

Dependency in Linguistic Description

Igor Mel'čuk

It depends!

[the main principle of human science—and of human life]

Table of contents

Introduction.....	2
Chapter I: Preliminaries.....	3
1. Auxiliary Notions.....	3
2. Basic Assumptions.....	5
3. Illustrations of Sentence Structures: Semantic, Syntactic, and Morphological.....	6
Chapter II: Three Major Types of Linguistic Dependency.....	9
1. General Remarks.....	9
2. Semantic Dependency.....	10
2.1. The Concept of Semantic Dependency.....	10
2.2. The Logical and Linguistic Properties of Semantic Dependency.....	11
3. Morphological Dependency.....	13
3.1. The Concept of Morphological Dependency.....	13
3.2. The Logical and Linguistic Properties of Morphological Dependency.....	13
3.3. The Three Major Subtypes of Morphological Dependency.....	16
4. Syntactic Dependency.....	22
4.1. General Remarks.....	22
4.2. The Rationale for Syntactic Dependency.....	23
4.3. The Concept of Syntactic Dependency.....	25
4.3.1. Criteria A: SSynt-Connectedness.....	26
4.3.2. Criteria B: SSynt-Dominance.....	28
4.3.3. Criteria C: Labeled SSynt-Dependencies.....	34
4.4. The Logical and Linguistic Properties of Syntactic Dependency.....	41
4.5. Some Non-Definitorial Properties of Synt-Governors and Synt-Dependents.....	42
4.6. The Absolute Head of the Synt-Structure of a Sentence.....	45
4.7. The Three Major Classes of Syntactic Dependencies.....	49
4.8. Syntactic Dependencies of a Language: Surface-Syntactic Relations of English.....	53
5. Possible Combinations of the Three Types of Linguistic Dependency.....	59
6. Correlations between the Three Types of Linguistic Dependency.....	66
Chapter III: Syntactic Dependency.....	67
1. Current Fallacies Concerning Syntactic Dependency.....	67
1.1. 'Double Dependency'.....	67
1.1.1. Relative Pronouns.....	67
1.1.2. Raisings.....	71
1.1.3. Subordination of Coordinate Expressions.....	72
1.2. 'Mutual Dependency'.....	72
1.3. 'No Dependency'.....	72
1.4. 'Insufficient Dependency'.....	73
2. Syntactic Dependency in Action: Eight Illustrative Case Studies.....	74
2.1. Russian Numeral Phrases.....	74
2.2. A Russian 'Approximation'-Marking Preposition.....	76
2.3. Determiners as Heads?.....	77
2.4. Romance Clitics.....	78
2.5. AUX + V Phrases, English-Style.....	78
2.6. Conjoined Nominal Phrases N + CONJ + N.....	80
2.7. Russian 'Exotic' Coordination of Interrogative/Negative Pronouns.....	81

2.8. Elliptical Constructions	82
3. Advantages of Syntactic Dependency	82
4. Syntactic Dependency and Syntactic Constituency	89
4.1. Comparing Syntactic Dependency with Syntactic Constituency	89
4.2. Crossing Syntactic Dependency with Syntactic Constituency.....	91
5. Insufficiency of Syntactic Dependency: Coordination.....	92
6. Syntactic Dependency in Computational Linguistics	95
Acknowledgments	95
References	10

6

Abbreviations and notations

-A	: actant	L(w)	: lexeme to which the wordform w belongs
ACC	: accusative	L	: a particular language
ADJ	: adjective	Morph-	: morphological
ADV	: adverb	MV	: Main Verb
AUX	: auxiliary verb	N	: noun
C	: (inflectional) category	NUM	: numeral
C(w)	: (inflectional) category of the wordform w	r	: a particular Surface-Syntactic Relation
C	: constituency	PERF	: perfect
CONJ	: conjunction	PREP	: preposition
D	: dependency	Rel	: relation
D-	: deep-	S-	: surface-
DET	: determiner	-S	: structure
DirO	: Direct Object	Sem-	: semantic
g	: grammeme	Synt-	: syntactic
IndirO	: Indirect Object	Σ	: syntactics (of a linguistic sign)
L	: lexeme	w	: wordform
		w(L)	: wordform which belongs to the lexeme L

Introduction

One of the most vital and, at the same time, the most visible characteristics of human speech is a VERY HIGH DEGREE OF ORGANIZATION of utterances. (Nothing astonishing, if we remember that ‘information’ means, strictly speaking, ‘degree of organization’.) More specifically, all the units which constitute the utterance—let us limit ourselves here, for simplicity's sake, to wordforms—are arranged by the speaker in well-specified configurations, according to numerous complicated rules, which make up the central part of any language: namely, its syntax. Putting this in a different way, all wordforms within an utterance are always related or linked among themselves. This fact is obvious to any speaker, independently of his educational level or general knowledge.

Thus, in English, we have to say *I love you*, rather than **I you love*, as one does in Russian or French (*Ja tebjja ljublju /Je t'aime*), or **Love I you*, or **Me you love* (still in the sense of ‘I love you’!), or **I loves you*, etc. It is clear that the position and the form of the pronouns I ⟨JA, JE⟩ and YOU ⟨TY, TU⟩ depend on the verb, while the form of the verb depends on I ⟨JA, JE⟩. To make a long story short, the wordforms in an utterance are linked by DEPENDENCIES: one wordform must

depend on another for its linear position and its grammatical form. That is how the concept of dependency appears in linguistics.

Just from these few words it becomes evident to what extent dependency is important for linguistic description. It is one of the most basic concepts of linguistics, situated on the same level of basicness as, say, the signified, the signifier, the syntactics, and the linguistic sign: to speak in a way that will guarantee the transmission of information, the speaker has first to select necessary signs (the *paradigmatic* axis) and then to arrange the signs selected into linear sequence (the *syntagmatic* axis). The arrangement of signs on the syntagmatic axis—i.e. the signs' temporal sequence—is controlled by dependencies between them. Thus, linguistic dependency merits an in-depth study, which I hope to offer in what follows.

Two important warnings: First, not all the relations between wordforms in utterances are dependencies. For instance, the coreference relation between wordforms *father* and *Hull* in the sentence *When John saw his father, Hull Senior was busy repairing the fence* (*father* and *Hull* refer to the same person) is not a dependency. I will limit myself here to dependency relations.

Second, dependency in language is of different types. This is, however, not easily seen on the surface—hence the widespread confusion of these different types; the failure to distinguish them clearly results in many an incongruous or outright false statement. I will keep the different types of linguistic dependency apart as strictly as possible.

