Principles as lexical methods

Jacques Jayez, Danièle Godard

Principles as lexical methods*

Jacques Jayez
EHESS-CELITH
54 Boulevard Raspail
75006 Paris France
jjayez@dial.oleane.com

Danièle Godard
CNRS, Université Paris 7, UFRL
case 7003, 2 Place Jussieu
75005 Paris France
Godard@Univ-Lille3.fr

Abstract

Current research in lexical semantics has brought into focus (i) the existence of general tendencies ('principles') across languages or inside language families, (ii) the existence of numerous exceptions to these tendencies. To reconcile these two facts, it seems natural to endorse a general conception of principles–with–exceptions or 'subregularities'[1], usually cashed on a form of default logic. This leaves open the question of how to identify and manage the exceptions in a more precise way, i.e. not just as marginal by–products of a subregularity system. In this paper, we analyze different examples where complex cases can be handled explicitly, and show that principle–based approaches require, as a natural complement, to be controlled by more local information.

Introduction

It is widely acknowledged that some additional mechanisms are necessary to interpret even simple sentences, which elaborate on the more standard modes of combination between predicate and arguments. Such extra devices are illustrated by (pragmatic) metonymy (Nunberg 1978; 1993), coercion and (logical) metonymy (Pustejovsky 1991; Pustejovsky & Boguraev 1993; Hays & Bayer 1991; Stallard 1993), lexical extension rules (Copestake & Briscoe 1994), or interpolation (Pollard & Sag 1994; Godard & Jayez 1993). Since they exhibit some form of generality, those 'interpretation boosters' can be viewed as *principles*, that is, mutually independent resources which can be used freely to generate interpretations when needed. However, it has been suggested that cross–linguistic variation as well as language–internal exceptions make this strong view untenable in the long run (Nunberg & Zaenen 1992; Copestake & Briscoe 1994). Our point in this paper is to show that some of these 'principles', those which are based on the sorting of linguistic entities[2], are locally controlled by (classes of) lexical items and constructs, which select (combinations of) operations to be activated, and possibly fix their parameters. Such general processes are in fact rather similar to *methods*, in a sense akin to that of object–oriented languages. While methods can be shared by several different objects, their application depends on the individual properties of these objects. In the same way, linguistic entities individually incorporate interpretive instructions. So–called principles lead no independent life. They are formed by abstracting away from these individual constraints.

We will first point out some empirical problems for a principle–based approach. We then describe methods for handling sorts in the combination of lexical items, and show them at work through several illustrations.

Problems for a principle–based approach

There are general strategies which all involve a form of sort management. We show in this section that *formulating* them as general principles is not empirically sufficient, if possible at all. Their usefulness crucially depends on working out their precise conditions of application, which in turns depends on scrutinizing lexical properties. We illustrate here some problems encountered by general–purpose strategies

Accessing the qualia structure

Pustejovsky's *qualia structure* and *coercion* (Pustejovsky 1991; Pustejovsky & Boguraev 1993) offer the opportunity to generate various interpretations without listing them up in a rigid way. E.g., the adjective *fast* can combine with nouns such as *typist* or *book* to give interpretations such as 'a person who types fast', or 'a book which can be read quickly'.

*In *Proceedings of the AAAI workshop on representation and acquisition of lexical knowledge*, March 27–29, Stanford University, pp. 57–68

[1]We borrow the term from (Wilensky 1993).

[2]We leave aside problems connected with metaphor and pragmatic metonymy, although they also raise questions about sorting.

However, it is not possible to predict which role a given A will access. In French, A's like *lent*, *rapide* can access the same role as 'fast' (viz. telic role), if the noun denotes a person: the NP *une dactylo lente/rapide* means exactly 'a slow/fast typist'. But these A's do not access the telic role of *livre*. *Un livre lent/rapide* does not mean 'a book which it takes a long/short time to read'.

Turning now to various A's belonging to the same broad semantic class (temporal A's), which modify the same N 'book', we must recognize that there is no obvious way to explain which roles each of these A's will preferentially access. *Un livre lent* does not mean 'a book which it takes a long time to read', but 'a book whose plot proceeds at a slow pace'. So, the sort required by *lent/rapide* is no longer **telic-event** in this case: the A is predicated of the book content. In fact the role which is accessed depends on the N.

