Calculus of possibilities as a technique in linguistic typology

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1. The problem stated: A unified conceptual system in linguistics

A central problem in the relationship between typology and the writing of individual grammars is that of developing a cross-linguistically viable conceptual system and a corresponding terminological framework. I will deal with this problem in three consecutive steps: First, I state the problem and sketch a conceptual system that I have put forward for typological explorations in morphology (Sections 1 and 2). Second, I propose a detailed illustration of this system: a calculus of grammatical voices in natural languages (Section 3). And third, I apply this calculus (that is, the corresponding concepts) in two particular case studies: an inflectional category known as antipassive and the grammatical voice in French (Sections 4 and 5). In the latter case, the investigation shows that even for a language as well described as French a rigorously standardized typological framework can force us to answer questions that previous descriptions have failed to resolve. I start with the following three assumptions:

1) One of the most pressing tasks of today’s linguistics is description of particular languages, the essential core of this work being the writing of grammars and lexicons. A linguist sets out to describe a language as precisely and exhaustively as possible; this includes its semantics, syntax, morphology and phonology plus (within the limits of time and funds available) its lexicon.

2) Such a description is necessarily carried out in terms of some predefined concepts – such as lexical unit, semantic actant, syntactic role, voice, case, phoneme, etc.

3) For the grammars/lexicons of different languages to be coherent and comparable, they must be developed within a general conceptual framework. The concepts used in linguistic description have to be: first, univer-
sal, i.e., naturally applicable to any language; second, sufficiently specific, i.e., naturally covering any linguistic phenomenon, no matter how idio-
matic; and third, organized in a flexible system that naturally allows for the
creation of new, ‘finer-grained’ concepts, if need be, by a regular proce-
dure.

Such a framework can come only from linguistic typology joining
forces with general linguistics. Taken together, these two disciplines must
offer linguistic practitioners a general descriptive scheme involving univer-
sal concepts, in terms of which a particular grammar/lexicon could be writ-
ten. This must be a unified conceptual apparatus and a metalanguage for
linguistics, sufficiently rich and formalized to serve as a tool in language
description. In terms of the broader questions of scientific inquiry and
methodology, this task can be characterized with respect to two names and
two achievements: Mendeleev in chemistry and Bourbaki in mathematics.

The Russian chemist D. Mendeleev, by creating (in 1869) the Periodic
Table of elements, thereby demonstrated the strength of the deductive ap-
proach – namely, the famous ‘empty cells’ of the system that predict the
existence of new elements. Mendeleev’s technique was the construction of
a calculus of logical possibilities anchored in the knowledge of some basic
facts.

The French mathematician N. Bourbaki, who never existed,Nevertheless created (between 1930 and 1950) a common unified metalanguage for
all divisions of modern mathematics and thus ensured considerable pro-
gress in the field.

Mendeleev’s deductive calculus and Bourbaki’s unified metalanguage
are intimately related: each unavoidably implies the other. I believe that
these two approaches, properly combined, constitute the main framework
for linguistic thinking today. Promoting them leads to two productive feed-
back loops. On the one hand, typology feeds on descriptive grammars,
while descriptive grammars put to work the conceptual apparatus devel-
oped in typology: they verify, complete and correct it. On the other hand,
general linguistics develops theories that embody concepts coming from
typology and organizes them into systems, while typology tests these con-
cepts and systems ‘experimentally’ – against the set of languages around
the world. To sum up:

Our aim is to develop a conceptual system for linguistics such that its con-
cepts are constructed deductively based on a few previously selected lin-
guistic facts and then can be proven typologically valid.
2. Conceptual system proposed: A set of definitions

I will start by formulating the requirements on which the linguistic conceptual system proposed is based. This system is nothing but a set of rigorous definitions, or a kit of systematically organized names for linguistic phenomena. I have to characterize these definitions – first substantively, and then formally. (A full-fledged system of linguistic concepts for morphology is presented in Mel’čuk (1993–2000), where 248 morphological concepts are defined, illustrated and discussed. The interested reader may refer to this book for more details on my approach.)

2.1. Substantive aspect of the definitions

The definitions considered here have the following three substantive characteristics: strictly deductive character, maximal separation of defining features, and orientation towards prototypical cases.

Deductive character of the definitions proposed

Suppose I have to define rigorously a concept $C$ that is intuitively more or less clear, especially in some obvious cases; however, in many border cases it is confusing and unsatisfactory. First of all, I have to find and define the most general concept of which $C$ is but a particular case. I emphasize: the most general concept, not genus proximum ‘closest genus’. In other words, I begin by specifying the most general class to which the phenomena $P_i$ covered by $C$ belong, but which also includes many other phenomena $Q_j$ not covered by $C$, but presumably related to $P_i$. Then I partition this class into the biggest subclasses available, ideally – into two subclasses, in such a way as to have all the $P_i$ in one subclass; I repeat this operation again and again, until I get exactly the subclass containing all and only $P_i$ – phenomena covered by $C$. (In this way, I establish the exact place of $C$ among other similar concepts.) This approach is of course deductive: it proceeds from the most general to the most particular.

Let me illustrate with two brief examples: the concept of morph and that of ergative construction.

THE CONCEPT OF MORPH. Consider the following imaginary situation: the term morph is applied to (1) radicals’ and suffixes (e.g., cat- and -s), to (2) meaningful alternations (e.g., oo $\Rightarrow$ ee, as in goose $\sim$ geese) and to (3)
prosodic markers (e.g., the tones that express different verbal tenses in some languages of the Sudan). Is such a use valid or should we introduce better concepts and better terminology? The most general class to which all three types of elements belong is ‘elementary linguistic sign.’ This class is naturally subdivided in two subclasses: signs whose signifiers are segmental and suprasegmental entities, and signs whose signifiers are operations, also segmental and suprasegmental (there exist tonal alternations). Thus we obtain class that contains radicals, suffixes and prosodic markers, and class that includes all meaningful alternations. Class is further subdivided into segmental (class) and suprasegmental (class) signs; as a result, we need a common name for radicals and suffixes together, but to the exclusion of suprasegmental markers. What is more convenient than to call them morphs? (Signs of the class can be named supramorphs/suprafixes, etc.) It becomes clear then that to use morph for the three types of elements mentioned above – that is, for segmental entities, suprasegmental entities and operations – is a bad practice. It is better to narrow the range of the term morph and apply it only to segmental elementary linguistic signs.

An important remark is in order here. Since my proposal concerns only the use of a name rather than some linguistic facts, it cannot be proven or disproved – in the strict sense of this term. I can only indicate why the proposed terminological use is more convenient. Thus, it is logically possible to keep applying the term morph to segmental and suprasegmental signs, distinguishing them by modifiers: segmental morphs vs. suprasegmental morphs. But then the class of most widespread and typical linguistic signs (= segmental elementary signs) and the class of relatively rare and rather ‘exotic’ signs (= suprasegmental elementary signs) will have formally similar complex names; it seems preferable to use a short and versatile name morph for the first class and coin a new term for the second. Note that such is nature of my whole endeavor: I propose a set of names (‘glued’ to corresponding concepts) that – hopefully – form a unified system and contribute to a better logical analysis of real linguistic phenomena.

THE CONCEPT OF ERGATIVE CONSTRUCTION. Traditionally, the ergative construction is defined as a ‘finite transitive verb construction in which the Direct Object [= DirO] is expressed in the same way as the Subject of an intransitive verb.’ However, I cannot accept such a formulation for a purely terminological reason: it covers no more than a particular case of a finite verb construction. The most general class of finite verb constructions (in case languages) that includes all instances of what is currently
called *ergative construction* is the predicative construction in which the Subject is marked by a case other than the nominative. I propose that it is just this construction which should be called *ergative construction*. Then I proceed to define its particular cases, among which we find an ergative construction whose DirO is formally identical to the Intransitive Subject. This is the most widespread and best known variety of ergative construction; yet logically and terminologically it is but a particular case. In this case, it is better to widen the range of the term under analysis. Among other things, such a definition has the advantage of subsuming under ergative construction the construction with tripartite case marking (the Transitive Subject, the Intransitive Subject and the Direct Object are marked by three different cases).

