




Sergio Scalise
Elisabetta Magni
Antonietta Bisetto
Editors

Studies in Natural Language and Linguistic Theory

76

Universals of Language Today

 Springer

Universals and Semantics

Denis Delfitto*

Abstract This contribution proposes a view of linguistic semantics as a set of mental computations defined on a suitably restricted inventory of interpreted features borrowed from conceptual structures external to the language organ. These features enter both a lexical and a syntactic computation. Semantic universals can be identified regarding the nature of these featural primitives, the nature of the lexical computation (involving both formal and substantive universals), the nature of the mapping between syntactic categories and notional categories, the role of grammatical features in pre-encoding interpretive operations. It is argued that consensus about semantic universals can be reached cutting across the artificial divide between functionalist and formalist approaches to human language.

Keywords Semantic universals · lexical and syntactic computations · set-theoretic properties · mapping conditions · grammatical features · morphosyntactic pre-encoding

1 Introduction

In the debate about universals, it is common to distinguish between a typological approach, according to which universals are identified with constraints on cross-linguistic variation defined in general cognitive terms and directly bearing on the communicative function of language, and a formalist approach, according to which universals are the defining property of language as a mental organ and represent the logical solution to the ‘poverty of the stimulus’ problem (for a recent overview, see Mairal & Gil 2006). In a formalist perspective, knowledge of meaning offers quite convincing examples of poverty of the stimulus. Consider for instance the paradigm

D. Delfitto
University of Verona

* I am indebted to Chiara Melloni and two anonymous reviewers for their written comments on a previous version of this contribution.

in (1) (Fillmore 1982, Jackendoff 2002), with (1d) traditionally assigned a more degraded status than the other variants in (1):

- (1) a. Bill climbed (up) the mountain
 b. Bill climbed down the mountain
 c. The snake climbed (up) the tree
 d. ?*The snake climbed down the tree

Since the analysis of verb meanings in English reveals a clustering of motion and path on one side and motion and manner on the other side (with complementarity between path and manner; cf. Levin and Rappaport 1992), it is arduous to explain how an arbitrary set of primary linguistic data can trigger the knowledge of the sort of disjunctive lexical meaning of 'climb' that seems required in order to account for the complex pattern of judgments in (1) ('climb' must involve either a clambering manner of motion *or* an upwards direction). This kind of evidence can be used as a strong argument in favor of the view that there must be concealed universal conditions governing the construction of the primitive building blocks that correspond to the lexical entries of a given language. On a similar vein, one might argue that there is evidence for universal conditions on the application of lexical operations. Consider in this respect the so-called causative/intransitive alternation exemplified in (2):

- (2) a. Bill broke the window
 b. The window broke
 c. Bill killed his wife
 d. *His wife killed

The kind of valency-reduction operation attested by the transition from causative (2a) to intransitive (2b), intuitively consisting in the suppression of the agent theta-role, cannot successfully apply to (2c), yielding (2d), roughly meaning that Bill's wife died as a result of Bill's killing. It is tempting to explain this contrast in terms of a universal ban on the suppression of the agent theta-role whenever the latter is conceptualized as [+mental +cause] (as is the case with 'kill') and not simply as [+cause], as is the case with 'break' (where the 'agent' is not necessarily animate, as in 'the storm broke the window'; cf. especially Reinhart 2002). There is compelling psycholinguistic evidence that speakers, when using causative verbs, single out events involving direct and intentional causation (a person *waved a flag* only when she shook a flagpole, not when she raised the flag on a windy day; cf. Wolff 2003 and the discussion in Pinker 2007). In English and many other languages, verbs referring to human actions do not take part in the causative alternation (**Bill laughed Mary*, **Bill cried Mary*), on a par with verbs referring to physical events in which an object emits something, such as a light, a sound, a substance (**glow a light*; see Levin 1985, Pinker 2007), strongly suggesting that the speaker conceptualizes these events as involving internal, inherent causation. Of course, the claim here is not that there are no exceptions to this generalization. However, to put it in Pinker's words, "[the causative and other related alternations, such as the locative alternation] repeatedly turn up in unrelated languages and language families all over the world,

suggesting that people's language-forming abilities, faced with the need to communicate certain kinds of ideas, are channeled to rediscover these constructions". More particularly, "languages with a documented causative alternation number in the hundreds, and many surveys have ferreted out their common properties" (Pinker 2007: 79, and the references cited therein).

Knowledge of meaning provides thus a strong motivation for underlying constraints on linguistic knowledge, both in the form of substantive universals (such as the inventory of primitive semantic ingredients for constitution and structuring of lexical meaning) and in the form of abstract universals (such as the formal conditions governing lexical operations of valency-reduction). It is an empirical matter to decide whether the proposed universals reflect the application of general cognitive constraints (phylogenetically related to functional properties of language, as in Newmeyer 2005) or of a well-defined set of language-specific conditions, as in the formalist models of syntactic knowledge. Investigation into semantic universals is in fact made more challenging, in my opinion, by the absence of an *a priori* bias towards either language-specific or non-language-specific principles, as is to be expected, under reasonable assumptions, for a domain of inquiry aiming to study the interaction between the computational system underlying language (Chomsky 1995) and the interpretive systems at its boundaries, crucially including conceptual structure.

