Contrastive *Meanings of the Terms "*Predicative*" and "*Predicational*" in Various Linguistic Theories (II)

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Abstract

This paper is devoted to a problem of lexical semantics, discussing various aspects gravitating around two distinct meanings of the terms "*predicative*" and/or "*predicational*" in some important and/or of particular interest linguistic approaches, trying to build a unitary mosaic image from "rocks" representing apparently disconnected examined viewpoints on the issue. The *first meaning* of the two terms is of semantic nature and corresponds to those lexical categories that introduce a true *predication, i.e.* an *event-denoting structure*, within or not the context of a *predicate*. Similar terms fitting this meaning are (*e.g.*) "*deverbative*", "*deverbal*" and "(*de*)*verbality*", "*deadjectival*", "*nominalizations*" and "*event nominals*", "*postverbal*", "*predicator*", "*predicative*", "*predicativity*" etc., while the proper term that we advocate is "*predicational*". The *second meaning* of the above mentioned terms is assigned, in general, to those non-verbal (nominal and adjectival) categories that, together with a finite auxiliary verb complex, make up a structural, *analytic predicate*. Its syntactic nature corresponds to those categories and phrases that contribute to make up a (finite or non-finite) *predicate*, but not *necessarily* introducing a true *predication*. The two meanings are crossly pursued in several approaches of special interest, a taxonomy of the verbal and non-verbal categories based on their intrinsic feature of *predicationality* is proposed, and its consequences on natural language processing are briefly referred.

*Why "Contrastive" and not "Complementary" (in the sense of [33])? The right choice would involve a discussion whose core is in the very issue of this paper.

This article represents the *direct continuation* (Part II) of the paper with the same title appeared in the previous number of the journal, with the sections numbered in the sequel and mutual cross-references in Part I and (the present) Part II. Only both parts of the paper make up together a comprehensive unity.

6 Bouchard's Semantic Approach to Predication Syntax

6.1 Predicative and Contextual Uses of the Copula Verb

D. Bouchard [1, p. 197] makes the following meaningful remark: "...*there are contexts in which the relation that* être *establishes between actants and the relation that* venir *establishes between actants can refer to the same situation and this also holds for* être *and* aller. *We can conclude that context is important in the computation of a situation and that, crucially, it must be kept separate from the meaning of the verb*". Instead of a *predicate-centrist* approach, Bouchard (1995) [1] argues for a modular approach based on the fact that many elements are combining to determine the possible uses of a sentence: (1) properties of the *verb* (such as the kind of relations it establishes between the actants) and the presence of particular constants; (2) properties of the *actants* (such as the nature of the elements they refer to); and (3) properties of *background knowledge* (such as the prototypical properties of humans).

In [1], Bouchard assumes that *être* is just a support for *Tense* when the sentence expresses only a copular relation. (We adhere to this view completely.) This could be an explanation for some bare copular sentences in French (and Romanian):

Ex. 6.1.1. (Fr) *Je considère Paul très intelligent.*

(Rom) *Îl consider pe Paul foarte inteligent.*

(Eng) *I consider Paul* (to be) *very intelligent.*

6.2 Event (or Nominalizations) and Non-Event Nominals

Besides the different treatment of the sentence in English and French, Bouchard notices [1, p. 206] that in English, unlike French, a *predicative* NP cannot function as a point or actant, thus cannot be the complement of the preposition *to*. This is because, in English, the Double Object and Dative constructions have different *predications*. However, in French, "*whether an* NP *is purely* predicative *or not, it can appear in an actant position, since a relational element can function as an actant*" in French; "*thus, a* predicative NP *is the complement of the preposition* à" [1, p. 206]. The corresponding examples are:

Ex.6.2.1. (Fr) *Jean a donné mal à la tête à Marie.*

(Eng) *Jean has given a headache to Mary.*

(Rom) *Jean i-a dat dureri*-PLU *de cap Mariei.*

There are several possibly disputable points here (but not room enough): whether an NP could be "*purely predicative*" or not, whether an NP can be the complement to the preposition *à* (and in general to a preposition) or not, and (essentially) "*whether relational elements are allowed to function as actants or not*" [1, p. 207]. We leave these issues open for the moment.

A perceptive analysis of the *predicational* (and nonpredicational) *nouns* (under the labels of *nominalization*, *event* and *nonevent nominals*) may be found in [1, §4.4.5§4.4.6]. A special attention is given to the analysis of the adjective distribution (for French) in [2], [3], [4] (see §6.3).

Presenting "*two unsatisfactory analyses of* Psych *verb nominalization*" made by Grimshaw (1990) [24] for the *event* (and non-event, or *object-denoting* [4, p. 18]) *nominals*, Bouchard provides his own solutions to these problems. Investigating the verb nominalization within the more precise semantic domain of *Psych* verbs, Bouchard refers to the analysis of Jane Grimshaw [24] of EO (Experiencer Object) verbs based on *event* and *non-event* nominals. Some of the Grimshaw hypotheses in the discussed situation are shown not to be correct; however, the general framework based on the *argument structure* involved

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by the *event nominals* proves to be fruitful, and questions such as: (*a*) What happen to the arguments of the verbal base when creating an event nominal? (*b*) Which is the result of the nominalization of (EO) verbs? (*c*) Which is the adequacy of the Grimshaw's tests proposed to distinguish event nominal from other (non-event) nominals? and the answers to these questions are of essential importance to our topic.

Bouchard [1, p. 323] discusses "R *and* NP*s as Predicates*" (where R is the "*referential external argument*" of an *event* E, and Ev is the *eventive counterpart* of R to the verbal base) starting from the Grimshaw's (1990) approach [24], shows several contradictions in her approach, and develops his own solution to the problem. The account for:

Ex. 6.2.2. *John is a man.*

is the following: the coindexation between a head and its argument(s) has to yield the following rules: (*a*) if an NP bearing the index is in an argument position that is linked to a variable in the semantic representation (as *John* is in Ex.6.2.2), then the index is interpreted *referentially*; (*b*) if the NP bearing the index is not in an argument position, which is the case for *a man* in Ex.6.2.2, then the index is interpreted *predicationally*. The conclusion is that NP predication as in Ex.6.2.2 "*does not motivate the use of* (variable) R" [1, p. 324].

Our only observation is the use of the term "*predicational*" in Ex.6.2.2 with the meaning of "*predicative*" in Bouchard [1, p. 324]; we would like to use the notion of *predication* only for *event-denoting* categories that involve an argument-structure meaning and representation. A single-argument representation may, or may not (as in Ex.6.2.2) involve a proper *predication*.

The existence of a *predicate* and of a *predication* are quite *distinct* situations: in Ex.6.2.2. there exist a (finite) predicate and clause but no (proper) predication since no event-denoting category is present; typical event nominals and only them involve *predications*, saturated or not, within the syntactic structures of non-finite clauses (and non-finite predicates, if we may call event nominals like this – see also §12.2).

