Matrices of Concepts

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Classically, in the discussion relating to *polar opposites*[1], one primarily directs his interest to the common and lexicalized concepts, i.e. for which there exists a corresponding word in the vocabulary inherent to a given language. This way of proceeding tends to generate several disadvantages. One of them resides in the fact (i) that such concepts are likely to vary from one language to another, from one culture to another. Another (ii) of the resulting problems is that certain lexicalized concepts reveal a nuance which is either meliorative or pejorative, with degrees in this type of nuances which prove difficult to appreciate. Finally, another problem (iii) lies in the fact that certain concepts, according to semiotic analysis[2] are regarded as *marked* with regard to others concepts which are *unmarked*, the status of unmarked concept conferring a kind of precedence, of pre-eminence to the concepts in question.

In my view, all the above-mentioned disadvantages arise from the fact that one traditionally works primarily, from the lexicalized concepts. The methodology implemented in the present study is at the opposite of this way of proceeding. Indeed, one will begin here to construct concepts in an abstract way, without consideration of whether these concepts are lexicalized or not. This construction being performed, one will then be able to verify that some of the concepts thus constructed correspond indeed to lexicalized concepts, whereas some others cannot be put in correspondence with any existing word in the common language. This latter methodology allows, I think, to avoid the above-mentioned disadvantages.

It will finally appear that the construction described below will make it possible to propose a taxonomy of concepts which constitutes an alternative to the one based on the *semiotic square* which has been proposed by Greimas.

1. Dualities

Let us consider the class of dualities, which is made up of concepts corresponding to the intuition that these latter:

(i) are different one from the other
(ii) are minimal or irreducible, i.e. can no more reduce themselves to some other more simple semantic elements
(iii) present themselves under the form of pairs of dual concepts or contraries
(iv) are predicates

Each of the concepts composing a given duality will be termed a *pole*. I shall present here a list, which does not pretend to be exhaustive, and could if necessary, be supplemented. Consider then the following enumeration of *dualities*[3]:

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[1] Or *polar contraries*.

[2] Cf. Jakobson (1983).

[3] In the same way, it would have been possible to define a more restricted class, including only half of the semantic poles, by retaining only one of the two dual predicates, and by constructing the others with the *contrary* relation. However, the choice of either of the dual poles would have been arbitrary, and I have preferred to avoid it. The following construction would have then resulted. Let Contrary be the semantic pole and α whatever semantic pole, not

Analytic/Synthetic, Animate/Inanimate, Exceptional/Normal, Antecedent/Consequent, Existent/Inexistent, Absolute/Relative, Abstract/Concrete, Accessory/Principal, Active/Passive, Aleatory/Certain, Discrete/Continuous, Deterministic/Indeterministic, Positive/Negative, True/False, Total/Partial, Neutral/Polarized, Static/Dynamic, Unique/Multiple, Container/Containing, Innate/Acquired (Nature/Nurture), Beautiful/Ugly, Good/Ill, Temporal/Atemporal, Extended/Restricted, Precise/Vague, Finite/Infinite, Simple/Composed, Attracted/Repulsed, Equal/Different, Identical/Contrary, Superior/Inferior, Internal/External, Individual/Collective, Quantitative/Qualitative, Implicit/Explicit[4], ...

At this step, it should be observed that certain poles reveal a nuance which is either meliorative (*beautiful*, *good*, *true*), or pejorative (*ugly*, *ill*, *false*), or simply neutral (*temporal*, *implicit*).

Let us denote by A/Ā a given duality. If words of the common language are used to denote the duality, capital letters will be then used to distinguish the concepts used here from the common concepts. Example: the Abstract/Concrete, True/False dualities.

It should be noted lastly that several questions[5] arise immediately with regard to dualities. Do dualities exist (i) in a finite or infinite number? In the same way, does there exist (ii) a logical construction which makes it possible to enumerate the dualities?

2. Canonical poles

Starting from the class of the *dualities*, we are now in a position to construct the class of the *canonical poles*. At the origin, the lexicalized concepts corresponding to each pole of a duality reveal a nuance[6] which is respectively either meliorative, neutral, or pejorative. The class of the canonical poles corresponds to the intuition that, for each pole α of a given duality A/Ā, one can construct 3 concepts: a positive, a neutral and a negative concept. In sum, for a given duality A/Ā, one thus constructs 6 concepts, thus constituting the class of the *canonical poles*. Intuitively, *positive canonical poles* respond to the following definition: positive, meliorative form of α; *neutral canonical poles* correspond to the neutral, i.e. neither meliorative nor pejorative form of α; and *negative canonical poles* correspond to the negative, pejorative form of α. It should be noted that these 6 concepts are exclusively constructed with the help of logical concepts. The only notion which escapes at this step to a logical definition is that of duality or base.

