Semantic Universals and Universal Semantics

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Introduction: Universals and Semantics

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Semantic universals are the properties the semantics of all languages have in common. Universal semantics is that part of semantic theory which is concerned with general semantic properties of language (singular) as opposed to the specific semantic properties of particular languages (plural). In other words, universal semantics is about semantic universals. But universal semantics is a term which covers quite diverse kinds of scientific study. This diversity can at least partly be traced back to different ways the common subject matter, semantic universals, is conceived of. So it will be useful to begin by first clarifying the different readings of this latter notion or, less specifically, the general notion of linguistic universals.

1. Kinds of linguistic universals

Linguistic universals are simply properties shared by all languages. So they naturally fall into two classes: those shared by virtue of the notion of language, the so-called analytical universals, and all the rest, the synthetical ones. Sometimes statements saying that some property is shared by all languages are also called linguistic universals, but we will keep them apart by calling them universal statements or universal hypotheses. So far, the notion seems to be rather clear. But there are two sources of complication hidden in its specification: First, what notion of language does it presuppose? And second, what does the quantification 'all languages' range over?

To begin with the second issue, there are basically two choices. First, we can choose to consider only observable languages, i.e., languages that either are still alive or at least reconstructable. In that case, the synthetical universals are just the empirical ones. Empirical universals in this sense may be accidental, i.e., hypotheses about them may be falsified by the discovery or emergence of systems that fail to have the properties in question, although they are languages by all general standards. Suppose, for instance, that the Khoisan and the neighboring Bantu languages haven't been discovered yet. Then the absence of clicks from the phoneme inventories would be an empirical universal, which would disappear at the moment where these languages are discovered, since they do have click consonants in their phoneme inventories.

The other possibility is to include in the set of languages also those that are not reconstructable anymore and those that still may come into existence. In this case, the non-analytical universals cannot be identified with the empirical ones anymore, since what can be observed may be accidental, and the question comes up whether there is anything left. Stating universals that hold not only for observable but also for possible languages, doesn't this amount to defining what a possible language is, in other words to stating analytical universals? But then the empirical universals are just the accidental ones and we are left with a dichotomy of accidental versus analytical universals which would make the whole research on universals rather uninteresting, since accidental universals may be falsified by the next language we come across and analytical universals can be read off the very notion of language.

So there must be something wrong with the simple picture we have drawn so far. The interesting universals are those that are neither analytical nor accidental, but something in between, namely those properties which are due to certain constraints that hold systematically without being part of the very notion in question. For example, suppose counterfactually that all American bachelors have a phone number containing the digit one, and that in America everybody prefers what he lacks over what he has. Under these circumstances, being unmarried would be an analytical universal property of American bachelors, having a phone number with the digit one would be an accidental universal property of them, and preferring to be married would be a third universal property of them, which would be neither analytical nor accidental, but rather induced by the fact that American bachelors are American people and that Amercan people prefer what they lack over what they have.

So the most interesting universals are the non-accidental non-analytical ones, which may be called induced universals. They are induced by background regularities that again are neither accidental nor analytical. Induced universals are not accidental in that counterexamples, although logically possible, are empirically utterly improbable, since they would have to escape the relevant constraints. The introduction of the induced universals has been achieved by complementing the original analytical-synthetical dichotomy with the accidental-systematical dichotomy. Induced universals may now be equally well characterized as the non-analytical systematical or as the non-accidental synthetical ones.

Induced universals may further be subdivided according to the kind of constraint they are induced by. For instance, biologically induced universals are properties of language which go back to the genetic endowment of humans. One extreme, but influential assumption, held by Noam Chomsky and his followers, is that all induced universals are biologically induced (Chomsky 1968: 76). Others assume that the interaction of different kinds of constraints is the source of induced universals. The plausibility of these

positions will not be discussed here, since this book deals with the universals themselves and not with their possible origins.