In the case of *Psych* constructions, Bouchard remarks not only a particular syntactic or semantic relationship between arguments, but

rather the nature of the elements that are related. Proposing an analysis of the nominalizations of (Psych) verbs, Bouchard [1, p. 332-340] exploits the *intensionality* properties of the *Genitive* NP, forcing it to be a (substantive) participant entity with a strong *agentivity* character.

One of the clues pointed out by Bouchard is exactly the distinction between *predicational* and *non-predicational nominalizations* one could derive from the same verbal source, which is also met in our taxonomy, and retrieved often in languages such as German (*Behang-Behängung*, *Einigkeit-Einigung* etc.), French (*fond-fondation-fondement*, *sabot-sabotage* etc.), Romanian (*friptură-frigare-frigere*, *strigătură-strigare*, *scris-scrisoare-scriere* etc.), with various relationships between the paradigmatic associations and the corresponding event or non-event meanings. The following interesting examples [1, p. 339-340]:

Ex. 6.2.3. (*a*) **the train's frequent arriving*

(*b*) *the train's arrival*

are explained by the fact that while *arriving* is a process (event) nominal, whose arguments function like the corresponding *"unaccusative"* (source) verb *arrive*, *arrival* is not an event nominal. Thus *the train* in Ex.6.2.3.(*b*) is not an *Actualizer* (thematic) argument but a loose *Identity* genitive link with the *arrival*.

The problem of the construal and meaning variability for complex NP*s* involving both event and non-event nominals needs a special treatment based both on verbal syntactic frames and semantic-pragmatic context analysis. [1], [4], [33], [24] (and others) may constitute solid premises to such a difficult task. The same nominalization does not provide distinct event and/or non-event forms, *e.g.* in the following example for English, Romanian (similar dependencies, in ambiguity as well), and French (a different and ambiguous one):

Ex.6.2.4. (Eng1) *arrival* of the *Bucharest train* in *Iaşi*

(Eng1a) *arrival* of the *train of Bucharest* to *Iaşi*

(*Rom*1) *sosirea trenului de Bucureşti* la *Iaşi*

(Eng2) *arrival* of the *train* from *Bucharest* to *Iaşi*

(*Rom*2) *sosirea trenului* de la *Bucureşti* în (la) *Iaşi*

(*Fr*1-2) *l'arrivée* du *train de Bucarest* à *Iassy*

The semantic analysis of Pustejovsky (1995) on the *varieties of nominalizations* [33, p. 165-177] (*e.g.* nominalizations in *-ing*, *-ion*, *-er*, *-or* etc. and others, not necessarily in a morphologic paradigm), based on a complex lattice of syntactic and semantic types, in the framework of the *generative lexicon* have to be referred in this context (see also §11 below).

6.3 Predicationality, Adjectival Distribution, and Linguistic Interfaces

Analyzing the nominal context of the adjectival distribution, Bouchard [4], [3] comes to the conclusion that the various factors that favour the order NA or AN have a common source: a *postnominal* adjective modifies the whole entry of the *semantic network of noun* (N), whereas a *prenominal* adjective modifies only one of the subelements of the N network. Essential explanations of this difference are *"the fundamental asymmetry between Functor and Dependent in interpretation"*, the functioning of the linguistic category ordering, and how this ordering express the modifying relations between the categories involved.

Referring [40], Bouchard [3, p. 117] remarks rightfully that Wilmet's *"analogy reasons"* on the basis of which is explained the supremacy of the NA ordering (distribution) in the following situations are doubtful (for French): (*a*) *nominalizations*: tour *cycliste*, carte *routière*, crédit *agricole*, accent *marseillais*; (*b*) *deverbal adjectives*: porte *fermée*, attitude *provocante* (*soluble*, *adoptif*, *motrice*); (*c*) *derivations* from the Latin adverbs *ante*, *post*, viz. *antérieur*, *postérieur*. It is interesting that in the nominal, adjectival, and adverbial phrases exposed in (*a*) − (*b*) − (*c*) above, *all* the head nouns, adjectives, and respectively adverbs in these phrases are accredited as *predicational* ones (in our terminology)! Namely, *tour*, *carte*(?), *crédit*, *accent* (nouns); *fermée*, *provocante*, *soluble*, *adoptif*, *motrice* (adjectives); *antérieur*, *postérieur* (adverbs).

In [4], Denis Bouchard proposes to change the view on the *distribution* and *modification* of *adjectivals* within the syntactic structure and *semantic network* of noun phrases in French (and across

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languages), taking fully into account the effects and consequences of the *Conceptual-Intentional* (CI) and *Sensori-Motor* (SM) language *interface* properties. The *interface properties* of the *Number* category are shown to provide an essential, principled explanation of the crosslinguistic variation for adjectival placement, nominals without determiners (bare NP*s*), determiners without nominals (clitics) etc. These theoretical intuitions are supported with detailed and contrastive data from English, French, Celtic, Walloon, and Romanian, and bring concrete arguments for a *new model* of an effective *minimalist approach* to human language.

Bouchard considers [4, p. 36] that the *computational system of human language* is strongly determined by 'external' properties of CI and SM language *interfaces*, that CI and SM initial conditions may account for *language variation*, and that the currently existing linguistic theories do not link (sufficiently) the (features of) *functional* categories on the language *interface* properties. (In particular, the *predicational*, functional feature we are interested in.)

In Bouchard's (2002) [4] proposed model, *lexical* and *functional subtypes* (classes) of *adjectives*, including *'intensional'* ones provide deeper linguistic solutions, within which the *predicational* feature of (adjectival-adverbial) *heads* become subsidiary, a 'technical' explanation useful to solve various problems inside the *computational system of human language*. Questions such as the hierarchies for the *serialization* of adjectives in *event-denoting* and *object-denoting* (or *individual-denoting*) nominals, or the relationship between the *predicationality* feature of a head category and the *systemic* order (or focused disorder) of its satellites, are typical instances of language-dependent, difficult problems that could be approached successfully within this original approach.

7   A Predicative (Predicational) Taxonomy of (Romanian) Verbs

This section is devoted to the approach of our problem in [26], a consistent perspective on the Romanian verb. Two functions are considered as fundamental to the verb: *denominative* function, at the lexical level of the word, and *predicational* function, at the syntactic level of discourse. Irimia [26, p. 22-27] takes into account two main classes from the viewpoint of the verb capacity of assuming and accomplishing its specific function of *predication*: (*a*) *predicative* and (*b*) *non-predicative* verbs. The predicative (actually, predicational) verbs may realize by themselves the *syntactic function* of *predicate* as well as their "*semantic contents* of *predication*". With few exceptions, *all* the Romanian verbs are predicative (and we may say as well, a large majority is predicational).

As *non-predicative* verbs, [26] considers the following classes: (*b*1) the verbs which by their semantic contents function only as *grammatical* instruments of the *predication*; (*b*2) those verbs which, due to their meaning, cannot realize alone the syntactic function of *predicate*; and (*b*3) the verbs which, by their semantic and morpho-syntactic mutations, did lose their predicative capacity. Based on semantic and syntactic criteria, the class of non-predicative (non-predicational, in our language) verbs may be split in two subclasses: (*b*Cop) (absolute and lexico-grammatical) *copulative* verbs; and (*b*Aux) *semi-auxiliary* verbs.