For a given duality A/Ā, we have thus the following canonical poles: $\{A^+, A^0, A^-, \bar{A}^+, \bar{A}^0, \bar{A}^-\}$, that we can also denote respectively by (A/Ā, 1, 1), (A/Ā, 1, 0) , (A/Ā, 1, -1) , (A/Ā, -1, 1) , (A/Ā, -1, 0) , (A/Ā, -1, -1).

A capital letter for the first letter of a *canonical pole* will be used, in order to distinguish it from the corresponding lexicalized concept. If one wishes to refer accurately to a canonical pole whereas the usual language lacks such a concept or well appears ambiguous, one can choose a lexicalized concept, to which the exponent corresponding to the chosen neutral or polarized state will be added. To highlight the fact that one refers explicitly to a canonical pole - positive, neutral or negative - the notations A^+, A^0 et A^- will be used. We have thus for example the concepts Unite^+, Unite^0, Unite^- etc. Where Unite^+ = Solid, Undivided,

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necessarily distinct from Contrary; the concept resulting from the composition of Contrary and α is a *semantic pole*. It should also be noted that this type of construction would have led to:

Contrary ° Contrary = Identical.

Contrary ° Identical = Contrary.

Contrary^n = Identical (for *n* even).

Contrary^n = Contrary (for *n* odd).

In this context, it is worth noting that Contrary constitutes a specific case. In effect, if one seeks to build a class of the *canonical poles* which is minimal, it is worth noting that one can dispense oneself from Identical, whereas one cannot dispense oneself from Contrary. There is here an asymmetry. In effect, one can construct Identical with the help of Contrary, by using the property of *involution*: Contrary ° Contrary = Identical. For other dualities, one can indifferently choose either of the concerned semantic poles.

[4] It is worth noting that one could have drawn here a distinction between *unary* and *binary* poles, by considering that they consist of predicates. But a priori, such a distinction does not prove very useful for the resulting construction.

[5] In what follows, the questions relating to the various classes are only mentioned. It goes without saying that they require an in-depth treatment which goes far beyond the present study.

[6] With variable degrees in the nuance.

Coherent and Unite$^-$ = Monolithic$^-$. In the same way, Rational^0 designates the neutral concept corresponding to the term *rational* of the common language, which reveals a slightly meliorative nuance. In the same way, Irrationnal^0 designates the corresponding neutral state, whereas the common word *irrational* reveals a pejorative nuance. One will proceed in the same way, when the corresponding lexicalized word proves ambiguous. One distinctive feature of the present construction is that one begins by constructing the concepts logically, and puts them afterwards in adequacy with the concepts of the usual language, insofar as these latter do exist.

The constituents of a *canonical pole* are:
- a *duality* (or *base*) A/Ā
- a *contrary component* $c \in \{-1, 1\}$
- a *canonical polarity* $p \in \{-1, 0, 1\}$

A *canonical pole* presents the form: (A/Ā, *c*, *p*).

Furthermore, it is worth distinguishing, at the level of each duality A/Ā, the following derived classes:
- the *positive canonical poles*: A^+, $\bar{A}^+$
- the *neutral canonical poles*: A^0, $\bar{A}^0$
- the *negative canonical poles*: A^-, $\bar{A}^-$
- the *canonical matrix* consisting of the 6 canonical poles: $\{A^+, A^0, A^-, \bar{A}^+, \bar{A}^0, \bar{A}^-\}$. The 6 concepts constituting the canonical matrix can also be denoted under the form of a 3 x 2 matrix.

Let also α be a canonical pole, one will denote by $\sim\alpha$ its *complement*, semantically corresponding to *non*-α. We have thus the following complements: $\sim A^+$, $\sim A^0$, $\sim A^-$, $\sim\bar{A}^+$, $\sim\bar{A}^0$, $\sim\bar{A}^-$. The notion of a complement entails the definition of a universe of reference U. Our concern will be thus with the complement of a given canonical pole in regard to the corresponding matrix[7]. It follows then that: $\sim A^+ = \{A^0, A^-, \bar{A}^+, \bar{A}^0, \bar{A}^-\}$. And a definition of comparable nature for the complements of the other concepts of the matrix ensues.

It should be noted lastly that the following questions arise with regard to canonical poles. The construction of the matrix of the canonical poles of the Positive/Negative duality: {Positive$^+$, Positive^0, Positive$^-$, Negative$^+$, Negative^0, Negative$^-$} ensues. But do such concepts as Positive^0, Negative^0 and especially Positive$^-$, Negative$^+$ exist (i) without contradiction?

In the same way, at the level of the Neutral/Polarized duality, the construction of the matrix {Neutral$^+$, Neutral ^{0}, Neutral$^-$, Polarized$^+$, Polarized^0, Polarized$^-$} ensues. But do Neutral$^+$, Neutral$^-$ exist (ii) without contradiction? In the same way, does Polarized^0 exist without contradiction?

This leads to pose the question in a general way: does any neutral canonical pole admit (iii) without contradiction a corresponding positive and negative concept? Is there a general rule for all dualities or well does one have as many specific cases for each duality?