We would expect *rapide* ('quick', 'fast') to access the same role(s) as *lent* when used with the same noun; in effect, they both modify the book content. However, *un livre rapide* can also mean 'a book which has been written quickly' (agentive role), a possibility which is not easily open to *lent*. The adjective *interminable* ('endless'), when applied to *book*, can access the telic role, the agentive role, and can be predicated of the book content (the plot is endless). The question is when and why these A's can modify the book content or the reading time.

It is intuitively satisfying to connect the plot and the reading durations: an endless script, with a boring succession of episodes, is likely to cause an endless reading. So, in this case, lexical access structure just fits our naïve knowledge. But why does this seemingly natural link not show up in the lexicon in the similar cases of *lent* or *rapide*? Should not a slow plot induce a slow reading, and a fast–paced plot favour a quick one? A possible answer is simply that *lent* and *rapide* bear on the *rythm*, that is on the average number of salient events. So, a short book with only a few interesting episodes can be read quickly, and still be perceived as *lent*.
Yet, how are we to explain the fact that *un livre long/court* refers to the book length rather than to the telic role? A long book should entail a long reading in most cases. One cannot appeal to the book content to argue that an easy–to–read long book can be read quickly. The same sort of argument goes for an endless book: a book with a fascinating entangled scenario can be read quickly. We conclude that there is no obvious representational explanation for the scope of those adjectives.

Interpolation

When the combination of a predicate with its arguments does not supply an acceptable interpretation, it is necessary to construct intermediate structures which provide the missing interpretive link. This phenomenon occurs in control structures (Pollard & Sag 1994, 7.5) as well as in simple V + complement NP sequences. In the latter case, it has been proposed (Pustejovsky 1991; Godard & Jayez 1993) that the class of interpolated predicates be specified by general abstract sort constraints. E.g. *to begin the room* may be interpreted as 'to build, paint, refurbish, clean the room', because these various predicates all inherit from a sort **modify** (cf. (Godard & Jayez 1993) for details). Unfortunately, no convincing generalization on these constraints emerges from the inspection of a variety of verbs.

First, such abstract constraints may be difficult to substantiate. For instance, *attendre* ('to wait for') has many interpolative uses, which we may divide into two classes. In the first one, the interpolated predicate seems to inherit from an abstract sort 'come to be', its precise instantiation depending on the sort of the NP: *J'attends l'arrivée du train* (**event** NP) means 'I am waiting for the arrival of the train to happen', *j'attends mon dernier livre* (**product** NP) means 'I am waiting for my last book to come out', *j'attends la voiture* (**mobile–obj** NP) means 'I am waiting for the car to arrive'. We will focus on the second one, exemplified by another sense of *j'attends la voiture*, meaning for example 'I am waiting for my car to be cleaned, mended', or 'to be delivered' in a situation in which I have ordered a car. It seems that interpolated predicates involve a notion of control, that is, *X attend Y* roughly means 'X has (temporarily) lost X's control on Y, because some Z has it, and X is waiting to resume X's control'.

The point here is that it is extremely difficult to flesh out the notion of control in specific cases. For instance, it seems that 'control' is relevant only for objects which are privately possessed (not machines which are for public use, such as cigarette machines), but which are not available at a given moment because another person retains them (for use, repair, etc.). Moreover, some personal objects, whose use is suspended for repair, do not provide good complements for *attendre*. E.g. it is strange to say *Il fumait une cigarette en attendant la porte* ('He was smoking a cigarette while waiting for the door'), in a context where a person is waiting for a given door to be fixed in her house.

Second, it is not even clear in some cases that we appeal to abstract sorts constraints rather than simple lexical forms. For example, the verb *suggérer* + NP is

interpreted as 'to suggest that one choose NP': *suggérer Pierre* means that Pierre would be the right choice for some relevant purpose in the situation. Sort–driven interpretation would be of no help, since the interpolated predicate 'choose' is not recoverable from any intuitively convincing abstract sort for propositions (Asher 1993), nor from the object NP, since one can choose or suggest practically any kind of entity.

So, interpolation is represented in these cases as the insertion of predicates corresponding to lexicalized forms (verbs), rather than abstract predicates.

Pronominal anaphors and sort conflicts

The sort of an NP may be complex, that is, it may have a conjunctive form $\sigma_1 \wedge \ldots \wedge \sigma_n$. For instance, the French NP in (1) has the sort **mat–obj** $\wedge$ **info–obj**.