As *absolute copulative* verbs, there are considered the copulative *to be*, and other semantically equivalent verbs such as: *to mean*, *to signify*, *to represent*, *to stand for*. The subclass of lexical-grammatical copulative verbs comprises: *to become*, *to seem*, *to remain*. Some of these commonly non-predicational verbs convey their *predicational* counterpart meanings too. We do not come into details with the *three* subclasses of the semi-*auxiliaries*: of *modality*, *aspect*, and *temporality*.

As the predicative–nonpredicative classes of verbs show, Irimia (1997) [26] differentiates accurately the verb capacity of realizing their *predicative* syntactic function (of making up the syntactic structure

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of a predicate), and their *predicational* semantic function (of assuming and accomplishing a syntactic-semantic structure of a *predication*). The class of non-predicative verbs in [26] is consistent with the non-predicational verbs in our taxonomy, and some of his remarks concerning *actional-processing-dynamic* versus *static-substantive-existential* meaning of the nouns and adjectives-adverbs suggest the same basic criteria that could discriminate all these major lexical categories: whether they bear, or not, in their meaning, the semantic feature of *predicationality*, *reflected* then in *syntax* as a true, proper predication.

8 Syntactic Problems with Predicational Solution

8.1 Splitting PP*s* and the Referential External Argument

De Kuthy (2001) [20] investigates the problem of splitting PP*s* from NP*s*, *i.e.* which is the semantic status of those PP*s* that can occur separate from their nominal *head*: are they *arguments* or are they *modifiers* (*adjuncts*) ?

The solution to this class of problems depends essentially on a well-established predicational taxonomy; our approach since [14], [15], as well as the present proposal coincides or is very close to the approach in [20]. A first essential question is the following: which nouns take *arguments* and which do not? De Kuthy [20] supports correctly that the "*deverbal noun*" *Gespräch* [Eng: *conversation*], derived from the verb *sprechen* [Eng: *to speak*], syntactically selects complements (arguments) similar to the source verb *sprechen* and, moreover, different to the verb, it can occur *without* any of its complements.

The meaning of *Gespräch* can be represented as the 2-place predicate *gespräch*(x, y), with the possible situation that the *speaker x* and/or the *patient y* to miss from the utterance. Missing or not, the correct representation of the arguments of the predicational category, both at the intensional and extensional level, could be very important in *anaphora* resolution.

Another category of predicational nouns mentioned in [20] is that of nouns selecting a single argument, most of them being "*deadjectival*" nouns such as *Schönheit* [Eng: *beauty*], derived from the adjective *schön*, and represented as the logical predicate *schönheit(x)*.

The question is whether the criterion of semantic valence is applicable to other classes of nouns, apart from '*deferrable*' and '*deadjectival*' ones mentioned by De Kuthy [20]. The answer to this problem is fundamental since the whole class of *concrete, existential, object-denoting* nouns (*individuals* in the language of HPSG-87 language in [31] – §2, Part I, *non-predicational* ones in our current terminology) is represented *only* as *extensional* one-place logical predicates: $house(X)$, $dog(X)$, $child(X)$ etc. The meaning of the involved variables x and X in the above mentioned logical predicates $schönheit(x)$ and $house(X)$ is quite different.

The basic difference between the representations of non-predicational nouns (*e.g. house, dog* etc.) and the one-place predicational categories (*e.g. Gespräch, Schönheit* etc.) is that the representation of the first category as one-place predicates is purely semantic, *extensionally* logic in nature, their semantic argument being never syntactically realized, while the second class of predicational nouns (*e.g.* '*deadjectival*' ones) entail a syntactic head-argument structure. The Grimshaw's (1990) [24] solution of representing event-denoting nouns like *Gespräch* or *Schönheit* is to use an *additional, non-thematic* argument which is never realized but can be predicated over, called also *referential external argument, e.g. X* (of *extensional* nature) in the representation $Schönheit(X, y)$. We mention here the analysis of Bouchard (1995) [1] of the Psych verbs in relationship to this kind of Grimshaw's (1990) representations in [24] (see §6).

In this context, we refer also to the approach of [21] (De Kuthy & Meurers; 2000), which brings interesting arguments from German in the favour of our shape of the *functional* FX-bar *scheme* and *theory* [18]. In the framework of HPSG theory, De Kuthy & Meurers (2000) [21] extend the SUBCAT and COMPS lists of complements by shuffling the adjuncts of the former list into the latter one. The new aspect of their Lexical Dependent-Raising Principle that replaces the Lexical

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Argument-Raising Principle is that adjuncts are represented on the COMPS list, being raised along with the verbal, adjectival, or nominal complements of their corresponding (verbal or non-verbal) *predicational head.*

The conclusion is that the problem of splitting PP adjuncts from a (complex) NP is possible *only* by distinguishing argument-taking nouns (*i.e.* predicational, event-denoting nouns) from those which do not take arguments (*i.e.* non-predicational, individual-denoting nouns). Syntactic and semantic representation questions, such as that of the *referential external argument* considered in Grimshaw (1990) [24], Bouchard (1995) [1], and De Kuthy (2001) [20], as well as parsing / generation problems would be interesting to be revised in a framework which should adopt the kind of taxonomy proposed here.

8.2 Case Assignment and Direction of Linguistic Projection

The problem of *case assignment* to subjects as part of *non-finite constituents* is another example of problem whose solution depends directly on a proper utilization of the feature of predicationality for the involved lexical categories. [21] (Meurers & De Kuthy; 2001) investigates this issue in the framework of HPSG theory. The examples :

Ex. 8.2.1.(*a*) (*Ger*1) *Der / Den Kanzler tanzen sah der Oskar.*

(*EngW*1) **the*-Nom / *the*-Acc *chancellor saw the Oskar.*

(*EngT*1) *Oskar saw the chancellor dance.*

[21, p. 37];

(*b*) (*Ger*2) *Das von Ion mit dem Fußball zerbrochene Glass*

(*EngW*2) *The*-Neut *by Ion with*-Dat *the football broken glass*-Neut

(*EngT*2) *The glass broken by Ion with the football*

[18, p. 73],

show that there is significant empirical evidence for reducing the apparently non-local case assignment and subject-verb agreement relations to an interaction of these extended local relations and the lexical class of raising verbs. These raising relations, including case assignment, are established on the highest level on which the corresponding arguments

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can be raised. The solution in the HPSG framework proposed by [21] is to modify the traditional Subcategorization Principle of HPSG in order to realize *the marking* of the *raised arguments* in the lexical entries of the raising verbs.