3. Relations between the canonical poles

Among the combinations of relations existing between the 6 canonical poles (A^+, A^0, A^-, $\bar{A}^+$, $\bar{A}^0$, $\bar{A}^-$) of a same duality A/Ā, it is worth emphasizing the following relations (in addition to the *identity* relation, denoted by I).

Two canonical poles α_1(A/Ā, c_1, p_1) and α_2(A/Ā, c_2, p_2) of a same duality are dual or *antinomical* or opposites if their contrary components are opposite and their polarities are opposite[8].

Two canonical poles α_1(A/Ā, c_1, p_1) and α_2(A/Ā, c_2, p_2) of a same duality are *complementary* if their contrary components are opposite and their polarities are equal[9].

Two canonical poles α_1 (A/Ā, c_1, p_1) et α_2(A/Ā, c_2, p_2) of a same duality are *corollary* if their contrary components are equal and their polarities are opposite[10].

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[7] When it is defined with regard to a dual pair, the complement of the pole α of a given duality identifies itself with the corresponding dual pole.

[8] Formally $c_1 = -c_2, p_1 = -p_2 \rightarrow \alpha_1(A/\bar{A}, c_1, p_1) = \neg\alpha_2(A/\bar{A}, c_2, p_2)$.

[9] Formally $c_1 = -c_2, p_1 = p_2 \rightarrow \alpha_1(A/\bar{A}, c_1, p_1) = \phi\alpha_2(A/\bar{A}, c_2, p_2)$.

[10] Formally $c_1 = c_2, p_1 = -p_2 \rightarrow \alpha_1(A/\bar{A}, c_1, p_1) = \chi\alpha_2(A/\bar{A}, c_2, p_2)$.

Two canonical poles α_1 (A/Ā, c_1, p_1) and α_2(A/Ā, c_2, p_2) of a same duality are *connex* if their contrary components are equal and the absolute value of the difference in their polarities is equal to 1 [11].

Two canonical poles α_1 (A/Ā, c_1, p_1) and α_2(A/Ā, c_2, p_2) of a same duality are *anti-connex* if their contrary components are opposite and the absolute value of the difference in their polarities is equal to 1.[12, 13]

The following questions then arise, with regard to the relations between the canonical poles. Does there exist (i) one (or several) canonical pole which is its own opposite? A priori, it is not possible without contradiction for a positive pole or a negative pole. But the question remains for a neutral pole.

In the same way, does there exist (ii) one (or several) canonical pole which is its own complementary? The following two questions then ensue: does there exist a positive canonical pole which is its own complementary? And also: does there exist a negative canonical pole which is its own complementary?

The questions (i) and (ii) can be formulated in a more general way. Let R be a relation such that R $\in$ {I, χ, $\neg$, φ, γ, β}. Does there exist (iii) one (or several) canonical pole α verifying $\alpha = R\alpha$?

4. Degrees of duality

One constructs the class of the *degrees of duality*, from the intuition that there is a *continuous* succession of concepts from A^+ to $\bar{A}^-$, from A^0 to $\bar{A}^0$ and from A^- to $\bar{A}^+$. The continuous component of a *degree of duality* corresponds to a *degree* in the corresponding dual pair. The approach by degree is underlied by the intuition that there is a continuous and regular succession of degrees, from a *canonical pole* A^p to its contrary $\bar{A}^{-p}$.[14] One is thus led to distinguish 3 classes of *degrees of duality*: (i) from A^+ to $\bar{A}^-$ (ii) from A^0 to $\bar{A}^0$ (iii) from A^- to $\bar{A}^+$.

A *degree of duality* presents the following components:

- a *dual pair* $A^p/\bar{A}^{-p}$ (corresponding to one of the 3 cases: $A^+/\bar{A}^-$, $A^0/\bar{A}^0$ or $A^-/\bar{A}^+$)
- a *degree* $d \in [-1; 1]$ in this *duality*

A degree of duality α has thus the form: $\alpha(A^+/\bar{A}^-, d)$, $\alpha(A^0/\bar{A}^0, d)$ or $\alpha(A^-/\bar{A}^+, d)$.

On the other hand, let us call *neutral point* a concept pertaining to the class of the *degrees of duality*, whose degree is equal to 0. Let us denote by α^0 such a concept, which is thus of the form $(A^p/\bar{A}^{-p}, 0)$ with $d[\alpha^0] = 0$. Semantically, a neutral point α^0 corresponds to a concept which responds to the following definition: *neither* A^p *nor* $\bar{A}^{-p}$. For example, (True/False, 0) corresponds to the definition: *neither True nor False*. In the same way (Vague/Precise, 0) corresponds the following definition: *neither Vague nor Precise*. Lastly, when considering the Neutral/Polarized and Positive/Negative dualities, one has then: Neutral^0 = $(\text{Negative}^0/\text{Positive}^0, 0)$ = $(\text{Neutral}^0/\text{Polarized}^0, 1)$.