2 Semantics as a Linguistic Module

Under the theory of meaning adopted here, there is an interesting correspondence between syntactic and semantic computations, that should be emphasized. If the inventory of formal features that enter the syntactic computation is a subset of the full inventory of features that constitute lexical entries, it is reasonable to assume that the inventory of interpreted features that feed the semantic computation represents a subset of the full inventory of notional features that constitute conceptual structure and, more generally, the systems of interpretation. In this sense, semantics is a kind of broad syntax, manipulating a restricted set of interpreted features corresponding to selected parts of conceptual structure (Chomsky 2000), provided one is disposed to concede that it is broad syntax so defined, and not *narrow* syntax in Chomsky's sense, to constitute the core of the language faculty (Jackendoff 2002). An example of semantic computation is the lexical operations giving rise to the causative/unaccusative alternations shown in (2a–b) and, more generally, to the application of causativization or decausativization strategies starting from a single lexical entry with well-defined thematic properties (more on this in Section 3 below). Another case in point is the manipulation of formal objects endowed with set-theoretic properties, as when the set-theoretic properties assigned to determiners appear to be relevant for the licensing of negative polarity items (cf. Ladusaw 1979 and much subsequent literature). Consider for instance that "any" is correctly licensed by "every" in (3a) but not in (3b):

- (3) a. Every student who praised **any** professor succeeded
 b. *Every student who succeeded praised **any** professor

Under the hypothesis that “any” needs to be in the scope of a monotone decreasing operator and that the determiner “every” expresses a relation between two sets A and B (whereby A is included in B), the grammaticality contrast between (3a) and (3b) is directly explained by the fact that “every” is monotone decreasing in the first set (i.e. the set A, corresponding to the nominal restriction of the determiner) but not in the second (i.e. the set B, corresponding to the VP). This is proved by the observation that there are valid entailments going from A to subsets of A, but there is no valid entailment going from B to subsets of B, as shown in (4):

- (4) a. “every student who praised the professor succeeded” *entails*
 “every student who verbally praised the professor succeeded”
 b. “every student who succeeded praised the professor” *does not entail*
 “every student who succeeded verbally praised the professor”

Since the polarity item “any” is contained within the linguistic expression corresponding to A in (3a), whilst it is contained in the linguistic expression corresponding to B in (3b), the condition stating that “any” must find itself in the scope of a monotone decreasing operator is satisfied in (3a) but not in (3b), accounting for the degraded status of “any” in (3b).

Significantly, the relevance of set-theoretic computations for the satisfaction of grammaticality conditions arguably extends beyond nominal syntax and the semantics of determiners. It is monotonicity that accounts in fact for the unexpected grammaticality contrast detected in (5) (see Higginbotham 1988 for a full discussion):

- (5) a. John left before anyone else
 b. *John left after anyone else

The case in (5) is particularly telling: It is only if we are ready to concede that the semantic computation applies to objects endowed with set-theoretic properties that superficially similar lexical items (*after* and *before* in the case under scrutiny) disclose deep concealed differences (see also Delfitto 2003).

I propose thus that the semantic computation applies to abstract objects built up from relevant fragments of conceptual structure (and, more generally, the Conceptual-Intentional systems), whose formal properties (possibly expressed in a set-theoretic vocabulary) may bear on the notion of logical consequence (for further discussion, the reader is referred to Section 5). A noticeable consequence of the view adopted here is that language must be fully distinguishable from conceptual structure and from the interpretive systems into which it is mapped. However, there is clear evidence according to which conceptual structure feeds language. For instance, it is the speaker’s ability to structure verb meaning, within a ‘language of thought’, in terms of subtle semantic properties such as manner of motion, change of state or mental state that is responsible for verb behavior in causative (and locative) alternation phenomena (i.e. for the mapping into syntactic structures), in complete disregard of other interpretive ingredients that may well appear in dictionary

definitions of verb meanings (cf. the discussion in Pinker 2007, Chapter 2). On these grounds, we propose that even from a semantic perspective, language presupposes thought (as we saw above, the featural system that feeds semantic computations is certainly related to the C-I system), whereas thought does not presuppose language (one may easily conceive of entities endowed with a C-I system but completely deprived of the sort of semantic computations briefly sketched above, applying to lexical items and/or syntactic structures and delivering valency-reduction, licensing of polarity items, etc.).

A lexicon involves thus a selection of proper subparts of conceptual structure (see also Lieber 2004's distinction between 'skeleton' and 'body') and gives rise, under the view adopted here, to two distinct forms of linguistic computation: a lexical computation and a syntactic computation. It follows that there are two distinct forms of semantic computation: one is pre-syntactic (and coincides with the lexical computation) and one is post-syntactic (coinciding with phrasal semantics). It is to the semantic universals that can be identified in each of these two distinct domains that we now devote our attention.