We remark that this problem is equivalent in the parsing context to the problem of proper assignment of the *predicational* feature to the major categories, with the interesting subproblem revealed in Ex. 8.2.1.(*b*) [18, p. 73], and called there as the phenomenon of "*directionality*" in the *predication projection*. The interplay between this parameter of predication, together with that of *systemic order* of *arguments*, see *e.g.* (Hajiova, Partee, Sgall; 1998) [37], of a *predicational head* category is important not only for the parsing problems of natural language but especially for the *discourse* question of *topic-focus* articulation. The equivalent problem of *functional head projection* is examined in terms of the principle of *Parameter Liniarization* (Bouchard; 2002) [4, p. 60].

The problem of *projection direction* (as well as the systemic order) of the arguments may be seen also in terms of the interaction between *grammatical weight* and *information structure* [39] (Wasow; 2002) in discourse. Defining (roughly) the *grammatical weight* measure as the capacity of certain categories for dominating other (phrasal) categories [39], our search for the categorial *predicationality* can also be seen as an effort of finding the grammatical weight of the various (grammatical) categories within discourse.

The *information structure* of a clause-type textual unit refers the *topic-focus* (*topic-comment*, *theme-rheme*) discourse problem. The *backward* direction of the linguistic projection of the 'heaviest' category in Ex.8.2.1.(*b*), or the change of the usual, systemic order of the arguments (as Ex.8.2.1.(*a*)), could provide essential clues within the algorithms for establishing the correct *theta-structure* as well as the topic-focus structure of textual units. This is a language-dependent, difficult problem in natural language processing, whose solution may have crucial effects in parsing / generation and discourse analysis.

The *lexical semantics* counterpart for the problems of *projection direction* and the *systemic order* (*topic-focus*) on *theta-arguments* of a *predicational* head is also mindfully analyzed in (Pustejovsky; 1995)

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[33] (see section §11 below).

9 HPSG Syntactic Solutions in (Sag &Wasow; 1999)

9.1 Predicative and Non-predicative NP*s*

Within the formalism of HPSG (Head-driven Phrase Structure Grammar) developed by [31], [32], the approach in [36] (Sag & Wasow; 1999) discusses the problem of *predicative verb forms* in the construction of a predicate. Using the feature PRED (PRD in our notation for *predicative*; not to be confounded with the feature PRED we use for *predicational* feature), they reformulate the lexical entry for the verb *be* as:

$$\left\langle be, \begin{bmatrix} be - lxm \\ ARG - ST\langle \boxed{1}, \begin{bmatrix} SYN & \begin{bmatrix} HEAD[\text{PRD} +] \\ SPR & \langle \boxed{1} \rangle \end{bmatrix} \\ SEM & [\text{INDEX} \boxed{2}] \end{bmatrix} \rangle \\ SEM \begin{bmatrix} \text{INDEX} & \boxed{2} \\ RESTR & \langle \ \rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

Figure 9.1. The entry for "*be*"

in order to handle not only passive VP complements but also complements of the kind:

Ex.9.1.1.   (*a*) *Pat is on the roof.*

          (*b*) *Pat is the captain (of the team).*

          (*c*) *Pat is fond of Chris.*

          (*d*) **Pat is hate Chris.*

          (*e*) **Pat is mere.*

[36, p. 252] appreciates that "*only some verb forms can head a* VP *complement of* 'be' *and not all adjectives can head* AP *complements of* 'be'. *The traditional name for the kind of phrase that can appear after* 'be' *is* 'predicative', *so we will introduce a binary feature* PRD *to encode this distinction.*"

In examples 9.1.1., [36] assigns to *found* the feature [PRD +], while *mere* is [PRD –], though both have HEAD values of type *adjective*. Likewise, *passive* and *present participles* receive [PRD +], while all other verb forms are [PRD –] (!). More generally, the type *verb-lxm* in [36] (Sag & Wasow; 1999) is associated with the constraint [PRD –].

The semantic index of the verb *be*( ) is that of its *predicative complement*. The formulation in Fig. 9.1. requires the *predicative nominals* NP[PRD +] to have a non-empty specific SPR (specifier), *i.e.* that they are of the form [SPR ⟨NP⟩], in order to handle the example "*Pat is a scholar*". Here "*scholar*" is a '*predicative*' NP because it is considered to express the *property* of scholariness, while the same word in the example "*A scholar arrived*" makes reference to an *individual*, and it is considered to be *non-predicative* NP.

"*...This syntactic distinction between* predicative *and* non-predicative NP*s reflects a semantic difference between two uses of certain* NP*s : one involving properties, the other individuals*" [36, p. 252*f*].

This solution raises a lot of questions. For instance: (**1**) What is *scholar* in the sentence *This is a* scholar *who arrived*; an individual or a property? *Scholar* in the matrix clause receives [PRD +], and its trace in the relative clause [PRD –]. (**2**) In the clause *He is John*, *John* is both an individual and '*predicative*' [36] !? (**3**) The verb *be* contributes nothing to the semantics of the sentence; and sometimes, it is just a placeholder. Indeed, there exist languages, like Russian and Hungarian languages (contrary, in general, to Romance, Germanic and Anglo-Saxon ones), where examples such as 9.1.1(a-d) may be uttered without any verb at all. For instance, one says *Oná horóšij vrač* (Russian), with the English transwords *she good doctor* and the translation *She is a good doctor*. It is also true that, the same Russian clause in past (as well as for in future) tense needs the explicit use of *be*, *viz*. *Oná bîlá horóšim vračom* (*She was*-FEM-SING *good doctor*), but this fact just points out again that *be* is just a *Tense* support in a copular relation, and that a new functional parameter is necessary when discussing the anatomy of the predicate, *viz*. the *Tense* parameter.

Thus *be* can constitute only the *aspectual* head of an analytic predicate in various and semantically different *copulative* contexts. The

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corresponding *predicative* NP or AP '*complements*' are indispensable parts of the formatted analytic predicate. Then where is the linguistic *prediction*, thus the *predication* inherent to the word *be*?

These facts confirm that "*be*" is *not* a predicational verb (at least in the copular context), and does not introduce a true predication (see §6 and §7 for the same conclusion).

9.2 'Predications' in (Sag & Wasow; 1999)

[36] (Sag & Wasow; 1999) introduces the *type* of feature structure called *predication* to describe the linguistic meaning corresponding to the semantic *mode* of an utterance. The features of a *predication* have to specify: (***a***) what kind of *relation* is involved, and (***b***) who or what is *participating* in the relation. [36] accepts that their '*predications*' are used without presenting for them a proper theory of *individuals*, *relations*, *circumstances*, and *situations* etc. and of the features that go with them (as in HPSG-87 [31], for example). The following feature structures are of *pred* (*predication*) type:

$$
\textbf{(9.2.1)} \quad
\begin{bmatrix}
RELN & love \\
SIT & s \\
LOVER & i \\
LOVED & j
\end{bmatrix}, \quad
\begin{bmatrix}
RELN & give \\
SIT & s \\
GIVER & i \\
RECIP & j \\
GIFT & k
\end{bmatrix}
$$

However, the restriction associated with many nouns and adjectives (e.g. *book*, *happy* etc.) includes a predication of only *one* (and, essentially for our discussion, *non-situational*) *argument*. The feature structures encoding these special type of categories are using the feature name INST(ANCE), as in:

$$
\textbf{(9.2.2)} \quad
\begin{bmatrix}
RELN & book \\
SIT & s \\
INST & k
\end{bmatrix}, \quad
\begin{bmatrix}
RELN & happy \\
SIT & s \\
INST & i
\end{bmatrix}, \quad
\begin{bmatrix}
RELN & under \\
SIT & s \\
LOWER & i \\
HIGHER & j
\end{bmatrix},
$$

which semantically represent completely different kinds of functionalities, among which the true *predicational* one in (9.2.1) is just a special case.