The paper is divided in three chapters:

- Chapter I supplies the introductory information: auxiliary notions, basic assumptions our discussion is based on, and detailed illustrations of linguistic representations proposed.
- Chapter II discusses the three major types of linguistic dependency: semantic, syntactic, and morphological. After formulating the definitions, the properties of each type of dependency are described in parallel, their subtypes are specified, and a review of their 14 possible combinations in a sentence is presented.
- Chapter III concentrates on syntactic dependency. Four current fallacies concerning syntactic dependency are analyzed, and eight case studies are given—to illustrate the effect of our criteria for establishing syntactic dependencies. A cursory comparison with constituency representation follows; the cases in which 'pure' syntactic dependency proves to be insufficient are discussed. The chapter ends with remarks on the use of syntactic dependency in computational linguistics.

Chapter I: Preliminaries

1. Auxiliary Notions

The logical analysis of the concept 'dependency in language' requires the following fourteen underlying notions:¹

1. **Utterance**: a speech segment which is sufficiently autonomous; it can appear between two major pauses, constitutes a prosodic unit and its internal structure is governed by linguistic rules; it is also perceived by speakers as 'something that exists in the language.' An utterance is a word-form, a phrase, a clause, or a sentence.

2. **Wordform**: a minimal utterance [= not containing other utterances]; in a prototypical case, it is a disambiguated word [= a lexeme] taken in a specific inflectional form; for instance, [to] SPEAK is a lexeme, while *speak, speaks, spoke, spoken*, etc. are its wordforms.² The word-form is the ultimate unit in this article: only linguistic dependencies between wordforms are considered, but not those between wordform parts [= morphs and other signs of the morphological level] or between wordform configurations [= phrases or clauses].

3. **Phrase**: an utterance consisting of several wordforms (as a limiting case, it can be one wordform).³

4. **Clause**: a phrase that is grammatically organized in essential respects as a sentence; it can constitute a (simple) sentence by itself or be a constituent part of a sentence. A clause always contains a finite (tensed) verb.

5. **Sentence**: a maximal utterance, which is a complete communication unit. (Two or more sentences are a sequence of utterances.) The sentence constitutes the upper limit of analysis in this article: only linguistic dependencies between wordforms within a sentence are considered, to the exclusion of those between wordforms from different sentences—such as, for instance, semantic and anaphoric dependencies.

6-8. **Semantic predicate, semantic name, argument of a predicate**: the notions themselves and the way they are used in linguistics are borrowed from the language of predicate calculus. A (semantic) predicate is a 'binding' meaning, which is somehow incomplete without other meanings—it has open 'slots' where other meanings should be inserted. A meaning that is not a predicate is a (semantic) name. Predicates refer to actions, activities, events, processes, states, properties, relations, localizations, quantities, etc.; their linguistic expressions can belong to any part of speech. Semantic names refer to objects (including beings), substances, and points in time and space; their expressions are nouns.

A meaning that is inserted into an open slot of a predicate is called its argument; the traditional notation for a predicate P and its argument a is $P(a)$. Thus, *Leo is sleeping* is represented as SLEEP(LEO). A predicate can have several arguments: $P(a_1; a_2; a_3; \dots)$; e.g., SEND takes three arguments, cf. *Leo sent a letter to Alan* = SEND(LEO; LETTER; ALAN). The number and the nature of possible arguments of a predicate must be fully specified in its description in one way or another, e.g., by ordering or numbering the arguments, so that, e.g., HIT(LEO; ALAN) HIT(ALAN; LEO). A predicate with its arguments can itself be an argument of another predicate, this phenomenon being recursive:

Leo knows that Alan is in love with Helen = KNOW(LEO, BE-IN-LOVE(ALAN, HELEN));

I think that Leo knows that Alan is in love with Helen =

THINK(I, KNOW(LEO, BE-IN-LOVE(ALAN, HELEN))); etc.

9-10. **Inflectional category**: a set of mutually opposed inflectional meanings, called *grammemes*, such that the selection of one of them is obligatory for lexemes of a given class (e.g., in English, number for a noun, with grammemes 'SG' and 'PL', or tense for a finite verb, with grammemes 'PRES', 'PAST', 'FUT').

11-13. **Syntactics**: one of the three components of any linguistic sign, in particular of a wordform; it specifies the cooccurrence of the sign that is not determined by its signified nor by its signifier (i.e. more or less arbitrary cooccurrence). The syntactics of a sign is represented as a set of *features*, each of which admits mutually exclusive values.

14. **Passive syntactic valency of a lexeme/of a phrase**: a set of syntactic roles which the lexeme/the phrase can take in larger constructions (maybe with some inflectional modifications). In other words, the passive syntactic valency of a lexeme/a phrase is its syntactic distribution. Passive syntactic valency is normally defined for major classes of lexemes, known as *parts of speech*. Thus, the passive syntactic valency of the English noun is as follows: 1) the syntactic subject of a finite verb, 2) the Dir(ect) O(bject) [= DirO] of a transitive verb, 3) the Indir(ect) O(bject) [= IndirO] of a special verb (*send **Father** a letter*), 4) the complement of a copula, 5) the object of a preposition, 6) the first member of a nominal compound (***computer** program*), 7) an address, 8) a fronted topic, etc.⁴

2. Basic Assumptions

Assumption 1: LEVELS OF SENTENCE REPRESENTATION. A sentence has representations on four levels: semantic, syntactic, morphological, and phonological. (In what follows, the phonological representation will be left out. However, phonological dependency is considered in a number of works: thus, see Durand (ed.) 1986, Anderson/Ewen 1987, and Árnason 1989.) Each representation reflects a set of such properties of the sentence that are of the same nature and belong to the level in question. The same is true of any non-minimal part of the sentence—e.g. the clause or the phrase.

A sentence representation is a set of formal objects called structures, each of which is responsible for a particular aspect of sentence organization at the given level. Thus:

Sem(antic) Representation	= <Sem-S(tructure); Sem-Comm(unicative) S; Sem-Rhetorical S>
D(eep)-Synt(actic) Representation	= <DSyntS; DSynt-CommS; DSynt-Anaph(orical) S; DSynt-Pros(odic) S>
S(urface)-Synt(actic) Representation	= <SSyntS; SSynt-CommS; SSynt-AnaphS; SSynt-ProsS>
DMorph(ological) Representation	= <DMorphS; DMorph-ProsS>
SMorph Representation	= <SMorphS; SMorph-ProsS>

Assumption 2: SENTENCE STRUCTURE. The central part of a sentence representation, called its (*central*) *structure*, appears formally as a labeled graph, whose vertices, or *nodes*, represent linguistic units of the corresponding level, and whose *arcs* represent relations between these units.

It is here that the notion of linguistic dependency comes into play: the major type of relation between linguistic units in a sentence structure is dependency.

Assumption 3: DEEP VS. SURFACE DISTINCTION. On the syntactic and the morphological level the Deep and the Surface sublevels of the sentence structure are distinguished: the former is aimed at meaning and expresses explicitly all relevant semantic distinctions; the latter is aimed at form and expresses explicitly all relevant formal distinctions. (For more on the Deep vs. Surface distinction, see Mel'čuk 1988: 59-72.)