3 Lexical Semantics: Formal and Substantive Universals

Starting with formal universals, there is widespread consensus that there is a unique system of lexical representations underlying some of the morphological distinctions detected within the verbal system. Consider in particular the hypothesis according to which distinct thematic forms are universally related to a single thematic entry by means of a well-defined set of lexical operations, informally stated in (6):

(6) **Universal** (*Lexicon Uniformity Hypothesis*):

Each verb-concept corresponds to one lexical entry with one thematic structure.
The various thematic forms of a given verb are derived by lexical operations from one thematic structure

On these conceptual grounds, one can argue that the set of *Aktionsart* distinctions originally identified by Vendler 1967 for English proves actually to have a crosslinguistic validity, accounting for the pervasiveness of the two symmetrical morphological strategies informally exemplified in (7), relating states, accomplishments and causatives (Van Valin 2006: 173):

(7) a. *Causativization* (Tibeto-Burman languages, Quechua, etc.)

State → Accomplishment/Achievement → Causative

ba (big) → *t̂-ba* (become big) → *t̂-ba-z* (cause to become big) (*Qiang*)

b. *Decausativization* (Russian, French, etc.)

Causative → Accomplishment/achievement → State

razbit' (break) → *razbit'sja* (break, intr.) → *razbityj* (broken) (*Russian*)

briser (break) → *se briser* (break, intr.) → *brisé* (broken) (*French*)

(7a) illustrates the case where the base form of the verb is a state, with accomplishment or achievement forms and causative forms derived morphologically from the state; similarly, (7b) illustrates the symmetrical case where the base form is a causative accomplishment, with accomplishment and state forms derived by application of morphological means.¹

The lexical operation accounting for the causative/unaccusative alternation is formalized in Reinhart 2002 as in (8), involving suppression of one of the theta-roles of the original verbal grid, under interesting universal constraints formulated in terms of a thematic feature-system (cf. the discussion of (2) above):

(8) *Reduction*: $V(\theta_1, \theta_2) \rightarrow V(\theta_2)$

'Reduction' should be carefully kept apart from the lexical operation of 'passivization' underlying 'voice' alternations cross-linguistically, and essentially involving the existential interpretation of a lexically discharged theta-role, as shown in (9) below:

(9) *Saturation*: $\lambda x \lambda y R(x,y) \rightarrow \lambda y \exists x R(x,y)$

On a similar vein, it has been argued that middle formation across languages involves application of a common lexical operation and a shared system of lexical representations based on thematic-feature decomposition (Marelj 2004). Significantly, it has also been proposed that the range of variation exhibited by middles cross-linguistically depends on the possibility of attaining the very same interpretive effects by application of syntactic means (Marelj 2004: Chapter 5). This way of accounting for linguistic variation within a common semantic core is highly reminiscent of the kind of syntactic pre-encoding of interpretive effects to be discussed in Section 4 below.

Let us now briefly consider the status of substantive universals in lexical semantics. In their most obvious form, these universals concern the presence of general constraints governing the building mechanism for lexical entries. One way of executing this research program consists in showing that the same function-argument structure applies indifferently across different semantic fields, ensuring a common cognitive base for superficially different lexical forms (Gruber 1965, Langacker 1987, Wierzbicka 1992). More precisely, the program can be executed by showing that (verb) lexical items are derived from a finite (and possibly very limited) array of words, hopefully constituting the exhaustive list of the primitive building blocks for a language lexicon (Wierzbicka's *Natural Semantics Metalanguage*). Alternatively, the program may be more indirectly implemented by means of generalizations across distinct semantic fields, by showing for instance that grammatical patterns used to describe physical objects in space are also used to describe non-spatial relations (Jackendoff, Langacker). A canonical example (adapted

¹ In fact, as observed by an anonymous reviewer, languages are also attested where the base form is an accomplishment/achievement. Clearly, this does not affect the logic of the argument made here, aimed to stress the pervasiveness of lexical operations relating members of the *Aktionsart* classes under discussion.

from Jackendoff 2002) of a common abstract organization of superficially different semantic fields is shown in (10) below:

- (10) *Spatial location and motion*
- | | |
|--|----------------------|
| a. The messenger is in Istanbul | [location] |
| b. The messenger went from Paris to Istanbul | [change of location] |
| c. The gang kept the messenger in Istanbul | [caused stasis] |
- Possession*
- | | |
|---|------------------------|
| a. The money is Fred's | [possession] |
| b. The inheritance finally went to Fred | [change of possession] |
| c. Fred kept the money | [caused stasis] |
- Ascription of properties*
- | | |
|-------------------------------------|----------------------|
| a. The light is red | [simple property] |
| b. The light went from green to red | [change of property] |
| c. The cop kept the light red | [caused stasis] |

An independent source of lexical universals concerns the way in which the internal structure of lexical items can be made more complex in order to account for the observation that certain classes of objects tend to belong, to a significant cross-linguistic extent, to more than one taxonomy, as in the canonical instance of co-predication involving 'book' (conceived both as an abstract information structure and as a physical object) in (11) below (adapted from Chomsky 2000):

- (11) The book I have in mind, if I ever write it, will weigh more than 5 pounds

The relevant generalizations may concern both fine-grained descriptions of the lexical meaning of individual lexical items (Pustejovsky's *dot-objects*, exemplified with 'book' in (11); cf. Pustejovsky 1995) and fine-grained mechanisms of semantic composition, involving cases where it is necessary to access the internal semantic structure of words, as in the instance of verb-object composition in (12), whereby the activity selected by the verb (*reading* in the case of 'book' and *drinking* in the case of 'beer') corresponds to the use or function to which the two objects ('book' and 'beer') are canonically subjected (Pustejovsky's *'Direct Telic' quale*):