Observing the principle that concepts should be deduced from the most general class guarantees the strictly hierarchical character of the conceptual system developed.

*Separation of defining features*

Modern linguistics tends to describe a complex linguistic phenomenon P by a ‘multifaceted’ definition, which leads to a cluster concept, aimed at capturing the sum of properties that accrue to P. In contrast, I lay emphasis on separating as much as possible the defining features of P, thus creating fine-grained concepts each of which characterizes P only partially. That is, I include into a concept as little as I can. Not that I am against cluster concepts in general – on the contrary, on many occasions they cannot be avoided, and I am quite willing to use them. But first I will try to separate the properties of the phenomenon P as much as this separation will go and then define P by the minimal set of properties, that is, by a set of concepts rather than by one single complex concept. Thus, instead of trying to define grammatical voice by its function and by its form taken together, I separate them. As a result, I cannot say, for instance, that “[the Algonquian] inverse construction cannot be considered a voice at all, since it is not an option chosen to express one pragmatic nuance or another” (Payne and Laskowske 1997: 423; emphasis added – IM.): I do not consider the function of expressing pragmatic information to be a defining property of voice, in this case of the passive. Therefore, I can have both: passives that fulfill pragmatic functions and passives that do not. This is so because expressing communicative factors is typical of a number of inflectional categories, not
only of voice; while permuting the syntactic actants with respect to the semantic ones characterizes the passive only. (See Section 3 for more details.)

Observing this principle enhances the flexibility of the conceptual system, as well as its ‘resolution power:’ it uses, so to speak, simpler and more general concepts.

**Orientation towards prototypical cases**

I try, to the best of my ability, to preserve traditional linguistic notions as they arose 100 or more years ago, departing from the prescientific interpretation only where logic requires certain extensions or reductions. Therefore, the proposed morphological concepts are not very different in substance from those employed in mainstream traditional morphology. The novelty is basically in form: the concepts are rigorously defined, and these definitions are rigorously applied to a variety of phenomena. The essence is, however, the same as it has been in most traditional definitions: to analyze and define prototypical instances of the phenomenon under study. (See Taylor (1989) and Wierzbicka (1989) on the role of prototypes in linguistic description.)

My approach is basically identical with what Hockett (n.d.) proposed some 50 years ago for the concept of grammatical case, namely – to define case strictly on the basis of a prototypical case system, for instance, that of Latin or Ancient Greek, and then to generalize reasonably, so that new phenomena subsumed under the definition thus obtained will be sufficiently similar to, say, the Latin case.

Let me emphasize that no Eurocentrism is implied in this methodology. What I am saying is not that the Latin concept of case should be imposed on a phenomenon of a completely different language. I am insisting only on using the name *case* strictly for such phenomena that are close enough to the Latin case. If the phenomenon considered is not sufficiently similar to what we call *case* in Latin it simply should not be called *case*.

This stand allows me to solve problems of the kind formulated by Shibatani (1985: 836, ex. (39)). According to his description, the Mayan language Mam expresses the Patient in an active transitive clause as the Surface-Syntactic Subject (“Mam is] a syntactically ergative language”), and in a passive clause, the same Patient is the Subject again.
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(1) a. Ma Ø- jaw t-tx’ee7ma-n Cheep tzee7
REC.PAST 3SG.ABS-DIR 3SG.ERG-cut-DIR José tree
‘José cut the tree’ [tzee7 ‘tree’ is claimed to be the Subject]

vs.

b. Ma Ø-tx’eem-at tzee7 t-u7n Cheep
REC.PAST 3SG.ABS-cut-PASS tree 3SG-by José
‘The tree was cut by José’ [tzee7 again is claimed to be the Subject].

How then can one propose a general definition of the passive as a voice that promotes the Patient to be expressed by the Subject, as it happens, for instance, in Latin, and that would cover the Mam form in question? I think I have an answer: One cannot. We have to choose.

Either we accept, with Shibatani, that TZEE7 ‘tree’ is the Subject in both (1a) and (1b); then the verbal form in (1b) should by no means be called passive, since this form is not at all similar in its behavior to the prototypical Latin/English passive, where the Object becomes the Subject. As prototypical passives do, the Mam form in -at (in (1b)) also serves to ‘defocus’ the Agent, but does it in a way that is diametrically opposed to how the prototypical passive works. If Shibatani’s description of the SSyntS of the sentences in (1) were correct, the form in -at would be a detransitivative, see Section 4, and not a passive.

Alternatively, we accept that the form tx’eem-at is a passive. Then we have to reject the analysis under which TZEE7 ‘tree’ is the SSynt-Subject in both sentences: in (1a), it must be a DirO.

(Personally, based on England’s (1988) description of the voices in Mam, I think that the second alternative is correct: in (2a), TZEE7 ‘tree’ is the DirO, because, as far as I can judge from the data available to me, the Mam Subject must linearly precede all other dependents of the verb.)

2.2. Formal aspect of the definitions

From the stand of their formal aspect, I try to formulate the definitions in such a way as to satisfy the following four general conditions (cf. Apresjan 1982: 175):

A definition should be:
(a) FORMAL: it should be applicable automatically, i.e., literally.
(b) RIGOROUS: it should contain only concepts which either have been defined prior to it or else are undefinable and listed as such; more precisely, it should be a definition of axiomatic type: *per genus proximum et differentia specifica*, i.e., literally, ‘by the nearest kind and specific differences’, as formulated by Boetius (480–524 AC, minister of the Ostrogoths’ king Theodoric the Great), who was following the ideas of Aristotle).

(c) SUFFICIENT and NECESSARY: it should cover all the phenomena that are perceived as being subsumable under the corresponding concept, and nothing but such phenomena.

(d) UNIVERSAL: it should be applicable to any relevant phenomena of any language.

More specifically, the construction of a linguistic concept *C* and of the corresponding definition consists of the following six steps.

Suppose we consider a class of observable linguistic phenomena *P*, our pretheoretical set of data. We think that all *P* is can be subsumed under *C*. How should we proceed?

1. First of all, establish a ‘kernel’ subclass *P₀* of the class *P* (\(P₀ \subseteq P\)), i.e., isolate such phenomena among all the *P* is that we would like to have covered by our definition under any circumstances. These *P₀* correspond to the most typical particular case of *C*, that is, to a *prototypical* *C*, symbolized as *c*. They constitute the empirical basis of our future definition and are chosen quite intuitively; this choice must be taken as a postulate.

2. Analyze *c* to find its **CONSTITUTIVE COMPONENTS**.

3. Develop a **CALCULUS** of all logically possible cases of *c*, presumably covered by *C*. To do so, combine the constitutive components of *c* in all possible ways; try to explain the impossibility of the combinations that are banned by the language.

4. Formulate the definition of *C* by **GENERALIZATION** of the concept *c*; extract all underlying concepts vital for this definition and make sure that these can be defined in their turn.

5. **REVIEW THE WHOLE FIELD** by applying the definition of *C* to the phenomena in the difference ‘*P* – *P₀*’; i.e., to less clear-cut, fuzzy or dubious items, in order to see whether all relevant phenomena have been covered.

6. **DISCARD** similar but essentially different phenomena *C′*, delimiting them with respect to *C*; sketch a definition for *C′*, to make sure that this can be done in a reasonable way.
Now the definition of \( C \) is ready. We have to make sure that it:

(i) covers all items which are intuitively sufficiently similar to \( P_j \) (cf. Kuipers (1975) on the importance of intuitively felt similarity for linguistics);

(ii) rejects all items which are intuitively sufficiently dissimilar to \( P_j \);

(iii) produces results for all intermediate domains where our intuition balks – results that can be supported by further arguments.