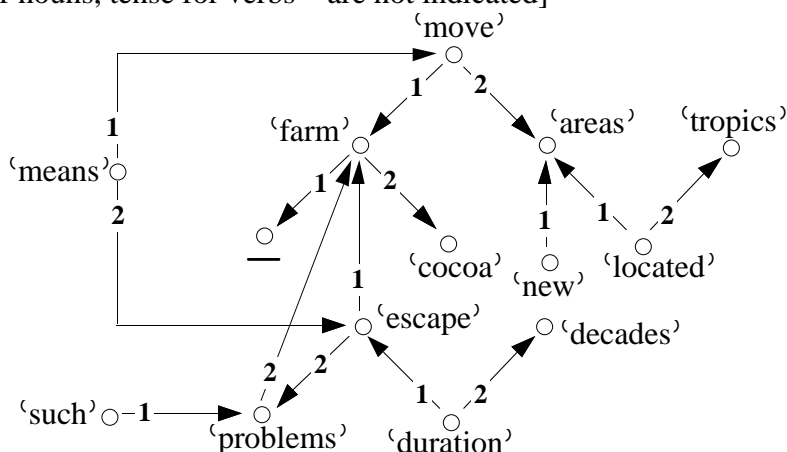
3. Illustrations of Sentence Structures: Semantic, Syntactic, and Morphological

In order to show the reader how linguistic dependencies 'work,' sentence structures that use various types of dependency will be presented—before introducing the corresponding concepts formally. These illustrations will be referred to when discussing dependencies later on.

Consider the English sentence (1) and its structures at different levels (2)-(5):

(1) *For decades, cocoa farming has escaped such problems by moving to new areas in the tropics.*

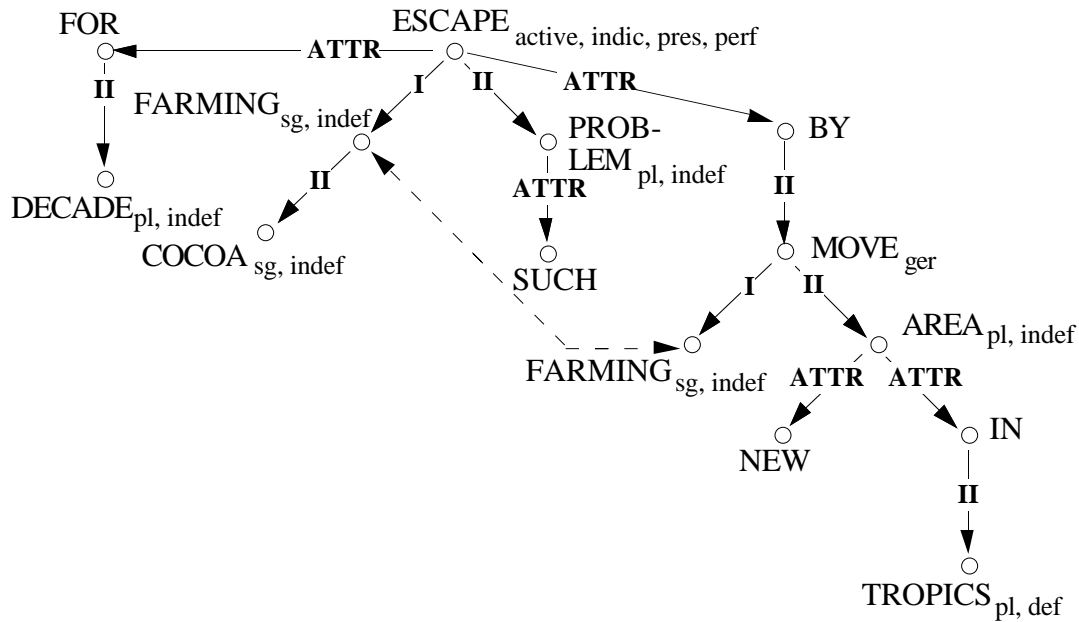
(2) The Semantic Structure [= SemS] of (1) [drastically simplified; thus, semantic grammemes—number for nouns, tense for verbs—are not indicated]



[The blank '-' instead of a semanteme attached to a node means that the corresponding Sem(antic) A(ctant) is not specified.]

The Semantic Structure of a sentence is a network whose nodes represent meanings and are labeled with semantemes (roughly, lexical meanings of the language); its arcs represent predicate-to-argument relations and are labeled with numbers identifying an argument with respect to its predicate. These arcs correspond to semantic dependencies, see Ch. II, 2, p. 00.

(3) The Deep-Syntactic Structure [= DSyntS] of (1)

