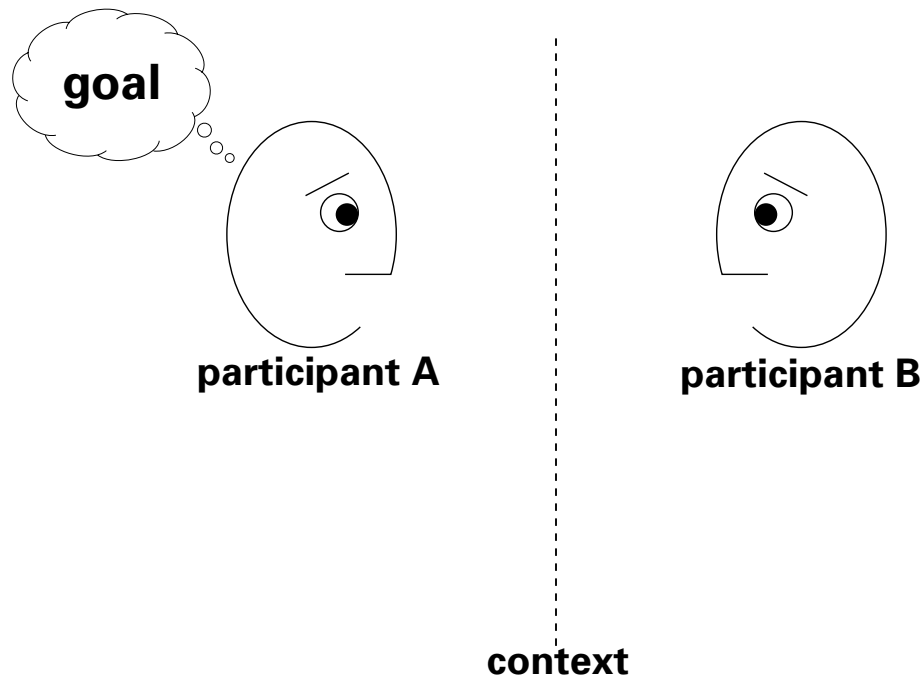


participant B

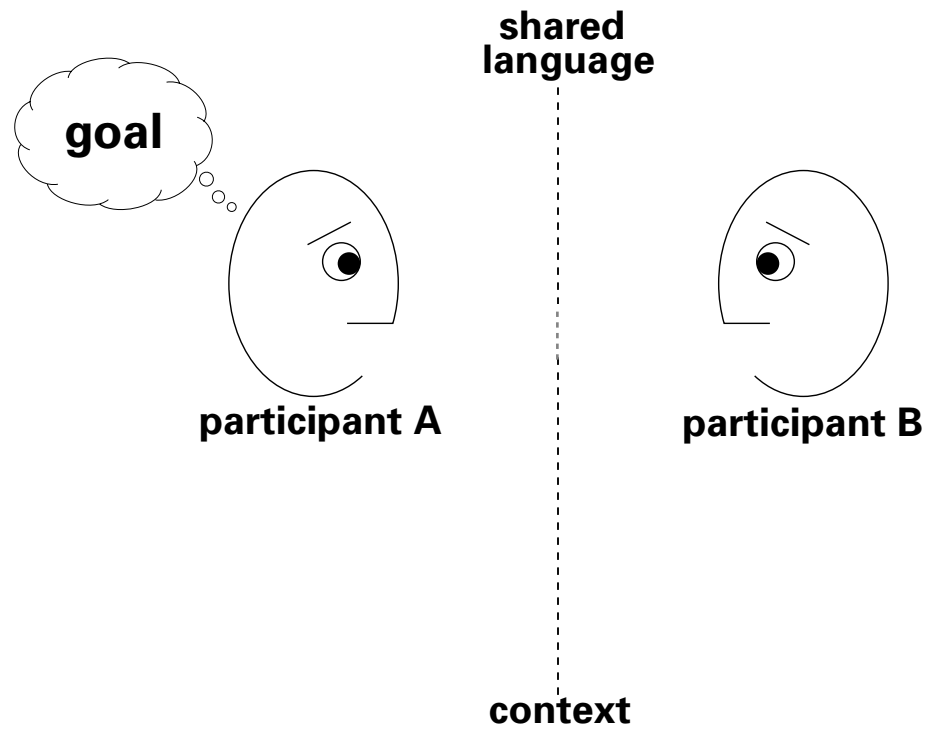
a participant has a goal



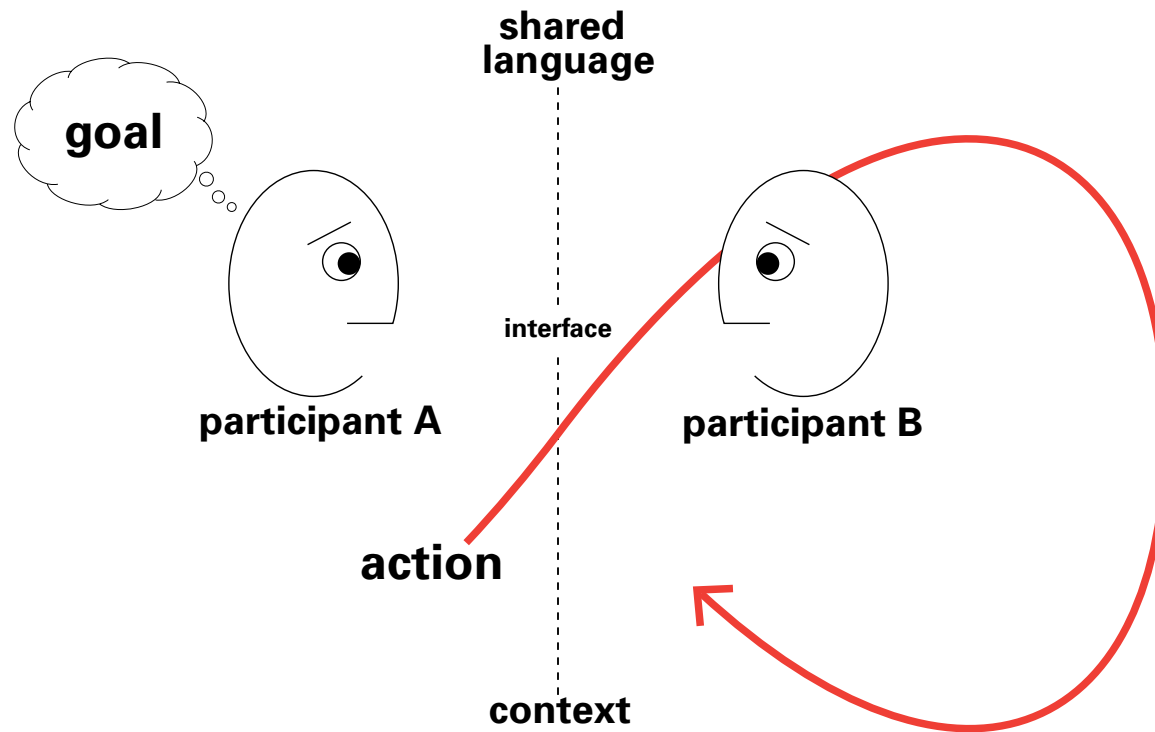
chooses a context



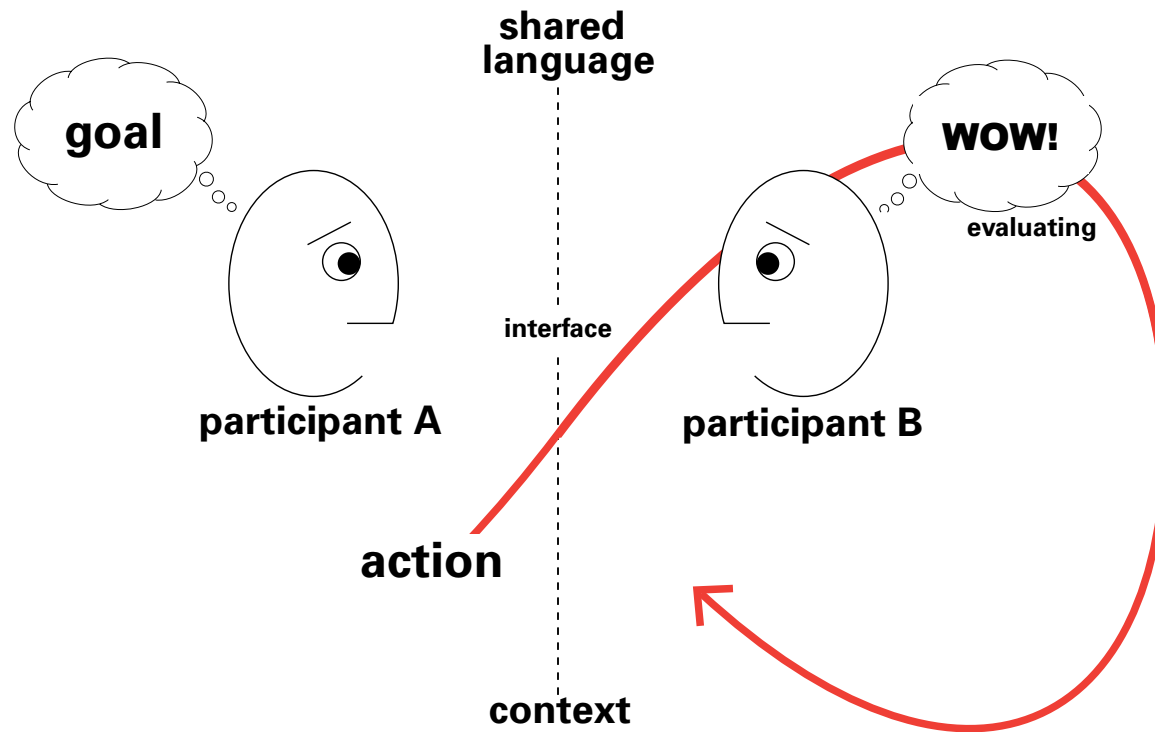
chooses a language



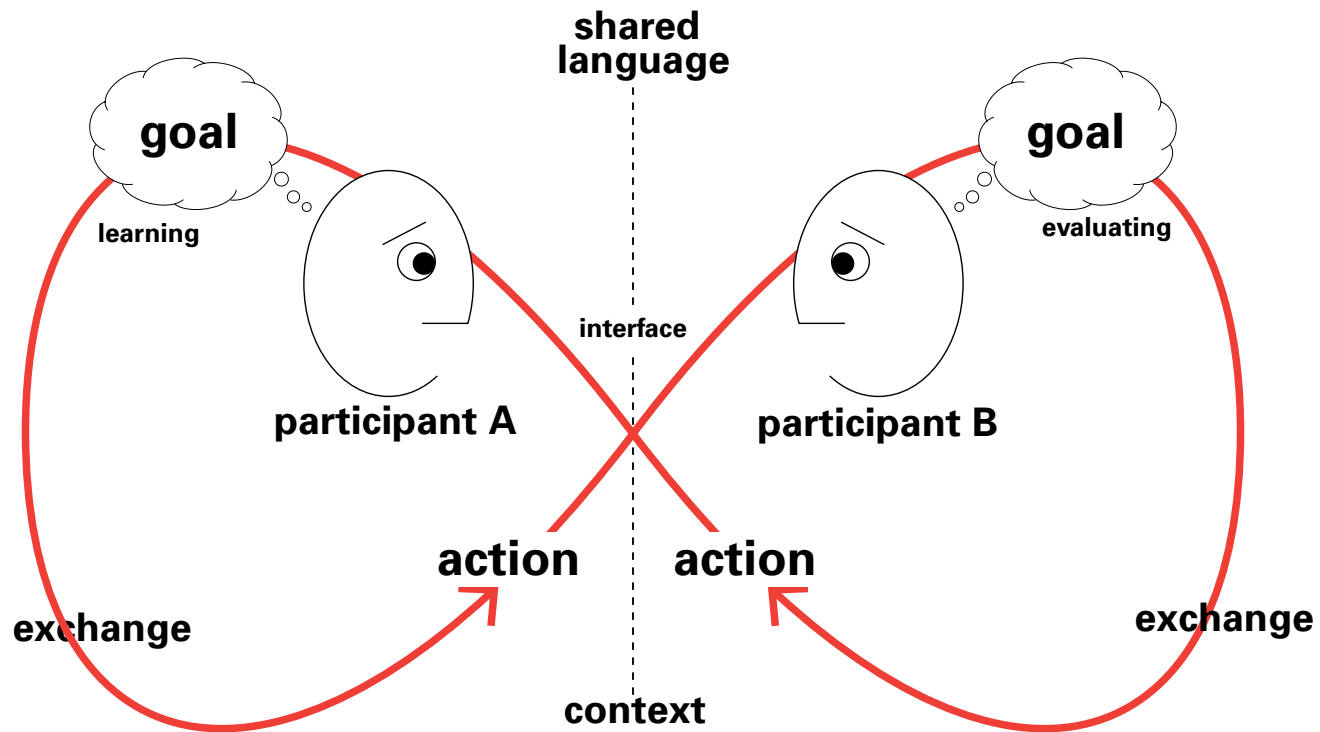
begins an exchange



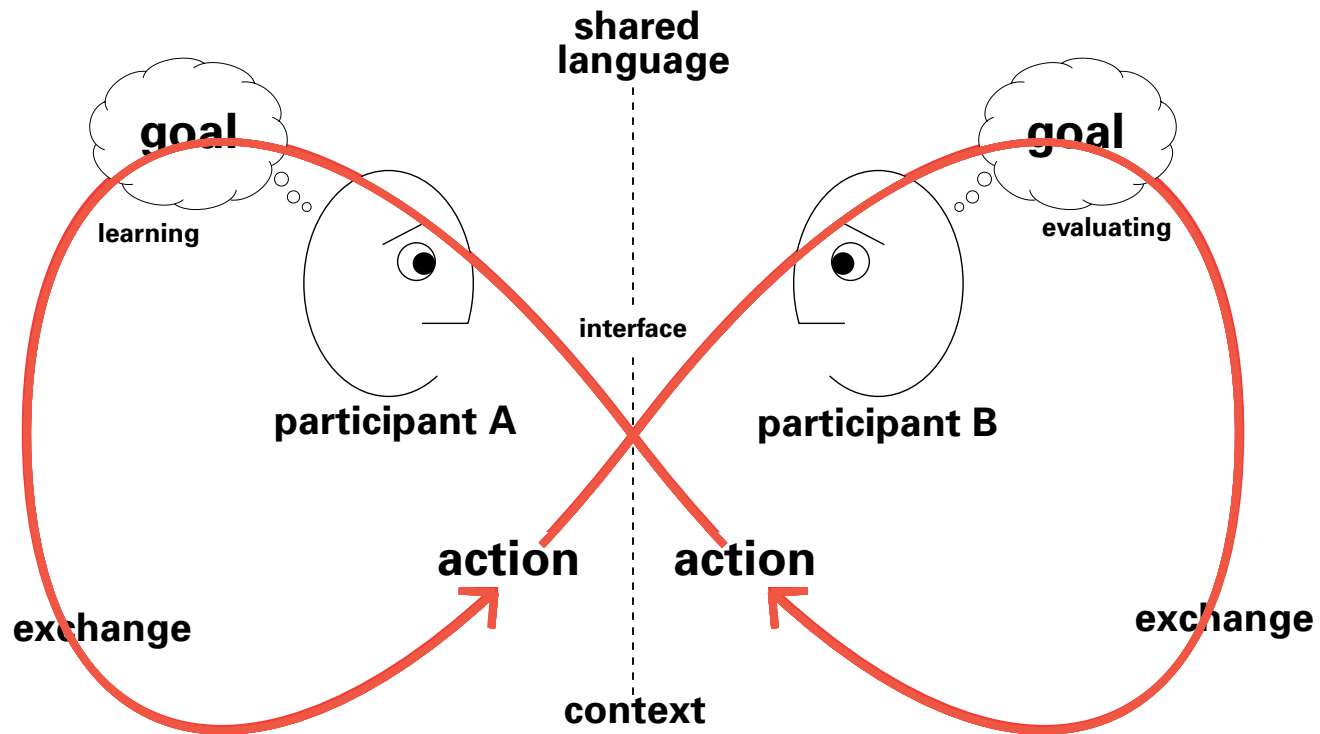
evokes a reaction...