(1) Ce livre lourd est riche d'enseignements
'This heavy book is full of interesting ideas'

A strong regularity is that the sorts **event** and **mat–obj** do not easily coexist, as shown in:

(2) ??La symphonie a été interrompue parce qu'elle a été emportée par l'orage
'The symphony was stopped because it had been blown away by the storm'

While a pronominal anaphor does not have to be of the same sort as its antecedent, the two sorts must be compatible. Thus, (3) is acceptable :

(3) Ce livre est très lourd, mais il est riche d'enseignements
'This book is very heavy, but it full of interesting ideas'

but not

(4) *La construction est très bien située [**mat–obj**]. Elle [**event**] a eu lieu l'année dernière.
'The construction is in a very nice location. It took place last year'

(5) *Le repas [**mat–obj**] est posé sur la table. Il [**event**] aura lieu dans une heure
'The meal is on the table. It will take place in one hour'

Yet, some predicates such as *disposer* ('to arrange') reveal a complex sort for the noun, namely **mat–obj** $\wedge$ **arrangement**, which smoothes the sort transition between otherwise incompatible members of a NP-pronoun pair.

(6) ?Le repas est disposé sur la table. Il aura lieu dans un heure
'The meal is arranged on the table. It will take place in one hour'

(6) is much better than (5). This is only possible with certain nouns, e.g. with *repas* but not *construction*:

(7) *La construction est disposée sur la colline. Elle a eu lieu l'année dernière.

In this case again, a general regularity on sort compatibility is defeated by detailed lexical behaviour, whose description requires that small classes of items (not just broad sort–based classes) be taken into account.

The general framework: extended sorts + methods

We treat lexical structures as objects (in the sense of object–oriented languages) on which operations can be performed. This requires two basic extensions to current feature structures representations.

(**a**) We must give internal structure to our objects (e.g. qualia structure), as all general purpose KR formalisms do (cf. (Nebel 1990)). We start from standard HPSG descriptions (Carpenter 1992) augmented with relevant semantic indications, and a notion of sort–as–distribution.

For N's[3], we posit two new attributes DSORTS and SDSORTS. They contain information about the N's distribution, i.e. the set of constructions in which it can occur. [4] Such each set is abbreviated by an abstract label, called *dsort*, for *distributional sort*. E.g. the dsort **event**[5] abbreviates a conjunction of constructions where a NP can be the complement of some temporal prepositions, or the subject of *avoir lieu* ('to take place'). NP's such as *le tremblement de terre* ('the earthquake') or *la cérémonie* ('the ceremony') are classified as **event** because they occur in such environments. In general, NP's can be classified as possible complements of classes of verbs (Le Pesant 1994). In some cases, a dsort may be just a label for a list of items which are considered to be in the same class, e.g. the dsort **arrangement** below.

Since an N may get several dsorts, the attributes DSORTS and SDSORTS contain in fact boolean combinations of dsorts, which are called *dsort formulas*. When some N is endowed with more than one dsort[6], we say

[3] We will assume here that the relevant information for N's is passed to NP's, and will not distinguish N's and NP's in the examples to come.

[4] Although selectional sorts enter into systematic relations with semantic sorts, we do not *a priori* assume that there is a one–to–one correspondence between the two.

[5] For space reasons, we will not delve into the subsorts of **event** here. Cf. (Godard & Jayez 1994).

[6] In this case, a conjunction of the relevant dsorts is used if they must be present conjointly, while a disjunction is used if this is optional or forbidden (mutually inconsistent sorts).

it that is *multisorted*. E.g. the N *livre* ('book') is **mat–obj** and **info–obj**: intuitively, it can denote a material object as well as an informational structure.

The value of DSORTS expresses the intrinsic sorting of the N. So, it remains unchanged in the course of unification. The value of SDSORTS (*selectional* dsorts) is initially the same as that of DSORTS, but is updated to comply with the selectional restrictions of the verb. For instance, the verb *poser* ('to put') requires its complement to be of sort **mat–obj**. The N *repas* ('meal') has a dsort formula **mat–obj** $\vee$ **event**, and **mat–obj** and **event** are incompatible. So, in the VP *poser le repas*, the value for SDSORTS will change to **mat–obj**. In HPSG, information about the arguments of a lexical item in a construction are registered in a special list, the value of the ARG–S feature, whose members are the values of the SYNSEM features in the arguments. DSORTS and SDSORTS are located in the SYNSEM, in order to take advantage of the standard unification process of HPSG. More precisely, we will assume that DSORTS and SDSORTS are head features; this will ensure that they are propagated to their projections.