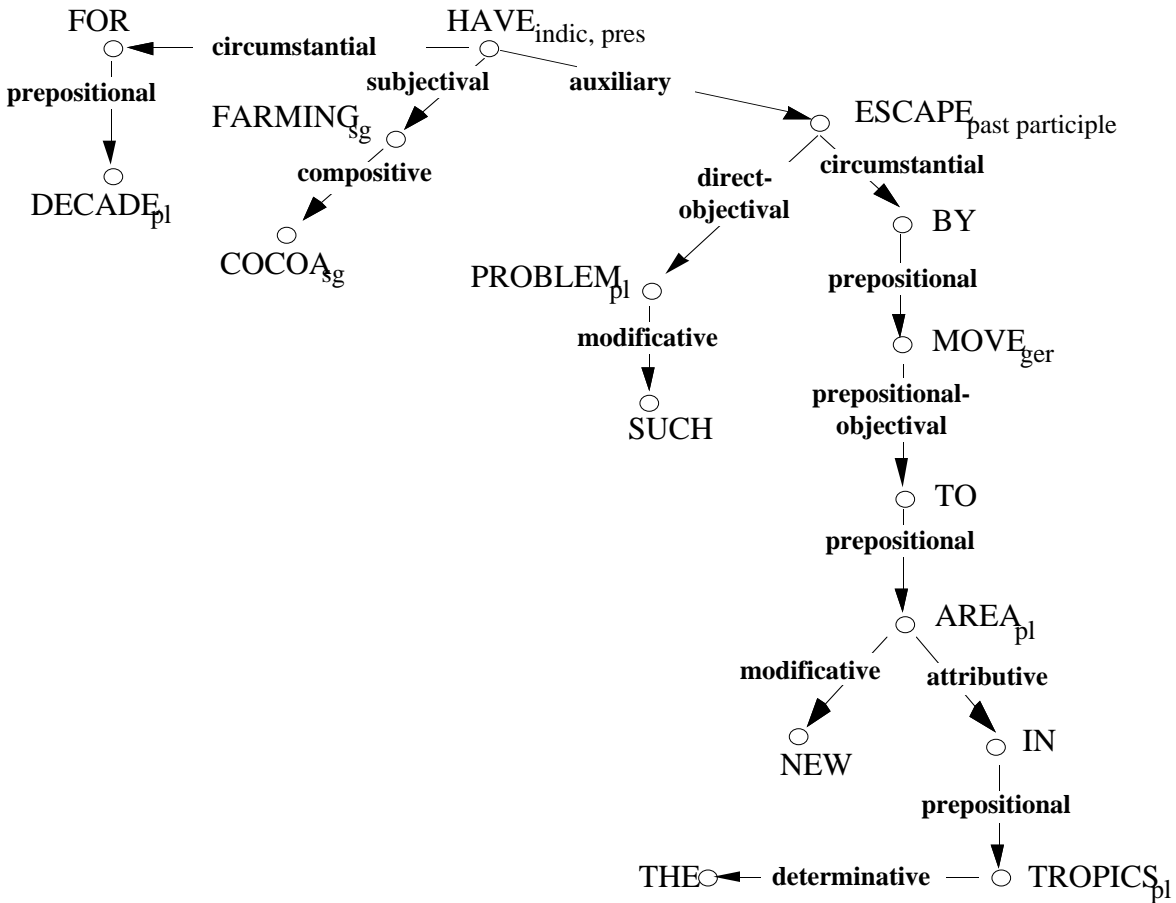


The Deep-Syntactic Structure of a sentence is a tree whose nodes are labeled with the full lexemes of the sentence—such that there is a one-to-one correspondence between DSynt-nodes and full lexemes; the arcs of this tree, called branches, are labeled with names of abstract universal Deep-Syntactic Relations. Their number—across all languages—is about 10: six actantial DSyntRels (I, II, ..., VI), an attributive (ATTR), a coordinative (COORD), and an appenditive DSyntRel (APPEND).⁵ DSyntRels are of course particular subtypes of syntactic dependency; see Ch. II, 3, p. 00.

The diagram of (3) indicates the coreference link between the two occurrences of FARMING (by a dashed bi-directional arrow). This indication belongs to the Deep-Syntactic Anaphoric Structure, mentioned above (and not considered in this paper); it does not interfere with genuine syntactic dependencies represented in the DSyntS.

The Surface-Syntactic Structure of a sentence (see next page) is also a tree whose nodes are labeled with all the lexemes of the sentence (including all auxiliary and 'structural' words)—again there being a one-to-one correspondence between the SSynt-nodes and the lexemes; the arcs of this tree, also called branches, are labeled with names of language-specific Surface-Syntactic Relations, each of which represents a particular construction of the language (their number, in an average language, is somewhere around 50; see a list of SSyntRels of English in Ch. II, 4.8, p. 00). SSyntRels also are particular subtypes of syntactic dependency.

(4) The Surface-Syntactic Structure [= SSyntS] of (1)



(5) The Deep-Morphological Structure [= DMorphS] of (1)

FOR	DECADE _{pl}	COCOA _{sg}	FARMING _{sg}				
HAVE _{ind, pres, sg, 3}		ESCAPE _{ppart}	SUCH	PROBLEM _{pl}			
BY	MOVE _{ger}	TO	NEW	AREA _{pl}	IN	THE	TROPIC _{pl}

The Deep-Morphological Structure of a sentence is a string of lexico-morphological representations of all its wordforms; its arcs are, so to speak, degenerated: they specify only the strict linear ordering of wordforms (' w_1 immediately precedes w_2 '), so that they need not be indicated explicitly. In sharp contrast to the SemS and the D-/S-SyntSs, the DMorphS of a sentence does not represent morphological dependencies between its wordforms: morphological dependencies are not explicitly presented in a special structure because they are not universal (see Ch. II, 3.2, item f, p. 00). They are computed—by means of syntactic rules of the language—on

the basis of syntactic dependencies, that is, from the SSyntS, and transcoded into grammemes that appear in the DMorphS and are expressed in the corresponding wordforms.⁶

Thus, the SemS (2) shows semantic dependencies between (the meanings of) the wordforms of sentence (1), while the DSyntS (3) and the SSyntS (4) show the Deep and Surface syntactic dependencies between the wordforms of (1); morphological dependencies are not shown explicitly. But given the morphological poverty of English, there is only one case of morphological dependency in (1): the wordform *has* depends morphologically—for the singular and 3rd person—on *farming*. The Russian sentence (6), which is a close translation equivalent of (1), contains many examples of morphological dependency (its major types—agreement, government, and congruence—are considered in Ch. II, 3.3, p. 00ff.):

(6) *V tečenie desjatiletij, kul'tura kakao ne znala ètix problem blagodarja rasprostraneniju na novye territorii v tropikax.*

Here,

<i>desjatiletij</i> [GEN] ‘decades’	depends for its case on <i>v tečenie</i> ‘during’ [government];
<i>kul'tura</i> [NOM] ‘farming’	depends for its case on [<i>ne</i>] <i>znala</i> ‘has-escaped’ [government];
<i>znala</i> [SG, FEM] ‘has-escaped’	depends for its number and gender on <i>kul'tura</i> ‘farming’ [agreement];
<i>ètix</i> [PL, GEN] ‘such’	depends for its number and case on <i>problem</i> ‘problems’ [agreement]; etc.

In Russian, unlike English, almost all the wordforms of a sentence may be linked by morphological dependencies.

Chapter II: Three Major Types of Linguistic Dependency

1. General Remarks

I will consider three types of syntagmatic dependency relations between wordforms in a sentence: semantic dependency [= Sem-**D**]⁷, syntactic dependency [= Synt-**D**], and morphological dependency [= Morph-**D**], as distinguished in Mel'čuk (1964, 1979: 13, 1981, 1988: 105-149) and developed in Nichols 1986. I will leave aside paradigmatic relations between wordforms, such as synonymy, antonymy or derivation, and syntagmatic relations of a different nature, such as:

—all kinds of lexical correspondences, e.g., between a word and a preposition it requires (*insist - on*, *borrow - from*, *central - to*), or between a noun and its classifier (e.g., in Vietnamese an animate noun takes the classifier CON and an inanimate noun, the classifier CÁI, with some exceptions—such as *con sông* ‘river’; in Malay, nouns take different classifiers according, roughly, to their semantic class: *tiga helas kemeja* ‘three shirts’ vs. *tiga ekor ayam* ‘three chickens’ vs. *tiga*

batang rokok ‘three cigarettes’, etc.; let it be emphasized that no morphology is involved in such lexical correspondences);

—the anaphoric relation (coreferentiality: between a pronoun and its antecedent or between two nouns sharing the same referent; lexical identity: between a pronoun of the type of THAT and its antecedent, as in *my hat and that of my friend*);

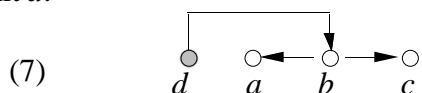
—the inclusion relation (between a phrase and its constituents),

—the ordering relation (between wordforms, phrases, and clauses);

—the communicative dominance relation (between semantic units in a semantic representation).