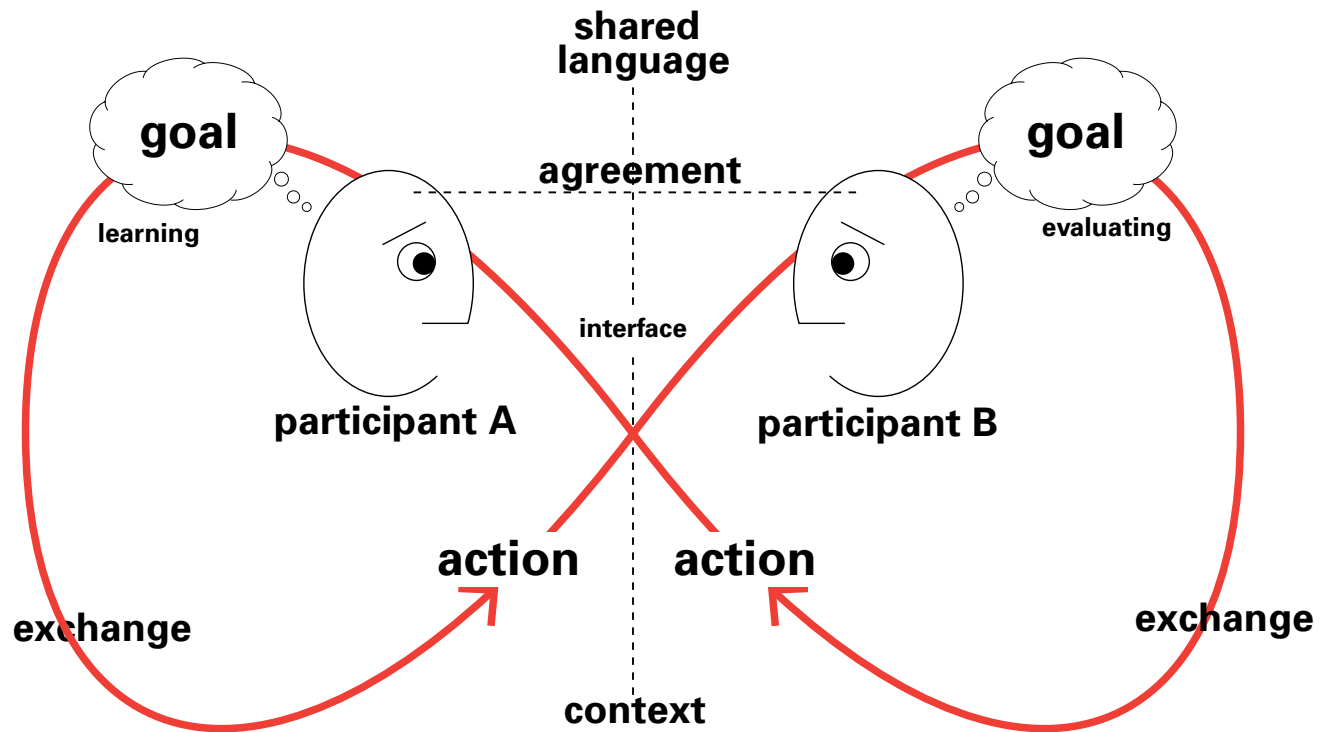
...that evokes a reaction



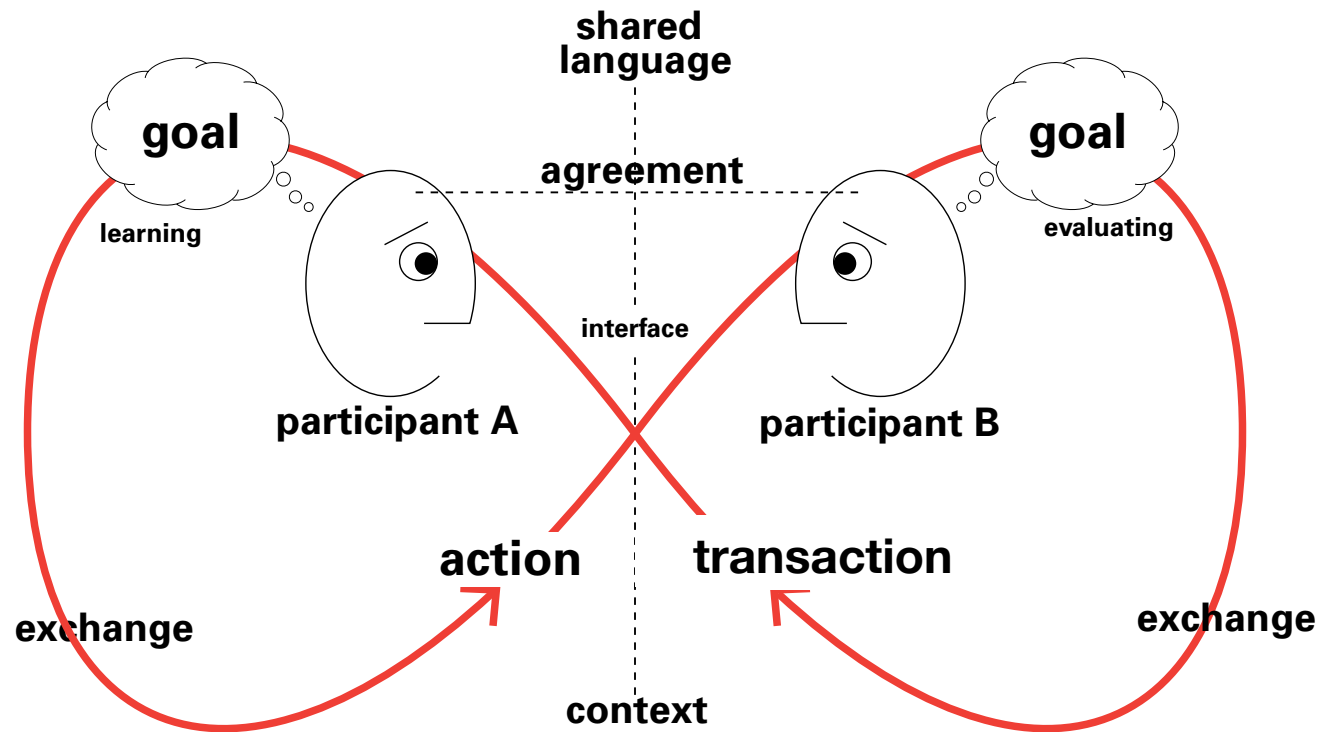
the exchange may continue



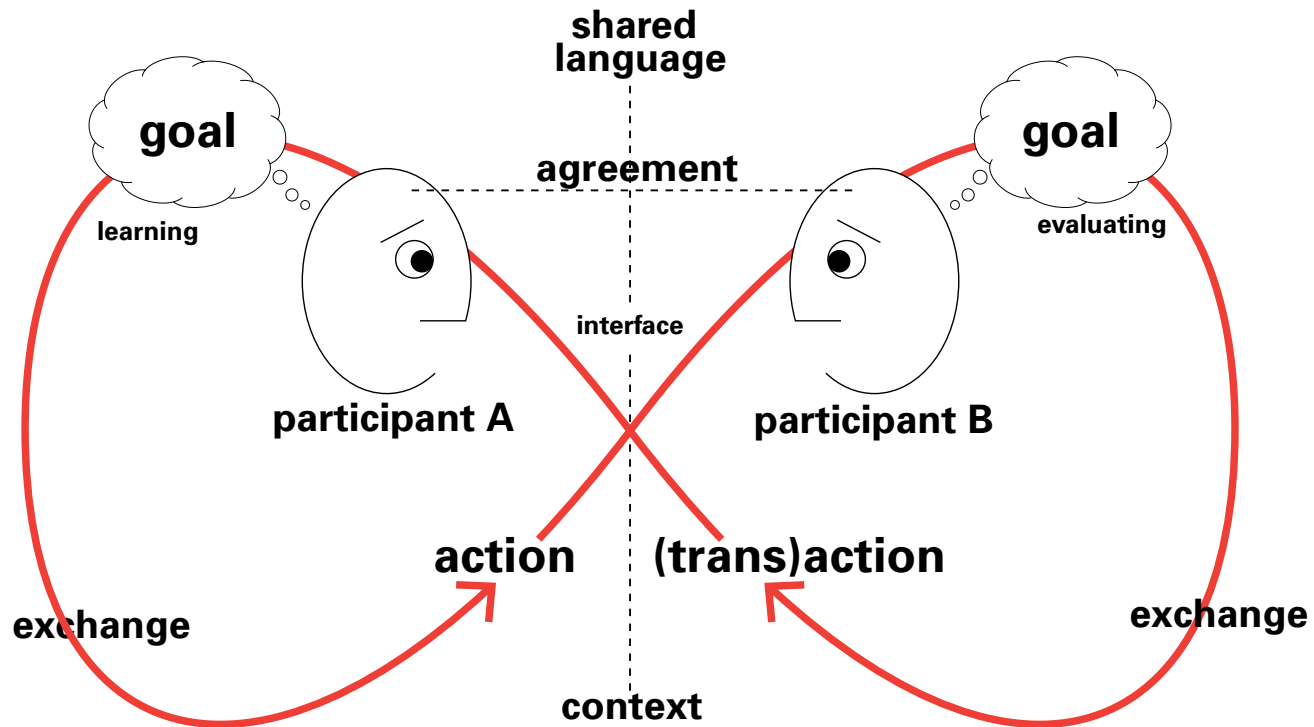
agreement may be reached



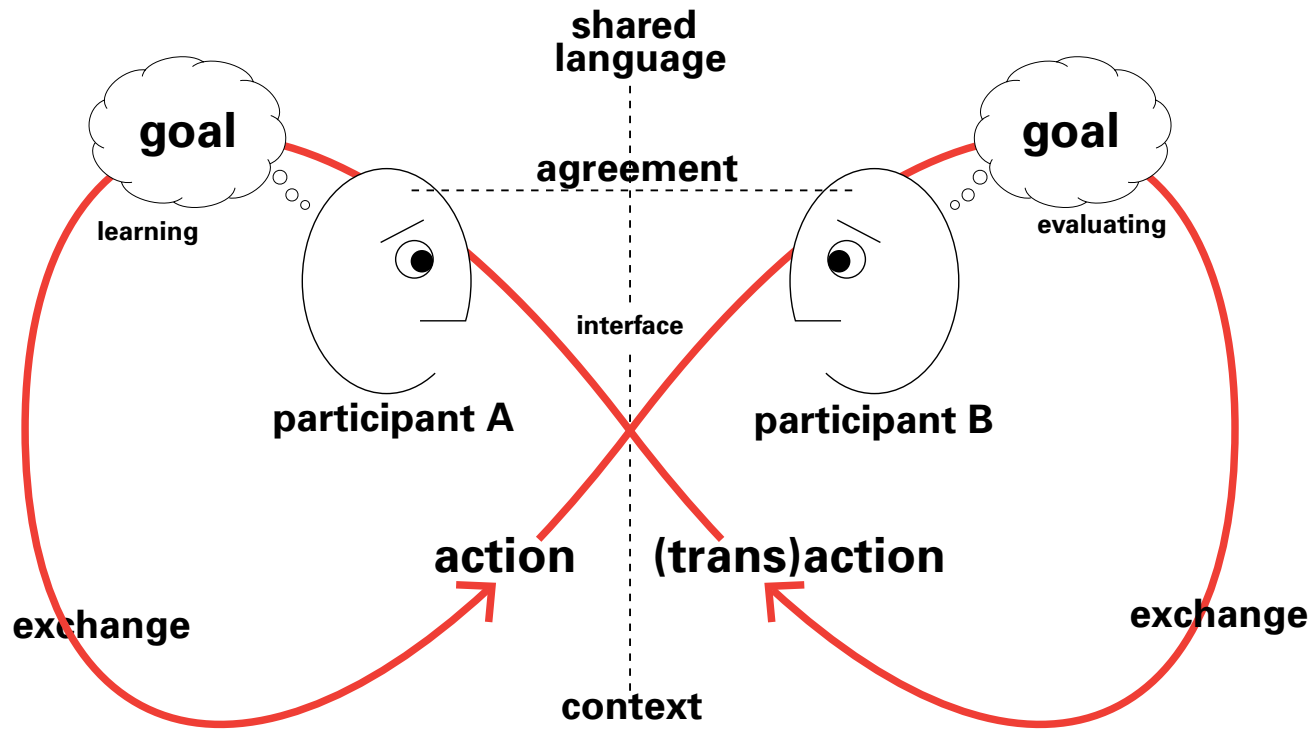
a transaction may occur



CONVERSATION REDUX



CONVERSATION = C-L-E-A-T



CONVERSATION = C-L-E-A-T

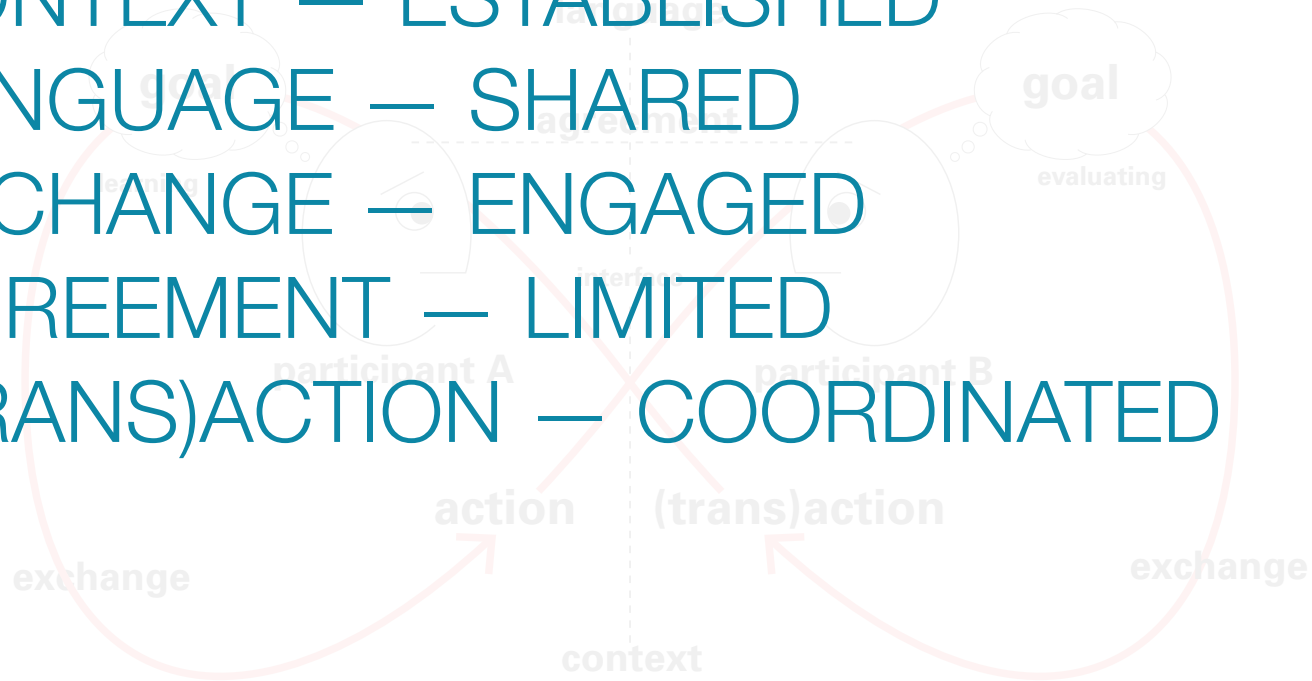
CONTEXT — ESTABLISHED

LANGUAGE — SHARED

EXCHANGE — ENGAGED

AGREEMENT — LIMITED

(TRANS)ACTION — COORDINATED



communication vs. conversation

	communication	conversation
theory	information theory	conversation theory
focus	reliability of channel	reliability of understanding
frame	episodic / fixed repertoire	continuous / unbounded
type of uncertainty	probabilistic	modal
atom	message	difference
molecule	message repertoire	coherence
objective + metric	correctness of message	degree of agreement
strength	disambiguating	evolving knowledge
limitation	not about new messages	takes effort to quantify