- (12) a. I began/enjoyed the book (= I began/enjoyed reading the book)
 b. I began/enjoyed the beer (= I began/enjoyed drinking the beer)

It goes without saying that these dynamic modalities of meaning description and meaning composition (Pustejovsky's *qualia structure*, Lieber's *body/skeleton* opposition; cf. also Melloni 2007) raise many intriguing questions concerning the conditions under which the encyclopedic information encapsulated in lexical items can be made accessible to the core of linguistic computations constituting the language faculty, both pre-syntactically (word formation and interpretation) and post-syntactically (phrasal interpretation). Clearly, understanding the universal principles and constraints governing the relation between conceptual structure and the feature-system underlying semantic computations is of tremendous importance for any theory of meaning aspiring to explanatory adequacy.

4 Universals and Phrasal Semantics

The strongest universalist position that one may take in phrasal semantics is expressed by the mapping principle in (13):

- (13) **Universal:** The mapping between syntactic categories and semantic categories is invariant across languages

The mapping condition in (13) entails, for instance, that noun phrases (NPs) uniformly project into properties (type $\langle e,t \rangle$), whereas determiner phrases (DPs) uniformly project into objects (type e) or generalized quantifiers (type $\langle \langle e,t \rangle, t \rangle$). The heuristic value of (13) clearly emerges from the observation that (13) is superficially disconfirmed by plenty of languages where determinerless nouns (NPs) are object-referring. This observation has actually led some researchers to adopt the position that the mapping of syntactic categories into notional categories should undergo parameterization, with NPs mapping into objects (and not into properties, as required by (13)) in languages featuring determinerless arguments, such as Chinese (Chierchia 1998). The only way to retain the universal validity of (13) consists then in arguing that superficially determinerless nouns, when they count as arguments, are necessarily introduced by a phonologically empty determiner. This heuristic strategy reveals itself to be extremely useful, since it allows one to show substantial empirical evidence in favor of the view that even bare nouns – and even in languages like Chinese – correspond in fact to DPs whenever used as arguments (see Longobardi 1994, 2006 for kind-referring bare nouns in Germanic; Cheng and Sybesma 1999, 2005 for bare nouns in Chinese; Engelhardt and Trugman 1998, Babyonyshev 1998 for bare nouns in Russian).

The result that argumenthood (and in particular object-reference) is closely connected to determiner phrases raises in turn the question concerning the conceptual link that should exist between determiner positions and reference to objects. A related observation is that only arguments have to be inflected for person, as shown by facts such as (14) below, where a (pro)nominal predicate expressing a property can only be resumed by a (default) third-person clitic (Longobardi 2006:18):

- (14) Se Gianni fosse te o se Maria lo fosse / *ti fosse
if Gianni were you or if Maria CL3SgM were / *CL2Sg were

Since individuals are arguably denoted in the determiner position, and there is convincing evidence that person features are a prerogative of arguments, it is tempting to conclude that object-reference is made possible by associating the semantic content of Person to the determiner position. Pursuing this intriguing line of argumentation, Longobardi 2006 comes to the formulation of a universal semantic constraint linking object-reference to the semantic content of Person, along the lines of (15) below:

- (15) Object reference is universally made possible by the Person feature

In the prototypical case of object-reference represented by proper names, association with person is realized by the expression of Person in the determiner

position and via the morphosyntactic forms of association of proper names with the determiner position studied in Longobardi 1994 (see also Delfitto 2002). For languages (such as Japanese) with no obvious manifestation of Person within morphosyntax, (15) predicts that object-reference be necessarily realized through free association of the semantic content of names with the semantic concept of Person as universally present within the conceptual system. Since the association of nouns with Person is not of a morphosyntactic nature in Japanese (or better, since there is no morphosyntactic pre-encoding of the semantic association of nouns with Person in Japanese), the syntax of object-reference will be radically simplified with respect to, say, Indo-European. More particularly: (i) the difference between common nouns and proper names is blurred (since there is no syntactic form of association of names with the determiner position, as in Longobardi's cases of (overt) N-raising); (ii) the difference between pronouns and names is blurred (since personal pronouns universally express a canonical form of realization of the person feature in the determiner position, but this strategy is entirely precluded to Japanese). If this analysis is on the right track, it may provide substantial conceptual and empirical corroboration for an important refinement of the universal in (13): the uniformity of mapping principles across languages is not limited to syntactic categories but can be tentatively extended to the set of formal features that we have consistently assumed, along this contribution, to represent the basic input of the syntactic computation. More precisely, (13) can be rephrased in the terms of (16):

- (16) **Universal** (revised): The mapping between the grammatical features feeding linguistic computations and the notional categories universally realized within the conceptual system is invariant across languages

Given this framework of reference, the primary source of linguistic diversity is identified with the different degree of morphosyntactic pre-encoding attested in different languages (see especially Svenonius 2006; for a closely related view in the domain of temporal anaphora, see Giorgi and Pianesi 1997). It should be noted, however, that the associations realized in morphosyntax can be entirely realized, in principle, within the conceptual component. This fits thus quite well with the more general conclusion formulated above, according to which the basic ingredient of an adequate theory of meaning for natural language is a correct understanding of which parts of the Conceptual-Intentional systems are 'linguistically' activated, that is, activated for the purposes of the syntactic or semantic computations proper to the language faculty.