I will deal only with DIRECT dependencies, without indicating this explicitly every time.

Dependency is by definition a non-symmetrical relation, of the same type as implication: one element ‘presupposes’ in some sense the other, but generally speaking not vice versa. Therefore, dependency is denoted by an arrow: $w_1 \rightarrow w_2$ means that w_2 depends on w_1 ; w_1 is said to be a/the governor of w_2 , and w_2 a dependent of w_1 . Other terms used to designate the governor in a dependency relation include: *head*, *regent*, *ruler*; here, however, only the term *governor* will be used. The term *head*, extremely popular in the literature, has the following defect: it is natural to speak of the *head of a phrase/clause/sentence*, but the expression ‘*the head of this wordform*’ meaning ‘the governor of this wordform’ seems much less convenient. The concept of head is inherited from phrase-structure syntax and carries with it unnecessary connotations (implying constituency). Moreover, *governor of phrase P* *head of phrase P*: P’s governor is outside of P, P’s head is inside of P, so that in (7) the head of the phrase $P = abc$ is the unit b , while P’s governor is the unit d :



Therefore, in this article the term *head* is used only in the precise sense ‘the Synt-head of a phrase/a clause/a sentence’, never in the sense of the Synt-governor. (Cf. Hudson 1993a: 274-275, on the *head of a phrase* vs. *head of a wordform* terminological problem.)

An alternative term for dependent is *satellite*.

Because of its intermediate nature—it is ‘squeezed’ between semantics and morphology—, Synt-**D** is the most difficult type of linguistic dependency to grasp; therefore, it will be treated after Sem-**D** and Morph-**D**.

2. Semantic Dependency

2.1. The Concept of Semantic Dependency

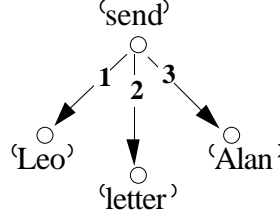
As stated in Chapter I and illustrated in (2), the meaning of a sentence can be represented using the formalism of the predicate calculus. We say that an argument of a predicate *semantically*

depends on its predicate, and for $P(a)$ we write $P\text{-sem}\rightarrow a$. As I have said, an argument of a predicate P_1 can be another predicate P_2 with its own arguments $a_{2-1}, a_{2-2}, a_{2-3}, \dots$:

$$P_1(P_2(a_{2-1}; a_{2-2}; a_{2-3}; \dots))$$

In this case, we write $P_1\text{-sem}\rightarrow P_2, P_2\text{-sem}\rightarrow a_{2-1}, P_2\text{-sem}\rightarrow a_{2-2}, P_2\text{-sem}\rightarrow a_{2-3}$, etc.

The arc between the predicate and its argument carries the number of the argument: $P\text{-1}\rightarrow a_1, P\text{-2}\rightarrow a_2$, etc. The meaning of the sentence *Leo sent a letter to Alan* can then be represented (leaving grammemes aside) as



From this, we immediately obtain the definition of Sem-**D** between wordforms w_1 and w_2 in a sentence.

Definition 1: Semantic dependency

The wordform w_2 is said to semantically depend on the wordform w_1 in the given sentence if the meaning of w_1 is a predicate and the meaning of w_2 is an argument of it in this sentence: $(w_1)(w_2)$.

I write, as convened above, $w_1\text{-sem}\rightarrow w_2$.

A Sem-dependent of a wordform is called its Sem-Actant.

2.2. The Logical and Linguistic Properties of Semantic Dependency

a) Sem-**D** is anti-symmetrical: $w_1\text{-sem}\rightarrow w_2$ entails $\neg(w_1\leftarrow\text{sem}\rightarrow w_2)$, i.e. $*w_1\leftarrow\text{sem}\rightarrow w_2$.

The meaning of a wordform (or any other type of meaning) cannot be an argument of the meaning of another wordform and, at the same time, have the latter as its own argument.

b) Sem-**D** is anti-reflexive: $*\begin{matrix} \text{sem} \\ \circ \\ \text{w} \end{matrix}$; a meaning cannot be its own argument. The anti-reflexivity of

the Sem-**D** follows from its anti-symmetry.

c) Sem-**D** is, generally speaking, neither transitive, nor anti-transitive: in most cases,

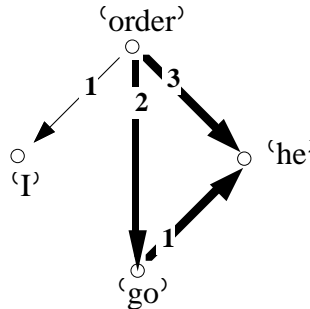
$$w_1\text{-sem}\rightarrow w_2 \text{ and } w_2\text{-sem}\rightarrow w_3 \text{ entails neither } w_1\text{-sem}\rightarrow w_3, \text{ nor } \neg(w_1\text{-sem}\rightarrow w_3).$$

Thus, from *I saw [= w_1] Alan's [= w_3] wife [= w_2]* it does not follow that I saw Alan as well, but it does not follow, either, that I did not (I could).

However, in some cases, i.e. for some predicates, Sem-**D** is transitive:

$$w_1\text{-sem}\rightarrow w_2 \text{ and } w_2\text{-sem}\rightarrow w_3 \text{ entails } w_1\text{-sem}\rightarrow w_3.$$

A typical example is the predicate ‘[to] order’ in the sentence *I order [= w₁] him [= w₃] to go [= w₂]*,⁸ which has the following SemS:



Thus, the SemS may contain an undirected circuit (such a circuit is shown in boldface in the above diagram), but not a cycle, i.e. a directed circuit in which all the arrows point in the same direction.

Finally, in some other cases, Sem-**D** is anti-transitive:

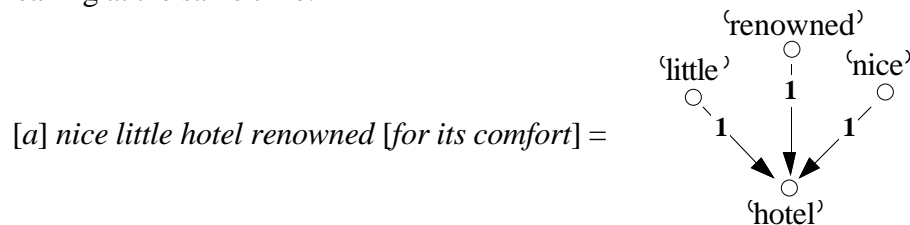
$w_1\text{-sem} \rightarrow w_2$ and $w_2\text{-sem} \rightarrow w_3$ (in a sentence) entails $\neg(w_1\text{-sem} \rightarrow w_3)$.

Thus, in *I wrote down [= w₁] Alan's [= w₃] address [= w₂]*, it is clear that $\neg(w_1\text{-sem} \rightarrow w_3)$.