This is somehow an ambiguous solution with the above '*predicational*' label attached to the feature structure representations (9.2.1)

and (9.2.2) in this HPSG variant. The two words bear not only different categories but also different linguistic meanings; *book* is noun of object-denoting type, represented extensionally as $book(X)$, whereas *happy* is an adjective, with the functional role of modifier and represented intensionally as $happy(y)$, where y is an (logically) intensional NP. Hence *book* cannot receive any intensional argument, while *happy* does; the former is a *non-predicational* noun, the latter is a *predicational* adjective (as any modifier, actually). For the preposition *under*, see §9.4 below.

9.3   Coordination as 'predication'

The role of *discourse markers* may also be viewed as *predications* (merely as *predictors* in the sense of (Davis; 2001) [19]) at the discourse level. The co-related (or not) *cue phrases*, with the role of discourse markers, are connecting finite or non-finite clauses (events) in a similar way that is performed on NP*s inside* the clause.

The question is whether a conjunction may be assimilated with a true predication, *i.e.* a pattern of a (finite or non-finite) clause, made up of an '*actional*' head surrounded by its '*actants*'. The answer is no. However, since any conjunction introduces a pattern of related clause-type events (even if a conjunction refers to the simplest XP, X = N, V, A, the conjuncted phrases have to be raised at the clausal level), [36] (Sag & Wasow; 1999) may extrapolate the term of *predication* for conjunction representation.

Returning to the conjunction meaning, its correct representation is a function of several event-type arguments, or a relation (for correlated conjunctions) applied to the same type of arguments (see also [28], [29], [18], [17] etc. for specific questions on sentence and discourse analysis).

9.4   The 'Predicational' Preposition *About*

Sag & Wasow (1999) consider in [36] two main roles of the *preposition* (P) category: (***a***) P as *argument-marker* in an *event*, clausal context, and in this situation P behaves in PP as a *case* and *theta-marker* of

an NP argument (complement); (**b**) P as a '*predicational*' category, in this situation P behaving as a *discourse marker*.

The relevant given example of P is *around*, that may play the both roles. The same *overloading* (as in programming languages), polysemous behaviour is met also for the preposition *on*, whose translation in Romanian partakes both [Rom: *pe, deasupra*] (with case-marking role), and [Rom: *asupra, cu privire la*] (with syntactic structure co-relating role). Similar remarks are legitimated by Marcu (1997, 2000) [28], [29] for the multiple role of the preposition *after*.

We agree with this approach of [36, p. 181-183] to P, and remark that in both of the specified roles, P behaves as a *marker* on different structures and levels. In [17], P receives only one of these roles within the unitary hierarchy of marker classes made up of *four* main levels. The only problem we see here, exactly as in the case of the conjunction as predication, is that of proper terminology: *predicational* seems to us as a better term for the *event, intra-clausal* pattern than for a *discourse*, (finally raising to an) *inter-event, inter-clausal* relational pattern.

10   Again on 'Deverbal' Categories

10.1   Deverbal Nominalizations and Disambiguation Algorithms

The paper [35] (Reinhard; 1999) investigates (for German) a class of N-N compounds with *deverbal* head constituent. If the head is a nominalization, then the semantic relation (and, of course, the syntactic one) within the N-N compound could be determined by the argument structure of the underlying source verb. The lexical-semantic structures of the German nominalizations with the suffix "*–ung*" and the compositional interpretations of the corresponding verb sources are analyzed. The following examples,

Ex.10.1.1. (*a*) (*Ger*1) *Projektbesprechung*
(*Eng*T1) *project discussion /meeting*
[*besprechen*(agent: nil, theme: Projekt)]
(**b**) (*Ger*2) *Nachmittagbesprechung*

(*Eng*T2) *afternoon meeting*
[*besprechen*(agent: nil, theme: nil, mod: Nachmittag)]
show two predicational nouns, with their verbal sources and the corresponding 'arguments'.

One purpose of the investigation in [35] is to find out which verbs allow this kind of nominalization in German, which arguments of these verbs can be realized only internally (*i.e.* morphologically as first constituent), only externally (*i.e.* syntactically), and which arguments can co-occur (*i.e.* one argument internally and another externally). Another goal followed in this application-oriented approach is to predict the relation holding between the two N-N constituents, using the lexical semantic structure of the head constituent and certain restrictions on its argument(s). This compositional semantic interpretation practiced to the machine translation task within Verbmobil Project proved to be effective.

[35] examines *seven* classes of verbs that provide a particular internal / external argument inheritance (predicational) pattern: causative accomplishments, non-causative accomplishments, non-symmetrical causative 'communication' verbs, symmetrical causative 'communication' verbs, non-psych 'effect' verbs, psych 'effect' verbs, and locative-causative verbs.

It is worth to emphasize the distinction (suggested by, but not restricted to this referred approach) between '*deverbal*' and *predicational* categories. Namely, a *deverbal* noun (or nominalization) is not necessarily *predicational* too, since it may come from a verb (being thus '*deverbal*', or '*deverbative*' – in the HPSG language of [31], [32]) which is not a properly *predicational* one, *e.g.* a copular, (semi-)auxiliary, modal verbs. In many European languages, by means of certain *morphological* (and/or syntactical) transformations, in a smaller or larger degree, one can derive nominalizations, *e.g.* with suffixes in "*-ung*" (German), "*-ing*" (English), "*-sion / -tion*" (French), "*-are / -ere*" (Romanian) etc., including from non-predicational verbs which bear, but not always necessarily, the predicational feature.

What we want to emphasize is that the semantic variety of the verbal sources and sometimes the twisted semantic inheritance of the

derived words proves that (morphologically-based) paradigmatic families (such as nominalizations) do not function automatically with the *predicationality* feature (while other words not in the paradigm may bear this feature naturally). The reference to the semantic-typed analysis of the similar categories in English provided by Pustejovsky (1995) [33] in the context of the *generative lexicon* is inevitable (see also the forthcoming §11.2).

10.2   Lexical Rules for Deverbal Adjectives

Relying essentially on *deverbal* property of adjectives, [34] (Raskin & Nirenburg; 1999) discusses an *adjective taxonomy* used in the Mikrokosmos computational semantics project. In the micro-theory they propose for an adjectival semantics, the adjectives are falling into *three* main classes, the taxonomic criterion for each adjective being its underlying ontology; *scalar*, *denominal*, and *deverbal adjectives* defining respectively a property, an object or an individual (concept), and a process (event).