(**b**) We provide messages and methods which create new information states. In essence, we apply certain operations, echoing, in a unification–based framework, those usually defined in the context of record semantics (Cardelli & Mitchell 1991). Typically, these operations update some given description and return the result. Lexical items can of course carry with them several interpretation operations.

There are three reasons to prefer methods to standard typed unification. (i) One avoids to posit as many lexical entries as there are distinct semantic behaviour for an item. (ii) Dynamic effects, such as on–line generation or modification, are possible. (iii) Checking the presence of an attribute in a description will result in adding it to the description in a unification–based framework, but this is clearly unwanted in somes cases. However, in the present treatment, we will extend unification only to a minimal extent.

A *description* D (Carpenter 1992) is a boolean combination of constraints and/or descriptions, where a constraint can be a sort assertion, a path–value declaration, or a path convergence declaration. We will consider only satisfiable (consistent) descriptions.
We extend the definition of (Carpenter 1992) by saying that the path π is *in* D ($\pi \in D$) if D contains a constraint $\pi : \sigma$ or a constraint $\pi' : \sigma$ such that $\pi'' \in \sigma$ and $\pi = \pi'\pi''$.
$a \sqcup b$ notes, as usual, the unification of terms a and b. List unification holds for lists of the same length whose corresponding elements unify.
Paths of labels $\ell_1 \ldots \ell_n$ are noted $\ell_1|\ell_2 \ldots |\ell_n$.

We consider three basic methods ϕ_i over the domain of satisfiable descriptions: sort checking $srtch()$, which checks the subsomption properties of an object, addition $addif$, which adds path–value declarations to an object, and replacement $rpl()$ which replaces values inside an object. The result of applying ϕ to x will be noted $\phi(x)$. A method is any sequence $\phi_1(\phi_2(\ldots\phi_n(x)\ldots)$ possibly with free variables. Disjunctions and conjunctions of methods can also be used. We define an atom for halting, $_{terminate}$, such that, for any method μ, $\mu(terminate) = terminate$.

• sort checking
Let D and D' be two descriptions, we say that D *subsumes* D', in symbol $D' \models D$, whenever any feature structure satisfying D' satisfies D.

$$srtch(D, D') = \begin{cases} terminate \text{ if } D' \not\models D \\ D' \text{ otherwise} \end{cases}$$

• Addition. The $addif(D', \pi, D)$ operator add elements of information D' at the location π in D. If a more precise information already exists at the same location, D is unchanged.

$$addif(D', \pi, D) = \begin{cases} D \text{ if } srtch(\pi : D', D) = D \\ D \cup \{\pi : D'\} \text{ otherwise} \end{cases}$$

• Replacement replaces the value of a given path by another value.

$$repl(x, y, D) = (D - \{x\}) \cup \{y\}$$
$$pathrepl(\pi, \pi : \sigma, D) =$$
$$(D - \{\pi : \sigma' | \ \pi : \sigma' \in D\}) -$$
$$(\{\pi' : \sigma' | \ \pi = \pi'\pi'' \ \wedge \ (\pi' : \sigma') \in D \ \wedge \ \pi'' \in \sigma'\})$$
$$\cup$$
$$\{\pi : \sigma\} \cup$$
$$\{\pi' : pathrepl(\pi'', \pi'' : \sigma, \sigma') | \ \pi = \pi'\pi'' \wedge$$
$$(\pi' : \sigma') \in D \ \wedge \ \pi'' \in \sigma'\}$$

Treatment of the examples

In what follows, to make the treatment uniform, we will suppose that methods are used in the course of or after a parsing process, which is sensitive to categorial syntactic information, in that it can group items into basic categories (S,VP, NP, etc.). This restriction is only for clarity, and does not preclude the application of methods to generation, or other tasks.