Another example of the same type is *I heard [= w₁] that Alan [= w₃] came [= w₂] home*.

d) Sem-**D**s must be *typed*, or *labeled*: a Sem-**D** arc has to be supplied with the symbol identifying the corresponding argument. In the present approach, this is a purely distinctive number: it does not carry meaning by itself; thus, an arc $\text{-}i\text{-}$ expresses different semantic roles with different predicates. (The actual semantic role of an argument of the predicate ‘**w**’ is specified by the semantic decomposition of ‘**w**’. For instance, ‘X kills Y’ \equiv ‘X, by acting upon Y, causes that Y dies’, which shows that X is the Agent and the Causer, while Y is the Undergoer.) In other approaches, the symbols on Sem-arcs can be meaningful: e.g., ‘Agent,’ ‘Perceiver,’ ‘Beneficiary,’ etc. Since this does not affect my reasoning in any essential way, I will not deal with this issue here.

e) Sem-**D** does not presuppose the uniqueness of the governor: a wordform can semantically depend simultaneously on many other wordforms, i.e. many different meanings can be predicated about one meaning at the same time:



f) Sem-**D** is universal in the following three respects: it is present in all languages; it appears in all sentences of a language; and it embraces all full wordforms of a sentence (this means that in a sentence, Sem-**D**s always form a connected structure, such that there is a Sem-‘path’ between any wordform and any other wordform). Cf. the Sem-**D**s in the SemS of (2).

3. Morphological Dependency

3.1. The Concept of Morphological Dependency

In many languages (but by no means in all!), a wordform w_2 in a sentence can take a particular morphological form, or *inflect*, under the impact of another wordform, w_1 , of the sentence.

Thus, in *I am well* vs. *You are well* the verb BE has different forms because of its subject [agreement, cf. 3.3, Definition 2.1]; in German, after the preposition NACH ‘after/to’ a noun is in the dative (*nach dem Fest* ‘after the feast’), but after WEGEN ‘because of’ it is in the genitive (*wegen des Festes* ‘because-of the feast’) [government, cf. 3.3, Definition 2.2]. Technically, in such cases a grammeme g of an inflectional category C of w_2 is determined by some properties of w_1 .

This leads to the following definition.

Definition 2.1: Morphological dependency

|| The wordform w_2 is said to morphologically depend on the wordform w_1 in the given sentence if at least one grammeme of w_2 is determined by w_1 .

I write $w_1\text{-morph}\rightarrow w_2$.

3.2. The Logical and Linguistic Properties of Morphological Dependency

a) Morph-**D** is, strictly speaking, anti-symmetrical. In most cases (agreement of an ADJ with an N, government of the case of an N by the a V or a PREP, etc.), $w_1\text{-morph}\rightarrow w_2$ entails $\neg(w_1\leftarrow\text{morph}-w_2)$.

However, in some cases, Morph-**D** is, so to speak, symmetrical—or rather reciprocal: a wordform w_2 can be inflected, for the inflectional category C_1 , as a function of the wordform w_1 , and, at the same time, w_1 must be inflected, for a DIFFERENT category C_2 , as a function of w_2 , so that $w_1\text{-morph}\rightarrow w_2$ entails $w_1\leftarrow\text{morph}-w_2$; as a result, $w_1\leftarrow\text{morph}\rightarrow w_2$ obtains, with C_1 C_2 . This property does not contradict the anti-symmetry of dependency in general, since this reciprocity of Morph-**D** is possible only with respect to different Cs.

Examples

(8) a. Russian

<i>dv+a</i>	<i>stol</i>	<i>+a</i> ‘two tables’
two MASC.NOM	table[MASC]	SG.GEN

The noun *stola* morphologically depends for its singular and genitive case on the numeral *dva*, while *dva* depends on *stola* for its masculine gender; cf. *pjat stol+ov* [PL.GEN] ‘five tables’ or *dvadcat odin stol+Ø* [SG.NOM], lit. ‘twenty-one table’; *dv+e* [FEM.NOM] *krovati* ‘two beds’.
[Here and below, I boldface the grammemes of the wordform w which are determined by the wordform w' , as well as their markers.]

b. Georgian

i. *Gogi+∅ m +zrdi +s me*
 Gogi **NOM** **1SG.OBJ** bring.up **PRES.3SG.SUB** me.**DAT**
 ‘Gogi brings me up’.

vs.

Gogi+∅ gv +zrdi +s čven
 Gogi **NOM** **1PL.OBJ** bring.up **PRES.3SG.SUB** we.**DAT**
 ‘Gogi brings us up’.


ii. *Gogi+m ga +m +zard +a me*
 Gogi **ERG** **COMPL** **1SG.OBJ** bring.up **AOR.3SG.SUB** me.**NOM**
 ‘Gogi brought him/her up’.

vs.

Gogi+m ga +gv +zard +a čven
 Gogi **ERG** **COMPL** **1PL.OBJ** bring.up **AOR.3SG.SUB** we.**NOM**
 ‘Gogi brought us up’.

Both Synt-actants depend morphologically on the verb for their case (which is imposed by the syntactic type of the verb and its tense: the present *vs.* the aorist), while the verb depends morphologically on the actants for its person/number (of the subject and of the DirO).

morph

b) Morph-**D** is anti-reflexive: * , i.e. the inflection of a wordform cannot be determined

by the wordform itself. However, the inflection of a wordform **w** can be conditioned by some properties of **w** itself, which is not a case of Morph-**D**.⁹ Thus, in Alutor, in the ergative construction of a transitive verb, the Synt-subject **w** is in the instrumental if **w** is not a human proper name, and in the locative if it is:

(9) a. Alutor (Chukchee-Kamchatkan family, Russia)

i. *ənpəŋav+a ∅ +ləʒuʂqiv +nin +∅ qəlavul+∅*
 old.woman **SG.INSTR** **3SG.SUB** went.to.see **3.OBJ** **SG** man **SG.NOM**
 ‘An old woman went to see [her] man’.

ii. *Miti+nak ∅ +ləʒuʂqiv +nin +∅ qəlavul+∅*
 Miti **SG.LOC** **3SG.SUB** went.to.see **3.OBJ** **SG** man **SG.NOM**
 ‘Miti went to see [her] man’.

The case of the Synt-subject is determined here by the verb—but conditionally, i.e. according to the indicated property of the subject noun.

Another example of a slightly different kind comes from Arabic:

b. Arabic

Jā rafīq+u vs. *Jā rafīq+a* → *ab +ī*
 oh friend **NOM** oh friend **ACC** father 1SG
 ‘Oh, friend!’ ‘Oh, friend of my father!’