The universal in (16) is *prima facie* falsified by the observation that the ambiguity detected in (17) for English (and, more generally, Indo-European) is not found in other languages, where the reading corresponding in (18b) is expressed by means of 'shifted' second-person pronouns (i.e. 2nd person pronouns used anaphorically) (Schlenker 2003, Delfitto 2007):

- (17) Bill told Hillary that she was too arrogant
 (18) a. Bill told Hillary: "Hillary is too arrogant"
 b. Bill told Hillary: "You are too arrogant"

This observation might lead one to propose that the 3rd person features realized on the pronoun ‘she’ in (17) are not assigned a universal interpretation, yielding a violation of (16). However, a possibility worth exploring is that the reading corresponding to (18b) arises as an effect of the non-interpretability of 3rd person features. Non-interpretable person features (technically, features that are added in the course of the syntactic computation as a result of a morphosyntactic operation of copying targeting an independent 3rd person antecedent) would then be exploited for the sole purpose of encoding a formal dependency between the pronoun ‘she’ and the antecedent ‘Hillary’ in (17). In this sense, ‘she’ would qualify as a ‘minimal pronoun’ (in the sense of Kratzer 2006). Suppose further that the formal dependency encoded by the non-interpretable 3rd person features realized on ‘she’ is interpreted by identifying the referent of the pronoun with the referent of the antecedent (co-valuation), crucially including the properties assigned to the antecedent in virtue of the theta-role that it fulfills (essentially, its being the ‘addressee’ within the speech act performed by Bill). Under this view (according to which pronominal anaphora involves sharing of thematically-related features), the direct speech reading corresponding to (18b), according to which Bill acknowledges that the person endowed with the property ‘of being too arrogant’ is the addressee of the speech act that he performs, would be expressed by the indirect speech construal in (18c), intuitively the correct empirical result:

- (18) c. Bill told Hillary that Hillary, as the addressee of that very same speech act, was too arrogant

Now notice that if the reading in (18b) (corresponding to the use of ‘shifted’ 1st and 2nd person pronouns in non-Indo-European languages) can be discharged on the presence of non-interpretable 3rd person features on the pronoun, the possibility arises of preserving a universal interpretation of 3rd person features, *whenever they can be interpreted*. In particular, we may suggest that both in Indo-European and non-Indo-European languages, 3rd person is interpreted as expressing the presupposition that the individual referred to by the pronoun is distinct from the speaker and the hearer. In a nutshell, this means that the pronoun in (17) is simply translated into a variable ranging over semantic values distinct from speaker and hearer, along the lines of (19):

- (19) Bill told Hillary that x was too arrogant

A natural possibility consists in interpreting x as co-valued with Hillary, giving rise to the reading corresponding to (18a) (accidental coreference, *de re* interpretation). The important fact to be noticed is that this reading arises universally, and corresponds to the unique interpretation that is available for *interpreted* 3rd person features. We conclude that the universal in (16) may actually be valid and constitutes in fact an important heuristic tool for the investigation of some intriguing interpretive properties of pronominal anaphora, intuitively related to *de re / de se* ambiguities.

5 Generalized Quantifiers and Set-Theoretic Universals

Starting from the seminal study in Barwise and Cooper 1981, it has become increasingly evident that a set-theoretic approach to the semantics of determiners (Generalized Quantifier Theory) may give rise to an interesting class of semantic universals. Given obvious space limitations, it is not possible to review here all the properties and constraints that have been proposed within this very productive stream of semantic research (for a first orientation, see Delfitto 1986 and the references cited therein). I will thus limit myself to discuss conservativity and logicity.

Consider first the universal in (20):

(20) **Universal:** All natural language determiners are conservative

Conservativity is formally defined in (21a) and gives rise to the kind of logical equivalences exemplified in (21b–c), for the determiners ‘some’ and ‘most’:

- (21) a. *Conservativity:* $D(A) \text{ is } B \leftrightarrow D(A) \text{ is } A \cap B$
 b. Some student walks \leftrightarrow Some student is a student who walks
 c. Most students walk \leftrightarrow Most students are students who walk

One of the interesting remarks to be made about conservativity is that it makes it possible to compute the different relations between two sets A and B expressed by different determiners without taking into considerations the elements of B that are not in A: in Barwise and Cooper’s terminology, we say that a determiner D ‘lives on’ the set A (it goes without saying that this has non-trivial consequences for semantic parsing). Moreover, the striking fact about conservativity is that there are elementary set-theoretic relations that are not conservative (like those in (22) below) and that, significantly, cannot be expressed by a determiner in any known natural language. This may be taken to entail that conservativity is the core semantic constraint in the mapping between determiners and the notional categories associated to determiners.