Adjective and noun combination

The general idea in this section is that A modifiers update the value of CONT for the A (and thus for the $\overline{\text{N}}$[7]) when they combine with nouns. The standard HPSG representation for a $\overline{\text{N}}$ such as *rapide* + N is shown (in a simplified form) below:

[7] In virtue of the semantic principle of HPSG.

$$\left[\begin{array}{ll} \text{SYNSEM} & \boxed{1} \\ \text{HEAD–DTR} & \left[-\,|\,\text{CONT}\,|\,\text{IND} \quad \boxed{2}\right] \\ \text{ADJ–DTRS} & \left[-\text{CONT} \quad \left[\text{RESTR} \quad \left[\begin{array}{ll}\text{REL} & \textbf{rapide} \\ \text{ARG} & \boxed{2}\end{array}\right]\right]\right] \end{array}\right]$$

We will make two basic assumptions. (i) CONT can contain a more complex information, that is, additional attributes and their values. For instance, an attribute QUALIA for the qualia structure will be found in CONT. (ii) The choice of a method depends on the value of the SDSORTS. Typically, an adjective must look for the dsort formula of the noun it modifies, and resort to the appropriate methods.

We illustrate the method–based approach with the case of *rapide* ('fast', 'quick'), to which we associate a method which is in fact a disjunction of methods.

Conventions

The HPSG paths are labelled as follows:
– *adjarg* for ADJ–DTRS|SYNSEM|LOCAL|CONT|RESTR|ARG,
– *nounind* for HEAD–DTR|SYNSEM|LOCAL|CONT|IND,
– *nounhead* for HEAD–DTR|SYNSEM|LOCAL|CAT|HEAD,
– *nouncont* for HEAD–DTR|SYNSEM|LOCAL|CONT.
D is a description for the above feature structure and D' is the description $adjarg = nounind$. Note that D' is a term of D.
We assume that RHYTHM and DURATION occur in the values of ACTIVITY, as well as in the CONT value of **event** nouns. More generally, types like **activity** or **event** are interpreted, in the language of descriptions, as descriptions containing minimally RHYTHM : $\bot \wedge$ DURATION : $\bot$.

Methods

We will deal with the following cases[8]. :
– the N is an **event** ('a quick construction'); the method is :
$repl(D', adjarg = nouncont|\text{RHYTHM}, srtch(nounhead |\text{DSORTS} : \textbf{event}, D))$.
A similar method is defined for DURATION. These methods simply declare that the relation **rapide** bears on the value of RHYTHM or DURATION.
– For **animal** and **machine** ('a fast horse / typist / printer'), the A will add ACTIVITY. We define:
$addif((\text{ACTIVITY} : \textbf{activity}), nouncont, srtch(noun–head|\text{DSORTS} : \textbf{animal} \vee \textbf{machine}, D)) = \mu(D)$.
and use the simple embedding (shown only for DURATION):
$repl(D', adjarg = nouncont \mid \text{ACTIVITY} \mid \text{RHYTHM}, \mu(D))$.
– For **break–event** ('a fast resigning')[9], we replace the totality of *nouncont*, by a method of form $pathrepl(nouncont, nouncont : x, D)$ where x is:
REL : **and** $\wedge$ ARG1 : (REL : **rapide** $\wedge$ ARG : $\bot$) $\wedge$ ARG2 : (REL : **before** $\wedge$ ARG1 : (DURATION : $\bot$) $\wedge$ ARG2 : *nounind*) $\wedge$ ARG1|ARG = ARG2|ARG1|DURATION
The intended interpretation is that the duration of the interval which precedes the event denoted by the noun is short.
– For **path** (ways of communication: 'a fast road'), we just use the telic role, which is supposed to be of sort **activity**. The method is (for RHYTHM):
$repl(D', adjarg = nouncont \mid \text{QUALIA} \mid \text{TELIC} \mid \text{RHYTHM}, D)$.
– For **info–obj** (books, texts, documents, etc.), we will assume that the adjective can modify the value of the agentive role in the qualia, or an INFO–CONT role whose value must contain at least one of the two attributes USE–INFO and SCRIPT–INFO. The first one is appropriate for dictionaries, technical treatises, and corresponds to the presence of an information independent of any plot or script.[10] The second one is appropriate for any form of story and its value contains RHYTHM. *Rapide* can access the two, which produces the two readings 'fast plot' and 'insufficient information'. The method is analogous to the previous ones.