2. Kinds of universal semantics

There are at least two major ways of doing universal semantics in research on language. One is mainly pursued by data-oriented linguists, who browse through the reports of field workers, grammars, and typological surveys and care about sample size before they generalize. The other one is mainly followed by philosophers of language, language-oriented logicians, and philosophically interested linguists who prefer to carry out in-depth investigations into particular languages and to generalize from there.[1] The former, the breadth-oriented *extensive* approach, is primarily concerned with synthetical universals in general and tends to postpone discussions of the accidental-systematical distinction. The latter, the depth-oriented *intensive* approach, is only interested in systematical universals and avoids discussing the analytical-synthetical distinction.[2]

The central question in this latter distinction is: How strong a notion of language do we assume? Obviously, if we stick to a rather weak notion, many more general phenomena turn out to be synthetical universals than if we assume a rather strong and therefore narrower notion. Defining a language as any system of signs, i.e., of correlations of observable forms with inferrable contents, identifies linguistics with semiotics and leads to a notion of language that is too weak. In order to adequately strengthen the notion, we need at least three more ingredients. First, a sign system that is to be a language in our sense should be a general-purpose system serving all general encoding and communication needs as opposed to special-purpose systems like the 'language' of traffic lights. Second, it should be used or capable of being used by humans beings as opposed to animals or machines. Third, it should have developed (or possess the potential to develop) and stay alive naturally, i.e., mainly as a self-organizing system, with at most marginal external planning and control. So the notion of language we are interested in can be defined as a natural human general-purpose sign system.

But how about the arbitraryness or conventionality of most linguistic signs? Shouldn't we include it as well in our notion of language? This seems to be dispensable. Only limited purpose human languages can exclusively get along with natural, iconic signs, because general human encoding and communication needs are simply too vast. The extent of human encoding and communication needs is a non-accidental synthetical fact and therefore the arbitrariness of most linguistic signs is an induced universal.

The same holds for what van Benthem (this volume) calls their computability, the fact that they can be processed by humans with normal cognitive capacities, and similarly for what Barwise and Perry (1983) call their efficiency, their potential for serving different purposes in different contexts, since the fact that they can be used by human beings with limited resources involves that they are learnable in a quite restricted amout of time and that their use has a reasonable cost-benefit ratio.

Our definition of language would also classify as a synthetical universal the fact that human natural general-purpose languages are primarily systems of acoustic and not of visible signs and it would imply that such languages could have evolved or could evolve as visual systems that only later, if at all ,are correlated with acoustic representations, should there be no constraints precluding this possiblity. A richer notion would include the orality feature and exclude purely or primarily visual sign systems from its extension. So the exceptional nature of, e.g., sign languages, for example those developed for the deaf, would be an analytical rather than a synthetical feature. For our purposes we do not have to decide which of these two notions is preferable because we are concerned with semantic universals, and having a semantics is an analytical universal since (a) languages are systems of signs, (b) signs correlate sign-vehicles, perceivable forms, with inferrable sign-contents, information units or concepts, and (c) to have a semantics means to include such a correlation.

3. Examples of semantic universals

If we leave with these remarks the general universals for the specifically semantic ones, the next question that comes up is the following: Is this analytical universal, that all languages have a semantics, the only semantic universal, or are there other universals that are more interesting and that, in the analytical case, are useful building blocks for a fruitful specification of our central notion, or that, in the induced case, have a fair chance of surviving attempts to falsify them?

It might seem a plausible proposal for an analytical semantic universal to require that the contents of linguistic signs be humanly graspable concepts, i.e., possible contents of human cognition. The plausibility of this idea vanishes however if one takes into consideration that linguistic sign-vehicles in our sense, i.e., elements of a general-purpose language, can be of arbitrary (within certain limits[3]) complexity, which means, given the rough, but certainly positive correlation of sign-vehicle size with sign-content complexity, that linguistically encodable concepts can be of arbitrary complexity too. But certainly human cognition is not ready to grasp arbitrarily complex concepts. So this universal

would better be conceived of as an induced universal that follows from the analytical ones plus the trivial constraint mentioned above, namely that humans can only use concepts within the range of their cognitive capacities.