When we are finished with the concept, the problem of the choice of an appropriate term should be dealt with: could we use one of the existing terms associating it with the concept we have just defined or had we better coin a new term? As mentioned above, this is a difficult question that must be answered with delicacy and caution. What we do depends on the particularities of the term under analysis. Sometimes it is better to keep the term \( t \) as it is, i.e., apply it to the old concept and invent a new term for the new concept; sometimes, on the contrary, it pays off to use \( t \) for the new concept and to name the old one by \( t \) plus a modifier. Unfortunately, I do not know of any formal criteria to guide our choice.

3. An illustration: The concept of grammatical voice

I will illustrate my point with one example: a definition of grammatical voice as an inflectional category and a deductive calculus of possible grammatical voices – grammemes of this category. The whole discussion is carried out within the framework of the Meaning-Text linguistic theory, from which I have to borrow the general approach and some crucial concepts (Mel’čuk 1974, 1981, 1988, 1997a, 2001: 4–10, Mel’čuk and Pertsov 1987). However, I try my best to make this presentation as theory-independent as possible.

3.1. Introductory remarks

The concept of voice is developed following the six steps sketched above.

(1) As the prototypical cases on which the definition of voice is to be based I take the opposition ‘active ~ passive’ in Latin and English – well-studied and relatively clear representatives of what I would like to call voices.
(2) The main defining feature of the Latin or English passive is that it modifies the correspondence between the semantic roles foreseen by the meaning of the verb and the syntactic roles of the phrases that fill in these roles. Thus, the verb \([\text{to}] \) EAT introduces two semantic roles: the living being who absorbs the food (= Eater), and the substance being swallowed (= Food). In the active, the Eater phrase is the Subject and the Food phrase a DirO (\(\text{Nick ate the steak}\)), in the passive, the Food is expressed by the Subject, while the Eater phrase becomes an Agentive Complement \([= \text{AgCo}] \) (\(\text{The steak was eaten by Nick}\)). It is this \textit{chassée croisée} of semantic/syntactic roles that is taken to be the very foundation of the concept of voice.

To proceed, I have to formalize first the pretheoretical notion ‘correspondence between semantic and syntactic roles;’ to do this, I introduce the concepts of \textit{Semantic/Deep-Syntactic Actants} and then that of \textit{diathesis}, see 3.2. These are the constitutive components of the concept of voice.

(3) A complete calculus of all possible modifications of the basic diathesis of a verb is developed; a formally marked modification of the diathesis is called a voice.

(4) The definition of voice as an inflectional category of the verb is then formulated.

(5) The relevant data known to me are checked in order to draw subtler distinctions between genuine voices and voice-like phenomena.

(6) Some phenomena close to voice but nevertheless different from it are analyzed and separated from voice (I give an example of such a phenomenon: detransitivative, 4). In this way, the borders of the concept of voice become sharper.

3.2. Auxiliary concepts

The concepts of Semantic Actant \([= \text{SemA}] \), Deep-Syntactic Actant \([= \text{DSyntA}] \) and diathesis are crucial for the definition of voice, so that I need to introduce them. On the other hand, they are fundamental for linguistic theory in general and very complex, so that I cannot introduce them in an appropriate way – this would require too much space. Therefore, I have to compromise and limit myself to a very sketchy characterization, hoping that the goodwill of the readers and the examples will prove sufficient (see, however, Mel’cuk 2004a, b).
**Semantic actants**

A SemA $L'$ of a lexical unit $L$ is an argument of the predicate which represents $L$'s meaning, so that if $L'$ semantically depends on $L$, this means that $L$ denotes a predicate and $L'$ is one of its arguments: if $L' \leftarrow \text{sem} - L$, then $L(...; L'; ...)$, and vice versa. A SemA is represented by a variable in the lexicographic definition of $L$; for instance:

(2)  
$X$ rents $Y$ from $Z$ for $W$ for $T$

‘$X$ obtains from $Z$, who owns $Y$, the right to use $Y$ during time $T$ for money $W$ that $X$ pays to $Z$."

Simplifying the real picture, I can say that SemAs possess two important properties:

(a) If a SemA of $L$ is “subtracted” from the meaning ‘$L$’, what remains cannot be called $L$ anymore. Thus, if we subtract ‘money $W$’ from the meaning in (2), we obtain ‘[to] borrow’ rather than ‘[to] rent’; by subtracting ‘time $T$’ we get ‘[to] buy’.

(b) A SemA of $L$ can, generally speaking, be expressed in the sentence alongside $L$ – as a clause element syntactically linked to $L$, not necessarily directly.

**Deep-Syntactic actants**

DSyntAs are introduced as a convenient ‘interface’ between SemAs and Surface-Syntactic Actants [= SSyntAs]. A DSyntA is a generalization for a set of such SSyntAs that can correspond to the same SemA (I mention here only verbal DSyntAs). Roughly speaking:

DSyntA I corresponds to what is on the surface a SSynt-Subject (and to all its ‘transforms’):

John←I-sleeps, John’s←I-sleep, John’s ←I-arrival, her←I-love

DSyntA II corresponds to what is on the surface:

• a DirO (and all its ‘transforms’): [She] loves←II→John, [her] love←II→for John
• the most important Indirect Object [= IndirO] of $L$—if there is no DirO (and all its ‘trans–forms’): belong←II→to John, John’s←II→-belongings

DSyntA III corresponds to what is on the surface an IndirO/Oblique Object (in case there is a DirO as well):
sends—III→John a letter, [a letter] sent—III→to John,
[He] punched [John]—III→on the nose

DSyntAs IV to VI correspond to what are on the surface even more Oblique Objects:
rented—IV→for $300, rented—V→for two weeks

The following three conventions also affect the numbering system in our representations. In the Government Pattern [= GP] of a lexical unit L in a given morphological form, L’s DSyntAs must be numbered as follows:

1. Consecutively (= without gaps): I, II, III, etc.; the GPs with such numberings as *I, III or *I, II, IV are disallowed.8
2. Beginning with I or II—or having no DSyntAs at all; the GPs with such numberings as *III, IV are disallowed.9
3. Without repetitions: the GPs with such numberings as *I, I or *I, II, II are disallowed.

Let it be emphasized that the above requirements concern the numbering itself, not the linear order in which L’s DSyntAs appear in its GP or in the sentence.

Respecting these conventions may have interesting consequences. Thus, consider the sentence Nick—I—ate—I—the steak; its passive counterpart is The steak—I—was.eaten—I→by Nick. As we see, the Agentive Complement [= AgCo] is represented as the DSyntA II, since gaps in numbering of DSyntAs are disallowed. This formal result seems substantially quite natural: even if a DirO and an AgCo differ largely by their SSynt-properties, they are related: each one of them is the closest DSyntA of the verb after its DSyntA I.

Diathesis

The diathesis of a lexical unit is the correspondence between its SemAs and its DSyntAs. For instance, the English verb [to] LIKE and the French verb PLAIRE ’[to] like’ have the same meaning (roughly, “X has pleasant feelings whenever X is experiencing Y”) and therefore the same SemAs. But they have different diatheses, as shown below.

(3a) I [I] like him [II].
(3b) II [I] me [II] plait.
3.3. Voice and voice grammemes

The definition of voice is based on the concept of inflectional category and its grammemes. These two important concepts cannot be introduced here, so that the reader has to be satisfied with examples. Thus, an important inflectional category of the English noun is number, with grammemes ‘SINGULAR’ ~ ‘PLURAL’; the Russian noun has two inflectional categories: number (also with the grammemes ‘SINGULAR’ ~ ‘PLURAL’) and case (with the grammemes ‘NOMINATIVE’ ~ ‘GENITIVE’ ~ ‘DATIVE’, etc.). An inflectional category is a set of mutually opposed grammemes, each of which has its set of markers.

Now voice can be readily defined: 10

Voice is an inflectional category whose grammemes specify such modifications of the diathesis of a verb that do not affect its propositional meaning.