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[11] Formally $c_1 = c_2$, $|p_1 - p_2| = 1 \rightarrow \alpha_1(A/\bar{A}, c_1, p_1) = \gamma\alpha_2(A/\bar{A}, c_2, p_2)$.

[12] Formally $c_1 = - c_2$, $|p_1 - p_2| = 1 \rightarrow \alpha_1(A/\bar{A}, c_1, p_1) = \beta\alpha_2(A/\bar{A}, c_2, p_2)$.

[13] We have then the following properties, with regard to the above-mentioned relations. The relation of identity constitutes a relation of equivalence. Antinomy, complementarity and corollarity are symmetrical, anti-reflexive, non-associative, involutive.

The operation of composition on the relations {*identity*, *corollarity*, *antinomy*, *complementarity*} defines an *abelian group* of order 4. With G = {I, χ, $\neg$, φ}:

°	I	χ	$\neg$	φ
I	I	χ	$\neg$	φ
χ	χ	I	φ	$\neg$
$\neg$	$\neg$	φ	I	χ
φ	φ	$\neg$	χ	I

where for all A $\in$ G, $A^{-1} = A$, and A ° I = A, I being the neutral element. It should be noted that the group properties make it possible in particular to give straightforwardly a valuation to any propositions of the form: *the contrary concept of the complementary of* α_1 *is identical to the corollary of the complementary of* α_2.

[14] This construction of concepts can be regarded as an application of the *degree theory*. Cf. in particular Fine (1975), Peacocke (1981). The present theory however is not characterized by the preferential choice of the degree theory, but considers simply this latter theory as one of the methods of construction of concepts.

It is worth noting that this construction does not imply that the neutral point thus constructed is the unique concept which corresponds to the definition *neither* A^p *nor* $\bar{A}^{-p}$. It will appear on the contrary that several concepts and even hierarchies of concepts can correspond to this latter definition.

The following property of the neutral points then ensue, for a given duality A/Ā: $\alpha(A^+/\bar{A}^-, 0) = \alpha(A^0/\bar{A}^0, 0) = \alpha(A^-/\bar{A}^+, 0)$.

At this point, it is worth also taking into account the following derived classes:

- a discrete and truncated class, built from the degrees of duality, including only those concepts whose degree of duality is such that $d \in \{-1, -0.5, 0, 0.5, 1\}$.
- the class of the degrees of complementarity, the degrees of corollarity, etc. The class of the *degrees of duality* corresponds to the relation of *antinomy*. But it is worth considering, in a general way, as many classes as there exists relations between the canonical poles of a same duality. This leads to as many classes of comparable nature for the other relations, corresponding respectively to degrees of *complementarity*, *corollarity*, *connexity* and *anti-connexity*.

It is worth noting finally the following questions, with regard to degrees of duality and neutral points. Does there exist (i) one (or several) canonical pole which is its own neutral point? A priori, it is only possible for a neutral pole.

Does any duality A/Ā admit (ii) a neutral point or trichotomic zero? One can call this question the *problem of the general trichotomy*. Is it a general rule[15] or well does there exists some exceptions? It seems a priori that the Abstract/Concrete duality does not admit a neutral point. It appears to be the same for the Finite/Infinite or the Precise/Vague duality. Intuitively, these latter dualities do not admit an intermediate state.

Does the concept corresponding to the neutral point ($Neutral^0/Polarized^0$, 0) and responding to the definition: *neither neutral nor polarized* exist (iii) without contradiction in the present construction?

5. Relations between the canonical poles of a different duality: includers

It is worth also considering the relation of *includer* for the canonical poles. Consider the following pairs of dual canonical poles: A^+ and $\bar{A}^+$, A^0 and $\bar{A}^0$, A^- and $\bar{A}^-$. We have then the following definitions: a *positive includer* α^+ is a concept such that it is itself a positive canonical pole and corresponds to the definition $\alpha^+ = A^+ \vee \bar{A}^+$. A *neutral includer* α^0 is a neutral canonical pole such that $\alpha^0 = A^0 \vee \bar{A}^0$. And a *negative includer* α^- is a negative canonical pole such that $\alpha^- = A^- \vee \bar{A}^-$. Given these definitions, it is clear that one assimilates here the includer to the minimum includer. Examples: $Determinate^0$ is an includer for $True^0/False^0$. And $Determinate^0$ is also a pole for the $Determinate^0/Indeterminate^0$ duality. In the same way, $Polarized^0$ is an includer for $Positive^0/Negative^0$.

More generally, one has the relation of *n*-includer ($n > 1$) when considering the hierarchy of ($n + 1$) matrices. One has also evidently, the reciprocal relation of *includer* and of *n*-includer.

