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A GENERATIVE FRAMEWORK FOR CONVERSATION THEORY

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ABSTRACT

Pask's **conversation theory** unifies his own work and integrates it with that of others. This paper gives a systemic framework for the key constructs of conversation theory, generating them from Brown's notion of **making a distinction.** The sequence of derivation links conversation theory to Popper's notion of 3 **worlds** and defines Pask's three forms of **individuals** as autonomous entities, autopietic unities, one in each world.

INTRODUCTION

Those who come across Gordon Pask's work for the first time and realize its massive scope, volume and depth, can easily come to think of it as a complex of different theories formulated at different times with different domains of application. Pask has written about a great diversity of topics and become involved in a great many more, from abstract mathematics, through models of the brain, to those of social organizations, and to experiments with massive arrays of electromechanical equipment, computers and people. He has also been involved in the arts and theatrical production. However, what Pask (1975,1980,1981) now terms **Conversation Theory** not only unifies his own work over its complete span but also integrates it with that of others.

In this paper we present a framework for conversation theory that brings out its essential power and completeness, its internal coherence and its external applicability. This framework provides links both to the work of others and to the tools of conversation theory. However, we emphasize that this is **a** framework. By the very nature of conversation, in that it is reflexive, one can see our own activity here as but one way of generating, motivating and presenting conversation theory. There are an indefinite number of other ways. The discussion of all that there is has no end.

CONVERSATION THEORY

Pask (1975 p.13) defines **cybernetics** as "primarily concerned with establishing isomorphisms...The basic mode of argument and development involves analogy...The analogy expressed or represented in the language employed to account for events is a **metaphor.** In this sense, cybernetics is the science or art of manipulating defensible metaphors..." His notion of **conversation theory** is strongly related to this in that it is concerned with how **metaphors are used to replicate analogies between individuals.** Pask's notions of conversation, language and individual are sufficiently widened for the theory to encompass all aspects of knowledge acquisition and processing as such replication; conversations with nature model experience of the physical world and conversations with oneself model the restructuring of information at one level into knowledge at a higher level.

Pask is particularly concerned with the veridicality of communication and his precise definition of "agreement over an understanding" (Pask 1981) is a key part of conversation theory. It may be seen as an equivalent in the world of knowledge to the replication of an organism in the biological world. He is also particularly concerned with the operational definition of consciousness and identifies it in its minimal form as an "agreement over an understanding" between two perspectives within one person.

These considerations lead to the main sub-theories of conversation theory which Pask (1975) defines as:

1. Sub-theory of **individuals** concerned with characterizing potentially conscious entities.
2. Sub-theory of **conversational domains** in which P-Individuals may converse and remain stable.
3. Sub-theory of **process** applicable to decision making.
4. Sub-theory of **vehicles** or M-Individuals.
5. Sub-theory of **uncertainties and values** characterizes measures that give integrity to P-Individuals.
6. Sub-theory of **conscious processes** defined in terms of genuine conversations.
7. Sub-theory of **compatibility** as **an immunology of ideas.**

In the following section we give a simple generative framework for conversation theory and its sub-theories.

A GENERATIVE FRAMEWORK FOR CONVERSATION THEORY

We have described a systems methodology based on Brown's (1969) notion of **making a distinction** which allows the constructs of conversation theory to be generated as basic systemic distinctions (Gaines & Shaw 1981). In using this to analyse the concept of a **knowledge environment** we have given a derivation of Popper's (1974) theory of **3 worlds** that leads to operational definitions of the various forms of individual that Pask considers in conversation theory (Gaines & Shaw 1983). The form of the argument is shown in Figure 1. Out of some initial "prologue of being" we assume there is formed a fundamental postulate:

FP **There exists distinction-making, some necessary.**

This traps us (through ontological fallacies) into:

W3 **There exist distinctions -- world 3.**

W2 **There exist distinction makers -- world 2.**

W1 **There exists a source for necessary distinctions -- world 1.**

The distinctions that lead to these definitions of **worlds** are categorically dissimilar. However, if we compound our ontological fallacies with those of category collapse we can consider analogous phenomena within the the three worlds. An **entity** is defined to be a coherent fragment of a world, and an **individual** is defined to be an autonomous entity. Pask's M-Individuals are "living organizations" (Varela 1979) in world 1; his P-Individuals are "personal scientists" (Shaw 1980, Shaw & Gaines 1981) in world 2; and his "conversational domains" are D-Individuals in world 3 (D for discourse).