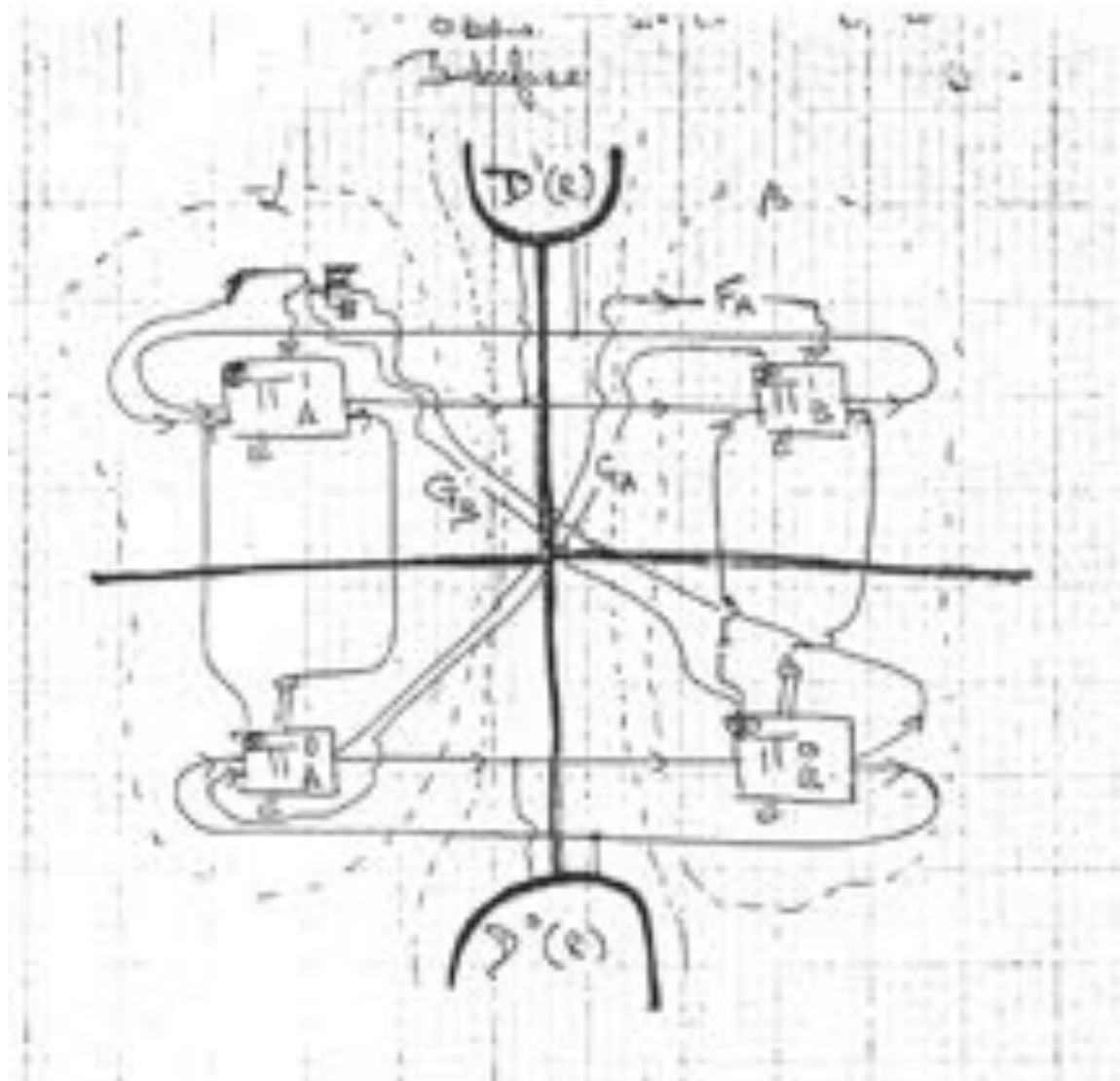


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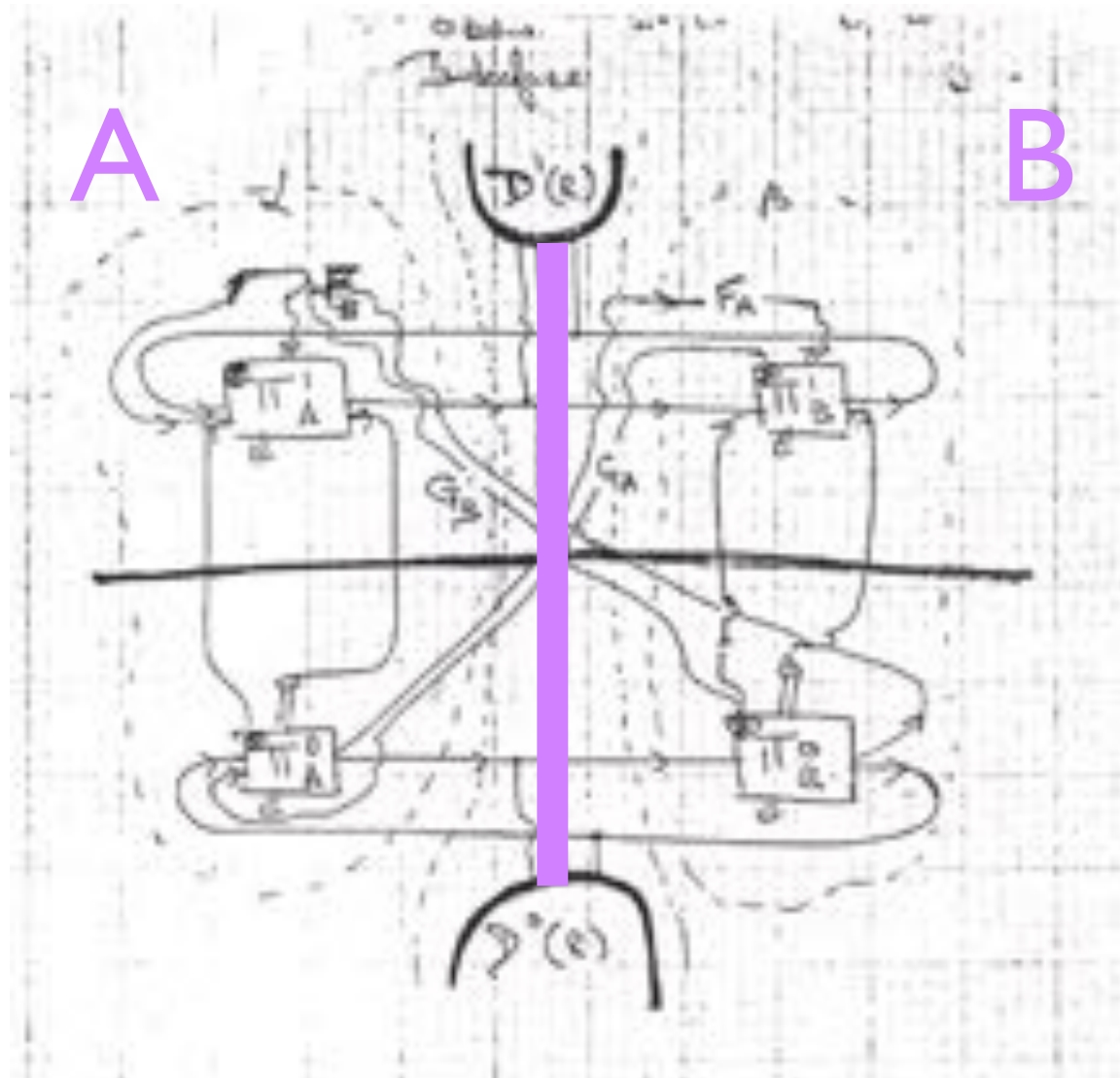
Aspects of Machine Intelligence

Introduction by Gordon Pask

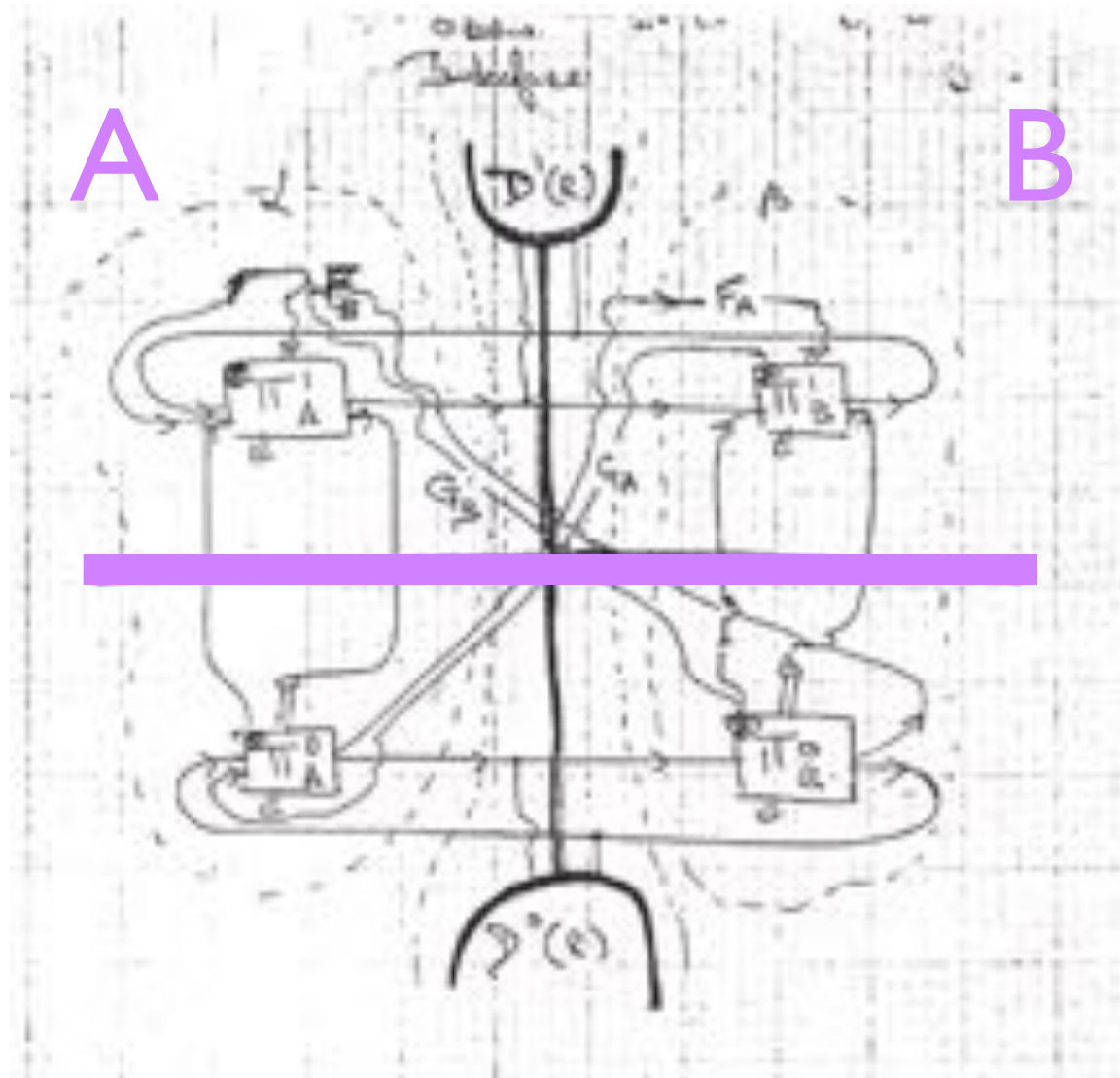
Pask's hand rendering from *Soft Architecture Machines*