This definition draws a line between voice and such phenomena as the following three:

(a) the causative (adds to the propositional meaning ‘L(X)’ of the verb the component ‘Z causes [that L(X)]’);
(b) the applicative (adds to the meaning ‘L(X)’ the component ‘[L(X)] involving Z’);
(c) and the decausative (subtracts from the meaning ‘L(X)’, which is of the form ‘X causes that P(Y)’, the component ‘X causes’).

A modification of a given diathesis is obtainable by the following three operations: (1) permutation of DSyntAs (with respect to SemAs); (2) suppression of DSyntAs; and (3) referential identification of SemAs. Note that suppression means the impossibility of expressing the suppressed DSyntA (optional omissibility of a DSyntA in the text is not suppression); and referential identification of SemAs presupposes suppression of at least one DSyntA.

When used separately, permutation produces, roughly speaking, passives, suppression suppressives, and identification reflexives. These operations can also be combined.
Let there be a bi-actantial verb, such as, for instance, \textit{[to] dress} or \textit{[to] shave}, with a basic, or lexicographic, diathesis as follows:

\[
\begin{array}{cc}
X & Y \\
I & II \\
\end{array}
\]

For such a binary diathesis, there are 11 possible modifications (\textit{= derived variants}) plus a zero one. Here are all logically possible binary diatheses obtained by mechanical application of the three above operations to the basic diathesis of a bi-actantial verb plus this basic diathesis itself (patterns 1-4 are formed by possible permutations of two DSyntAs; patterns 5-16, by suppressing first the expression of Y, then the expression of X, and then the expressions of both Y and X; patterns 17-20 represent referential identification of X and Y with the suppression of one or both of their expressions):

1. \[
\begin{array}{cc}
X & Y \\
I & II \\
\end{array}
\]
2. \[
\begin{array}{cc}
X & Y \\
II & I \\
\end{array}
\]
3. \[
\begin{array}{cc}
X & Y \\
III & II \\
\end{array}
\]
4. \[
\begin{array}{cc}
X & Y \\
II & III \\
\end{array}
\]
5. \[
\begin{array}{cc}
X & Y \\
I & — \\
\end{array}
\]
6. \[
\begin{array}{cc}
X & Y \\
II & — \\
\end{array}
\]
7. \[
\begin{array}{cc}
X & Y \\
III & — \\
\end{array}
\]
8. \[
\begin{array}{cc}
X & Y \\
II & — \\
\end{array}
\]
9. \[
\begin{array}{cc}
X & Y \\
— & II \\
\end{array}
\]
10. \[
\begin{array}{cc}
X & Y \\
— & I \\
\end{array}
\]
11. \[
\begin{array}{cc}
X & Y \\
III & — \\
\end{array}
\]
12. \[
\begin{array}{cc}
X & Y \\
II & — \\
\end{array}
\]
13. \[
\begin{array}{cc}
X & Y \\
— & — \\
\end{array}
\]
14. \[
\begin{array}{cc}
X & Y \\
— & — \\
\end{array}
\]
15. \[
\begin{array}{cc}
X & Y \\
— & — \\
\end{array}
\]
16. \[
\begin{array}{cc}
X & Y \\
— & — \\
\end{array}
\]
17. \[
\begin{array}{cc}
X = Y \\
I \\
\end{array}
\]
18. \[
\begin{array}{cc}
X = Y \\
II \\
\end{array}
\]
19. \[
\begin{array}{cc}
X = Y \\
III \\
\end{array}
\]
20. \[
\begin{array}{cc}
X = Y \\
— \\
\end{array}
\]

The shadowed variants are ‘illegitimate;’ they either violate numbering conventions for DSyntAs (the asterisked ones) or else they coincide with some other variant, already on the list. (It is of course irrelevant which of the two repeats is retained; I simply take the first one.) The subtraction of illegitimate variants gives us 12 logically possible binary diatheses: the starting one (which is associated with the basic, or lexicographic, form of the verb) and 11 ‘derived’ ones; this means 12 diathesis modifications, in-
excluding a zero modification. As a result, ideally, 12 grammemes of voice for a binary diathesis are possible and will be considered in what follows.

To refer to particular voice grammemes, I propose the following terminology. For the passive:

(a) **Full** [= bilateral], if the passive affects both DSyntaxAs (I ⇒ II and simultaneously II ⇒ I).
(b) **Partial** [= unilateral], if the passive affects only one DSyntaxA (e.g., I ⇒ III, while II remains in place and no DSyntaxA becomes I).
(c) **Promotional**, if the passive promotes the DSyntaxA II to I, automatically demoting the former DSyntaxA I. (‘Promoting’ means giving a DSyntaxA a smaller number, ‘demoting’ being the opposite.)
(d) **Demotional**, if the passive simply demotes the DSyntaxA involved, without promoting anything.
(e) **Agentless**, if the passive does not allow for the expression of the Agent, i.e., it does not admit the AgCo. (The other name, current in the literature, is truncated, or short, passive.)
(f) **Patientless**, if the passive does not allow for the expression of the Patient.

For the suppressive and the reflexive I propose the following terminology.

(g) **Subjectless**, if the suppressive/the reflexive cannot have the Subject (= DSyntaxA I).
(h) **Objectless**, if the suppressive/the reflexive cannot have the Object (= DSyntaxA II).
(i) **Absolute**, if the suppressive blocks the expression of both DSyntaxAs.

For instance, the *objectless reflexive* denotes a reflexive form which admits the expression of the Agent as the Subject only (Fr. *Il se rase* ‘He shaves himself’), while with the *subjectless reflexive*, the Agent is expressed as a DirO or an AgCo (see below, 3.3.11, example (13)).

In the examples, the name of the voice and the corresponding marker are boldfaced. The subsection number corresponds to the numbered cell in the voice paradigm above, for example 3.3.1 will exemplify cell 1. of the paradigm.
3.3.1 ‘ACTIVE’: zero modification of the basic diathesis.

\[
\begin{array}{c|c}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{c|c}
X & Y \\
I & II \\
\end{array}
\]

A Latin example is:

(4) Xenophon n-Ø agricultur-am lauda-ba-t-Ø.  
Xenophon-SG.NOM agriculture-SG.ACC praise-IMPF-3SG-ACT  
lit. ‘Xenophon [I, Subj, NOM] [the] agriculture [II, DirO, ACC] praised [ACT].’

3.3.2 ‘FULL PROMOTIONAL PASSIVE’: bilateral permutation of DSyntAs.

\[
\begin{array}{c|c}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{c|c}
X & Y \\
II & I \\
\end{array}
\]

An example, again from Latin:

(5) A Xenophon nt-e agricultur-a lauda-ba-t-ur.  
by Xenophon-SG.ABL agriculture-SG.NOM praise-IMPF-3SG-PASS  
lit. ‘By Xenophon [II, AgCo] [the] agriculture [I, Subject, NOM] was-praised[FULL.PR.PASS]’.

3.3.3 ‘PARTIAL DEMOTIONAL PASSIVE’: pure demotion of the DSyntA I (to III), with the DSyntA II retained in place (‘[It]is-shaving Alan by-John’).

\[
\begin{array}{c|c}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{c|c}
X & Y \\
III & II \\
\end{array}
\]

This type can be illustrated from Ukrainian:

(6) Mn-øju bu-l-o spla e-no  
I-INSTR be-PAST-SG.NEU pay-PART.DEM.PASS  
c-ju sum-u.  
this-FEM.SG.NOM sum-SG.ACC

‘This sum was paid by me.’, lit. ‘By-me [III, AgCo, INSTR] [it] was paid [PART.DEM.PASS] this sum [II, DirO, ACC]’.
3.3.4 ‘FULL DEMOTIONAL PASSIVE’: pure demotion of both the DSyntAs I and II (‘[There] is-shaving by-John at-Alan’).

\[
\begin{array}{cc}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{cc}
X & Y \\
II & III \\
\end{array}
\]

I have not found actual examples of this voice. It might be due simply to the insufficiency of my data – or to the unwarranted psychological complexity of double demotion. This is a good example of the situation where an uninstantiated cell in the calculus raises challenging questions.