By contrast, let us now consider an example of a universal semantic property that clearly could only be called synthetical right from the outset. Since semantics is concerned with the correlation between form and content of signs, the most simple kind of synthetical semantic universal would state that certain linguistic signs occur in all languages. This presupposes that there are phonological forms which occur in all languages of the world. Since phoneme inventories differ considerably (cf. Maddieson 1984), and so do phonotactic constraints, this is a problematic assumption. Yet, some simple syllables like *ka* and *pa* seem to pertain to all languages; therefore it is conceivable that there are also universally shared meanings associated with them. But there aren't any. What comes closest to this very concrete kind of semantic universal is the so-called global etymologies, families of related forms, paired with related meanings which can be reconstructed in all language families of the world (cf. Bengtson and Ruhlen to appear). But at present, the status of these etymologies must rather be called tentative, and so we are left without a good example for our first, most straightforward kind of semantic universal.

So we have to look for more abstract types of universal properties, such as meanings universally encoded not by expressions with a given phonological form, but with given syntactic properties, i.e., belonging to a certain syntactic category. This is the kind of universal Johan van Benthem (this volume) is interested in, who defines semantic universals as general laws about meanings expressible in all human languages. The main question is: How are they expressed? If all languages have, in principle, the same general-purpose expressive power, as seems reasonable to assume, the differences must lie in the kind, especially in the size of the linguistic sign needed to encode a given meaning. One language may possess a single word to express a meaning another language would need a whole story to encode. It has been suggested (e.g., in Zaefferer 1990) that the hierarchy of coding (1) reflects some hierarchy of basicness in the notional structure of a given language: The lower a means of encoding in the hierarchy, the more fundamental the encoded concept.

(1)   grammatical (unmarked) < grammatical (marked) < lexical (root) <
         lexical (stem) < lexical (compound) < phrasal

Singularity, for instance, is in most languages a more basic concept than plurality, since, although both concepts may be encoded by grammatical means like inflection, plurality tends to be more marked.[4] Likewise, in English, *four* (root), *fourty* (stem), *four hundred*

(compound), *almost four* (phrase), in this order, express notions which are decreasingly basic. This hierarchy is in line with a general tendency of coding economy correlating the means of expression with the meanings expressed: The more basic a concept in a system of linguistically encoded concepts, the lower the cost of encoding it. One notion may be more basic in one linguistic community than in another one, but there are many areas of tendential conformity. For instance, the cost of encoding the notion of the speaker of an utterance doesn't seem to exceed in any language the size of one rather short word.

A more specific example of this type of semantic universal, which is much 'harder' since it is not statistical and which is also discussed by van Benthem (this volume), is Keenan and Stavi's (1986: 260) 'Extensional determiners in all languages are always interpreted by *conservative* functions.' Extensional determiners denote functions from properties (sets) to sets of properties, and for a function f to be conservative means that the value for any set P in the domain of f is a subset of the powerset of P, in other words, values are built from the arguments, without going beyond. It would seem at first glance equally plausible to *define* extensional determiners as those interpreted by conservative functions and to state as a universal hypothesis that all natural languages have expressions which are determiners in that sense, as Barwise and Cooper (1981: 179) had done. However, by weakening the notion of determiner, Keenan and Stavi have managed to turn a statement that in the Barwise/Cooper framework would express an analytical semantic universal into a synthetical universal which probably is not an accidental one and hence not void of interest.