- (22) a. $A = B$ is true iff $A = A \cap B$ (identity)
 b. $\langle X, Y \rangle : X > Y$ (Rescher’s quantifier)

This conclusion is corroborated by the observation that potential counterexamples to conservativity concern elements that, under a closer scrutiny, are better assigned a categorial status different from determiner. This is the case for ‘only-phrases’, which do not license the sort of logical equivalences tied to (21a), as shown by (23) below:

- (23) *Only Americans fight \leftrightarrow Only Americans are Americans who fight

The fact that the purported equivalence is not valid is made clear by the observation that the right member of the bi-conditional in (23) qualifies as a tautology, since the truth-conditions for ‘Only A is B’ reduce to the requirement that B (the intersection between Americans and fighters) be included in A (the set of Americans). However, the point is that ‘only’, on distributional grounds, is not a determiner, since it can be

realized outside the nominal domain as a VP-modifier, as shown in (24) (it qualifies thus as an adverbial element; see Chierchia 1997):

(24) Americans only fight wars, they don't pursue peace ideals

This is not to say, of course, that the universal in (20) is not in need of some further qualifications (see for instance Westerståhl 1985). There is no doubt, however, that conservativity is a core property of the determiner system.

Let me now briefly consider logicity. The relevant question here is whether there exist syntactic categories in natural language whose notional counterpart can be characterized as a logical term. A logical term is a term whose interpretation is invariant under isomorphic structures defined on a given domain of interpretation. More particularly, a determiner is logic if it can be defined as a function from ordered pairs of natural numbers to truth-values. For instance, some of the most common English determiners can be defined as in (25) below, and qualify thus as logical ('a' corresponds to the difference between set A and set B, 'b' corresponds to the intersection between set A and set B):

(25) Every($\langle a, b \rangle$) = t if and only if $a = 0$ e $b = n$ ($0 \leq n$)
 No ($\langle a, b \rangle$) = t if and only if $a = n$ e $b = 0$
 Most ($\langle a, b \rangle$) = t if and only if $b > a$

It is thus tempting to think that DPs headed by a determiner qualify as logical categories:

(26) **Universal** (Logicity Thesis): Generalized quantifiers are universally the result of the combination of a logical determiner with a NP

Despite its intuitive appeal, we know by now that the alleged universal in (26) is false: there are DPs whose behavior is indistinguishable from the behavior of logical generalized quantifiers (in that for instance they pattern with logical DPs and not with names in licensing anaphoric relations) but that do not qualify as logical DPs on semantic grounds. A case in point is that of 'exception-phrases' like 'no students except five students in chemistry' (see Moltmann 1995 for a full discussion). Even negative conclusions such as the dismissal, on uncontroversial empirical grounds, of the potential universal in (26), can be of remarkable importance for a proper characterization of the mapping between syntactic and semantic categories. In particular, since generalized quantifiers are the most likely candidate for a logical status, the dismissal of (26) entails that none of the semantic categories that are associated to standard syntactic categories can be assigned a logical status. This shows in turn that the semantic computations that are part of the knowledge of natural language are not built up as a logic, that is, as a system intended to single out the set of valid sentences or the set of valid inferences.

6 Ontology and Grammar

Reference to events is a relatively well-established fact in natural language, since the seminal proposals in Davidson 1980 (see also Higginbotham 1985, Larson and Segal 1995).

The relation between semantic variability and ontological presuppositions gives rise to other intriguing research questions. Consider for instance the fact that determinerless nouns arguably denote kinds in a language such as English, whereas they simply introduce variables in Romance-like languages (see Longobardi 2001 for an updated discussion of this long-debated issue). One of the obvious questions that arise concerns the possible interplay between the ontological presuppositions carried by the semantics of natural language and the feature systems underlying the syntactic and semantic computations. It is often syntactic data that provide substantial evidence in favor of relatively subtle ontological distinctions that have been originally neglected. Here is a telling example. The sentences in (27) might be taken to suggest that both the *that*-clause in (27a) and the derived nominal in (27b) denote a proposition, given their perfect equivalence on interpretive grounds:

- (27) a. That Bill arrived very late surprised Hillary
 b. Bill's very late arrival surprised Hillary

However, notice that a *that*-clause is no longer freely interchangeable with a derived nominal when it counts as the selected complement of a predicate of propositional attitude. This is shown in (28):

- (28) a. Hillary believes that Bill arrived very late
 b. *Hillary believes Bill's very late arrival

The grammaticality contrast between (28a) and (28b) cannot be discharged on categorial selection properties of the predicate, since 'believe' is perfectly fine with other kinds of DP-complements, as shown in (28c):

- (28) c. Hillary believes this

These observations seem to suggest that the explanation for the degraded status of (28b) resides in the fact that the objects referred to by *that*-clauses (propositions) are not the same as the objects referred to by derived nominals such as 'arrival'. Since *that*-clauses can also be used as arguments of psych-verbs, as in (27a), on a par with derived nominals, the conclusion might be that derived nominals are necessarily non-propositional, whereas *that*-clauses are ambiguous between a propositional and a non-propositional status (for a full discussion on this and other strictly related issues, see Zucchi 1993). Since there is evidence to the effect that complements of psych-verbs are non-eventive, we need to enrich the natural language ontology with entities endowed with an intermediate status between events and propositions (let us call them 'facts'; see Asher 1993 and Neale 2001).