Deverbal adjectives turn out to be the largest subclass of the adjective lexical category, and their meanings are derived from the corresponding event-related verbal category. The adjectives as participles and the deverbal adjectives ending in "*-able /-ible*" are carefully examined. An interesting proposal in [34] is to introduce the notion of *lexical rule* as transition (and translation) formulae from, *e.g.*, a noun lexical entry to that of a denominal adjective, or from a verb lexical entry to those of deverbal adjectives.

This ontological semantics, with the emphasis on *deverbal* (actually, *predicational*) *adjectives* is proved to be especially useful in the efficient organization of the *computational lexicons*; the significant majority of the adjectival entries are pointed, through adequate *lexical rules*, to the corresponding verb and nominalization entries of the same lexicon.

11 Predicational Feature and Lexicon Organization

11.1 Predicators in the Linking Theory

Linking theory constitutes a sum of techniques of specifying the mapping of thematic roles to grammatical functions or syntactic positions. In *linking* theory, *e.g.* [19] (Davis; 2001), [1] (Bouchard; 1995), a *predicator* is realizing syntactically the arguments of a semantic head by designating three kinds of constraints: **(1)** Constraints on the *form* of *predicators*; **(2)** Constraints on the *subcategorization* of *predicators*; **(3)** Constraints on the *interface* between semantic structures and subcategorizations.

The semantic roles of predicators are represented as *lexical semantic relations* within HPSG typed feature structures, encoding *proto-role attributes* whose values denote the participants in a situation of the type expressed by the corresponding lexical semantic relation. The constraints on predicators impose restrictions on the types found in the considered lexical hierarchy, including the lexical items themselves, and entailing strong dependencies at the lexical semantics level.

In the instituted framework, the *semantic classes* of *predicators* are reflected in the settled *hierarchy* of *types*. Essentially, the semantic content of a *predicator* would precisely determine which of its semantic roles are realized syntactically and how they are achieved. [19] mentions predicator classes having identical semantic content but bearing (slightly) different syntactic realizations actually. Typical examples are pairs of verbs differing in transitivity, active *vs.* passive verbs, verbs *vs.* nominalizations (with the same verbal source) etc. Despite the variations in the *linking patterns*, for the semantically identical (or similar) classes of predicators, the linking hierarchy of (sub)types preserves (generally) the mapping between the semantic roles and the syntactic arguments, working with a smaller number of linking types to encode the lexical semantic representations as predicator subcategorizations within a hierarchically organized lexicon.

[19] is using the complex notion of *predicator*, within the *type linking*

theory, both for lexical and grammatical categories, for the very similar meaning of *head-argument* structures and subcategorization properties of the functional (predicational) categories. In particular, one can find here the same key observation that the verbs and the corresponding nominalizations are predicators, holding (in general) an identical semantic content but bearing slightly different syntactic patterns.

In the generous category of *predicator* one can enclose, naturally, various classes of markers, from *Case* and other syntactic marker types, to the *discourse* markers. However, [19] does not make the *distinction* between *predicational* and *non-predicational* quality that could be assigned to the major lexical categories N, V, A, coming finally from the same basic feature that is borne or not by the corresponding (in most cases, verbal) category source. *Predicationality* should be treated as a really special *predicator*, within a much larger family of *predicators* of various functionalities (which family could be further associated with a hierarchical system of *marker classes* in the SCD linguistic strategy [16], [17], [18]).

11.2 Two Problems in Pustejovsky's Generative Lexicon: Event Headedness and Nominalizations

The *first*-mentioned *problem* in the title can be enounced as follows: which is the relationship between the *event headedness* (Pustejovsky; 1995) [33, p. 72-75] of a major category (N-V-A), described semantically within the *qualia*'s extended (sub)event structure of the *generative lexicon*, and the *predicational* feature of the same category, in particular, to the surface, syntactic projection of (*theta*-structure) complements (arguments) generated by that category?

This relationship is not clear, though certain clues could be gathered. As Pustejovsky (1995) [33] specifies, "*event headedness provides a way of indicating a type of foregrounding and backgrounding of event arguments... and a configuration where events are not only ordered by temporal precedence, but also by relative prominence*". Informally, "*the head is defined as the most prominent subevent in the event structure of a predicate, which contributes to the "focus" of the interpretation*",

while the conventional role of a *head* in a syntactic representation of a structure is to mark linguistic rules such as agreement, government etc. ”*in terms of heads of phrases*” [30, p. 72]. Assuming that events have (at most) a binary tree (sub)event structure, (Pustejovsky; 1995) [30, p. 73] considers single (right or left) *headed* events, *unheaded* (underspecified) events, *double-headed* events etc.

The event structure representation of the *qualia*'s entry of the verb ”*build*” in a generative lexicon is the following [30, p. 82, rel. (42)]:

$$
\begin{bmatrix}
build \\
EVENTSTR = \begin{bmatrix} E_1 = e_1 : process \\ E_2 = e_2 : state \\ Restr =<_\alpha \\ Head = e_1 \end{bmatrix} \\[2em]
ARGSTR = \begin{bmatrix} ARG1 = \boxed{1}\begin{bmatrix} animate\_ind \\ FORMAL = physobj \end{bmatrix} \\ ARG2 = \boxed{2}\begin{bmatrix} artifact \\ CONST = \boxed{3} \\ FORMAL = physobj \end{bmatrix} \\ D-ARG1 = \boxed{3}\begin{bmatrix} material \\ FORMAL = mass \end{bmatrix} \end{bmatrix} \\[2em]
QUALIA = \begin{bmatrix} create\_lcp \\ FORMAL = exist(e_2, \boxed{2}) \\ AGENTIVE = build\_act(e_1, \boxed{1}, \boxed{3}) \end{bmatrix}
\end{bmatrix}
$$

Fig. 11.2. The *qualia* entry for ”*build*”

The (source) verb ”*build*” is described as having two *true* arguments and one *default* argument, containing two subevents (a *process* and a *resulting state*); the process is identified as an *agentive* act involving ARG1 and D-ARG1, and related to the logical object by the *constitutive* relation of ARG2.

The question remains however: how the connection between the *semantic* description of the component subevents and their headedness described into the ”*build*” *qualia* is projected in *syntax* by the *predicationality* feature of the category? The mechanisms governing these phenomena are not completely explored.

The *second problem* mentioned in the subsection title is quite in the centre of our discussion and the thorough analysis in Pustejovsky (1995) [33, Chapter 8: *The Semantics of Nominals*] is very close to our basic approach in SCD [16], [17], [18]. For instance, the *ing*-nominals bearing the *predicational* feature are modelled to denote the complete corresponding event in a way identical to the (also *predicational*) events such as *party* and *war* (in [15] and [16] we gave the example of *envy*), and to polysemous event nominals such as *examination*. The remark on the presence of the *predicational* feature is essential since there exist *ing*-nominals (or *ing*-gerundives), *e.g. being*, which are not *predicational* ones! [33] seems to make not very clear this discrimination, discussing about the *whole* class of *ing*-nominals.