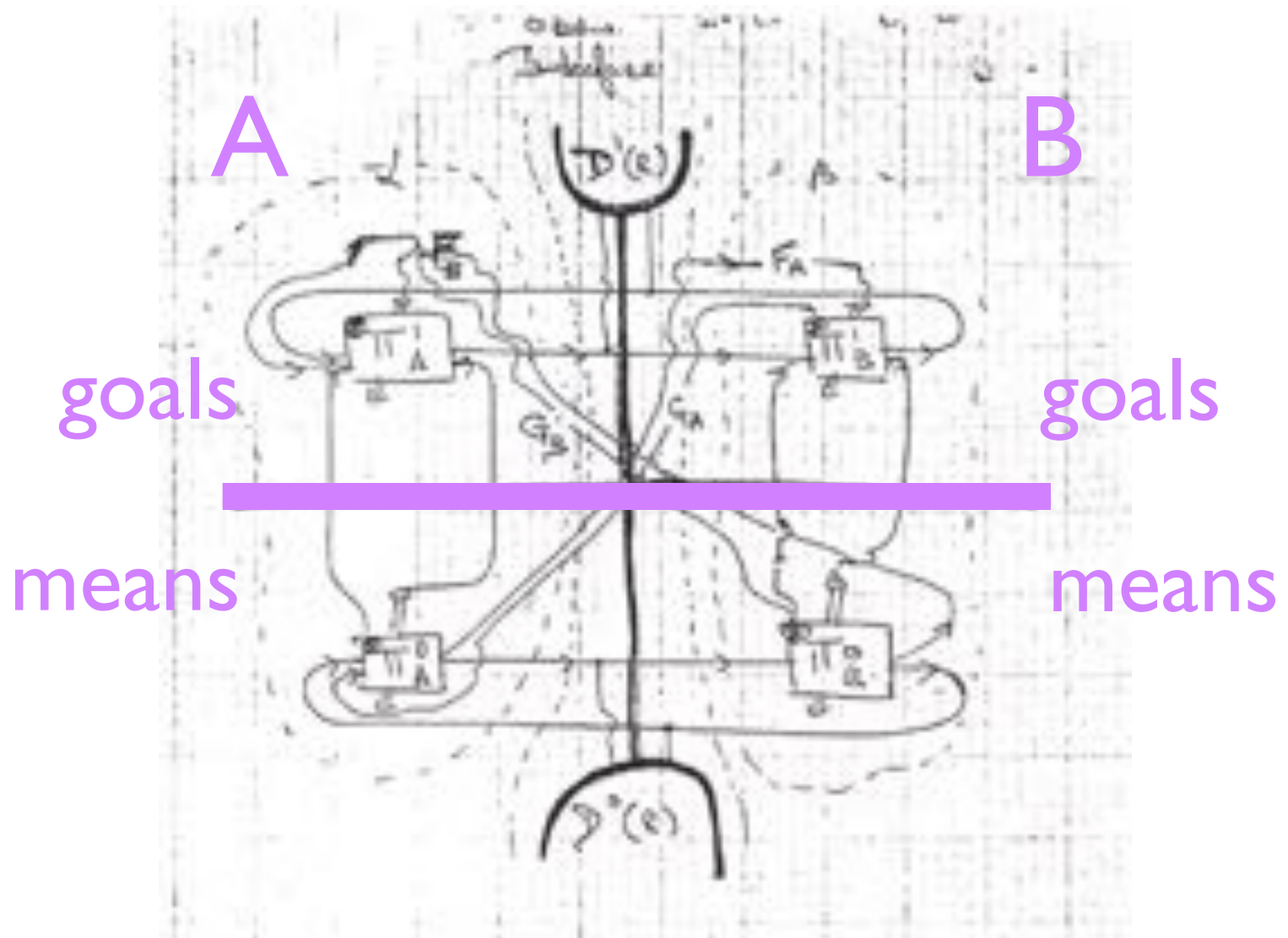
architecture—solitary action—individuals