Concerning reference to facts, a stimulating hypothesis is that the ontological commitment to facts in a language L may be subjected to grammatical encoding. This leads to unexpected relations between ontology and syntax. It can be shown

indeed that reference to entities that are non-eventive and non-propositional (arguably qualifying as ‘facts’) crucially depends on the presence of specific formal features that are interpreted in dedicated positions, and on the syntactic computations in which these features are involved. In Italian, we find for instance a singular contrast – in the possibility of anaphorically resuming a fact reported in a preceding utterance – between active and passive sentences, as can be seen in (29) and (30). A null pronoun can resume the fact expressed by the first sentence in the passive sentence in (30), whilst this is impossible in (29) (see Delfitto 2005 for a full discussion):

- (29) L' uomo è autodistruttivo. *(pro) Dimostra che la natura umana ha aspetti negativi
 the man is self-destructive it shows that the nature human has aspects negative
 ‘Man is self-destructive. This shows that nature has a negative side’
- (30) L' uomo è autodistruttivo. *(pro) È stato dimostrato dalla storia umana
 the man is self-destructive it is been shown by the history human
 ‘Man is self-destructive. This is shown by human history’

A natural hypothesis is that there are structural environments in which null pronominals get enriched with the interpretable feature required for fact-reference in the course of the syntactic derivation. In these contexts, null pronominals should be able to resume facts that have previously been introduced into the discourse domain. In this respect, consider the contrast below between (31) and (32):

- (31) a. È scoppiata una bomba. *(pro) Mi ha riempito di sgomento
 is exploded a bomb it CL1Sg has filled of dismay
 ‘A bomb exploded. This fact frightened me’
- b. È scoppiata una bomba. *(pro) Ha provocato enorme emozione
 is exploded a bomb it has caused huge emotion
 ‘A bomb exploded. This fact is caused great emotion’
- (32) a. È scoppiata una bomba. (pro) È ormai noto a tutti
 is exploded a bomb it is already known to all
 ‘A bomb exploded. This fact is already known to everybody’
- b. È scoppiata una bomba. (pro) È doloroso ma vero
 is exploded a bomb it is painful but true
 ‘A bomb exploded. This fact is painful but true’
- c. È scoppiata una bomba. (pro) È un fatto
 is exploded a bomb it is a fact
 ‘A bomb exploded. This is a fact’

Syntactically, there is a clear difference between pronominal resumption in (31) and pronominal resumption in (32). In (31), the null pronominal is realized in the canonical spec-of-VP position proper to external arguments: in the course of the derivation, it never finds itself in a sisterhood relation with the selecting predicate. In (32), the null pronominal represents the subject of the small clause including an adjectival (32a–b) or a nominal (32c) predicate: in the course of the derivation, it finds

thus itself in a sisterhood relation with a fact-selecting predicate (*to be well-known, to be painful/true, to be a fact*). Arguably, it is this sisterhood relation between the fact-referring pronominal and the fact-selecting predicate that is responsible for the licensing of fact-reference in passive structures such as (30). Analogously, null pronominal subjects get computationally endowed with the interpretable feature required for fact-reference in the small-clause configuration proper to (32), before moving higher up for syntactic reasons.

If these considerations can be generalized across languages, ontological commitments in natural language are not only a question of arbitrary metaphysical choices or of logical regimentation. Rather, they universally manifest a systematic interplay with the feature-systems feeding the syntactic and semantic computations.

References

- Asher, Nicholas. 1993. *Reference to abstract objects in discourse*. Dordrecht: Kluwer.
- Babyonyshev, Maria. 1998. The possessive construction in Russian: A crosslinguistic perspective. *Journal of Slavic Linguistics* 5: 193–234.
- Barwise, John, and Robin Cooper. 1981. Generalized quantifiers and natural language. *Linguistics and Philosophy* 4: 159–219.
- Cheng, Lisa Lai-Shen, and Rint P.E. Sybesma. 1999. Bare and not-so-bare nouns and the Structure of NP. *Linguistic Inquiry* 30: 509–542.
- Cheng, Lisa Lai-Shen, and Rint P.E. Sybesma. 2005. Classifiers in Four Varieties of Chinese. In *The Oxford handbook of comparative syntax*, eds. Guglielmo Cinque and Richard Kayne, 259–292. New York: Oxford University Press.
- Chierchia, Gennaro. 1997. *Semantica*. Bologna: Il Mulino.
- Chierchia, Gennaro. 1998. Reference to kinds across languages. *Natural Language Semantics* 6: 339–405.
- Chomsky, Noam. 1995. *The minimalist program*. Cambridge MA: MIT Press.
- Chomsky, Noam. 2000. *New horizons in the study of language and mind*. Cambridge: Cambridge University Press.
- Davidson, Donald. 1980. *Essays on actions and events*. New York, Oxford: Oxford University Press.
- Delfitto, Denis. 1986. Quantificatori generalizzati e universali semantici. *Rivista di grammatica generativa* 11: 65–98.
- Delfitto, Denis. 2002. *Genericity in language*. Alessandria: Edizioni dell'Orso.
- Delfitto, Denis. 2003. Results in semantics. *Lingue e Linguaggio* 2: 261–275.
- Delfitto, Denis. 2005. On facts in the syntax and semantics of Italian. In *Romance languages and linguistic theory*, eds. Twan Geerts, Ivo van Ginneken, and Haike Jacobs, 15–35. Amsterdam: Benjamins.
- Delfitto, Denis. 2007. A case-study on grammar, meaning and linguistic diversity: the nature of person features. In *Proceedings of the annual meeting of the Società Italiana di Glottologia – 2006*. Pisa: Scuola Normale Superiore.
- Engelhardt, Miriam, and Helen Trugman. 1998. D as a source of adnominal genitive in Russian. In *Proceedings of the Sixth Annual Workshop on Formal Approaches to Slavic Linguistics*, eds. Željko Bošković, Steven Franks, and William Snyder, 114–133. Ann Arbor MI: Michigan Slavic Publications.
- Fillmore, Charles J. 1982. Towards a descriptive framework for deixis. In *Speech, place and action*, eds. Robert J. Jarvella and Wolfgang Klein, 31–52. New York: Wiley.
- Giorgi, Alessandra, and Fabio Pianesi. 1997. *Tense and aspect: From semantics to morphosyntax*. Oxford: Oxford University Press.