Let us finally consider an even more abstract example of a synthetical universal semantic property of language. It is what Weinreich calls the 'limited sloppyness' of natural languages, i.e., the fact "that languages are universally less 'logical,' symmetrical, and differentiated than they could be if the components and devices contained somewhere in each system were uniformly utilized throughout that system." (Weinreich 1963: 190) In other words, natural languages tend to be systematic only to a certain degree and they tend to contain a considerable amount of 'exceptions,' and this, of course, does not only hold of the semantic subsystems.

If we assume this as a synthetical and not as an analytical universal, we are free to accept languages like Esperanto as natural languages, provided we weaken our notion of natural, requiring self-organization only for the maintenance of the system, and not for its origin. Not everybody will be willing to subsume artificial languages like the international auxiliary languages under the natural languages. But even if one does, other artificial languages that are clearly non-natural, like programming languages or all the diverse languages of formal logic, would not yet fall under this rather weak notion, since they fail to

meet the generality requirement by being special-purpose languages for human-computer communication and the encoding of certain aspects of logical inferences, respectively.

Wherever the notional border is drawn, investigating universals of human languages across the natural-nonnatural distinction is an interesting task that may still bring important discoveries.[5] By contrast, the investigation of universals of natural languages across the human-nonhuman distinction, interesting as it may be, is on a different level, since the knowledge we have about animal languages seems to support the hypothesis that they are special-purpose rather than general-purpose sign systems.[6] But the general-purpose/special-purpose distinction is a graded one, and so are other key notions in our discussion: Living beings can be more or less human (think about possible sign systems of Pithecanthropus) and more or less natural (does Esperanto begin to be natural once it is learned as a first language?).

With this cautionary remark we will leave the general reflections about how semantic universals, universal semantics, and their relation can be conceived, and turn to an overview of the themes discussed in this volume. They fall into three groups whose order reflects their degree of specificity. The most general topics are placed at the beginning. Next come the issues which, although more specific, have a direct bearing on the foundations of predicate and propositional logic, those almost indispensable tools of semantic analysis. The last group presents a selection of currently discussed problems.

4. General questions about semantic universals

The first three papers address some general questions which may be formulated as follows: Are there non-trivial semantic universals at all, and if so, where are they to be located, especially how are they related to logics?

The opening paper by Johan van Benthem is concerned with those systematical universals which are due to the fact that languages are constrained by being systems produced and handled by human cognition. The question which possibilities and limitations this implies is still quite open and may be partially answered through research on universals. He gives an expert overview of recent advances in logical semantics that shed some light on this issue. Among the most interesting findings in this area is the discovery of transcategorial phenomena such as monotonicity or, more generally, inferential sensitivity, of which Krifka's contribution on polarity items gives a stimulating illustration. Another fascinating result is the recurring organization of meanings or linguistically organized concepts into groups of four as in the lexical squares, which come from the combination of operators with different kinds of negation (internal vs.

external), yielding what Sebastian Löbner (1990) calls 'duality groups'. A plausible candidate for such a pair of dual operators, concessive and causal subordinators, is discussed in König's contribution.

Manfred Immler starts his paper from a position that seems quite sympathetic with a sceptical attitude towards the question whether there are non-trivial semantic universals at all. After discussing a considerable number of different positions, he concludes that although there may be no interesting semantic universals, the superficial diversity of semantic systems only covers a deeper commonality: not meanings are universal, but the cognitions behind them. The gross disagreement with the preceding article diminishes to a certain degree if one takes into account that Immler, maybe due to the fact that he mostly discusses more traditionally oriented books and articles, emphasizes lexical meanings, where the diversity is obvious, at the expense of grammatical meanings, where more commonalities can be observed, and it is the latter which are the focus of interest of more recent, logically oriented investigations such as the ones referred to by van Benthem.