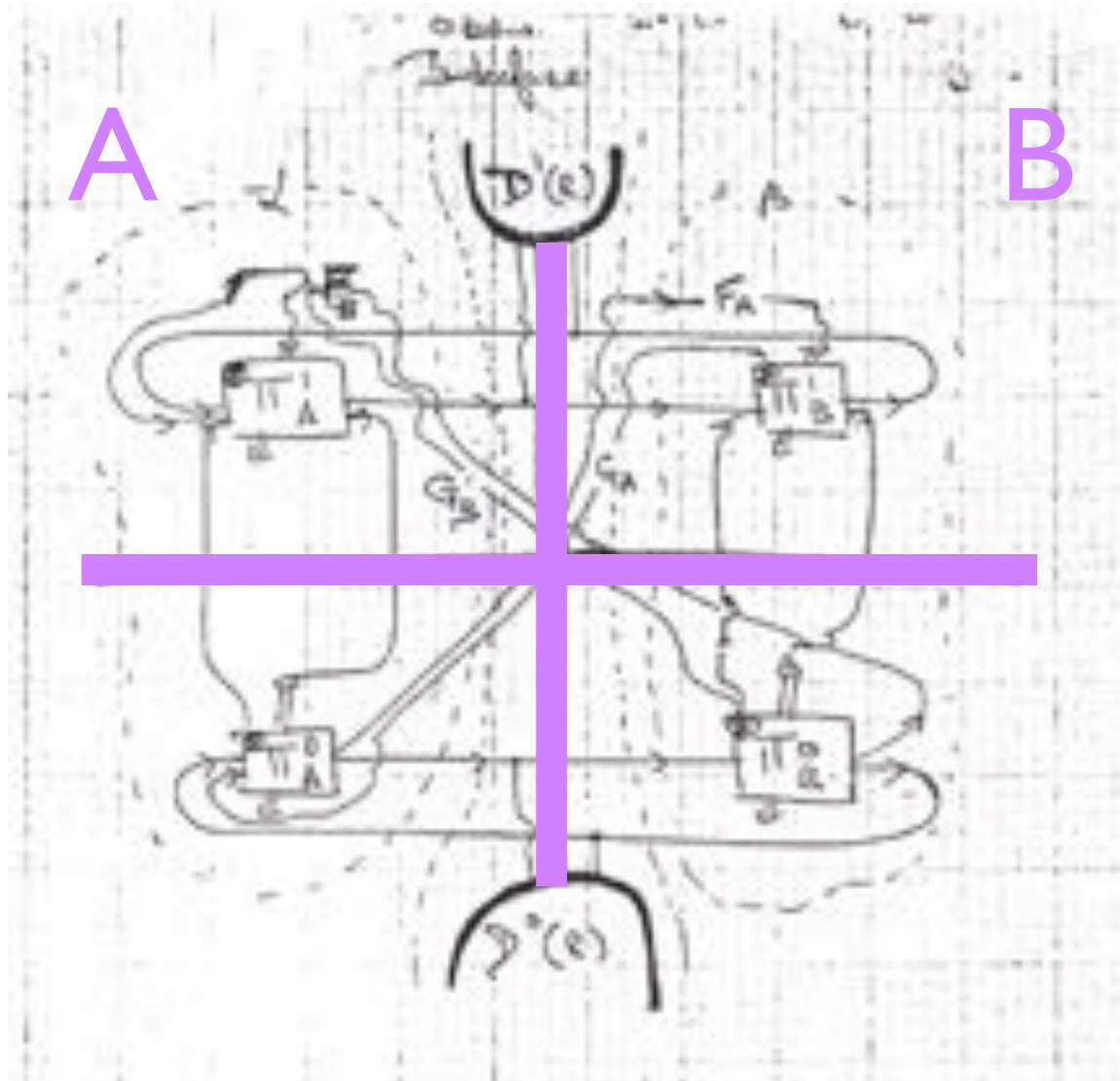
architecture—conversation—participants



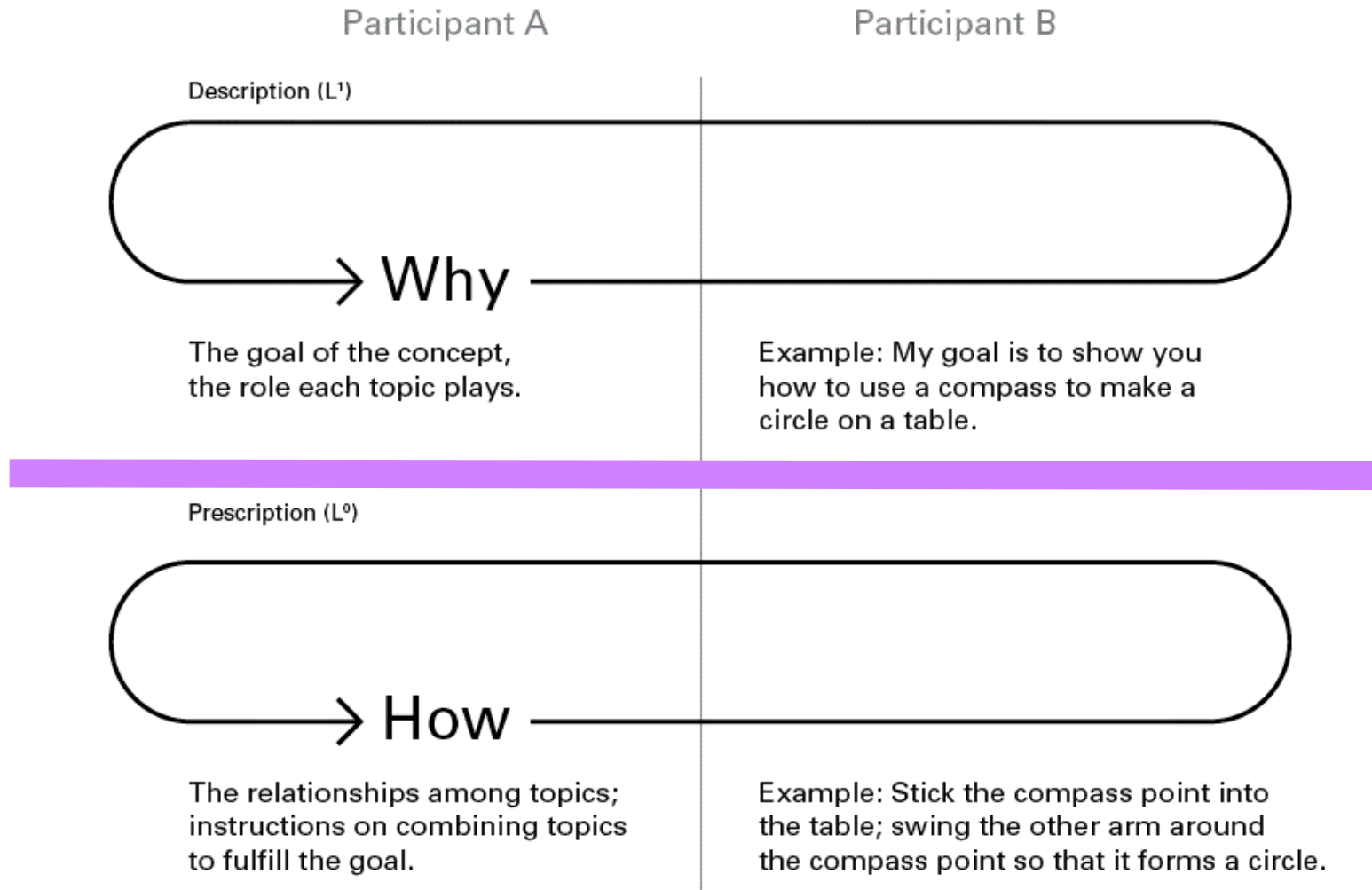
architecture—conversation—participants



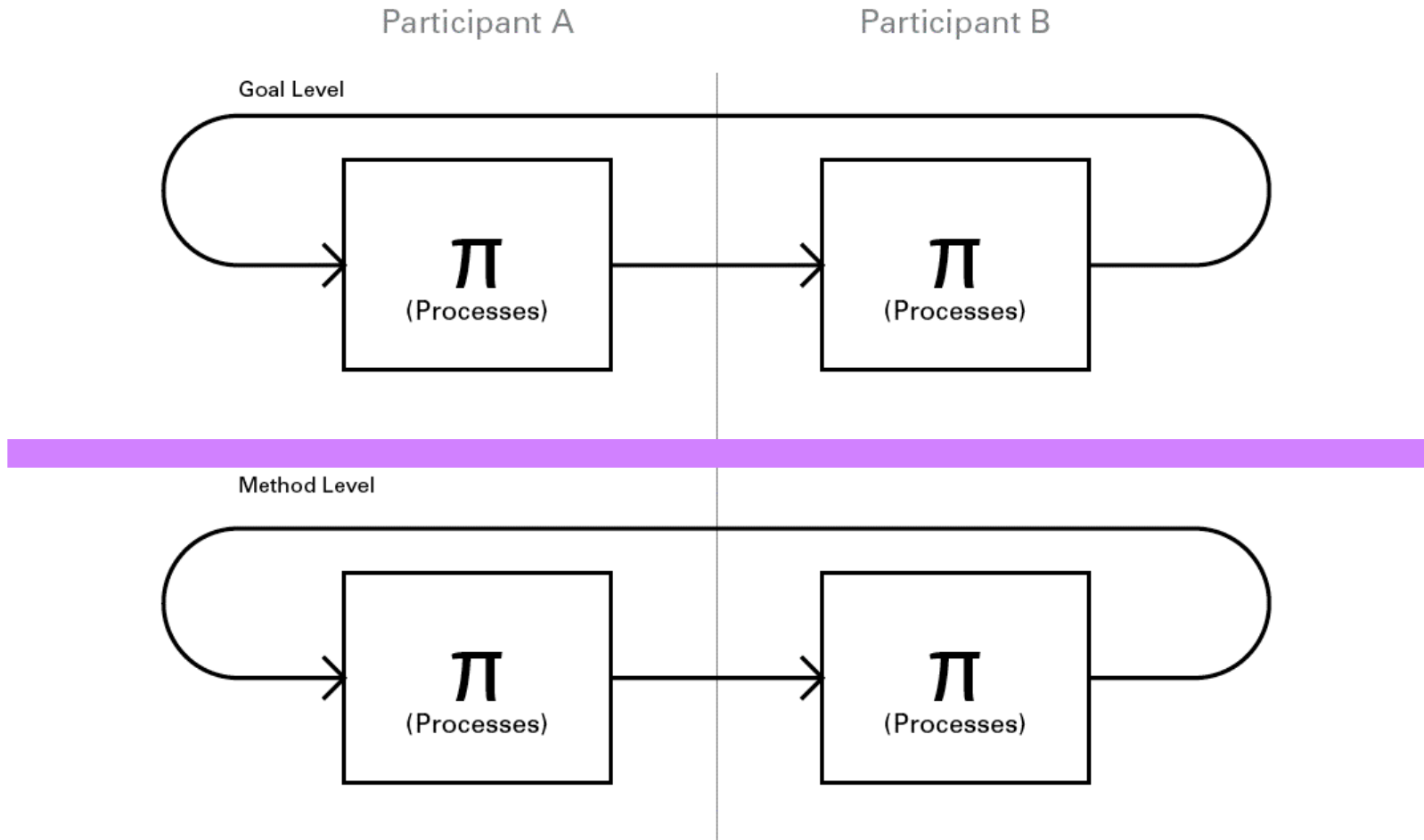
architecture—levels—conversation



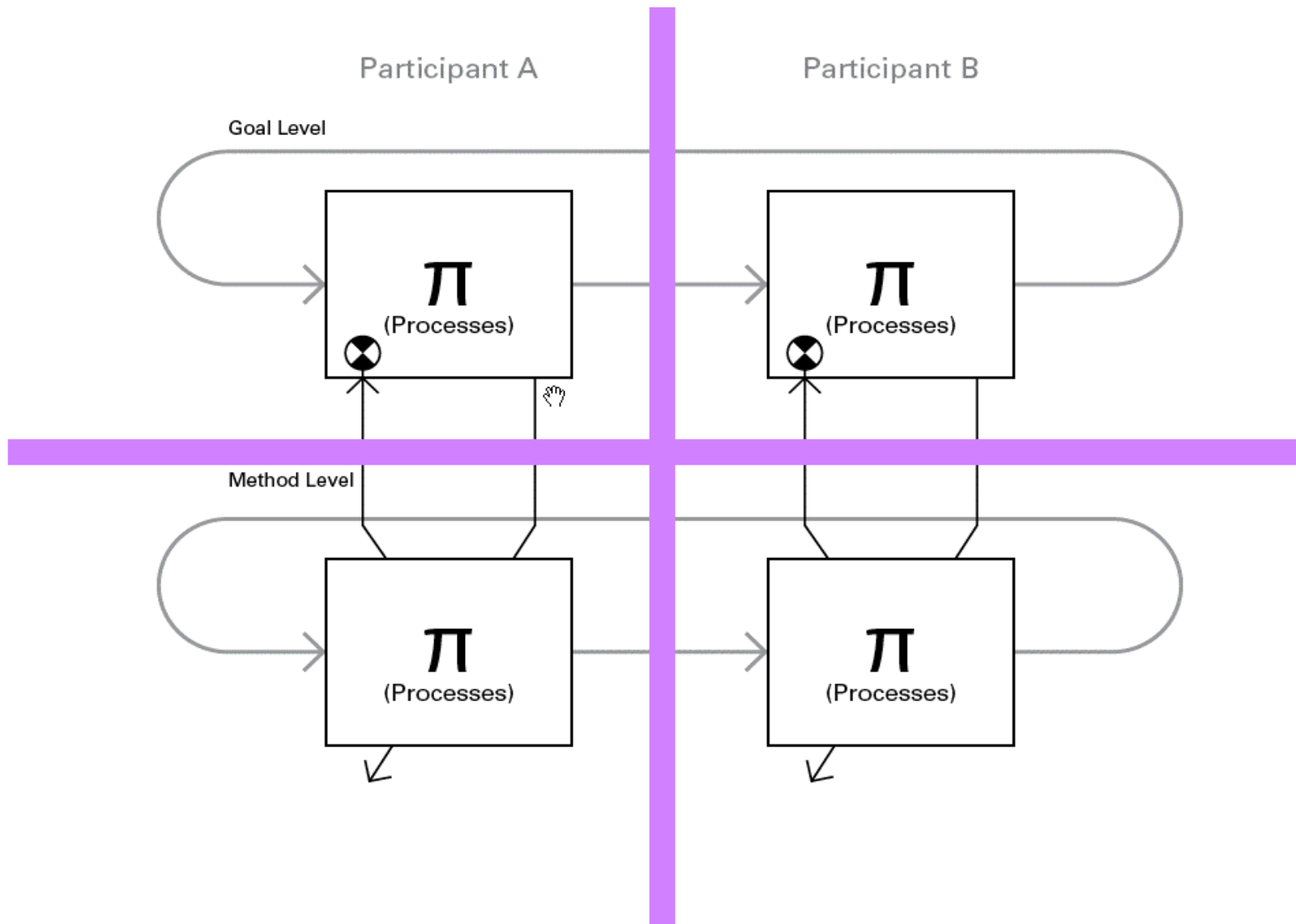
gordon pask—circular interactions—modeling



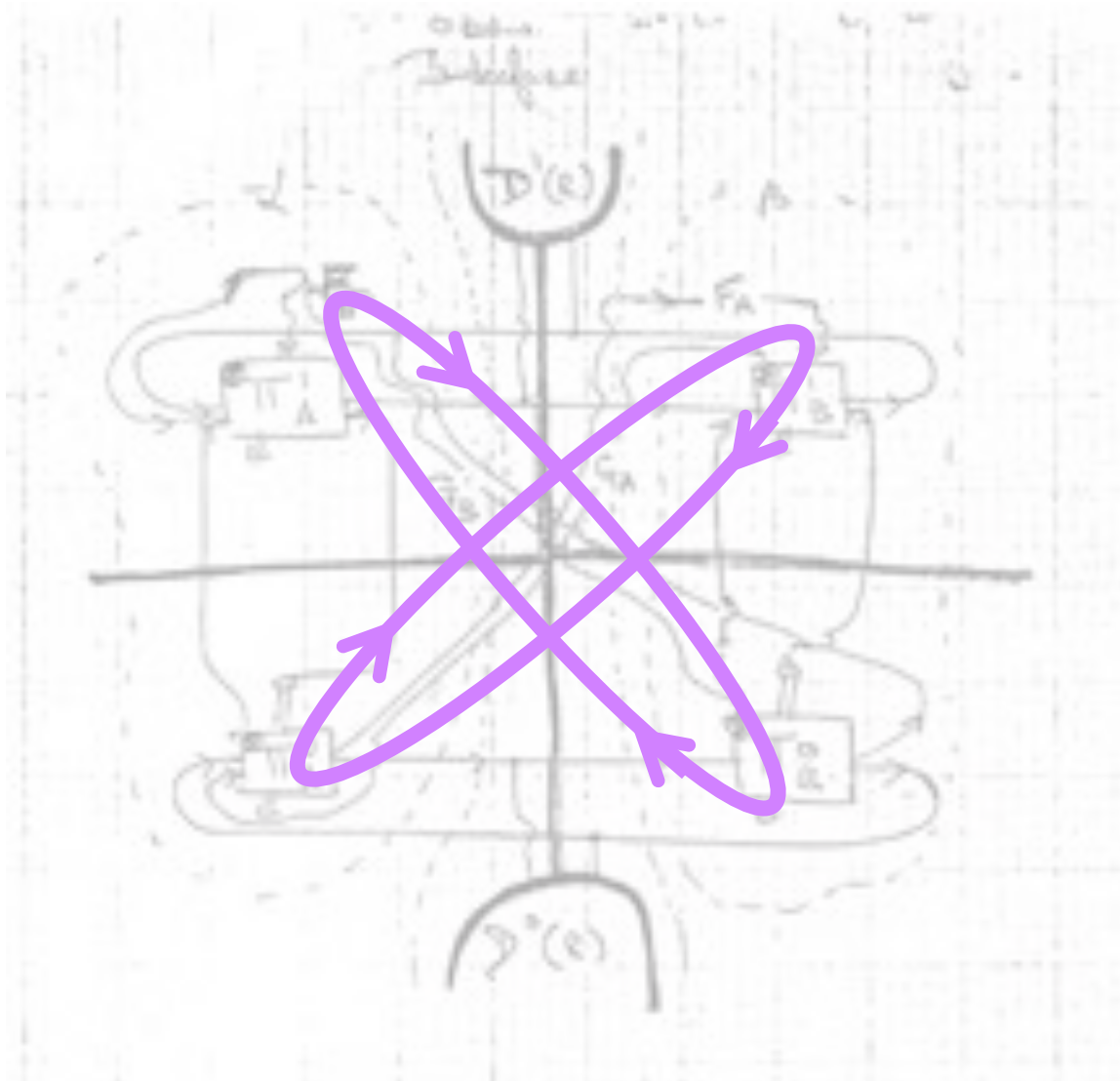
gordon pask—circular interactions—modeling



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dance—contention—shared outcomes