The case of the address noun N is determined by the vocative particle $J\bar{A}$, but according to whether or not N has its own nominal Synt-dependent: if such a dependent is absent, N is in the nominative; if the dependent is present, N is in the accusative.

c) Morph-**D** is neither transitive nor anti-transitive. In most cases, Morph-**D** is anti-transitive:

w_1 -morph → w_2 and w_2 -morph → w_3 (in one sentence) entails $\neg(w_1$ -morph → w_3).
 Thus, in Rus. *Ja vižu [= w₁] krasivuju [= w₃] knigu [= w₂]* ‘I see [a] beautiful book’ there is no Morph-**D** between the verb and the adjective.

There are, however, cases where Morph-**D** is transitive:

w_1 -morph → w_2 and w_2 -morph → w_3 entails w_1 -morph → w_3 .

An example of a transitive Morph-**D** (again, for different inflectional categories and different grammemes) is found in Russian:

(10) Russian

Ja zna +l +a ego molod+ym
 I know PAST FEM he.SG.ACC young **SG.MASC.INSTR**
 ‘I [a woman] knew him young’.

vs.

Ja zna +l +a eë molod+oj
 I know PAST FEM she.SG.ACC young **SG.FEM.INSTR**
 ‘I [a woman] knew her young’.

vs.

Ja zna +l +a ix molod+ymi
 I know PAST FEM they.PL.ACC young **PL.INSTR**
 ‘I [a woman] knew them young’.

Here, *ego/eë/ix* [= w_2] depends on *znala* ‘knew’ [= w_1] for its accusative case, while *molodym/molodoj/molodymi* [= w_3] depends on *ego/eë/ix* for its number and gender, and on *znala* for its instrumental case.¹⁰

d) Similarly to Sem-**D**, Morph-**D** must be also typed (= labeled) : if w_1 -morph → w_2 , then in order to fully specify this Morph-**D**, we have to indicate the inflectional category $C(w_2)$ whose grammeme is imposed by w_1 . Thus, the labeling of Morph-**D**s is meaningful rather than purely distinctive, as is the case with Sem-**D**.

e) Morph-**D** does not presuppose the uniqueness of the governor: a wordform can morphologically depend simultaneously on several other wordforms—for different inflectional categories of course. Cf. (10), where w_3 depends morphologically on w_1 and w_2 at the same time (with transi-

tivity of Morph-**D**); another example of Morph-**D** with multiple governors (without transitivity of Morph-**D**) is (11a), p. 00.

f) Morph-**D** is not universal: in many languages it does not exist at all; in a language where it does exist it is not present in all sentences; and in a sentence where it is present it does not necessarily embrace every wordform (that is, in a sentence Morph-**D**s do not form, generally speaking, a connected structure: there are wordforms that are not morphologically linked to the rest of the sentence).

3.3. The Three Major Subtypes of Morphological Dependency

There are three major subtypes of Morph-**D**: agreement, government, and congruence (Mel'čuk 1993).¹¹ Here are the corresponding definitions; in all of them the wordform w_2 depends morphologically on the wordform w_1 according to the inflectional category C_2 . The wordform w_1 is called the controller, and the wordform w_2 , the target of the Morph-**D** in question. In the examples below, the controller is boxed, and the controlled grammeme and its marker in the target are boldfaced.

Definition 2.2: Agreement

The wordform w_2 is said to agree with the wordform w_1 in the inflectional category C_2 if the following two conditions are simultaneously satisfied:

- 1) the wordform w_2 is not a substitute pronoun¹² coreferential with w_1 ;
- 2) a grammeme $g_2 \in \langle w_2 \rangle$, such that $g_2 \in C_2$, is selected depending upon:
 - (a) either a grammeme $g_1 \in \langle w_1 \rangle$, such that $g_1 \in C_1$ and C_2 is bound to C_1 ;
 - (b) or the value γ_1 of a feature Σ_1 of the syntactics of w_1 , this Σ_1 being one of the following three features of syntactics:
 - agreement class, pronominal person, or pronominal number;
 - (c) or some semantic components of w_1 or some properties of its referent.

Comments

1. An inflectional category C_2 is said to be bound to the inflectional category C_1 if (roughly) C_2 exists in \mathbf{L} exclusively to 'reflect' C_1 . Thus, adjectival number and adjectival case are bound to nominal number and nominal case. (The relation *to be bound to* is by no means symmetrical: C_1 is not bound to C_2 .)

2. The agreement class A is (roughly) a subset of lexemes of the same part of speech (essentially, of nouns) such that in any context the following three conditions are simultaneously satisfied:

1) if any two wordforms w_i and w_j of A impose on a third wordform w a grammeme of a category $C(w)$, they impose on w the same grammeme $g \in C(w)$;

2) if in a sentence a wordform **w** of *A* simultaneously imposes on different wordforms **w_i** morphologically depending on it a grammeme of a category $C(w_i)$, it imposes on all **w_i** the same grammeme $g \in C(w_i)$;

3) the grammeme **g** is not imposed by anything except the wordforms of *A*.

Agreement class is a generalization of grammatical gender (as in Indo-European languages) and of nominal class (as in Bantu and Daghestanian); agreement classes are defined and established in particular languages prior to and independently of the notion of agreement (Mel'čuk 1993: 323-324, 1996b: 206-211).

3. Condition 1 separates agreement from congruence, see below. Condition 2a foresees agreement with GRAMMEMES of the controller (e.g., agreement of an ADJ with an N in number and case). Condition 2b foresees agreement with FEATURES of the SYNTACTICS of the controller: e.g., agreement of an ADJ with an N in gender; or agreement of a V with a pronominal Synt-actant in person and number, the latter being syntactic features of a pronoun). Condition 2c foresees what is known as SEMANTIC AGREEMENT (Rus. *Naš+a vrač skazal+a* 'our[FEM] doctor [a woman] said[FEM]', where, in spite of the fact that the noun VRAČ is masculine, the agreeing adjective and the verb are both in the feminine, because in this sentence VRAČ refers to a woman).