3.3.5 ‘SUBJECTLESS SUPPRESSIVE’: suppression of the DSyntA I, i.e., of what should become the Subject (‘There-is-shaving Alan’).

\[
\begin{array}{cc}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{cc}
X & Y \\
— & II \\
\end{array}
\]

Estonian offers an example of this type:

(7) \textit{Ehita-ta-kse sild-a.}\linebreak build-SBJL.SUPPR-PRES bridge-SG.PART \linebreak
‘A bridge is being built.’, lit. ‘Be-building [SUBJLESS.SUPPR] bridge [II, DirO, PART].’

3.3.6 ‘OBJECTLESS SUPPRESSIVE’: suppression of the DSyntA II, i.e., of what should become the DirO (‘John is-shaving [somebody]’).

\[
\begin{array}{cc}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{cc}
X & Y \\
I & — \\
\end{array}
\]

Apapantilla Totonac illustrates this type, in which no object is possible:

(8) a. \textit{ø-ø-tamāwá pancín.} \linebreak 3SG.SUBJ-3OBJ-buy bread \linebreak ‘[He] buys bread.’

b. \textit{ø-tamāwá-náñ.} \linebreak 3SG.SBJ-buy-OBJ.SUPP \linebreak ‘[He] buys [OBJLESS.SUPPR].’
3.3.7 ‘ABSOLUTE SUPPRESSIVE’: suppression of both DSyntAs I and II (‘There-is-combing’).

\[
\begin{array}{ccc}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{ccc}
X & Y \\
- & - \\
\end{array}
\]

This type occurs in German:

(9) \textit{Hier wird viel ge-les-en.}  
\textit{here becomes much PAST.PTCP-read-PAST.PTCP}  
‘(People) read a lot here.’, lit. ‘Here becomes much read.’

3.3.8 ‘AGENTLESS PROMOTIONAL PASSIVE’: permutation of DSyntAs, with suppression of the ‘new’ DSyntA II – the one which should correspond to X (‘Alan is-being-shaved’).

\[
\begin{array}{ccc}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{ccc}
X & Y \\
- & I \\
\end{array}
\]

This type is illustrated by the following Arabic example, in which no AgCo is possible.

(10) \textit{Al-ʤɨsr-u j-u-bn-a-y-u}  
DEF-bridge-NOM 3SG-PASS-build-PASS-build3SG.MASC  
‘The bridge is being built.’

3.3.9 ‘PATIENTLESS DEMOTIONAL PASSIVE’ : permutation of DSyntAs, with suppression of the ‘new’ DSyntA I – the one which should correspond to Y (‘[It] is-being-shaved by-John’).

\[
\begin{array}{ccc}
X & Y \\
I & II \\
\end{array}
\Rightarrow
\begin{array}{ccc}
X & Y \\
II & - \\
\end{array}
\]

German illustrates this type:

(11) \textit{Von Politiker-n wird hier geg-ess-en.}  
\textit{by politician -PL.DAT becomes here PAST.PTCP-eat-PAST.PTCP}  
‘Politicians eat here.’, lit. ‘By politicians [II, AgCo] becomes here eaten.’
3.3.10 ‘OBJECTLESS REFLEXIVE’: referential identification of the SemAs, with suppression of the DSyntA II (‘John is-self-shaving’).

\[
\begin{array}{c|c}
X & Y \\
\hline
I & II \\
\end{array}
\Rightarrow
\begin{array}{c|c}
X = Y \\
\hline
I \\
\end{array}
\]

This type can be illustrated by Russian:

(12) \textit{Otec-ø pri ėsyyva-ø-et-sja.}  
father-SG.NOM comb-PRES-3SG-REFL  
‘Father is combing his hair.’, lit. ‘Father is-combing-self.’

3.3.11 ‘SUBJECTLESS REFLEXIVE’: referential identification of the SemAs, with suppression of the DSyntA I (‘By-John [it] is-self-shaving’).

\[
\begin{array}{c|c}
X & Y \\
\hline
I & II \\
\end{array}
\Rightarrow
\begin{array}{c|c}
X = Y \\
\hline
II \\
\end{array}
\]

Lithuanian can illustrate:

(13) \textit{Jon-o su-si-škuo-t-a.}  
Jonas-SG.GEN comb-REFL-comb-PASS.PART-NEU.SG  
‘Jonas has combed his hair.’, lit. ‘By-Jonas [II, AgCo, GEN] been-self-combed [SUBJLESS.REFL].’

3.3.12 ‘ABSOLUTE REFLEXIVE’: identification of the SemAs, with suppression of both the DSyntAs I and II (‘There-is-self-shaving’).

\[
\begin{array}{c|c}
X & Y \\
\hline
I & II \\
\end{array}
\Rightarrow
\begin{array}{c|c}
X = Y \\
\hline
- \\
\end{array}
\]

This type is found in Polish:

(14) \textit{Uczesa-no się.}  
comb-SBJL.SUPPR REFL  
‘Some people have combed their hair.’, lit. ‘Has-self-combed’.

This inventory of possible voice grammemes constitutes a convenient background for a study of particular voice systems. It is a general schema against which particular voices of particular languages can be checked and
in terms of which they can be characterized. Of course this inventory does not eliminate all the difficulties; on the contrary: due to the fine-grained analysis it introduces, more unresolved problems become visible. I’ll mention three of the most serious ones.

Firstly, in some languages some voice grammemes can combine within one word-form – which argues for several distinct voice categories. Thus, in (13), the passive participle marker -t- combines with the reflexive marker -si-; together they express the subjectless reflexive. If one is to follow a strictly logical approach, then passives, suppressives and reflexives have to be distinguished as different inflectional categories, such that the term voice should apply to the opposition ‘active ~ passive’ only. But since combinations such as those in Lithuanian are not widespread, maybe it is worth trying to keep all the grammemes described in one ideal inflectional category, using it as a ‘measuring stick’ for specific descriptions? Thus, in French or Russian, it does not make sense to distinguish ‘ACTIVE’ ~ ‘PASSIVE’ and ‘NON-REFLEXIVE’ ~ ‘REFLEXIVE’ oppositions as two different inflectional categories, since the passive and the reflexive cannot be combined in one wordform. However, in German the passive and the reflexive do combine: *Es wird sich um eine Lösung bemüht*, lit. ‘It is self trouble-taken for a solution’ = ‘Much trouble was taken in order to find a solution’ or *Hier wird sich jeden Tag rasiert*, lit. ‘Here is self shaved every day’ = ‘Here, one shaves every day’. Therefore, for this language, one has to postulate the category of voice and a separate category of reflexivity.

Secondly, our requirement that voice should not affect the propositional meaning of the verb is of course too rigid. Thus, clear-cut cases of passives that imply ‘human activity’, ‘absence of control’, or else ‘adverse effects’ are well-known. We need a more flexible formulation that bans major changes of propositional meaning, supplied with a definition of what constitutes a major change – as opposed to a minor change (admissible for voice).

Thirdly, the above calculus has been developed for binary diatheses only, while voice in principle can apply, on the one hand, to monovalent verbs (i.e., to intransitives: the demotion I ⇒ II and the suppression I ⇒ ~) and on the other, to plurivalent verbs with ternary and even more complex diatheses (thus, in 5.2 we find a French voice – the indirect reflexive – that is possible for a ternary diathesis only). Therefore, a richer version of the calculus is needed.

In order to show how the proposed concepts help the researcher solve some practical problems in morphological description, I will now present
two case studies. First, I consider a phenomenon that is similar to voice and
is often treated as such, while according to my definition of voice it is not (I
mean the so-called ‘antipassive’). Second, I sketch the system of voices in
French.