Bechert is even more radical in doubting the existence of interesting semantic universals: For him the observable degree of diversity among natural languages is too high to leave hope for the discovery of semantic invariants behind it. Even where we might be inclined to admit some, he warns us to be extremely careful to avoid the trap of the effects of *colonization*. He does not use this term in a metaphorical way, as one might be inclined to think, referring to the influence of our ways of speaking on our way of analyzing differing languages, but rather literally, referring to the influence of our ways of speaking on the languages themselves. In other words, many common features of existing languages may be due to language contact, whereby the colonized language acquires properties of the colonizing one. One has often to go back in history to a point where influence from a colonizing language has not yet been possible in order to detect the real variety of semantic systems. This is very difficult for languages without any historical documents, because one depends exclusively on the highly problematic job of reconstruction. But otherwise, the descriptive linguist easily comes into the situation of the ethnologist who, by misfortune, always arrives at a tribe after the missionary and therefore states monotheism as a religious universal.

On the one hand, the current linguistic situation in the world is characterized by a high degree of colonization and consequently of convergence of different linguistic systems. Human language, on the other hand, probably goes back to a single or at least a small number of roots so that, looking backwards, one is also confronted with convergence. Therefore, and this could be the bottom line of what can be learned from Bechert's contribution, the best place to look for genuine (as opposed to enforced) universals is that period in history when there was maximal diversity of languages due to maximal

dispersion of mankind together with minimal group-external communication, in short: before divergence turned back into convergence.

5. Semantic universals and the foundations of classical logic

The second group of papers addresses two basic issues: Are sentences universally constituted by subjects and predicates, and are constituents universally joined by conjunctions such as 'and'? This entails the question whether standard first order logic (FOL) can still be regarded as the core of a universal formal semantics, since its atomic formulae are constituted by subjects and predicates (in the one-place case), and its complex formulae make crucial use of propositional logic with its connectives 'and' and 'not' (the well-known fact that both can be reduced to the Sheffer-stroke meaning 'not both' seems to be a rather superficial phenomenon).

Sasse answers the first question negatively, because in the languages of the world, sentence constitution by subject and predicate is only one of three observable basic types that may be further specified according to the kind of device used in relating the state of affairs expression (in our languages the finite verb) to the participant expressions (the complements). Besides the subject-predicate sentence constitution type (Sasse's type 2), where the mere concatenation operation on a subject expression and a predicate expression encodes the semantic operation of proposition formation, there are two other types with segmental, i.e., phonologically observable encoding of this operation that can be distinguished according to the well-known analytical-synthetical distinction (syntactical encoding by grammatical words vs. morphological encoding by inflectional properties). The analytical type (Sasse's type 1) requires a third element, such as a tense-aspect-mood marking word, besides the state of affairs expression and the participant expressions in order to form a complete sentence, whereas in languages that are synthetical in this respect (Sasse's type 3), the proposition forming operation is encoded in the morphological form of the states of affairs expression, which allows the latter to constitute a complete sentence all by itself.

So the minimal type 3 sentence consists of one word, whereas in the other two types at least a dummy subject (type 2) or an additional grammatical word (type 3) is needed. Does this challenge the widely held assumption that universal semantics, be it cast in the framework of possible worlds semantics (Montague, Cresswell), or discourse representation theory (Kamp, Heim), or situation semantics (Barwise/Perry, Peters), can be based on FOL? I think it does not, since FOL cannot be identified with any one of its notations, and it is possible to devise notations that correspond to all three of Sasse's

types. I will illustrate this with the critical examples of a zero place predicate P and a one-place predicate Q, the extension to predicates with more arguments being obvious. Type 1 requires a syntactical constituent, written as a symbol that is separated by a blank from its coconstituents, to form a sentence, i.e., a well-formed formula. The difference with type 3, where a morphological element replaces the syntactic constituent, is marked by leaving out the blank in the latter case. FOL notations often use pairs of parentheses for the coding of the proposition forming predicate-argument relation (semantically the set-theoretical membership relation), which are discontinuous constituents and therefore syntactically quite complex, so I will in addition use a single colon as an alternative which is closer to natural language.