- Gruber, Jeffrey Steven. 1965. *Studies in lexical relations*. PhD dissertation, MIT. Repr: Gruber, Jeffrey Steven. 1976. *Lexical structures in syntax and semantics*. Amsterdam: North-Holland.
- Higginbotham, James. 1988. Is semantics necessary? *Proceedings of the Aristotelian Society* 88: 219–241.
- Higginbotham, James. 1985. On semantics. *Linguistic inquiry* 16: 547–593.
- Jackendoff, Ray. 2002. *Foundations of language*. Oxford: Oxford University Press.
- Kratzer, Angelika. 2006. Minimal pronouns. Fake indexicals as windows into the properties of bound variable pronouns. Manuscript, University of Massachusetts, Amherst.
- Ladusaw, William A. 1979. *Polarity sensitivity as inherent scope relations*. PhD dissertation, University of Texas at Austin.
- Langacker, Ronald. 1987. *Foundations of cognitive grammar*. Stanford: Stanford University Press.
- Larson, Richard, and Gabriel Segal. 1995. *Knowledge of meaning. An introduction to semantic theory*. Cambridge MA: MIT Press.
- Levin, Beth. 1985. *Lexical semantics in review: An introduction*. Cambridge MA: MIT Center for Cognitive Science.
- Levin, Beth, and Malka Rappaport Hovav. 1992. The lexical semantics of verbs of motion: The perspective from unaccusativity. In *Thematic structure: Its role in grammar*, ed. Iggy M. Roca, 247–269. Berlin: Foris.
- Lieber, Rochelle. 2004. *Morphology and lexical semantics*. Chicago: The University of Chicago Press.
- Longobardi, Giuseppe. 1994. Reference and proper names. *Linguistic Inquiry* 25: 609–667.
- Longobardi, Giuseppe. 2001. How comparative is semantics? A unified parametric theory of bare nouns and proper names. *Natural Language Semantics* 9: 335–369.
- Longobardi, Giuseppe. 2006. Reference to individuals, person, and the variety of mapping parameters. To appear in *Proceedings of Copenhagen Determiner Colloquium*, eds. Alex Klinge and Henrik H. Müller. Philadelphia, Amsterdam: John Benjamins.
- Mairal, Ricardo, and Juana Gil. 2006. *Linguistic universals*. Cambridge: Cambridge University Press.
- Marelj, Mariana. 2004. *Middles and argument structure across languages*. PhD dissertation, Uil-OTS, Utrecht university.
- Melloni, Chiara. 2007. *Polysemy in word formation: The case of deverbal nominals*. PhD dissertation, University of Verona.
- Moltmann, Friederike. 1995. Exception sentences and polyadic quantification. *Linguistics and Philosophy* 18: 223–280.
- Neale, Stephen. 2001. *Facing facts*. Oxford: Oxford University Press.
- Newmeyer, Frederick J. 2005. *Possible and probable languages. A generative perspective on linguistic typology*. Oxford: Oxford University Press.
- Pinker, Steven. 2007. *The stuff of thought*. London: Allen Lane.
- Pustejovsky, James. 1995. *The generative lexicon*. Cambridge MA: MIT Press.
- Reinhart, Tanya. 2002. The Theta-system – An overview. In *Theoretical Linguistics* 28, ed. Wolfgang Sternefeld, 229–290. Berlin: Mouton.
- Schlenker, Philippe. 2003. A plea for monsters. *Linguistics and Philosophy* 26: 29–120.
- Svenonius, Peter. 2006. Interpreting uninterpretable features. Manuscript, University of Tromsø.
- Wierzbicka, Anna. 1992. *Semantics, culture and cognition: Universal human concepts in culture-specific configurations*. Oxford: Oxford University Press.
- Wolff, Phillip. 2003. Direct Causation in the linguistic coding and individuation of causal events. *Cognition* 88: 1–48.
- Van Valin, Robert D. 2006. Some universals of verb semantics. In *Linguistic universals*, eds. Ricardo Mairal and Juana Gil. 155–178. Cambridge: Cambridge University Press.
- Vendler, Zeno. 1967. *Linguistics in philosophy*. Ithaca: Cornell University Press.
- Westerståhl, Dag. 1985. Logical constants in quantifier languages. *Linguistics and Philosophy* 8: 387–413.
- Zucchi, Sandro. 1993. *The language of propositions and events*. Studies in Linguistics and Philosophy, Kluwer Academic Publishers, Dordrecht.