Let us also consider the following derived classes:

- *matricial includers*: they consist of concepts including the set of the canonical poles of a same duality. They respond to the definition: $\alpha^0 = A^+ \vee A^0 \vee A^- \vee \bar{A}^+ \vee \bar{A}^0 \vee \bar{A}^-$.
- *mixed* includers: they consist of concepts responding to the definition $\alpha_1 = A^+ \vee \bar{A}^-$ or well $\alpha_2 = A^- \vee \bar{A}^+$

It is worth also considering the *types of relations* existing between the canonical poles of a different duality. Let A and E be two matrices whose canonical poles are respectively $\{A^+, A^0, A^-, \bar{A}^+, \bar{A}^0, \bar{A}^-\}$ and $\{E^+, E^0, E^-, \bar{E}^+, \bar{E}^0, \bar{E}^-\}$ and such that E is an includer for A/Ā i.e. such that $E^+ = A^+ \vee \bar{A}^+$, $E^0 = A^0 \vee \bar{A}^0$ and $E^- = A^- \vee \bar{A}^-$. One extends then the just-defined relations between the canonical poles of a same matrix, to the relations of comparable nature between two matrices presenting the properties of A and E. We has then the

[15] Some common trichotomies are: {*past*, *present*, *future*}, {*right*, *center*, *left*}, {*high*, *center*, *low*}, {*positive*, *neutral*, *negative*}.

relations of 2-*antinomy*, 2-*complementarity*, 2-*corollarity*, 2-connexity, 2-*anti-connexity*[16]. Thus, for example, A^0 is 2-contrary (or trichotomic contrary) to $\bar{E}^0$, 2-connex (or trichotomic connex) to E^+ and E^- and 2-anti-connex (or trichotomic anti-connex) to $\bar{E}^+$ and $\bar{E}^-$. In the same way, A^+ and $\bar{A}^+$ are 2-contrary to $\bar{E}^-$, 2-complementary to $\bar{E}^+$, 2-corollary to E^-, 2-connex to E^0 and 2-anti-connex to $\bar{E}^0$, etc.

Let us consider also the following *property* of neutral points and includers. Let A and E be two matrices, such that one of the neutral poles of E is an includer for the neutral dual pair of a: $E^0 = A^0 \vee \bar{A}^0$. We has then the following property: the canonical pole $\bar{E}^0$ for the matrix E is a neutral point for the duality $A^0/\bar{A}^0$. Thus, the neutral point for the duality $A^0/\bar{A}^0$ is the dual of the includer E^0 of A^0 and $\bar{A}^0$. Example: Determinate^0 = True$^0 \vee$ False^0. Here, the neutral point for the True/False duality corresponds to the definition: *neither True nor False*. And we have then (True^0/False^0, 0) = (Determinate^0/Indeterminate^0, -1).

This last property can be generalized to a hierarchy of matrices A_1, A_2, A_3, ..., A_n, such that one of the poles α_2 of A_2 of polarity *p* is an includer for a dual pair of A_1, and that one of the poles α_3 of A_3 is an includer for a dual pair of A_2, ..., and that one of the poles α_n of A_n is an includer for a dual pair of A_{n-1}. It follows then an infinite construction of concepts.

One also notes the emergence of a hierarchy, beyond the sole neutral point of a given duality. It consists of the hierarchy of the neutral points of order *n*, constructed in the following way from the dual canonical poles A_0 and $\bar{A}_0$:

- A_0, $\bar{A}_0$
- A_1 = neither A_0 nor $\bar{A}_0$
- A_{21} = neither A_0 nor A_1
- A_{22} = neither $\bar{A}_0$ nor A_1
- A_{31} = neither A_0 nor A_{21}
- A_{32} = neither A_0 nor A_{22}
- A_{33} = neither A_0 nor A_{21}
- A_{34} = neither $\bar{A}_0$ nor A_{22}
- ...

One can also consider the emergence of this hierarchy under the following form[17]:

- A_0, $\bar{A}_0$
- A_1 = neither A_0 nor $\bar{A}_0$
- A_2 = neither A_0 nor $\bar{A}_0$ nor A_1
- A_3 = neither A_0 nor $\bar{A}_0$ nor A_1 nor A_2
- A_4 = neither A_0 nor $\bar{A}_0$ nor A_1 nor A_2 nor A_3
- A_5 = neither A_0 nor $\bar{A}_0$ nor A_1 nor A_2 nor A_3 nor A_4
- ...

Classically, one constructs this infinite hierarchy for True/False by considering I_1 (Indeterminate), I_2, etc. It should be noticed that in this last construction, no mention is made of the includer (Determinate) of True/False. Neither does one make mention of the hierarchy of includers.

The notion of a *complement* of a canonical pole α corresponds semantically to *non*-α. One has the concept of a 2-complement of a canonical pole α, defined with regard to a universe of reference U that consists of the 2-matrix of α. One has then for example: $\sim A^+ = \{A^0, A^-, \bar{A}^+, \bar{A}^0, \bar{A}^-, \bar{E}^+, \bar{E}^0, \bar{E}^-\}$. And also, $\sim A^+ = \{\bar{A}^+, E^0, E^-, \bar{E}^+, \bar{E}^0, \bar{E}^-\}$, etc. More generally, one has then the notion of a *n*-complement ($n > 0$) of a canonical pole with regard to the corresponding *n*-matrix.