Accordingly, a type 1 syntax will state that if a is an individual constant, then P $()$ and Q (a) are formulae, or alternatively, with the colon in final and the argument in initial position, if a is an individual constant, then P : and $a\ Q$: are formulae. A type 2 syntax will state that if a is an individual constant, then $\varepsilon\ P$ and $a\ Q$ are formulae, where ε is a semantically empty expression of appropriate category. (Recall that the question of a parentheses/colon alternation does not arise, since type 2 codes the proposition forming operation only by concatenation of functor and argument expression.) A type 3 syntax will state that if a is an individual constant, then $P()$ (without any blank) and $Q(\ a)$ are formulae, or alternatively, with the colon in suffix notation and the argument in initial position, if a is an individual constant, then P: (without any blank) and $a\ Q$: are formulae.

This playing around with logical notations shows that those who think Sasse's typology is a challenge to the universality claim of FOL are trapped by a naive identification of natural syntactic subjects with logical argument expressions and of natural syntactic predicates with logical predicate expressions. The logical distinction between predicates and arguments is on a rather abstract level and can be surface-syntactically realized by any one of Sasse's three basic types, not just by the subject-predicate pattern of type 2. Nevertheless, the three types should be kept in mind by all semanticists who try to keep their semantic representations close to the object language's surface.

The situation seems to be similar with Gil's contribution. Gil answers negatively the question whether constituents are universally joined by conjunctions such as 'and.' He presents ample evidence that there is at least one human language, namely the Yuman language Maricopa[7] (of the large Northern Amerind phylum), that entirely lacks the syntactic category of a coordinate construction, defined as a construction of some given category with at least two constituents of the same category plus one coordinator. If English sentences with coordinated constructions are translated into Maricopa, a host of different constructions can be used, none of which is exactly parallel to a coordination; hence it seems that the Maricopas are missing a generalization. But Gil does not conclude

from this finding that the logical *and*-connective is absent from the Maricopa semantics since it might be present without having a direct surface-syntactic counterpart. So the investigation does not provide conclusive evidence for or against the universality of propositional logic. But it does give a good example of a category whose presence would probably be assumed by many as a universal, contrary to facts. And again, although the diversity found in human languages is surprisingly high, it turns out that the structures of formal logic are much too abstract to be affected by these findings.

6. Number, polarity, cause, and condition: Some special topics in universal semantics

The last group of contributions consisting of four papers deals with special topics, namely the syntactic and semantic notions of number, polarity items, causal and concessive operators, and conditional constructions and their relatives .

Link's paper, which presents an intriguing combination of linguistic findings with philosophical discussion and formal semantic exploration, deals with the non-trivial relation between the universal cognitive semantic category of quantity and the universal morphosyntactic category of number (cf. Greenberg's universal 42).[8] It discusses the ontological prerequisites for counting and then discusses the phenomenon that in general there is no direct way of inferring quantity from number except in the case of the so-called autonomously referring expressions (Keenan). In the last part a formal way of dealing with this problem is proposed.

Polarity items, both negative and positive, are a class of expressions whose universal existence is far from having been confirmed. The reason is that too many descriptive grammars are not sufficiently informative in this respect. But the phenomenon is obviously widespread and interesting enough to be discussed in the context of a volume like the present one. These items are more aptly characterized as expressions whose occurrence is restricted to contexts exhibiting a certain inferential behaviour, allowing for - sometimes limited - truth-preserving local strengthening and weakening, respectively. Krifka's paper shows how the surprising generalizations gained from the semantic approach, which goes back to Ladusaw's pioneering work, have to be restricted in order to fit the data. It furthermore demonstrates how the seemingly isolated phenomenon can be integrated into the general picture if one adopts the independently motivated view that in natural languages propositions have to be interpreted against the backdrop of an ordered set of alternatives.

