

## WHY CATJECTS?

Dirk Baecker

v3, January 2018

- I. Assume there are four types of *self-referential systems*, to wit organic, psychic, social, and, soon enough, artificial.
- II. Consider any subject of analytical interest either an *element* of one of these systems or an *object* within the environment of one or more of these systems.
- III. Catjects are material, structural, or semantic, i.e. artificial objects which are considered interfaces between self-referential systems. They model how you *observe* a catject *observing*, and *being observed* by, the systems it interfaces. Catjects are called catjects because they are neither objects nor subjects but complex categories giving rise to objects and subjects.
- IV. Catjects are to be considered *forms* as defined by George Spencer-Brown. Basic mechanisms to construct a catject are *crosses*,  $\sqcap$ , and *re-entries*,  $\sqcup$ , producing *closure* and relying on *negativity*.

Catjects are information. They are “messages” (Spencer-Brown’s *indications*) “*selected from a set*” (Spencer-Brown’s *distinctions*) “of possible messages” (Claude E. Shannon, his emphasis). Yet, this time the set is not technically given, let alone pre-established in some celestial harmony, but to be socially constructed, tested, disputed, changed, and nevertheless trusted upon. It may even evolve dynamically via *variation* positively or negatively *selected for retention* (Donald T. Campbell).

A *cross* is both operation and operand, spinning in its non-classical negation, or *sterēsis* (Aristotle).

A catject is a *form/rigid coupling* within a *medium/loose coupling* (Fritz Heider).

As suggested in Talcott Parsons’ *AGIL paradigm of the human condition* a catject interfaces trivial and non-trivial matter (*Adaptation*), teleonomic organisms (*Goal-attainment*), social symbolism (*Integration*), and cultural values (*Latent-pattern maintenance and conflict management*).

Relying on Niklas Luhmann’s systems theory catjects are considered to compute *functional equivalence* of its elements via systemic reproduction/decay and relying on Harrison C. White’s network theory catjects are considered to compute *structural equivalence* of its elements via network differentiation/uncertainty, that is via decoupling/coupling. Combining both ideas a catject is considered to control

a self-produced indeterminacy via *switches* within a *poly-contextural form* (Gotthard Günther).

A catject is both *eigen-value* and *eigen-function* of a non-linear *recursive function* (Heinz von Foerster). Its operations are its operands. As *evolutionary form* it selects its own variations and re-stabilizes itself (Donald T. Campbell).

A catject computes the rest of the world as *empty* (Herbert A. Simon), as long as it does not have to correct this assumption.

- V. Calling your subject of interest  $m = \text{marked state}$  and anything else  $n = \text{unmarked state}$ , start your analysis by writing

$$s = \overline{m} \Big| n .$$

Give your  $m$  a name and continue searching for indications and distinctions of  $n$  and re-entries of  $\overline{m}|n$  into the form until you think  $m$  is able to self-reproduce as specified in (IV) within a space  $s$  generated by this self-reproduction. Note that  $n$  is never to be determined conclusively; with any step of determination it moves one state right.

- VI. Referring to Talcott Parsons' *paradigm of the human condition* one possible *sociological* interpretation is

$$s = \overline{m} \Big| n$$

with

$$m = \overline{\overline{\overline{A} \Big| G \Big| I \Big| L}} \Big| n$$

and  $A$ : adaptation to trivial and non-trivial matter;  $G$ : goal-attainment by organisms/brains/personalities;  $I$ : integration via social symbolisms; and  $L$ : latent-pattern maintenance and conflict regulation via cultural values.

Second-order observations determine the values of  $A$ ,  $G$ ,  $I$ , and  $L$  relying on *functional equivalence* based on continuous decay (Niklas Luhmann) and *structural equivalence* based on identities searching for control (Harrison C. White).

## Bibliography

Aristotle, *Physics*, Oxford, 2008

Campbell, Donald T., “Variation and Selective Retention in Socio-Cultural Evolution”, in *General Systems* 14 (1969), pp. 69–85

Günther, Gotthard, “Life as Poly-Contextuality”, in *Beiträge zur Grundlegung einer operationsfähigen Dialektik*, vol. 2, Hamburg, 1979, pp. 283–306

Heider, Fritz, “Thing and Medium”, in *On Perception, Event Structure, and Psychological Environment. Selected Papers. Psychological Issues* 1, 3, New York, 1959, pp. 1–34

Luhmann, Niklas, *Social Systems*, Stanford, CA, 1995

Parsons, Talcott, “A Paradigm of the Human Condition”, in *Action Theory and the Human Condition*, New York, 1978, pp. 352–433

Shannon, Claude E., „A Mathematical Theory of Communication“, in *Bell System Technical Journal* 27 (July and October 1948), pp. 379-423 and 623-656

Simon, Herbert A., *The Sciences of the Artificial*, Cambridge, MA, 1981

Spencer-Brown, George, *Laws of Form*, London, 1969; Leipzig, 2008

von Foerster, Heinz, *Understanding Understanding: Essays of Cybernetics and Cognition*, New York, 2003

White, Harrison C., *Identity and Control: A Structural Theory of Action*, Princeton, NJ, 1992