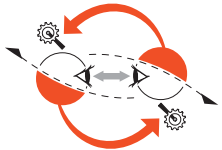
CONVERSATION

cybernetics reviewed

Gordon Pask

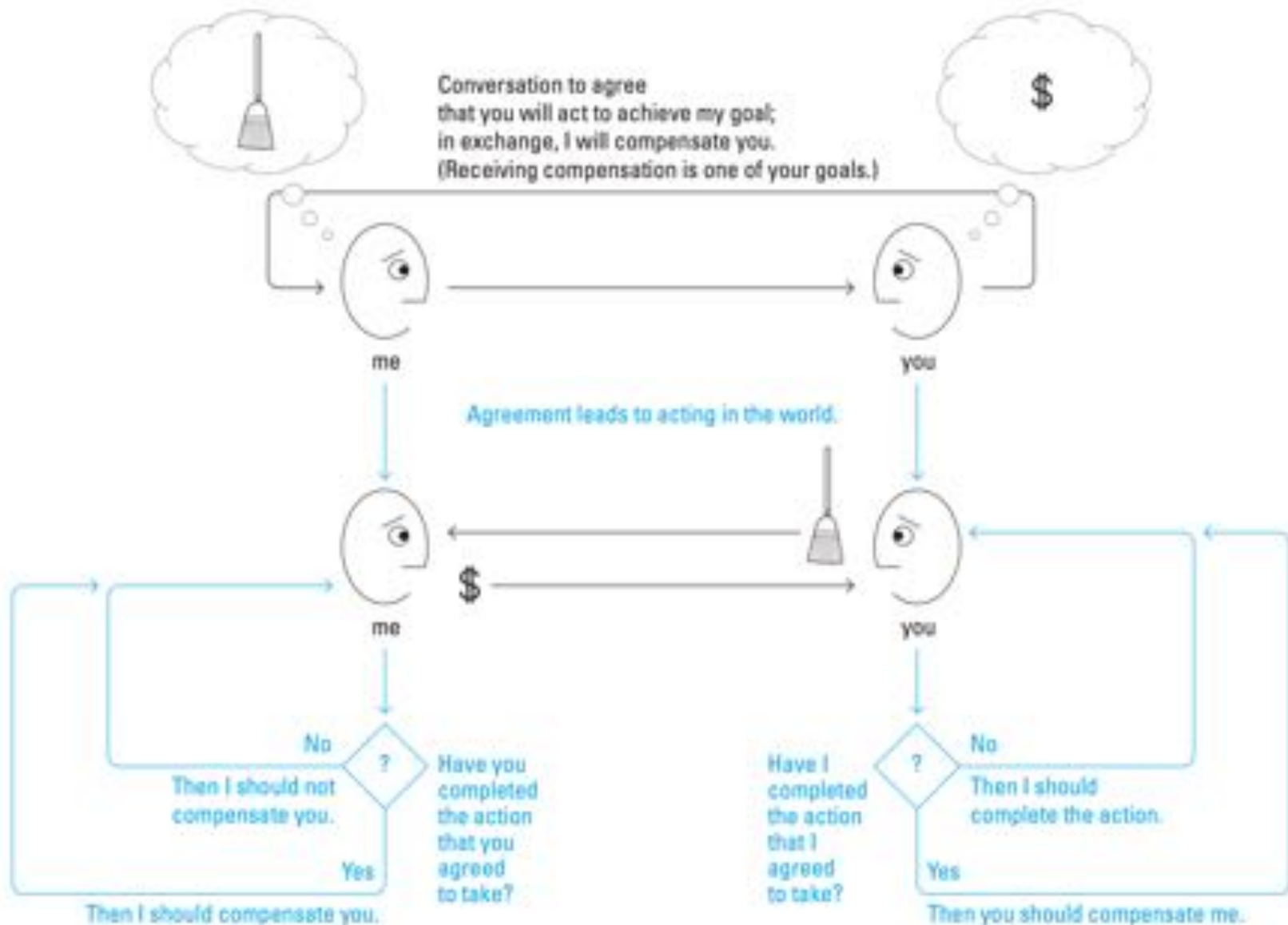
double-loop architectures

conversation theory

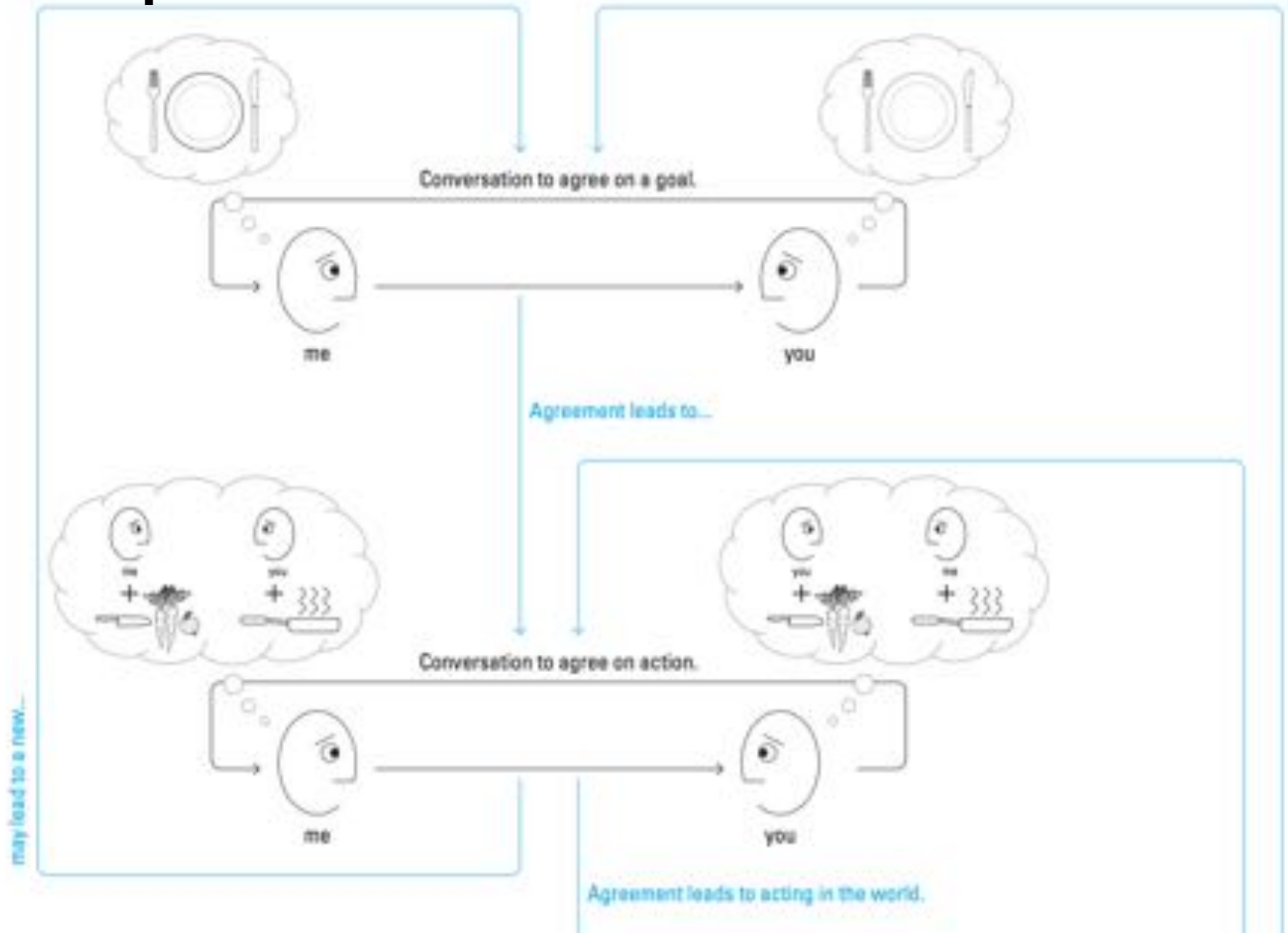


applications

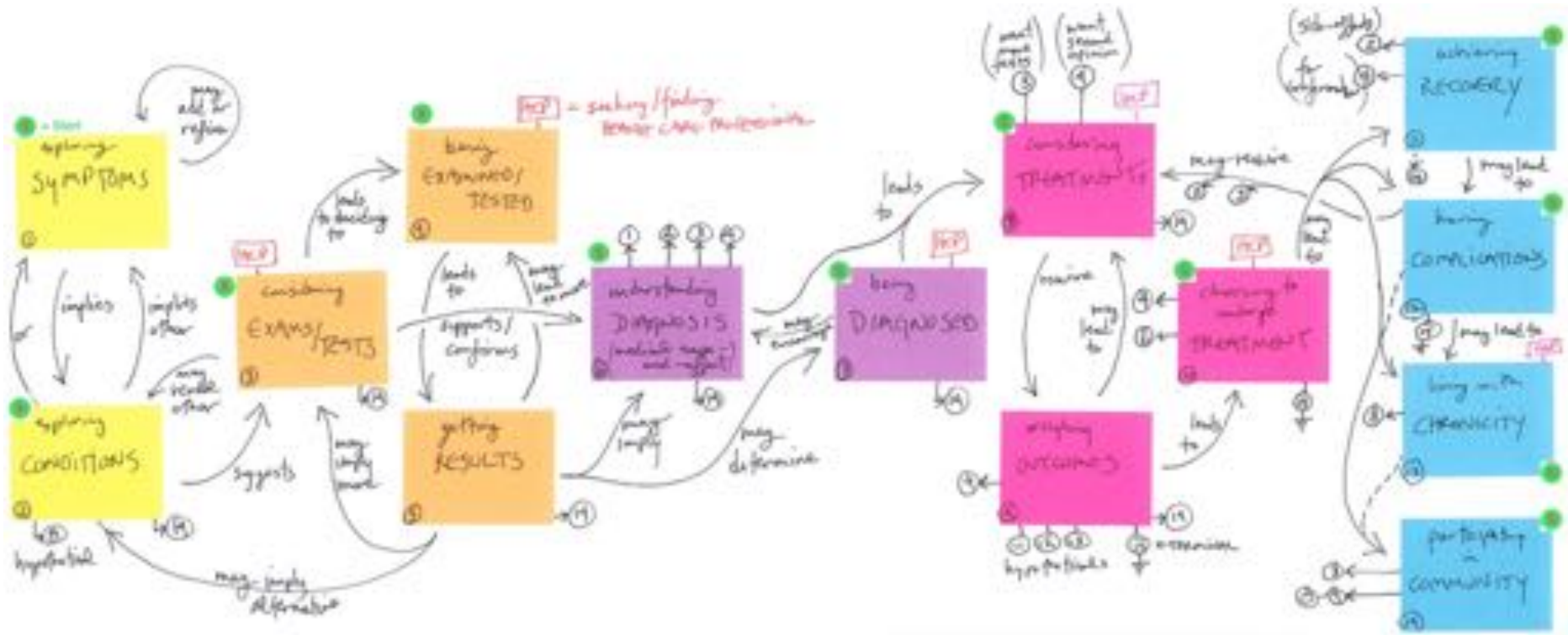
coöperation as coordination

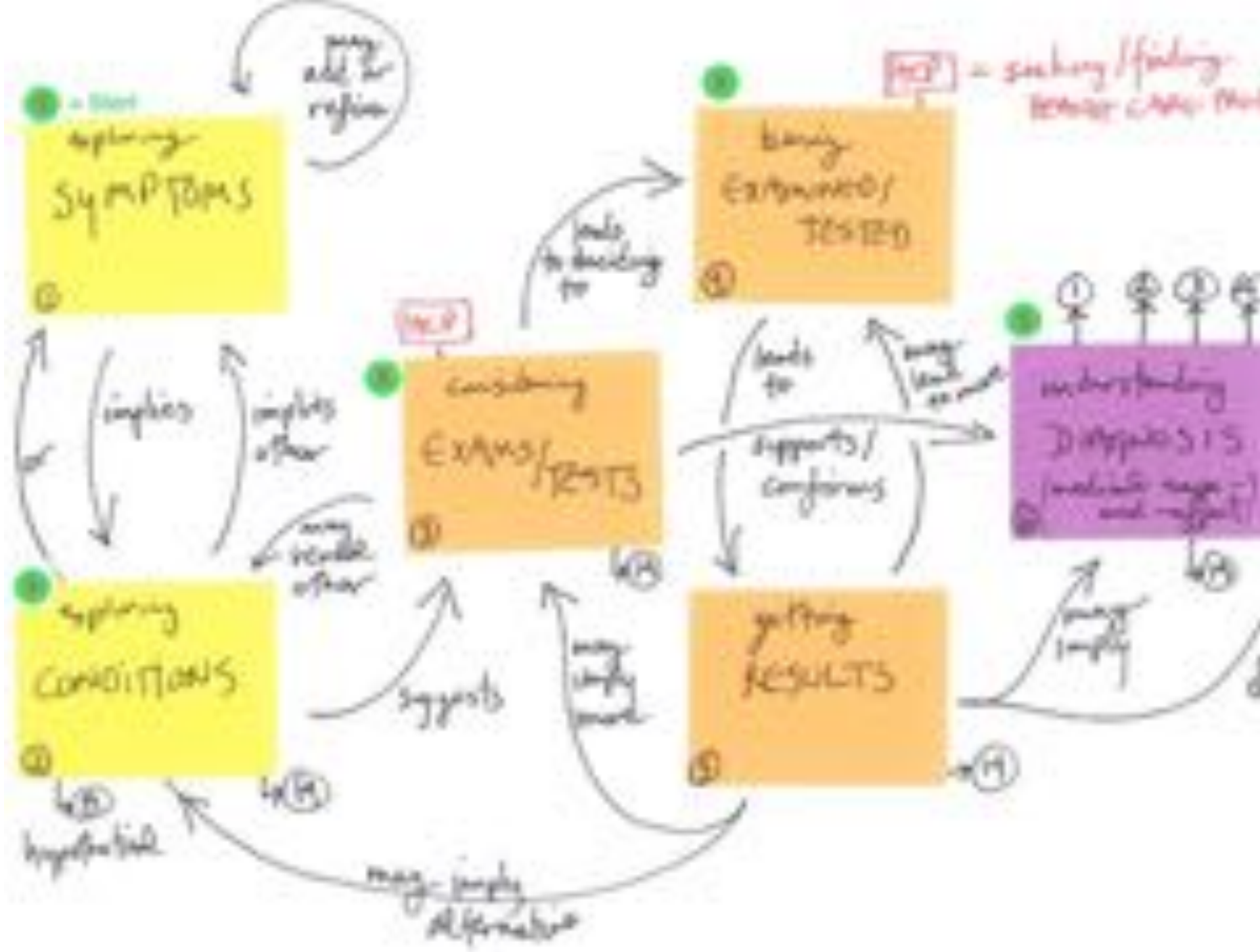


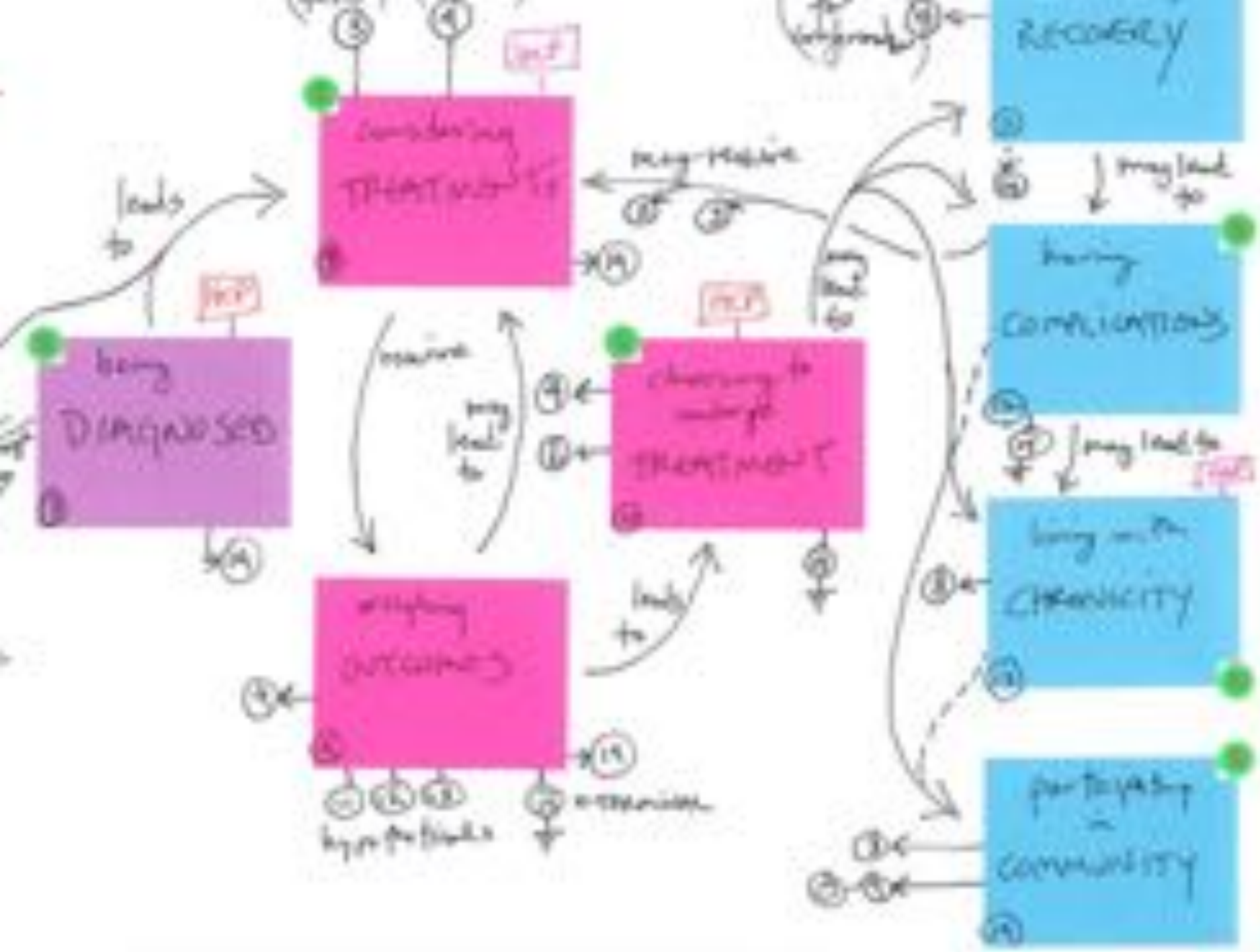
coöperation as collaboration

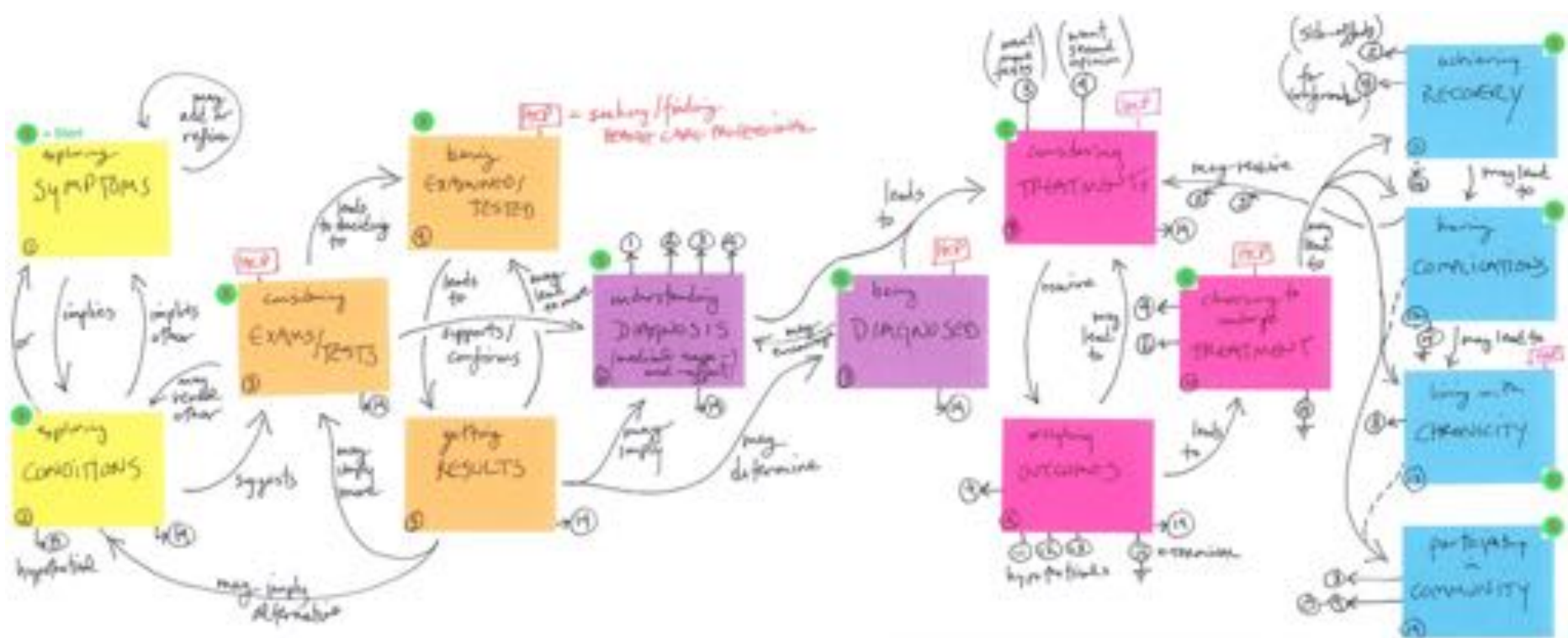


user interfaces / conversing with myself









requisite variety

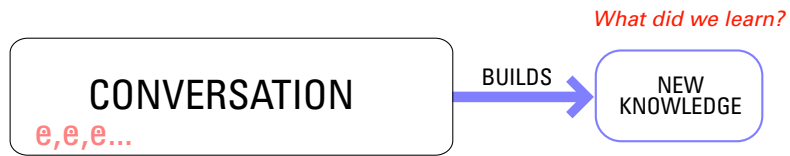
cybernetics has a rigorous definition
of the limitations of a system
to achieve its goal...