Since these methods are independent they can be activated in parallel, and several cumulative results can be produced. E.g. a **break–event** can itself have a duration, so that that the corresponding construction gets at least two readings.

Although methods resemble each other in some respects, their control remains 'local'. E.g. *lent* looks for a RHYTHM attribute, producing a clumsy combination if it does not find it. This is why it cannot be applied to a dictionary, or in general, to any form of documentation. Moreover, not just any RHYTHM attribute will do for *lent*: telic and agentive role, which provide **activity** values with a RYTHM attribute, are not systematically accessed.

Interpolation

When the interpolated predicate is restricted, as in the *suggérer* example, interpolation is a straightforward replacement. If *suggérer* + NP has a content of the following form, where *cmpcont* abbreviates the path lead-

[8] There are other cases not described here, e.g. those of the dsorts **state**, **feeling**, **function**.

[9] This sort labels events which constitue the borderline between two opposite situations. E.g. the event *démission* ('resigning') separates a situation in which one is in charge of some professional or official activity from a situation in which one has refused this responsibility.

[10] It is an open question whether there exist clear distributional criteria for identifying those classes (Le Pesant 1994).

ing to the complement's content:
(REL : **suggest** $\wedge$ SUGGESTEE $= -|$SUBJ$|-|$IND $\wedge$ SUGGESTED $=$ *cmpcont*|IND$) = D$
one can define a method:
repl(SUGGESTED $=$ *cmpcont* $|$ IND$, x, D$), where x is (**proposition** $\wedge$ REL : *choose* $\wedge$ CHOOSER : **person** $\wedge$ CHOSEN $=$ *cmpcont*|IND).

For *attendre*, we have to compensate for the relative opacity of the 'control' notion. Instead of using a set of abstract conditions on the possible sorts of the predicate, we adopt a hybrid approach. We first specify the interpolated predicate as follows. It can be:
– any verb of sort **happen** for NP's of sort **event**,
– any verb of sort **produce**, e.g. *fabriquer* ('to make'), *préparer* ('to prepare'), *construire* ('to build'),
– any synonym of *arriver* ('to arrive'),
– any synonym of *donner* ('to give') or *rendre* ('to give back').

The indices of the arguments vary according to the predicate. For instance, for a form X *attend* Y, the interpolated form with **produce** is X *attend* Z **produce** Y. It is X *attend* Z *give* Y to X for *donner*.
The method for *donner* is given as an example:
repl(WAITED–FOR $=$ *cmpcont* $|$ IND$, x, D$), where x is (**proposition** $\wedge$ REL : *give* $\wedge$ GIVER : **person** $\wedge$ BENEFICIARY $=$ HEAD–DTR$|-|$SUBJ$|-|$IND $\wedge$ GIVEN $=$ *cmpcont*|IND)

Most often, the choice over predicates depends on the context. E.g. *J'attends le livre de Pierre* ('I am waiting for Peter's book') can mean that the speaker is waiting for Peter's book to be given to her, to be written, or even to arrive by mail. Contrary to what appears at first sight (see above), it should be noted that the choice of a predicate does not coincide with the sorts of the NP complement. The important point is that we do not resort systematically to abstract constraints on predicates, because they are difficult to flesh out in a coherent way. The differences between *commencer* ('to begin'), *attendre*, *suggérer*, and other interpolative verbs show clearly that a general mechanism for interpolation construction is out of reach, and that interpolation must be conceived as locally determined by classes of verbs and arguments.

Sort drifting

We want to account both for the general compatibility constraint and the possibility of overriding it. The verbs like *disposer*, which reveal that the dsort formula of some NP's is compatible with a pronoun of SDSORTS of type **event**, constitute a small class, which can be listed.[11] We call it **order**. A dsort formula for the NP's of the *repas* class will be **mat–obj** $\wedge$ **arrangement**. Because of the selectional frames, the SDSORTS of *le repas* is **mat–obj** when it is the complement of *poser*, **mat–obj** $\wedge$ **arrangement** when it is the complement of *disposer*. Normally, a pronoun must get a sort which is unifiable both with the value of SDSORTS and of DSORTS for its antecedent. Thus, (5) is strange because the SDSORTS values **mat–obj** and **event** do not unify. But, if a strong notion of inconsistency is used, the unification of **mat–obj** $\wedge$ **arrangement** with **event**, which is found in (6), will also fail, which is not what we want.