These definitions can be formalized by noting that: an entity is a distinguished part of a world; a coherent entity is one that is relatively stable in that the relations of its parts one with another are more stable than with those outside it; an autonomous entity is one which is relatively uncontrollable in that the relations of its parts to those outside it are less stable than the relations of parts outside it with one another. Stability can be formalized in relation to pairs of distinctions in opposition except for unstable entities, and opposition can be formalized as pairs of distinctions distinguished by never both marking the same entity. These concepts are the basis of Pask's sub-theories of uncertainty and value, process and stability.

Individuals under these definitions are autopoietic unities in worlds 1, 2 and 3, and the worlds correspond to the different forms of autopoiesis noted by Varela (1981). Maturana's (1975) original biological autopoiesis is essentially in world 1. Zeleny's (1977) social autopoiesis is in world 2. Pask's (1981)

organizational closure is autopoiesis in world 3. Life operates in all three worlds and is autopoietic in all three.

SUMMARY AND CONCLUSIONS

Pask's conversation theory may be developed from a sequence that:

(a) Commences with the notion of a distinction;
(b) Posits there exists distinction-making, some necessary;
(c) Derives the three worlds by an ontological argument;
(d) Defines an entity in a world as a coherent part;
(e) Defines an individual in a world as an autonomous entity;
(f) M-entities are objects, M-Individuals living organisms;
(g) P-entities are construct systems, P-Individuals are personal scientists;
(h) D-entities are theorems, D-individuals are conversational domains.
(i) Compatibility between individuals within worlds leads to an immunology of ideas, etc.;
(j) Coherence across worlds corresponds to consciousness;
(k) A person is a coherence between an individual in each world.

The relationships between the key constructs in conversation theory when derived in this way are shown in Figure 2.

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REFERENCES

Brown, G.S. (1969) **Laws of Form.** London: George Allen & Unwin.

Gaines, B. R. & Shaw, M. L. G. (1981) "A programme for the development of a systems methodology of knowledge and action." **General Systems Research and Design: Precursors and Futures.** Louisville: Society for General Systems Research.

Gaines, B.R. & Shaw, M.L.G. (1983) "Is there a knowledge environment?" **World Problems and System Learning,** Proceedings of SGSR 27th Annual Conference.

Maturana, H. R. (1975) "The organization of the living: a theory of the living organization." **International Journal of Man-Machine Studies 7.**

Pask, G. (1975) **The Cybernetics of Human Learning and Performance.** London: Hutchinson.

Pask, G. (1980) "Developments in conversation theory - Part I." **International Journal of Man-Machine Studies** 13(4), 357-411.

Pask, G. (1981) "Organizational closure of potentially conscious systems." In Zeleny, M. **Autopoiesis.** New York: North Holland, 265-308.

Popper, K. (1974) "Autobiography." In P.A. Schilpp (ed.) **The Philosophy of Karl Popper.** Illinois: Open Court.

Shaw, M. L. G. (1980) **On Becoming a Personal Scientist.** London: Academic Press.

Shaw, M. L. G. & Gaines, B. R. (1981) "The personal scientist in the community of science." **General Systems Research and Design: Precursors and Futures.** Louisville: Society for General Systems Research.

Varela, F. (1979) **Principles of Biological Autonomy.** New York: North Holland.