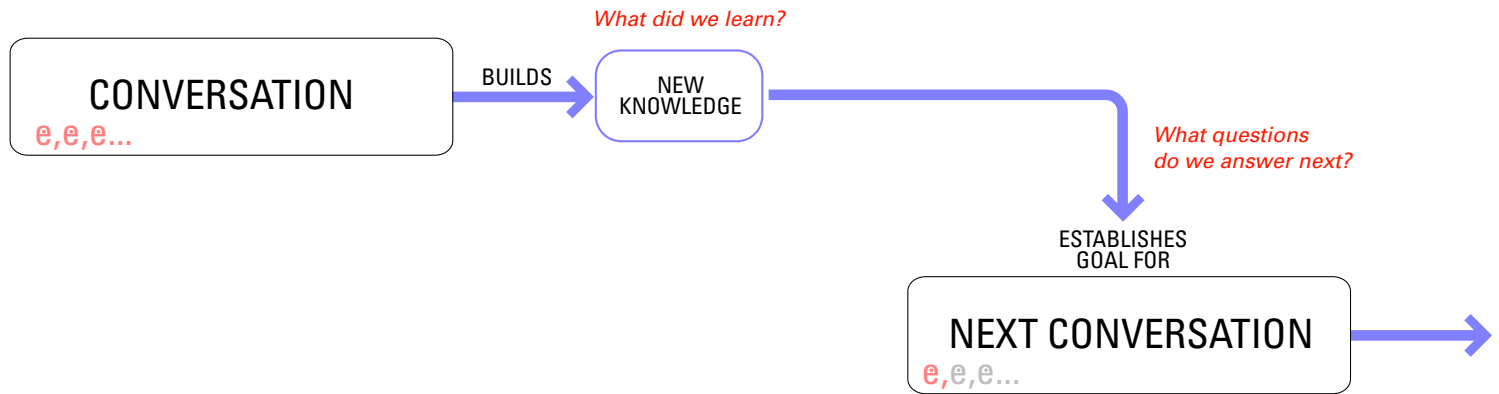
which can be applied to social systems

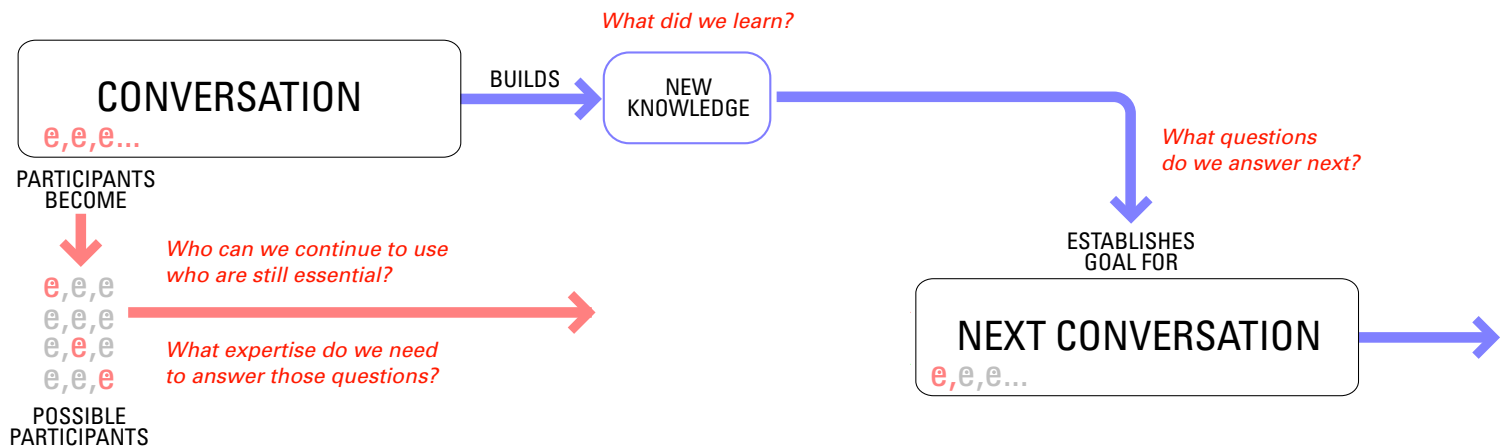
- variety is defined as capacity for conversation
- local truth controls the “essential variables”
that determine the viability system

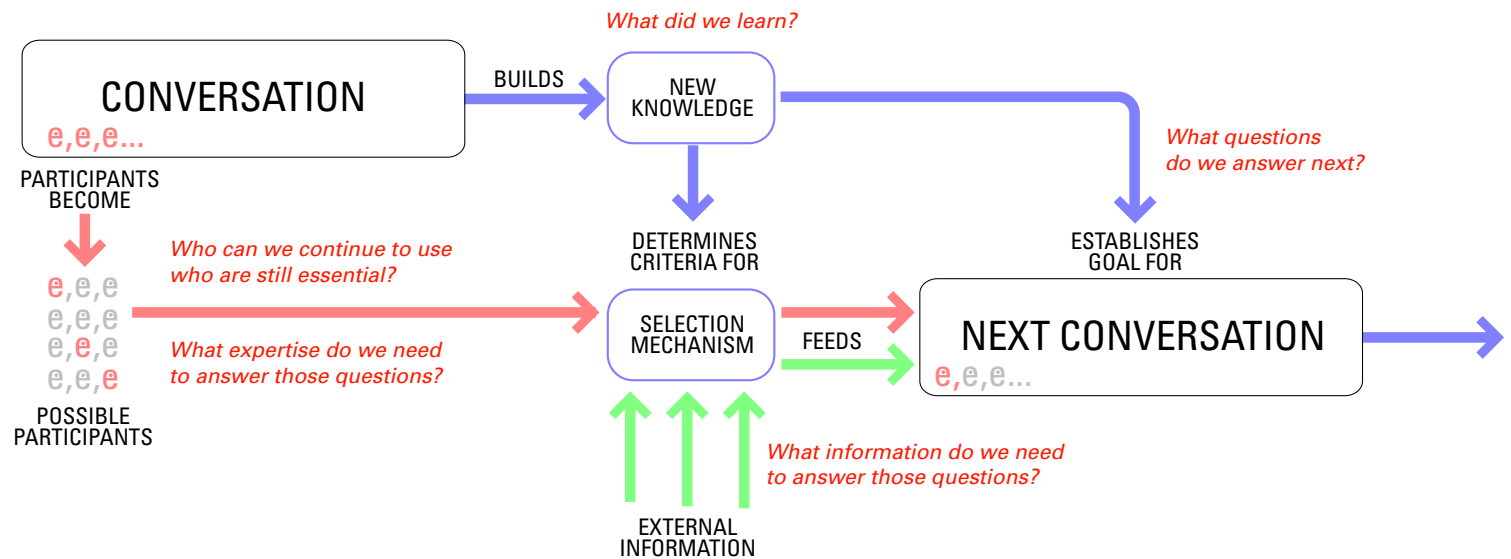
CONVERSATION

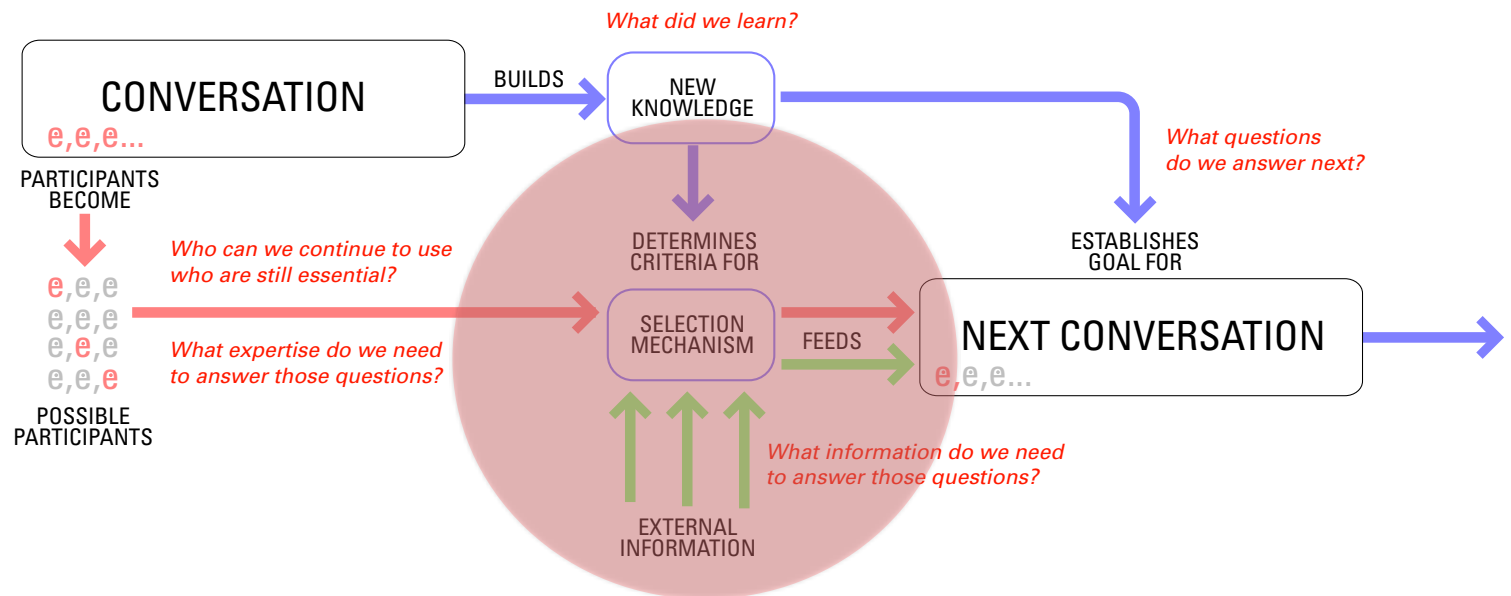
e,e,e...