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[16] There is a straightforward generalization to *n* matrices ($n > 1$) of this construction with the relations of *n*-antinomy, *n*-complementarity, *n*-corollarity, *n*-connexity, *n*-anti-connexity.

[17] One can assimilate the two just-described hierarchies to only one single hierarchy. It suffices to proceed to the following assimilation:

- $A_2 = A_{21}$ or A_{22}
- $A_3 = A_{31}$ or A_{32} or A_{33} or A_{34}
- $A_4 = A_{41}$ or A_{42} or A_{43} or A_{44} or A_{45} or A_{46} or A_{47} or A_{48}
- ...

The following questions finally arise, concerning includers. For certain concepts, does there exist (i) one maximum includer or well does one have an infinite construction for each duality? Concerning the True/False duality in particular, the analysis of the semantic paradoxes has led to the use of a logic based on an infinite number of truth-values[18].

Does any duality admit (ii) one neutral includer? Certain dualities indeed seem not to admit of an includer: such is in particular the case for the Abstract/Concrete or Finite/Infinite duality. It seems that Abstract constitutes a maximum element. Admittedly, one can well construct formally a concept corresponding to the definition *neither Abstract nor Concrete*, but such a concept appears very difficult to justify semantically.

Does there exist (iii) a canonical pole which is its own minimum includer?

Does there exist (iv) a canonical pole which is its own non-minimum includer? One can formulate this problem equivalently as follows. At a given level, does one not encounter a canonical pole which already appeared somewhere in the structure? It would then consist of a structure comprising a loop. And in particular, does one not encounter one of the poles of the first duality?

6. Canonical principles

Let α be a *canonical pole*. Intuitively, the class of the *canonical principles* corresponds to the concepts which respond to the following definition: *principle corresponding to what is* α. Examples: Precise → Precision; Relative → Relativity; Temporal → Temporality. The canonical principles can be seen as 0-ary predicates, whereas the canonical poles are *n*-ary predicates ($n > 0$). The lexicalized concepts corresponding to canonical principles are often terms for which the suffix *-ity* (or *-itude*) has been added to the radical corresponding to a canonical pole. For example: Relativity^0, Beauty$^+$, Activity^0, Passivity^0, Neutrality^0, Simplicity^0, Temporality^0, etc. A list (necessarily non-exhaustive) of the canonical principles is the following:

Analysis^0/Synthesis^0, [Animate^0]/[Inanimate^0], [Exceptional^0]/Normality^0, [Antecedent^0]/[Consequent^0], Existence^0/Inexistence^0, Absolute^0/Relativity^0, Abstraction^0/[Concrete], [Accessory^0]/[Principal^0], Activity^0/Passivity^0, [Random^0]/Certainty^0, [Discrete^0]/[Continuous^0], Determinism^0/Indeterminism^0, [Positive^0]/[Negative^0], Truth^0/Falsity^0, Attraction^0/Repulsion^0, Neutrality^0/Polarization^0, [Static^0]/Dynamic^0, Unicity^0/Multiplicity^0, Contenance^0/[Containing^0], Innate^0/Acquired^0, Beauty$^+$/Ugliness$^-$, Good$^+$/Evil$^-$, Identity^0/Contrary^0, Superiority^0/Inferiority^0, Extension^0/Restriction^0, Precision^0/Vagueness^0, Finitude^0/Infinitude^0, Simplicity^0/Complexity^0, [Internal^0]/[External^0], Equality^0/Difference^0, Whole^0/Part^0, Temporality^0/Atemporality^0, Individuality^0/Collectivity^0, Quantity^0/Quality^0, [Implicit^0]/[Explicit^0], ...

It should be noticed that a certain number of canonical principles are not lexicalized. The notations A^+, A^0, A^- will be used to denote without ambiguity a canonical principle which is respectively positive, neutral or negative. One could also use the following notation: α being a canonical pole, then α-ity (or α-itude) is a canonical principle. The following notation could then be used: Abstract^0-*ity*, Absolute^0-*ity*, Acessory^0-*ity*, etc. or as above [Abstract^0], [Absolute^0], etc.

The constituents of the canonical principles are the same ones as for the class of the canonical poles.

It is worth distinguishing finally the following derived classes:
- *positive canonical principles*
- *neutral canonical principles*
- *negative canonical principles*
- *polarized canonical principles*

with some obvious definitions[19].

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[18] *Infinite-valued logics*. Cf. Rescher (1969).

[19] Furthermore, it should be noted that some other concepts can be thus constructed. Let also α be a canonical pole. We have then the classes of concepts responding to the following definition: *to render* α (Example: Unite → Unify; Different → Differentiate); *action of rendering* α (Unite → Unification; Different → Differentiation); *that it is possible*

7. Meta-principles

Let α^0 be a neutral canonical principle[20]. The class of the *meta-principles* corresponds to a disposition of the mind directed towards what is α^0, to an interest with regard to what is α^0. Intuitively, a meta-principle corresponds to a point of view, a perspective, an orientation of the human mind. Thus, the attraction for Abstraction^0, the interest for Acquired^0, the propensity to place oneself from the viewpoint of Unity^0, etc. constitute *meta-principles*. It should be noted that this construction makes it possible in particular to construct some concepts which are not lexicalized. This has the advantage of a better exhaustiveness and leads to a better and richer semantics.