However, two observations in [33, p. 168] comprise a special interest for our analysis and the relationship between semantic *headedness* (in particular, *predicationality*) and its projection into syntax: (A) "Right-headed transitions (*i.e.*, achievements) are much less acceptable as *ing*-nominals than are processes and left-headed transitions", and (B) "There is no interpretation of *ing*-nominals as the result of an event, as there is with *ion*-nominalizations, such as *destruction*." *Complementary* meanings of pairs of these varieties of nominalizations such as *arriving-arrival*, *constructing-construction*, *destroying-destruction*, *examination-exam* etc., embodied into distinct *qualia* structures (those *predicational* ones being very close to the corresponding verb source encodings) show the linguistic impact at the generative lexicon and analysis(-generation) levels, gaining on the real importance of the problem.

11.3   Lexicon Organization and Categorial Predicationality

As one can guess easily (the *linking theory* in *hierarchical-generative lexicon* organization indicated in the above subsections is a strong witness), the predicational taxonomy we support in this paper has the starting point at the lexicon level (with recurrent and profitable returning to this module). During our tour in the predicational feature

(type) territory, we often met its essential relationship with the computational lexicon design and organization. We remind the importance of the *lexicon organization* in Chomsky's theories [9], [11], where the subcategorization conditions (c-selection) and the intrinsic semantic and thematic properties of the lexical heads (s-selection) play a central role. The previous subsection §11.2 has the aim of drawing the attention to the Pustejovsky's (1995) remarkable theory [33] on *generative lexicon*.

In a *minimal semantics* use at the lexicon level, we consider that certain lexical major (and grammatical) categories should bear naturally both the PRED (predicational) and EXIST (non-predicational) features for their meanings. (Jacquey; 2002) [27] and (Pustejovsky; 1995) [33] observed rightfully for *deverbal* action nouns denoting a *creation* process (see also our remark in Section 1, Part I, and [18]), that there exists an inherent lexical semantic ambiguity between processive and resultive readings of certain words. The choice, in a concrete text, of one or the other of the two meanings cannot be decided otherwise than *contextually*. The lexical semantics of such nouns (*e.g. book*, *newspaper*, *exam*, *belief* etc.) modelled as *dot objects* based on *dotted* (semantic) *types* is a good step [33], but presumably not enough in the relationship to the *syntactic typing* and linguistic *projection into syntax* of the obtained semantic representations.

The distinction made by James Pustejovsky's (1995) [33] in his *generative lexicon* among *agentive nominals* as *individual*-level and *stage*-level nominals is used in [5] (Busa; 1996) to discover predictable patterns in the syntactic behaviour of this class of nominals. In the generative lexicon taxonomy, the *agentive* type expresses the mode of coming into being of the entity to be defined. The event-based representation and the properties of a variety of agentive nouns can be explained by how the event defining the individual is quantified, and proved to be fruitful also in the lexical semantics of productive affixes.

An example of using a computational lexicon based on lexical semantics is the SIMPLE (Semantic Information for Multiple Plurilingual LExicons) project [6] (Busa *et al.*; 2001). SIMPLE lexicon develops a methodology for the full characterization of word sense (lexical meaning) and includes the following basic elements: (***a***) the specification of

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the *argument structure* of predicative (actually, predicational) semantic units (this enclose *all* functional categories, not only the N-V-A major ones); (***b***) selectional preferences and *syntactic realization* of arguments; (***c***) *aspectual* properties (*e.g.*, event type); (***d***) (logical) *polysemy* alternations. [6] is using the notions of *entity* and *event* to describe definitions of their lexical semantics conceptual hierarchy, in a similar way to our proposed taxonomy where the predicational or non-predicational feature of *concept* entities is oriented on the syntactic realization and distributional properties of the lexical and grammatical categories.

A theoretical and *practical* solution (at least for the parsing situation) to the logical polysemy displayed by various deverbal (event-based) nominals pointed out in [27] and [33], *in the context* of our simple taxonomy, is to consider the non-predicational meaning of a deverbal noun as being *subsumed* by the predicational one, for the particular case that the predicational noun bears just (and only) *empty* (*covert*) *arguments* (the predicational case is anyway characterized by the exhibition of a variable number of arguments and/or adjuncts).

12 (Partial) Conclusions

12.1 A Synthetic Tableau

The following table gives a synthesis of the characteristic *difference* between meanings (M1) and (M2) mentioned in Section 1 :

12.2 The Real Problem: an Effective Definition of 'Predication'

According to the DEX dictionary [22, p. 839], a *predication* is an *utterance reflecting the relationship between an object and (one of) its property.* From this definition viewpoint, '*John is a man*' or '*The mammoth was a mammal*' express 'predications'. However, this definition proves not to be of much help since when trying to provide a consistent logical representation, any common noun and/or adjective seems to be

Lexicality (predicationality feature)	*predicational* (**PRED**) *categories*	*non-predicational, existential* (**EXIST**) *categories*
Grammaticality (temporality feature)	(introduce a true, event-denoting category, thus *predication*)	(introduce an existential, object- or individual-denoting category)
finitely predicative (finite clause)	<u>PRED verbs</u> that make up synthetic finite predicates, and other <u>PRED categories</u> (*e.g.* PRED nouns, adjectives) that, together with finite EXIST verbs make up analytic finite predicates Rom: *am dat* Fr: *j'ai donné* Eng: *gave*	<u>EXIST verbs</u> (copulative, semi-auxiliary, modal) verbs in <u>finite predicate</u> constructions Rom: (*Eu*) *sunt* (*acasă*) Fr: *je suis* (*à la maison*) Eng: *I am* (*home*)
infinitely predicative (infinite clause, in particular "small" clause)	non-finite PRED categories: <u>verbal</u>: infinitive, gerund, past participle, supine; and <u>non-verbal</u>: noun, adjective-adverb, with a special emphasis on <u>PRED nouns</u> (event-denoting nominalizations) Rom: *integrarea, dăruirea...* Fr: *intégration, ...* Eng: *integration, integrating, giving...*	<u>non-finite EXIST</u> (verbal and non-verbal) categories, including <u>EXIST nouns</u> (object and individual-denoting nouns), adjectives-adverbs Rom: *creion, Ion* Fr: *crayon, Jean* Eng: *pencil, John*

Table 1. The proposed predicational taxonomy

a 'predication'. Only proper nouns, understood as simple *labels* of common nouns, thus as logical constants of an extensional logic, seems not to be predications. This is not an operational solution to the problems stemming from the tasks of parsing the syntactic structures of natural language and representing them in an adequate logic language.

In a *dictionary of logic* [23, p. 281-282], a *predication* is an *enounce* expressing the relation between a *subject S* and its *predicate P*, "*S* is *P*". The original (Latin) term *praedicatio*, meaning initially *judgment* of the form "*S* is *P*", evolved to the more general term of *enounce*. However, [23, p. 282] recognizes that "*until now, still does not exist an adequate term for the basic judgments of the form 'S is P' *", thus for the *predication* from the logic point of view. This is exactly our problem. Furthermore, these classical definitions of predication clear up the fact that the *predicate* is, both linguistically and logically, a *fragment* of the *predication*.