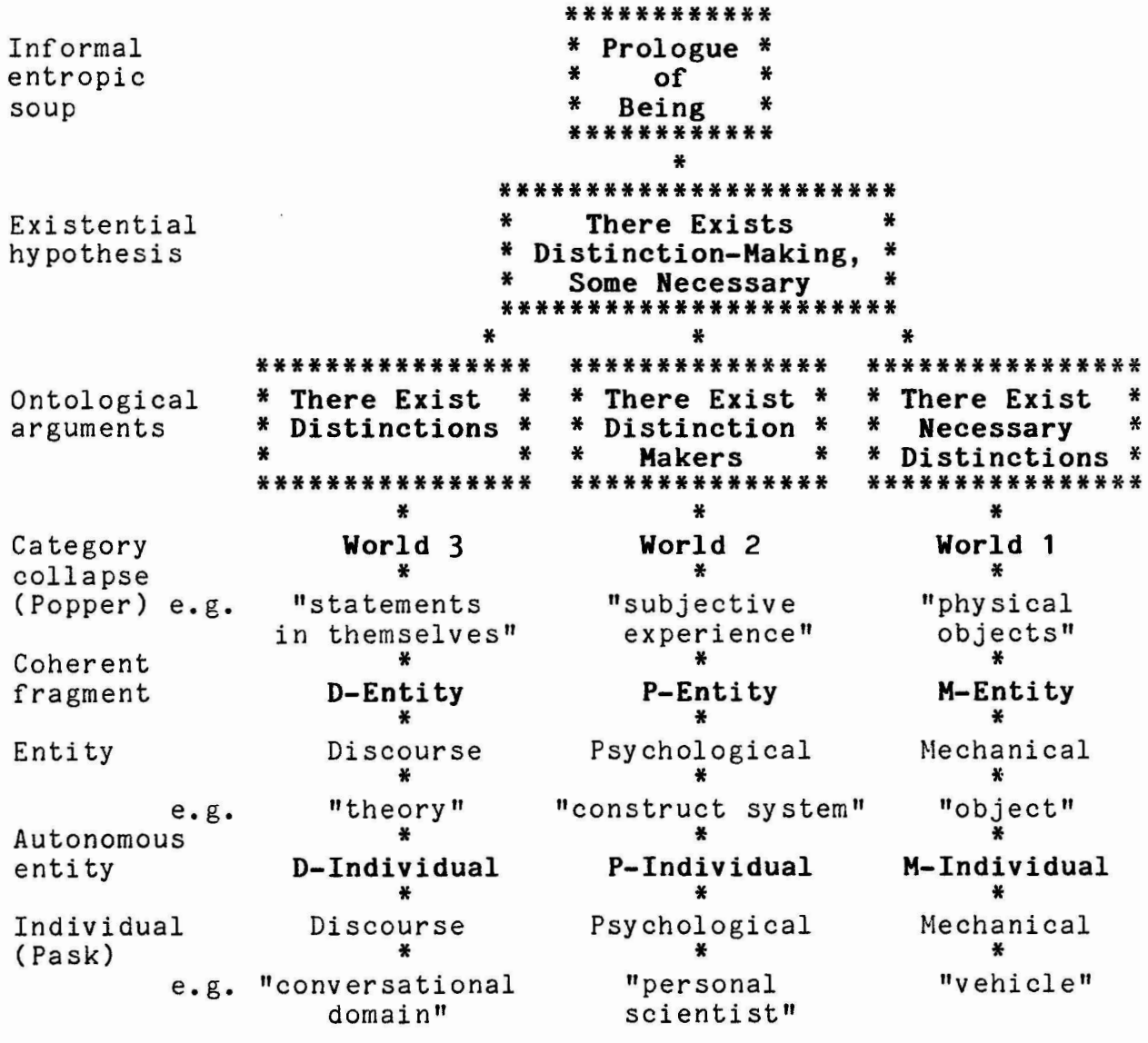
Varela, F. (1981) "Describing the logic of the living." In M.Zeleny (ed.) **Autopoiesis.** New York: North Holland.

Zeleny, M. (1977) "Self-organization of living systems: a formal model of autopoiesis." **International Journal of General Systems 4.**

FIGURE CAPTIONS

Figure 1 Derivation of Pask's Individuals as autonomous entities in Popper's 3 worlds

Figure 2 A framework for conversation theory and its sub-theories


Informal entropic soup
Prologue of Being
Existential hypothesis
There Exists Distinction-Making, Some Necessary
Ontological arguments
There Exist Distinctions
There Exist Distinction Makers
There Exist Necessary Distinctions
Category collapse (Popper) e.g.
World 3
"statements in themselves"
World 2
"subjective experience"
World 1
"physical objects"
Coherent fragment
D-Entity
P-Entity
M-Entity
Entity
Discourse
Psychological
Mechanical
e.g.
"theory"
"construct system"
"object"
Autonomous entity
D-Individual
P-Individual
M-Individual
Individual (Pask)
Discourse
Psychological
Mechanical
e.g.
"conversational domain"
"personal scientist"
"vehicle"

Conversation Theory
(Pask)

Calculus of Distinctions
(Brown)

Uncertainty & Value	**Process & Stability**
ordering	opposition
Coherence	Autonomy
relative stability	relative uncontrollability
Entities	Individuals

Existential & Ontological Presuppositions

Worlds
(Popper)

World 3	World 2	World 1

Individuals in Worlds

D-Individuals	P-Individuals	M-Individuals
Conversational Domains	**Psychological Individuals**	**Mechanical Individuals or Vehicles**

Formation and Dissolution

Compatibility
immunology & ecology

Coherence Across Worlds

Consciousness