Let α^0 be a neutral canonical principle. Let us also denote by $\alpha^{\psi p}$ a meta-principle ($p \in \{-1, 0, 1\}$). One denotes thus a *positive* meta-principle by $\alpha^{\psi+}$, a *neutral* meta-principle by $\alpha^{\psi 0}$ and a *negative* meta-principle by $\alpha^{\psi-}$. We have then the enumeration of the meta-principles, for a given duality: $\{A^{\psi+}, A^{\psi 0}, A^{\psi-}, \bar{A}^{\psi+}, \bar{A}^{\psi 0}, \bar{A}^{\psi-}\}$. Moreover, one will be able to denote by α*-ism* a meta-principle. Example: Unite → Unite-ism. We have then Internalism, Externalism, Relativism, Absolutism, etc. which correspond in particular to dispositions of the mind. A capital letter will preferably be used here to distinguish the meta-principles from the lexicalized concepts, and in particular to differentiate them from the corresponding philosophical doctrines, which often have very different meanings. It will be however possible to make use of the classical terms when they exist to designate the corresponding meta-principle. Thus All-ism corresponds to Holism.

One can term *Ultra*-α-*ism* or *Hyper*-α-*ism* the concept corresponding to $\alpha^{\psi-}$. This latter form corresponds to an exclusive, excessive, exaggerated use of the viewpoint corresponding to a given principle. One has thus for example: Externalism$^-$ = Hyper-externalism.

The constituents of the meta-principles are:

- a *polarity* $p \in \{-1, 0, 1\}$
- a *neutral canonical principle* composed of:
  - a *duality* (or *base*) $A/\bar{A}$
  - a *contrary component* $c \in \{-1, 1\}$
  - a *neutral polarity* $q = 0$

The *positive*, *neutral*, *negative canonical meta-principles* are respectively of the form $\alpha((A/\bar{A}, c, 0), 1)$, $\alpha((A/\bar{A}, c, 0), 0)$, $\alpha((A/\bar{A}, c, 0), -1)$.

Between the canonical meta-principles of a same duality, one has the same relations as for the canonical poles.

One has lastly the derived classes consisting in:

- the *positive meta-principles* ($p > 0$)
- the *neutral meta-principles* ($p = 0$)
- the *negative meta-principles* ($p < 0$)
- the *polarized meta-principles* which include the *positive* and *negative meta-principles*
- the *matrix* of the canonical meta-principles, consisting of 6 meta-principles applicable to a given duality $\{A^{\psi+}, A^{\psi 0}, A^{\psi-}, \bar{A}^{\psi+}, \bar{A}^{\psi 0}, \bar{A}^{\psi-}\}$.
- the *degrees of canonical meta-principles*. Intuitively, such concepts are more or less positive or negative. The polarity is regarded here as a *degree of polarity*. These concepts are such that $p \in [-1; 1]$.
- the class of the *behavioral principles*. Intuitively, the class of the *behavioral principles* constitutes an extension of that of the meta-principles. While the meta-principle constitutes a disposition of the human mind, the concepts concerned here are those which aim to describe, in a more general way, the

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to render α (Unite → Unitable; Different → Differentiable), etc. These concepts are not however of interest in the present context.

[20] It should be observed that we could have taken alternatively as a basis for the definition of the meta-principles a canonical principle, without distinguishing whether this latter is positive, neutral or negative. But it seems that such a definition would have engendered more complexity, without giving in return a genuine semantic interest.

tendencies of the human behavior[21]. Among the lexicalized concepts corresponding to the *behavioral principles*, one can mention: *courage*, *prudence*, *pessimism*, *rationality*, *avarice*, *fidelity*, *tendency to analysis*, *instability*, *objectivity*, *pragmatism*, etc. A first analysis reveals (i) that a certain number of them reveal a meliorative nuance: *courage*, *objectivity*, *pragmatism*; that (ii) others, by contrast, present a pejorative, unfavorable connotation: *cowardice*, *avarice*, *instability*; and finally (iii) that certain concepts present themselves under a form which is neither meliorative nor pejorative: *tendency to analysis*[22]. One has here the same classes as for the meta-principles, and in particular the *degrees* of behavioral principles. Example: *coward* is more negative than *apprehensive*; in the same way, *bravery* is more positive than *courage*.

Conclusion

The concepts constructed with the help of the present theory need to be distinguished in several regards from those resulting from the application of the *semiotic square* described by Greimas (1977, p. 25). This last theory envisages in effect four concepts: S1, S2, ~S1, ~S2. On the one hand, it appears that the semiotic square is based on two lexicalized concepts S1 and S2 that constitute a dual pair. It does not distinguish, when considering the dual concepts, whether these latter are positive, neutral or negative. By contrast, the present theory considers six concepts, lexicalized or not.