Ekkehard König's contribution explores the evidence for and the implications of the hypothesis that concessive and causal subordinators can be conceived of as dual operators, i.e., pairs of operators that are interdefinable with the help of internal and external negation. Although the resulting type of duality group is somewhat special in that it seems to lack both left and right mononicity, which are at least partially present in most of its structure-mates (cf. van Benthem's paper), logical behavior and an impressive amount of cross-linguistic data support the hypothesis. Additional corroboration comes from the fact that it allows to explain the semantic change from a causal to a concessive reading through reanalysis of the relative scope of negation and adverbial, as with English *for* and German *darum*. All this makes the paper an excellent illustration of the potential for mutual clarification inherent in general comparative and logical semantic analyses which has been the chief motivation for conceiving the present volume.

Zaefferer's paper on typological and logical properties of conditionals and related constructions is a further example of the very same methodological approach. It first formulates this approach in its introductory part, and then gives a cross-linguistic survey of the kinds of constructions used in natural languages to encode the conditionalization of a given proposition. It argues that the findings support those logical analyses which treat conditionals as restricted modal operators, such as Kratzer's theory. The paper closes with the outline of an analysis along these lines that accounts not only for standard conditionals, but also for modus ponens conditionals (assertions of a conditional proposition in a context where the antecedent is already accepted) and for unconditionals (conditional constructions with a disjunctive or generalizing antecedent which implicate the truth of at least one of the propositions covered by the antecedent).

7. Conclusion

Universal semantics tries to account for semantic universals, for general properties found in the meaning systems of all natural human general-purpose sign systems. At present it seems that an exhaustive list of relevant hypotheses is still far from being established, let alone from being confirmed. And the more challenging enterprise of explaining those semantic universals that are amenable to explanation, the systematical ones, seems even further away from completion. But it is to be hoped that the present volume has clarified at least two points: First, the task of an interesting, empirically contentful universal semantics is quite an involved one. And second, it is probably too difficult to be accomplished by either the data-oriented extensive approach or the logically oriented intensive approach alone: The future of universal semantics in particular and of universal

grammar in general depends on how they interact. There is reason to believe, and this is the third and main point the present volume gives ample evidence for, that substantial progress will ony be made if they join forces and continue to learn from one another.

Notes

1. This opposition corresponds to the two major approaches to universal grammar outlined by Comrie (1981: 1f.) and hallmarked with the names of Joseph H. Greenberg and Noam Chomsky (cf. the two readers Greenberg 1963 and Bach/Harms 1968). The more recent developments of Chomskian generative grammar with their emphasis on universal principles and language specific parameters and with an increasing number of languages that are taken into account has lead, however, to a certain convergence of the two schools, cf. Comrie (1988: 458ff.).

2. There is a third strand of work within the philosophy of language and especially within logics that is neither concerned with accidental nor with induced properties of natural languages, but rather with properties of ideal languages, and which is called ideal language philosophy. Obviously, it can only investigate analytical properties of its constructs; therefore it is of no direct interest in our context.

3. Computational linguists assume the upper complexity bound of natural human language expressions to be in the region of the indexed languages, i.e., between the context-free and the context-sensitive languages (Gazdar/Mellish 1989: 137).

4. This follows from Greenberg's universals 35 ("There is no language in which the plural does not have some non-zero allomorphs, whereas there are languages in which the singular is only expressed by zero....") and 42 ("All languages have pronominal categories involving at least ... two numbers") (Greenberg 1963: 112f.).

5. Van Benthem 1989 may be considered as a first step in this direction.

6. Cf. Demers (1988: 333): "What all nonhuman communication systems lack, however, is the unboundedness in scope that is the central feature of human language."

7. Johan van Benthem (p.c.) has pointed out to me that the Maricopas should be known to the readers of Karl May: They appear in his novel *Im Tal des Todes*, unfortunately on the wrong, i.e., 'bad' side.

8. "All languages have pronominal categories involving at least three persons and two numbers." (Greenberg 1966: 96).

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