4. A voice-like inflectional category: Detransitivation (a.k.a.
‘antipassive’)

Let me start with an example, borrowed from the Chukotka-Kamchatkan
language Chukchee (Kozinsky et al. (1988); parentheses indicate optional
clause elements):

(15) a. Ḍm-nan ta-ret-arkan-ø
   I-INSTR 1SG.SUB-transport-PRES-3SG.OBJ

   kimit’e’on (tomy-ets).
   load-SG.NOM friend-SG/PL.DAT

   ‘I [=I] transport a-load [=II] (to-friend(s) [=III]): I actually do this.

b. Ḍm-ø t-ine-ret-arkan
   I-NOM 1SG.SUB-‘antipassive’-transport-PRES

   (kimit’e)- (tomy-ets).
   load-SG.INSTR friend-SG/PL.DAT

   ‘I [=I] transport (a-load [=II]) (to-friend(s) [=III]): I am a transporter
   (this is my occupation).

(15a) shows an ergative construction, obligatory in Chukchee for an active
transitive verb: the Subject ‘I’ is in the instrumental, and the DirO ‘load’, in
the nominative. (NB: In current descriptions of Chukchee, my nominative is
often called absolutive, and my instrumental, ergative.) (15b) manifests a
nominative construction, which is possible only for intransitive verbs: the
Subject, which remains ‘I’, is in the nominative; the DirO ‘[a] load’ of
(15a) has become an Obl(ique)O in the instrumental, thus losing its sali-
ence; the two objects here are optional. The change in the valence of the
verb is marked by the prefix ina-/ine-, which is currently called ‘antipas-
sive’ (the notion and the term go back to Silverstein (1972)). This name is
due to the belief that the modification marked by *ina-/ine* is the inverse of the passive: while the passive demotes the Subject, the ‘antipassive’ demotes the DirO; at the same time, both the passive and the ‘antipassive’ turn a transitive verb into intransitive. As a result, the ‘antipassive’ is taken to be a voice. However, if the data in (15b) are checked against our definition of voice, one sees that the ‘antipassive’ is not a voice at all: it does not change the diathesis of the verb. In (15b), the DSyntax I still corresponds to X – the semantic Actor, and the DSyntax II to Y – the Object Moved, as in (15a). What the ‘antipassive’ does is change 1) the surface-syntactic realization of the DSyntax II (instead of a very prominent DirO, it is implemented by a non-prominent ObO) and 2) the morphological form of the Subject (instead of the instrumental, it is marked by the nominative). As a result, we have to accept that the ‘antipassive’ is a grammeme of an inflectional category other than voice. It could be called, e.g., DETRANSITIVATION, with two grammemes: {‘TRANSITIVATIVE’, ‘DETRANSITIVATIVE’}. The ‘antipassive’ is then a detransitivative (cf. a presumed case of detransitivative in Mam, 2.1, (1b)). The term antipassive is better abandoned, since it entails unnecessary confusion, for the following three reasons.

Firstly, the ‘antipassive’ is not the functional inverse of the passive: even for those who defend the term, the passive necessarily demotes the Subject, and the ‘antipassive’ also demotes – the DirO; both the passive and the ‘antipassive’ being demoters, the term ANTIPassive seems unwarranted.

Secondly, the terms passive and antipassive do not have the same extension: the passive can also apply to intransitive verbs, while for the ‘antipassive’ this is impossible by definition (the ‘antipassive’ demotes the DirO, and an intransitive verb does not have a DirO).

Thirdly, the passive applies at the DSyntax-level, while the ‘antipassive’ applies at the Surface-Syntax one.

For more clarity, let me quote another example of detransitivative, this time from the Daghestanian language Dargwa.

(16) a. Neš-li gazet-ø b-uče’-uli sa-ri
mother-SG.ERG newspaper-SG.NOM OBJ.SG.NON.HUM-read-GER be-SUB.SG.FEM
‘Mother is reading [a] newspaper.’
b. Neš-li (gazet-li) r-uc’uli
mother-SG.NOM newspaper-SG.ERG SUB.SG.FEM-read-GER
sa-ri
be-SUB.SG.FEM
‘Mother is reading (a newspaper).’

Here the verb is transitive, the Subject ‘mother’ is in the ergative and the DirO ‘newspaper’, in the nominative. The verb agrees – in nominal class – with both the Subject (via its auxiliary part, i.e. the suffix -ri on the copula) and the DirO (via its lexical part, i.e. the prefix b- on the gerund); the DirO cannot be omitted. This is a typical ergative construction, the only one available in Dargwa for a transitive verb with a DirO.

In (16b), the verb is intransitive, the Subject (again, ‘mother’) is in the nominative, while ‘newspaper’, which became an OblO (but still is a DSyntA II), is in the ergative. The verb agrees only with the Subject, now via both its parts (the suffix -ri on the copula and the prefix r- on the gerund); the OblO is optional. This is a nominative construction; verbs that appear in it are intransitive. (The sentence *Nešli ruč’uli sari ‘Mother is reading’ is ungrammatical. The sentence Nešli buć’uli sari means ‘Mother is reading it’: its syntactic structure contains an object pronoun, which, although it is (quasi-)obligatorily elided on the surface – in any context where the referent is obvious, is reflected by the objectal prefix b- on the lexical part of the verb.)

(16b) presents another case of detransitivitive: the Government Pattern of the verb changes, but not its diathesis, so that the grammeme in question cannot be a voice. This detransitivitive, very typical of Daghestanian languages, is expressed by a morphological conversion (= a change in the verb’s syntactics: the feature “trans” is replaced by “intrans”).

5. Voice in French

5.1. Pronominal verbs in French

To establish the set of voices in French you have first to examine French ‘pronominal’ verbs, that is, verbs accompanied by what is known as a form of the reflexive pronoun SE ≈ ‘oneself’. It is necessary in order to show that a ‘pronominal’ verb is, in point of fact, a voice form rather than a verb with a pronominal Object. Compare two French sentences in (17):
(17) a. *Je me rase.
   ‘I shave (myself).’ lit. ‘I shave me’.

b. Jean me rase
   ‘John shaves me.’

In (17a) and (17b) we see two different wordforms *me*, which are both pronominal clitics of the 1st person singular, but belong to two different lexemes:

In (17a), *me* is a lex of the lexeme SE, which (although it is commonly called reflexive pronoun) is not a pronoun in the strict sense of the term, see immediately below;

In (17b), *me* is a lex of the lexeme MOI ‘I’ – a real personal pronoun. In (17b), *me* is a DirO of the verb; in (17a) this is not the case. Here, *me* is but a marker of an inflectional form of RASER ‘[to] shave’ – namely, the reflexive voice; it is not a real pronoun, but an ‘auxiliary’ word. (This fact was established in Grimshaw 1982: 107.)

Distinguishing the two wordforms *me* boils down to distinguishing ‘real’ pronouns MOI, TOI, LUI, ..., on the one hand, and the lexeme SE, on the other. This view can be buttressed by the following seven differences in the behavior of the pronoun wordforms and the SE wordforms:

1. The auxiliary ÊTRE. One *me*, but not the other (i.e., SE, but not the real pronouns), requires that the analytical verb form should use the auxiliary ÊTRE ‘[to] be’ rather than AVOIR ‘[to] have’. In French, a transitive verb is inflected in the compound tenses with the auxiliary AVOIR, but in (17a), the auxiliary must be ÊTRE:

(18) a. *Je me suis ‹*a*› rasé.
   ‘I have [lit. am] shaved myself.’

b. Jean m’ ‹*est*› rasé.
   ‘John has shaved me.’

2. Coordination. In (17b), *me* – under the tonic form moi – can be conjoined with a noun, but not in (17a):

(19) a. *Je nous rase, moi et mon frère.
   ‘I shave myself and my brother.’
   [the correct expression is: *Je me rase, et je rase mon frère*].

b. Jean nous rase, moi et mon frère.
   ‘John shaves me and my brother.’
(The perfect grammaticality of the English gloss in (19a) shows that in English MYSELF is a normal element of the clause – a DirO coreferential with the subject; there is no question of a particular inflectional form of the verb.)