An obvious solution is to substitute a nonmonotonic relation term unification for the traditional term unification[12]. Using $\vdash$ for strict consequence and $\mathrel{|\!\sim}$ for nonmonotonic one, we can posit:
event $\sqcup$ **mat–obj** $\mathrel{|\!\sim}$ *undefined*
event $\sqcup$ **mat–obj** $\sqcup$ **arrangement** $\vdash$ **event** $\wedge$ **mat–obj** $\wedge$ **arrangement**
Although there exist reasonably simple frames for dealing with such dependence systems (Schulz 1991), they also raise questions in the framework of unification, which we leave aside here.

Conclusion

Contrary to a principle–based approach, the interpretations we have sketched are not driven by some principle(s) which can apply to the case (success) or not (exception). In object–oriented parlance, we would say that lexical objects can trigger a given (combination of) method(s) whenever they satisfy explicit *control conditions* (Martin & Odell 1995, chap. 17), which range from simple presence in a list to abstract constraints. The effective triggering may still depend on factors such as default ordering of methods, pragmatic cues, or probabilistic hierarchy, which leave room for indeterminacy. Describing a core of lexical preferences in a given idiom does not exclude other interpretive processes. It is required for constructing a layered approach based on an explicit (partial) hierarchy of strictness/relaxation, which puts principles in their place, not just anywhere.

References

Asher, N. 1993. *Reference to Abstract Objects in Discourse*. Dordrecht: Kluwer.

[11] *agencer*,*arranger*, *disposer*, *installer*, *mettre en place*, *préparer*, etc.

[12] Actually, unification by $\sqcup$ returns a pair whose first element is a conjunction, and second element an evaluation of the 'goodness' of the result, e.g. $\langle$**event** $\wedge$ **mat–obj** $\wedge$ **arrangement**, tolerable$\rangle$.

Cardelli, L., and Mitchell, J. 1991. Operations on records. *Mathematical Structures in Computer Science* 1.

Carpenter, B. 1992. *The Logic of Typed Feature Structures*. Cambridge: Cambridge University Press.

Copestake, A., and Briscoe, E. 1994. Semi–productive polysemy and sense extension. To appear in *Journal of Semantics*.

Godard, D., and Jayez, J. 1993. Towards a proper treatment of coercion phenomena. In *EACL 93*.

Godard, D., and Jayez, J. 1994. Anaphore et typage : le cas des événements et des objets. Antwerp Colloquium on anaphora, december 1994.

Hays, E., and Bayer, S. 1991. Metaphoric generalization through sort coercion. In *29th ACL*.

Le Pesant, D. 1994. Les compléments nominaux du verbe *lire*. une illustration de la notion de 'classe d'objets'. *Langages* 115.

Martin, J., and Odell, J. 1995. *Object–Oriented Methods. A Foundation*. Englewood Cliffs: Prentice Hall.

Nebel, B. 1990. *Reasoning and Revision in Hybrid Representation Systems*. Berlin: Springer–Verlag.

Nunberg, G., and Zaenen, A. 1992. Systematic polysemy in lexicology and lexicography. In *Proceedings of Euralex92, Tampere, Finland*.

Nunberg, G. 1978. *The Pragmatics of Reference*. Ph.D. Dissertation, CUNY Graduate Center.

Nunberg, G. 1993. On the meaning and interpretation of indexical expressions. *Linguistics and Philosophy* 16.

Pollard, C., and Sag, I. 1994. *Head–Driven Phrase Structure Grammar*. Chicago and Stanford: Chicago University Press and CSLI.

Pustejovsky, J., and Boguraev, B. 1993. Lexical knowledge representation and natural language processing. *Artificial Intelligence* 63.

Pustejovsky, J. 1991. The generative lexicon. *Computational Linguistics* 17(4).

Schulz, K. 1991. Preferential cumulative reasoning and nonmonotonic semantic nets. In Fuhrmann, A., and Morreau, M., eds., *The Logic of Theory Change*. Berlin: Springer–Verlag.

Stallard, D. 1993. Two kinds of metonymy. In *31st ACL*.

Wilensky, R. 1993. Knowledge acquisition and natural language processing. In Chipman, S., and Meyrowitz, A., eds., *Foundations of Knowledge Acquisition. Cognitive Models of Complex Learning*. Boston: Kluwer.