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[21] This particular class would require however a much finer analysis than the one which is summarily presented here. I am only concerned here with showing that a many concepts pertaining to this category can be the subject of a classification whose structure is that of the meta-principles.

[22] One can consider the following - necessarily partial - enumeration corresponding to the *behavioral principles*, in the order (A^+), (A^0), (A^-), ($\bar{A}^+$), ($\bar{A}^0$), ($\bar{A}^-$):

firmness, propensity to repress, severity, leniency, propensity to forgive, laxism
defense, refusal, violence, pacifism, acceptance, weakness
pride, self-esteem, hyper-self-esteem, modesty, withdrawal of the ego, undervaluation of self
expansion, search of quantity, excess, perfectionism, search of quality, hyper-selectivity
delicacy, sensitivity, sentimentality, coolness, impassibility, coldness
objectivity, to be neutral being, impersonality, to be partisan, parti pris
uprightness, to act in a direct way, brusqueness, tact, to act in an indirect way, to flee the difficulties
combativeness, disposition to attack, aggressiveness, protection, disposition to defense, tendency to retreat
receptivity, belief, credulity, incredulity, doubt, excessive skepticism
expansion, oriented towards oneself, selfishness, altruism, oriented towards others, to render dependent
sense of economy, propensity to saving, avarice, generosity, propensity to expenditure, prodigality
mobility, tendency to displacement, instability, stability, tendency to stay at the same place, sedentariness
logical, rationality, hyper-materialism, imagination, irrationality, inconsistency
sense of humour, propensity to play, lightness, serious, propensity to the serious activity, hyper-serious
capacity of abstraction, disposition to the abstract, dogmatism, pragmatism, disposition to the concrete, prosaicness
audacity, tendency to risk, temerity, prudence, tendency to avoid the risks, cowardice
discretion, to keep for oneself, inhibition, opening, to make public, indiscretion
optimism, to apprehend the advantages, happy optimism, mistrust, to see the disadvantages, pessimism
sense of the collective, to act like the others, conformism, originality, to demarcate oneself from others, eccentricity
resolution, tendency to keep an opinion, pertinacity, flexibility of spirit, tendency to change opinion, fickleness
idealism, tendency to apprehend the objectives, quixotism, realism, tendency to apprehend the means, prosaicness
taste of freedom, to be freed, indiscipline, obedience, to subject oneself to a rule, servility
reflexion, interiorization, inhibition, sociability, exteriorisation, off-handednes
spontaneousness, tendency to react immediately, precipitation, calm, tendency to differ one's reaction, slowness
eclecticism, multidisciplinarity, dispersion, expertise, mono-disciplinarity, bulk-heading
revival, propensity to change, rupture, safeguarding of the assets, propensity to maintenance, conservatism
motivation, passion, fanaticism, moderation, reason, tepidity
width of sights, tendency to synthesis, overflight, precision, tendency to analysis, to lose oneself in the details
availability, propensity to leisure, idleness, activity, propensity to work, overactivity
firmness, tendency not to yield, intransigence, diplomacy, tendency to make concessions, weakness
causticity, tendency to criticism, denigration, valorization, tendency to underline qualities, angelism
authority, propensity to command, authoritarianism, docility, propensity to obey, servility
love, tendency to be attracted, exaggerate affection, tendency to know to take one's distances, repulsion, hatred
conquest, greed, bulimia, sobriety, to have the minimum, denudement

On the other hand, the present analysis differs from the semiotic square by a different definition of the complement-negation. Indeed, the semiotic square comprises two concepts corresponding to the complement-negation: non-S1 and non-S2. By contrast, in the present context, the negation is defined with regard to a universe of reference U, which can be defined with regard to the corresponding matrix, or well to the 2-matrix..., to the *n* -matrix. For each canonical pole, there is thus a hierarchy of concepts corresponding to non-S1 and non-S2.

One sees it, the present taxonomy of concepts differs in several respects from the one conceived of by Greimas. Implemented from the dualities and the logical concepts, the present theory has the advantage of applying itself to lexicalized concepts or not, and also of being freed [affranchie] from the definitions of concepts inherent to a given culture. In this context, the classification which has been just described constitutes an alternative to the one based on the semiotic square which has been proposed by Greimas.

References

FINE, Kit (1975). Vagueness, Truth and Logic. *Synthese* 30: 265-300
GREIMAS, A. J. (1977). Elements of a Narrative Grammar, *Diacritics* 7: 23-40
JAKOBSON, Roman (1983). *Dialogues*, Cambridge MA: MIT Press
PEACOCKE, C. A. B. (1981). Are Vague Predicates Incoherent?. *Synthese* 46: 121-141
RESCHER, Nicholas (1969). *Many-Valued Logic*, New York: McGraw Hill