3. Focalization. In (17a), me cannot be focalized, either by a cleft or by
ne ... que ‘only’, while me in (17b) can, cf. (20):

(20) a.*C’est moi que je rase. /*Ce n’est que moi que je rase.
‘It is me who I shave.’ / ‘I shave only me.’

b. C’est moi que Jean rase. / Jean ne rase que moi.
‘It is me who John shaves.’ / ‘John shaves only me.’

The incapacity of me in (17a) to undergo focalization naturally follows from the fact that it is not an element of the clause and does not have an independent referent: there is, so to speak, nothing to focalize.

4. Causative Construction. In French, if a transitive verb V appears in a causative construction with FAIRE ‘[to] make’, its DirO remains the DirO of the causative construction, while the Subject of V becomes an IndirO or an OblO of the causative construction. That is what we see for sentences of (17b) type, but not for those of (17a) type:

(21) a. Marie le fait se raser.
[le = the Subject of Il se rase ‘He shaves’]
‘Mary makes him shave himself.’
or

b. Marie fait se raser Jean.
‘Mary makes John shave himself.’
(*Marie se fait raser Jean.)

vs.

c. Marie le fait raser à/par Jean.
[le = the DirO of Jean le rase ‘John shaves him’]
‘Mary makes John shave him.’
or

d. Marie fait raser Alain à/par Jean.
‘Mary makes Jean shave Alan’
(*Marie fait le raser par Jean.)

SE RASER behaves as an intransitive verb, its Subject becoming the DirO of the FAIRE-construction. At the same time, the lexes of SE must be posi-
tioned between FAIRE and the infinitive of the lexical verb – as in (21a), while genuine pronominal clitics can only precede FAIRE, as in (21b). This is yet another indication that in (17a), me ∈ SE is not a DirO of the transitive verb, but a voice marker. (Cf. Grimshaw 1982: 120.)

5. ‘X does so too’ Construction. In French, me in (17b) can be targeted separately by the French equivalent of the ‘X does so too’ expression, but not me in (17a):

\[(22) a. \text{Je me rase tous les matins, et Alain aussi \{tout comme Alain\}.} \\
\text{‘I shave myself every morning, and Alan does so too \{like Alan\}.’} \\
\text{(this means that Alan shaves HIMSELF, not me.)} \\
\]

\[b. \text{Marie me rase tous les matins, et Alain aussi \{tout comme Alain\}.} \\
\text{‘Mary shaves me every morning, and Alan does so too \{like Alan\}.’} \\
\text{(this means that together with Mary, Alan shaves ME.)} \\
\]

6. Impersonalization. In French, a verb with a DirO cannot appear in the impersonal construction, available to a large class of intransitive verbs, including the passives; but a verb with a lex of SE impersonalizes easily, which shows again that SE is not a DirO (see Grimshaw 1982: 113):

\[(23) a. \text{Des milliers de pélerins se baignent dans le Gange.} \\
\text{‘Thousands of pilgrims bathe in the Ganges.’} \\
\]

\[b. \text{Il se baigne dans le Gange des milliers de pélerins.} \\
\text{‘There bathe in the Ganges thousands of pilgrims.’} \\
\text{(lit. ‘It bathes itself in the Ganges thousands of pilgrims.’)} \\
\]

\[c. \text{Les mères baignent leurs enfants.} \\
\text{‘Mothers bathe their children.’} \\
\]

\[d. \text{*Il baigne les mères leurs enfants.} \\
\text{(lit. ‘It bathes mothers their children.’)} \\
\]

7. Subject Inversion in a Completive Clause. In French (Wehrli 1986: 273), an intransitive verb without Objects or Complements admits linear inversion of the Subject in a subordinate clause (24a,c), while a verb with an Object, even a clitic one, does not (24b,d).

\[(24) a. \text{Je me demande comment s’est rasé Paul.} \\
\text{‘I wonder how Paul has shaved himself.’} \\
\]

\[b. ??\text{Je me demande comment les a rasés Paul.} \\
\text{‘I wonder how Paul has shaved them.’} \\
\]
c. J’ignore où se rencontreront nos amis.
   ‘I do not know where our friends will meet.’

d. ??J’ignore où les rencontreront nos amis.
   ‘I do not know where our friends will meet them.’

The seven above properties of personal pronoun lexes and of SE lexes show that the SE lexes are by no means separate elements of the clause, i.e., pronominal objects; rather, they are analytical markers functionally similar to affixes. Since the semantic and syntactic relations between RASER et SE RASER are 100% regular (they are the same as in HABILLER ~ S’HABILLER, Laver ~ SE LAVER, PEIGNER ~ SE PEIGNER, PROTÉGER ~ SE PROTÉGER, etc.), these two verbs cannot be considered as two different lexical units: they are different inflectional forms of the same lexical unit RASER. We can say that all French ‘pronominal’ verbal forms are voice forms, although it remains to be seen of what voice(s).

Crucially, SE is impossible with adjectives (cf. Gaatone 1975: 205–206):

(25) *Jean s’est fidèle antipathique, reconnaissants.
   ‘Jean is faithful ‹disagreeable, grateful› to himself.’
   [the correct expression: Jean est fidèle antipathique, reconnaissant à lui-même].

This follows immediately from SE being a voice marker: the adjective does not have the category of voice and thus cannot accept a voice marker.

5.2. French voices

Based on the calculus of voices presented in 3.3, I can state that all in all, the French verb has SIX grammatical voices (for rich data and references on French voices, see Gaatone (1998)). More precisely, the inflectional category of voice in French includes the following six grammemes:

(1) active
   [item 1 in the list of voice grammemes, 3.3] : Jean a rasé Alain. ‘J. has shaved A.’;

(2) full promotional passive
   [item 2 in the list of voice grammemes]: Alain a été rasé par Jean. ‘A. has been shaved by J.’;
(3) partial (= agentless) promotional passive
[item 8 in the list of voice grammemes]: Une barbe de deux jours se rase sans difficulté, lit. ‘A two-day beard shaves itself without difficulty’;

(4) partial demotional passive
[item 3 in the list of voice grammemes]: Il a été procédé par le gouvernement au licenciement des fonctionnaires, lit. ‘It has been proceeded by the government to firing officials’;

(5) direct reflexive
[item 10 in the list of voice grammemes]: Je me rase ‘I shave (myself)’
(see (17a)), Alain s’est rasé ‘A. has shaved himself’;

(6) indirect reflexive
[not in the list of voice grammemes, since it exists only for three-actantial transitive verbs]: Alain s’est rasé la barbe ‘A. shaved his beard’, lit. ‘A. has shaved the beard to-himself’.

No French verb distinguishes all the six voices: thus, a transitive verb cannot have the partial demotional passive, while an intransitive verb cannot have the full promotional passive. This is allowed by the definition of inflectional category (Mel’ëuk 1993–2000, vol. 1: 263; 2006: 22): it foresees the existence, on the one hand, of defective paradigms and, on the other, of partial grammemes (idem, p. 269), which are applicable only to some lexemes of a given lexemic class. Cf. partial cases – the partitive and the locative – in Russian: only some nouns have one of them, and only a handful of nouns have both of them (ČAJ ‘tea’, MEL ‘chalk’).

This description of the French voice system is a practical application of the general calculus of voice grammemes, presented in 3.3. No matter how strange it may sound, no descriptive grammar or manual of Modern French gives an answer to the simple question: ‘How many voices does French have and what are these?’; you don’t find an answer even in the fundamental study by Gaatone (1998). Now this answer is supplied, each French voice is logically fully characterized, and the soil is cleared for the detailed description of their usage. In turn, the exhaustive theoretical calculus of voices becomes possible with our definition of voice, which is constructed on the basis of principles formulated in 2. Thus, our study comes full circle: I start by introducing some postulates that the definitions of important morphological concepts should respect; in accordance with these postulates, the definition of voice is introduced; a calculus of possible voices is developed;
and then it is applied to French – in order to demonstrate its viability and, at
the same time, to solve a descriptive problem faced by specialists of
French.