But what happens when the predicate is an analitical verbal group, made up of a finite copular verb articulated with a noun, an adjective, or a non-finite verbal form? All these accessories are called, respectively: *predicative nominal* (or *noun*), *predicative adjectival* (or *adjective*), and for the third class of linguistic categories, *their "predicative" name is missing*! Possibly, one should use a phrase like "*predicative non-finite verbals*" or "*predicative non-finite verbal forms*" to tag the predicative constituents from the class of infinitive, supine, (present and) past participle, gerundive verbal forms etc.

A constructive solution to the classical definition of predication would be to consider the utterance '*John is a man*' as a *weak*, or *small predication* (concordant with the term "*small clause*") in the following sense: a weak predication is, logically and informationally, an assignment of the form $X := Y$, where X is a common or proper noun, and Y can be common noun (variable), proper noun (constant), adjective or non-finite verbal form (function name). The variables X and Y are interpreted as *extensional* ones, in conformity with the extensional / intensional representations in §8.1 above.

Our solution is thus to consider two types of predications, *small* and *proper* (or *weak* and *strong*) ones, the latter predications representing

Predication	Assignment (or IS-A) form of the verbal frame	Implicit-function form of the verbal frame
The wall is green.	$wall(X) :=_{PresT} green(X)$	$wall(X) \wedge green_{PresT}(X)$ or $green_{PresT}(wall(X))$.
John is a man.	$John :=_{PresT} man(X) \wedge X := John$	$man_{PresT}(John)$.
The fireman is a child.	$fireman(X) :=_{PresT} child(X)$	$fireman_{PresT}(X) \wedge child(X)$.
The fireman was a child	$fireman(X) :=_{PastT} child(X)$	$fireman_{PastT}(X) \wedge child(X)$.
John gave a book to Mary.	$John :=_{PastT} give(book(X), Mary)$	$gave_{PastT}(John, book(X), Mary)$.

Table 2. Predications and their functional representations

a natural extension of the former ones. In practice, however, we would prefer to talk of predications only for the *proper* ones, and to assign the feature of being *predicational* only to those major categories N, V, A that express (finite or non-finite) *processes, event-denoting* words. The two types of representations provide also a fairly objective and functional starting point for the discussion on the role of the (grammatical) subject within the finite clause and its codifying devices (*e.g.* SUBCAT list in HPSG theories).

12.3 Intensional/Extensional Consequences on the New Sets of Predicational/Non-Predicational Categories

In terms of *intensional* logic, our proposal represents at the same time a narrowing and an enlargement on the *extensional* and *intensional* types to be working with :

(1) From *extensional* (referential) point of view, we *narrow* the set of referential nominals to those nouns that are *non-predicational* ones, *i.e.* to the existential, *object-denoting, nonevent individuals*. As reference may take higher-order types (since natural language phrases may refer also more complex textual units than object-denoting nouns, *e.g.* predicational verb groups, finite or non-finite clauses, and even larger

discourse rhetorical structures), the domain of extensional variables is augmented with those phrases that refer higher-order typed structures, including and based on the new (and enhanced number of) categories Ns, As, and, of course, their Vs (verbal) sources that we consider now as being *predicational* ones.

Ex.12.3.1. (*a*) *The car is red.*

(*b*) *The man is leaving.*

In Ex.12.3.1, *car* and *man* are individuals, represented extensionally as $car(X)$ and $man(X)$, *red* is a basic, also *extensional* predicate $red(X)$, while *leaving* is a predicational (event) nominal (nominalization), represented as an intensional (unsaturated) predicate $leaving(x, y)$, with x and y as *intensional* arguments. We remind that, in our taxonomy, we exclude from being predicational ones the purely copular and semi-auxiliary verbal groups. Let us see at:

Ex.12.3.2. (*a*) *The movie was horrifying.*

(*b*1) *It gave him a terrible headache.*

(*b*2) *This gave him a terrible headache.*

Whether *horrifying* is considered to be non-predicational, then *It* in (*b*2), which normally refers *The movie*, is not excluded to refer the event nominal *horrifying* (which would be not the most correct semantical outcome), while *This* in (*b*2) refers the clause (*a*). But whether *horrifying* receives the feature of being predicational, then *It* in (*b*1) is much more probable to refer *The movie* in (*b*1), while *This* in (*b*2) refers (most probable) either the predicational *horrifying*, or the whole clause (*a*), which is also not at all a bad solution. Thus, extending the intensional types within the considered sense of our predicational taxonomy entails simplifying and normalizing the semantic solutions in *anaphora resolution.*

(2) From the *intensional* point of view, the narrowings and enlargements of the typed category sets correspond exactly to the *complementary* sets of the categories whose number was reduced, respectively enlarged in the *extensional* perspective. Specifically, the Ns and As that possibly, in other approaches were not predicational and now they have changed their status into predicational ones, become intensional types. Similarly, the copula and semi-auxiliary verbs did lose in our

taxonomy their potentially intensional quality. As one can observe in the following example,

Ex.12.3.3. (*a*) *The takeoff to Bucharest is today.*

(*b*) *The jet airplane is ready since Friday.*

whose types and structures are represented as:

(*a*1) *is_ today*(*the_ takeoff* (*X*, *to*(*Bucharest*))).

(*b*1) ((*since*(*Friday*))(*is_ ready*))(*the_jet_airplane*(*X*)).

the variable *X* is extensional, while *the_ takeoff*, usually utilized extensionally became intensional.

12.4 Application to Text Segmentation Algorithms and X-bar Theory

The aim of this subsection is to point out several applications constituting consistent, theoretical and practical utilizations of the considered predicational taxonomy. In the works mentioned below, a set of *predicationally*-related *features* (such as PRED, EXIST, TENSe, FINIte, INFInite) were applied cross-linguistically to Romanian, English, German and French as (*minimal semantics*) *markers* in the following contexts:

(***a***) Within a *hierarchical system* of *linguistic marker classes* that makes inherent part of the SCD (*Segmentation-Cohesion-Dependency*) *linguistic strategy*, *e.g.* [16], [17], elaborated since [14], [15] for sentence and discourse parsing purposes;

(***b***) To the development of *segmentation* (and *dependency establishing*) *algorithms* for clause-like textual units, realizing a theoretical comparison between (several versions of the) *SCD segmentation algorithms* [15], [17] and *Marcu*'s *segmentation algorithm* [28], [29]; and

(***c***) To the design of a *functional* X-bar (FX-bar) *scheme* and *theory* [18] based on the marker classes mentioned in (*a*) above, and articulated on the SCD segmentation algorithms referred in (*b*) above.

Other employment possibilities, with computational and theoretical consequences for the *predicational*-feature taxonomy proposed here have been suggested within the above various outlined approaches.

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