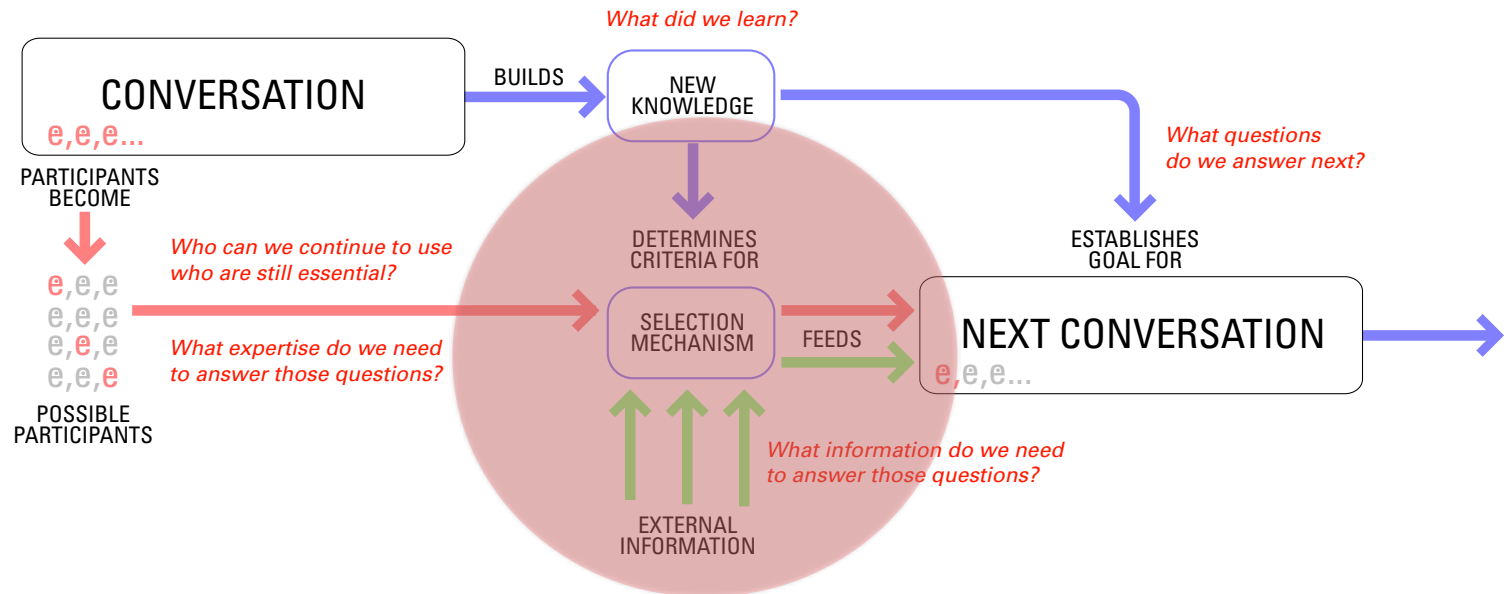


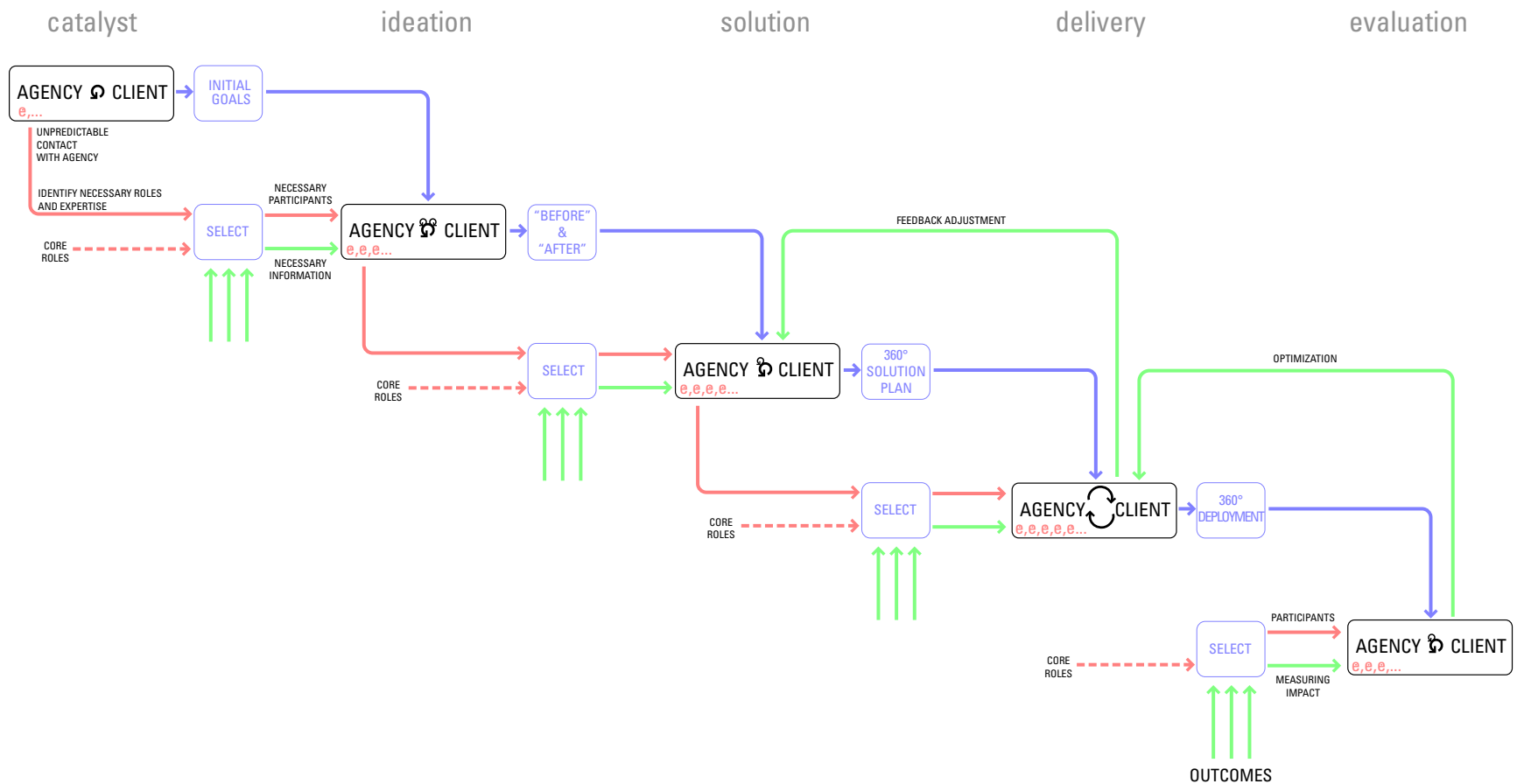


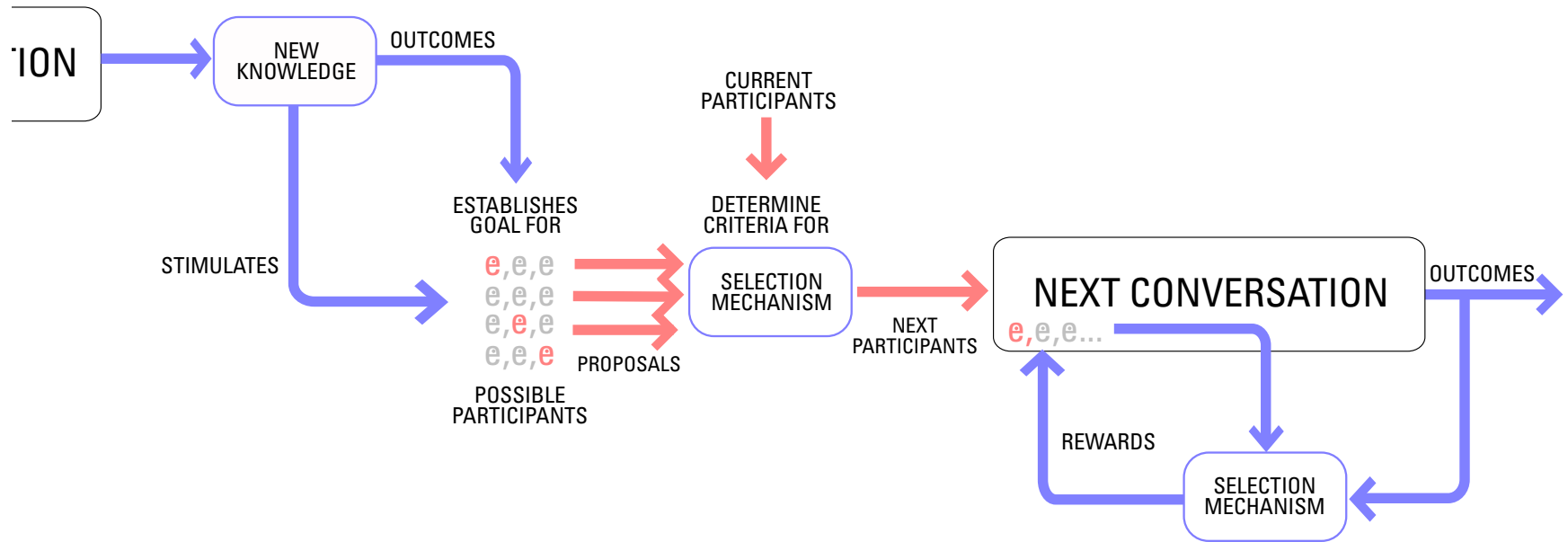




designing the cadence of conversations







co-evolution

cybernetics models the subjective and objective interactions inherent in any complex system that includes social / linguistic components

Notes on the
Role of
**Leadership
and Language**
in Regenerating
Organizations

An organization is its **language**.

Ultimately,
an organization consists of conversations:
who talks to whom, about what.

Each conversation
is recognized, selected, and amplified
(or ignored) by the system.
Decisions, actions, and a sense of valid purpose
grow out of these conversations.

Conversation leads to agreement.
Agreement leads to transaction.

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Narrowing language increases efficiency.

Organizations create their own internal language to solve specific problems.

This language serves as a kind of shorthand: Managers use it every day, knowing they will be clearly understood.

Over time, this internal language grows increasingly specialized—and narrow.

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This internal language is designed to address the needs of the present day business. It helps the organization's managers answer familiar questions and thus increases efficiencies.

Over time, this internal language grows increasingly specialized—and narrower.

Narrowing **language** also increases ignorance.

The organization's internal language is designed to help managers facilitate present-day business – not look beyond it.

Using the internal language, managers increase efficiencies, but cannot recognize new fields of research, new discoveries, new approaches.

e.

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Past language limits future vision.

Managers understand the organization's past behavior.
But this knowledge,
and the language that accompanies it,
limit their vision
of the organization's potential future state.

Using the language of the past,
managers may try to provide a vision for the future.
But it is an old future —
a memory of what the future could be.

Managers may strive for fundamental change,
but their language prevents them from achieving it.

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Expanding **language** increases opportunity.

The conversations necessary
for generating new opportunities
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For an organization to survive,
it must be able to acquire
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To regenerate,
an organization creates
a new **language**.

To support an organization's future viability, effective decision makers actively introduce change into the system.

They do so by generating new language that appropriate groups in the organization come to understand and embrace.

This new language does not overtly challenge the pre-existing, efficient system, but rather creates new distinctions and supportive relationships.

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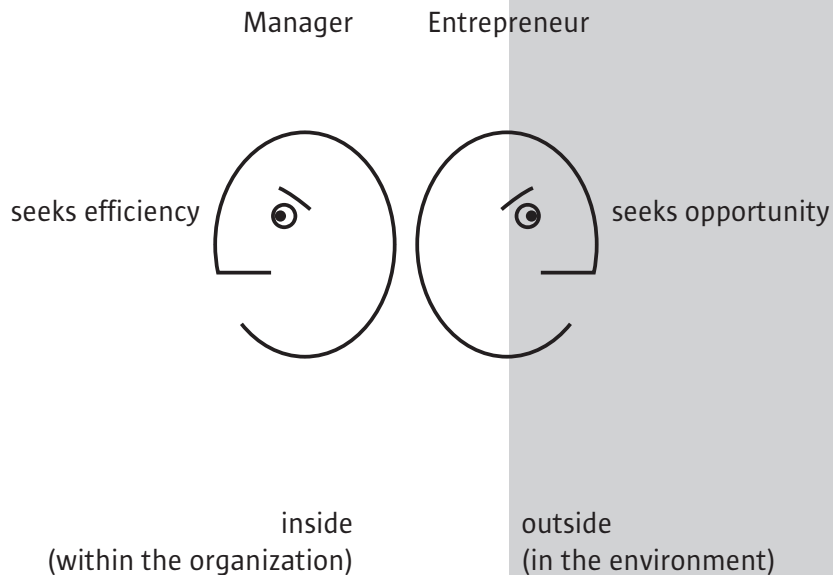
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Manager and Entrepreneur.

The Manager is responsible for improving the organization's present-day performance. Acting in what he perceives to be his own self-interest, he uses the organization's current language to improve efficiencies.

The Entrepreneur does not concern herself with present-day business. Acting in what she perceives to be her own self-interest, she strives to ensure the organization's future by facilitating its evolution.



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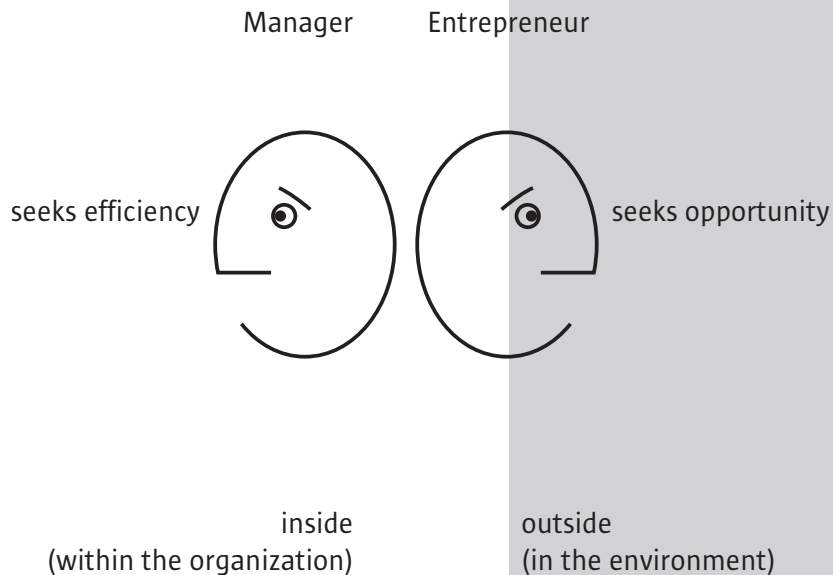
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Managers' reaction to
Entrepreneurs' language:

“Don't distract me with future problems.”

“That's a waste of time.”

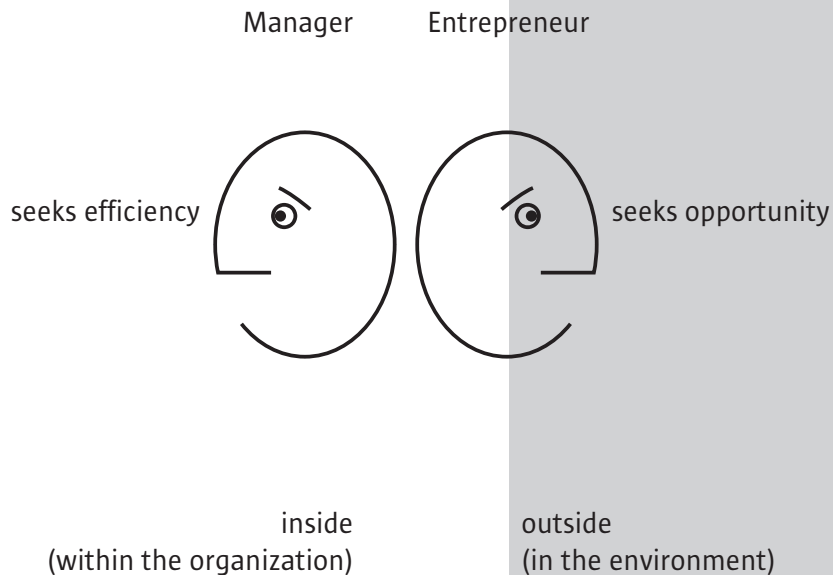
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Entrepreneurs' reaction to Managers' language:

“You are stuck in the past.”

“What you want to do is no longer relevant.”

“Stop taking resources away from what's important.”

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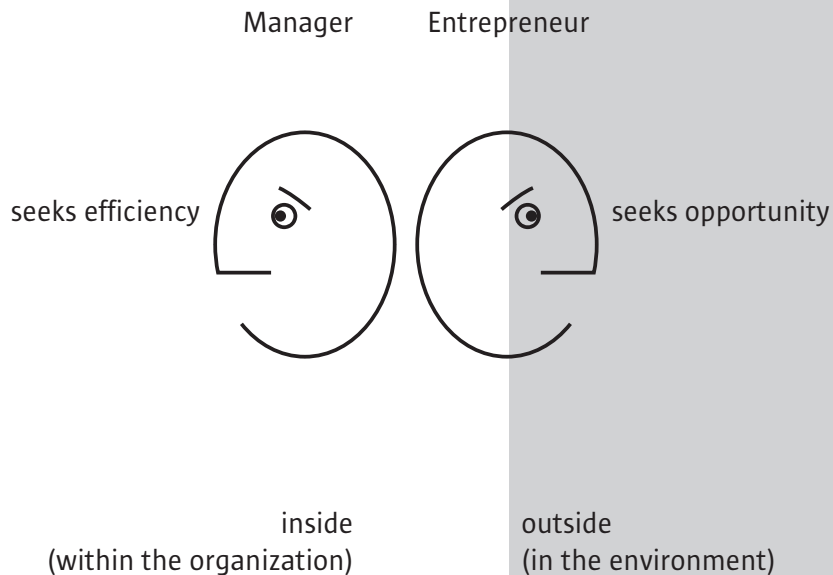
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But...

Managers and Entrepreneurs are both necessary for the long-term viability of an organization.

Managers' language improves quality, brings about efficiencies, and focuses on today.

Entrepreneurs' language increases variety, fosters insight, and focuses on tomorrow.



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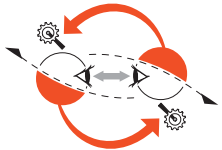
CONVERSATION

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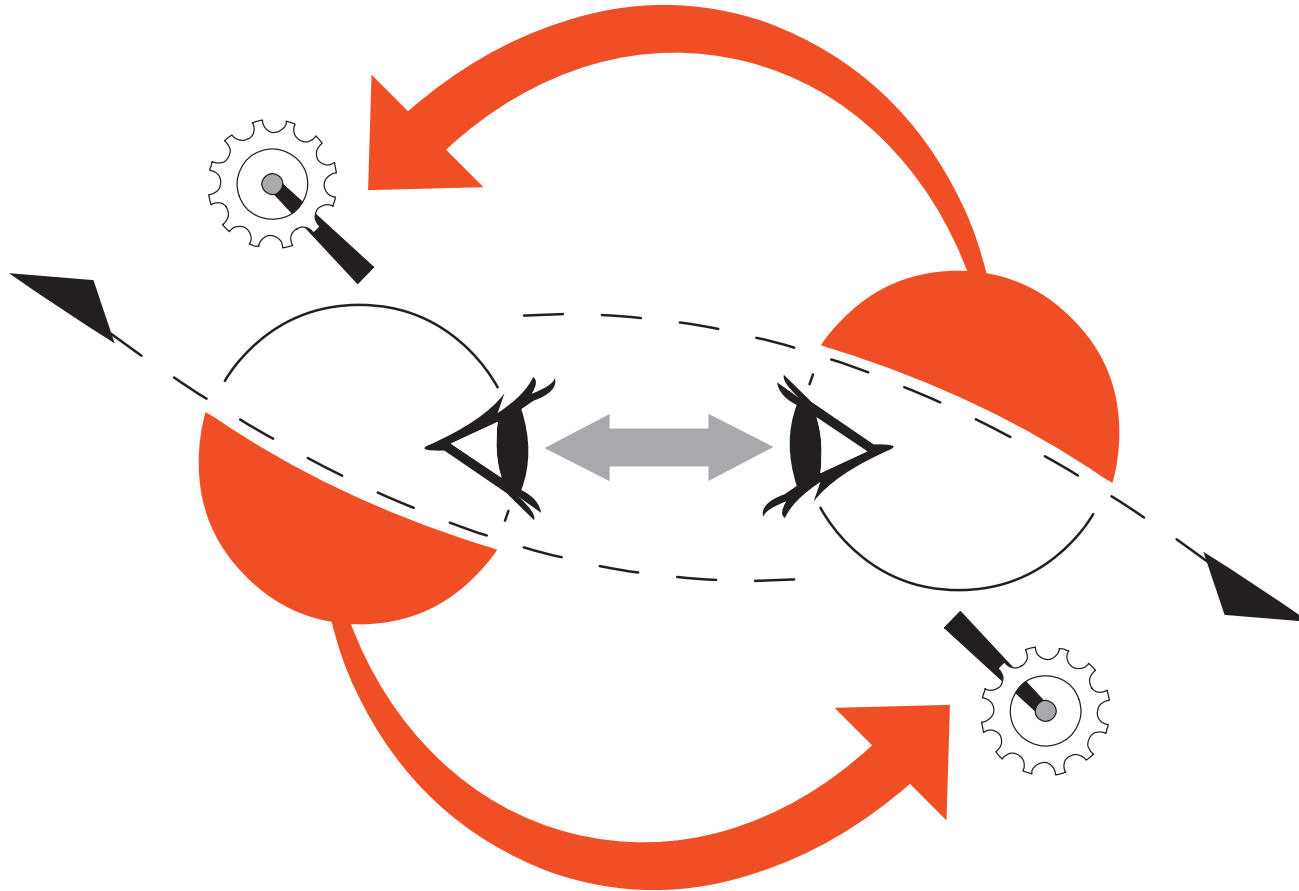
conversation theory



applications

CYBERNETICS CONVERSATION DESIGN

CUSO SEMINAR — University of Fribourg
Dr Paul Pangaro — New York City
November 2014



pangaro@generalcybernetics.net