Notes

1. *Bourbaki, Nicolas:* pseudonym under which a team of French mathematicians
wrote a series of treatises on different branches of mathematics. Bourbaki
members had all been associated with the École Normale Supérieure in Paris
at some point in their careers; among them most prominent were Henri Car-
tan, Claude Chevalley, Jean Dieudonné, and André Weil. The principal aim of
the Bourbaki treatises is to provide a UNIFIED foundation for the whole body
of modern mathematics. The method of exposition is axiomatic: abstract,
logically coherent and rigorous; normally it proceeds from the general to the
particular, i.e., it is essentially deductive. Bourbaki’s series of treatises began
with *Éléments de Mathématiques* in 1939; other books on algebra, set theory,
topology, etc. have followed. Many books in the series have become standard
references.

2. I prefer *radical* to *root* for the following two reasons: 1) *Root* is often under-
stood in the etymological (= diachronic) sense (thus, the root of the English
noun *restaurant* is *stū*, while its radical is *restaurant*). 2) It is counterintui-
tive to apply the term *root* to a quasi-elementary sign, such as *institution*,
while the term *radical* applies here quite naturally.

3. This imaginary situation is very close to what was normal in American struc-
tural linguistics of the 1940’s and 1950’s, with the only difference being that
the term used in this way (for instance, in Nida (1961: 62, 71, 75) was *mor-
pheme* rather than *morph*.

4. Note that in many Australian languages the Intransitive Subject and the Direct
Object have different case-marking (at least for some types of nominals);
without the proposed definition, the corresponding predicative construction
will not be accepted as ergative – which contradicts the intuition of Australian
language specialists. (Thanks to N. Evans for this remark.)

5. The examples from ‘exotic’ languages, which do not have a commonly known
spelling system (as Mam or Chukchee), are given in phonological transcrip-
tion.

6. SSyntAs are taken here for granted. They are defined by sets of observable
syntactic properties: omissibility, multiple presence, pronominalizability, rela-
tivizability, word order, agreement, control (of reflexives, gerunds and some
particles), gapping, etc.; cf. Keenan 1976, Iordanskaja and Mel’čuk 2000. Let
it be emphasized that in the examples I accept the most traditional and com-
monly suggested description of the SSyntAs; it is of course impossible to justify each decision here.

7. I mean here SSynt-phrases that semantically correspond to a Subject-predicate phrase: ‘John’s arrival’ = ‘John arrives’.

8. Dummy syntactic elements do not interfere with this principle: like all grammatical words, they do not appear on the DSynt-level and therefore are not counted. Thus, consider the Spanish idiom diñársela a N, lit. ‘[to] give-itself-it to N’ = ‘[to] swindle N’, while DIÑAR = ‘[to] give’ [coll.]. In the SSyntS, LA (= 3SG feminine pronoun in the accusative) is the DirO of DIÑAR, but this is only a dummy DirO: it does not appear at all in the DSyntS, where the DSyntA II of DIÑÁRSELA is the phrase ‘a N’: DIÑÁRSELA II → a N.—In the actual DSynt-structure of a sentence, actantial ‘gaps’ are of course possible, because of the optional non-expression of some DSyntAs: John [= I] rented his apartment [= II] for a year [= V].

9. **Main Verbs without the DSyntA-slot I**

This requirement is due to the fact that in several cases a verb has no DSyntA I (but has DSyntA II). I will quote four such cases.

1. Some semantically monoactantial verbs such that their only DSyntA is realized on the surface as a DirO and thus must be treated as the DSyntA II (in most cases, it denotes the Experiencer): Rus. TOŠNIT’, lit. ‘[to] nauseate N’; Lat. PUDERE, lit. ‘[to] shame N’; Germ. FRIEREN, lit. ‘[to] freeze N’; or Fr. FALLOIR, lit. ‘[to] need Vint/N’. Cf.:

   TOŠNIT’ (Vind, pres o-II → o L(Y) [MenjaACC tošnìt ‘I have nausea’])
   PUDERE(Vind, pres o-II → o L(Y) [Pudet meACC ‘I am ashamed’, taedet meACC ‘I am disgusted’, piget meACC ‘I am bored’, poenitet meACC Ngen ‘I repent N’])
   FRIEREN(Vind, pres-o-II → o L(Y) [Es friert michACC, lit. ‘It freezes me’ = ‘I am cold’])
   FALLOIR(Vind, pres-o-II → o L(Y) [Il faut des livres, lit. ‘It needs some books’])

   This situation, which is rather exotic in Indo-European, is very typical of numerous languages that regularly have transitive static verbs that denote physiological or psychological states and govern the name of the Experiencer as a DirO.

2. Idioms that contain their own Surface-Syntactic subject, for instance:
   *The cat’s got Y’s tongue* ⇔ THE CAT HAS GOT TONGUE o II → o L(Y)

   Fr. *La moutarde monte au nez à Y* ⇔ LA MOUTARDE MONTE AU NEZ o II → o L(Y)
   lit. ‘The mustard goes-up to-Y to the nose’ = ‘Y flares up’.

   Fr. *Le torchon brûle entre Y et Z* ⇔ LE TORCHON BRULE o II → o L(Y) COORD → ET II → o L(Z)
   lit. ‘The rag is burning between Y and Z’ = ‘There is a running battle going on between Y and Z’.
At the DSynt-level, such an idiom is represented by one node, and no branch numbered I leaves it.

3. Interjections of the type *Down with Y!*: DOWN [with] o-II→o L(Y).

4. Any verb in the form of subjectless suppressive (in a language where this voice exists, see below):

Fr. *Il se vend des Y*, with the DSyntS VENDRE subj-suppr.ind.pers o II→o L(Y).

These examples show that one can have diatheses in which the numbering of DSyntAs does not begin with I, but with II.

On the other hand, no diathesis can begin with DSyntA III: this follows from the fact that DSyntA II stands for the most important (= main, central) or only Object (not necessarily for the DirO).


11. A reflexive in a particular language can express different meanings: ‘genuine’ reflexive (acting upon oneself), reciprocal, etc. In the present context, this fact is ignored.

12. This opinion is by no means shared by all researchers. Cf., e.g.: “the essential characteristic of this [= pronominal verbal – IM.] construction lies in the coreferentiality manifested between the subject NP and the CLITIC VERBAL COMPLEMENT” (Burston 1979: 147; emphasis added – IM.), “the pronominal construction embodies essentially one type of elicit verbal complement – AN OBJECT PRONOUN” (idem: 150); “in quite a few so-called intransitives the OBJECT FUNCTION OF SE is reasonably transparent [Elle a besoin de se reposer]” (idem: 160). In the same way, Le Goffic (1993: 309ff) treats all forms of SE under the heading of ‘Clitic Complements.’ However, in most cases, it is believed that, for instance, in SE RASER, the clitic SE is a DirO and, at the same time, that SE RASER is a form of the reflexive voice. This is a contradictory viewpoint, which is logically impossible. On the other hand, cf. Wehrli (1986: 283), who says that ‘the process of reflexivization in Romance ... appears to be closer to an affixation process,’ meaning affixation that signals ‘a modification of the argument structure associated with a predicate (p. 274);’ or Wierzbicka (1996: 402ff), who demonstrates that the Polish reflexive pronoun SIĘ, syntactically similar to the French SE, is not an element of the clause, i.e., not a Noun Phrase in the role of an object.
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Abbreviations and Notations Used in the Paper

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<td>Agentive Complement</td>
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<td>Direct Object</td>
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<td>DMorphS</td>
<td>Deep-Morphological Structure</td>
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<td>SemS</td>
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<td>SSyntS</td>
<td>Surface-Syntactic Structure</td>
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