Examples

(11) **a.** In Akhvakh (North-Caucasian, Daghestan, Russia; Boguslavskaja 1991: 11), an adjective or a participle which is used as a restrictive modifier of a noun and, at the same time, has a complement or an actant of its own agrees both with this complement/actant (in nominal class) and the modified noun (again in class); the first agreement is shown by a prefix, and the second by a suffix:

<i>mina</i> +∅	b + <i>aši</i> + <i>da</i>	+ <i>we</i>	<i>hek^wa</i> + <i>ssuλa</i>
head[III] SG.NOM	III white ADJECT(ivizer)	I	man[I] SG.DAT
lit. 'head white to-man' = 'to a white-haired man'			
[<i>mina</i> 'head'] is a complement of the adjective <i>aši</i> 'white': <i>mina baši</i> 'head-wise white'			

<i>roča</i> +∅	b + <i>eχeq'ida</i>	+ <i>je</i>	<i>jaše</i> +∅
book[III] SG.NOM	III bring ADJECT	II	girl[II] SG.NOM
lit. 'book bringing girl' = 'a girl who is bringing a book'			

b. In Old Georgian, a noun N_2 in the genitive that syntactically depends on another noun N_1 agrees with N_1 in case; as a result, N_2 has two case suffixes: the marker of its own genitive and the marker of the second, 'agreeing' case, cf.:

<i>neb</i> +∅+ <i>ita</i>	<i>γmrt</i> +∅ + <i>isa</i> + <i>jta</i> , lit. 'by-[the-]will of-God'
will SG INSTR	God SG GEN INSTR

c. In Kayardild (Australia), all the objects and complements of the verb agree with it in tense/mood (Evans 1988: 221-222):

dangga+a *bargi+da* *tunggal+Ø* +*i* *nara+ŋuni* +*y*
 man NOM chop **NON-FUT** tree ACC **NON-FUT** knife INSTR **NON-FUT**

‘The man just chopped/is chopping the tree with a knife’.

vs.

dangga+a *bargi+du* *tunggal+Ø* +*u* *nara+ŋuni* +*wu*
 man NOM chop **FUT** tree ACC **FUT** knife INSTR **FUT**

‘The man will chop the tree with a knife’.

vs.

dangga+a *bargi+dara* *tunggal+Ø* +*ina* *nara+ŋuni* +*na*
 man NOM chop **PAST** tree ACC **PAST** knife INSTR **PAST**

‘The man (had) chopped the tree with a knife’.

For more examples of 'exotic' agreement see Kibrik 1977 and Anderson 1992: 103-118.

Definition 2.3: Government

The wordform w_2 is said to be governed by the wordform w_1 in the inflectional category C_1 if a grammeme $g_2 \in \langle w_2 \rangle$, such that $g_2 \in C_2$, is selected depending upon:

- (a) either a grammeme $g_1 \in \langle w_1 \rangle$, such that $g_1 \in C_1$ and C_2 is not bound to C_1 ;
- (b) or a value γ_1 of a feature Σ_1 of the syntactics of w_1 , this Σ_1 being neither agreement class, nor pronominal person, nor pronominal number.

Comment

Condition (a) foresees government by a grammeme of the controller. These are 'exotic' cases of government: e.g., the comparative that governs the case of the comparand (Rus. *sil'n+ee smerti* [GEN] 'stronger than death') or the tense of the verb governing the case of its actants, see examples (12a-b). Condition (b) foresees government by a feature of the syntactics of the controller; it separates such government from syntactics-induced agreement. These are 'normal' cases of government: e.g., a verb or a preposition governing the grammatical case of a complement.

Examples

(12) a. In Georgian, a transitive verb in the present/imperfect governs the nominative of the subject and the dative of the DirO; if the verb is in the aorist, the subject takes the ergative and the DirO, the nominative; the verb in the perfect governs the dative of the subject and the nominative of the DirO. However, the agreement of the verb does not change: it always agrees with its subject and with its DirO (in person and number), if the latter is not of the 3rd person:

Gogi + \emptyset *ceril* +*s* *cer* +*s*
 Gogi NOM letter.SG **DAT** write PRES.3SG.SUB

‘Gogi is-writing [a] letter’.

vs.

Gogi+m *ċeril* +*i* *da* +*ċer* +*a*
 Gogi **ERG** letter.SG **NOM** COMPLETIVE write AOR.3SG.SUB

‘Gogi wrote [a] letter’.

vs.

Gogi+s *ċeril* +*i* *da* +*u* +*ċer* +*i* +*a*
 Gogi **DAT** letter.SG **NOM** COMPLETIVE 3person write PERF 3SG.SUB

‘Gogi (apparently) has-written [a] letter’.

[“3 person” in the last example denotes the grammeme ‘for the other’ of a special inflectional category of Georgian: the version, which signals the person for whose ‘benefit’ the event in question takes place; this grammeme must be obligatorily present in perfect forms.]

- b. In Hindi, a transitive verb in the present governs the nominative of the subject and the nominative/dative of the DirO (the dative seems syntactically optional); if the verb is in the perfect, the subject takes the ergative and the DirO remains in the nominative/dative. But, unlike Georgian, the agreement of the verb changes depending on the tense: in the present, the verb agrees with the subject, but in the perfect either it agrees with the DirO (if the DirO is in the nominative) or it takes the unmarked form of the 3rd person singular masculine (if the DirO is in the dative).

Larkā + \emptyset *kitāb* + \emptyset *parh+tā* *hai*
 boy[MASC] **NOM** book[FEM] **NOM** read IMPF.MASC.SG AUX.PRES.3SG
 ‘[The] boy reads [a] book’.

analytical present form

vs.

Larke +*ne* *kitāb* + \emptyset *parh+i*
 boy[MASC] **ERG** book[FEM] **NOM** read PERF.FEM.3SG

‘[The] boy read [a] book’.

vs.

Larkō +*ne* *Sitā* + \emptyset *dekh+i*
 boys[MASC] **ERG** Sita[FEM] **NOM** see PERF.FEM.3SG

‘[The] boys saw Sita’.

vs.

Larkiyō +*ne* *Sitā* +*ko* *dekh+ā*
 girls[FEM] **ERG** Sita[FEM] **DAT** see PERF.MASC.3SG

‘[The] girls saw Sita’.

- c. In Russian, the infinitive in a special ‘impossibility’ construction governs the dative of its semantic ‘subject.’

Mn+e *ètu knigu* *ne* *pročest’*
 I **DAT** this book not read.PERF.INF

‘I will not be able to read this book’.

Alan+u *tuda* *ne* dojti
 Alan SG.DAT till.there not reach.walking.PERF.INF
 ‘Alan will not be able to walk till there’.

d. In Hungarian, the subordinate conjunction HOGY ‘that’, when it syntactically depends on a verb of volition, requires the imperative of the Main Verb of the subordinate completive clause:

Azt *akarta,* hogy *lassan* *jár+j*
 this-ACC want-PAST.3SG that slowly walk IMPER.2SG
 lit. ‘[S/he] this wanted that [you-SG] slowly walk’.

Let it be emphasized that it is impossible to define agreement and government in a simpler way—for instance, following the traditional view that agreement is a correspondence between the inflectional form of a lexeme and the inflectional form of another lexeme, while government is a correspondence between the inflectional form of a lexeme and lexicographic properties of another lexeme. This viewpoint is simply wrong: many types of agreement involve lexicographic properties of the controller (gender, nominal class, animacy), and many types of government are determined by the inflectional form of the controller (cf., among others, examples (12a-b)).

Definition 2.4: Congruence

The wordform w_2 is said to be congruent with the wordform w_1 in the inflectional category C_2 if w_2 is a substitute pronoun coreferential with w_1 and a grammeme $g_2 \in \langle w_2 \rangle$, such that $g_2 \in C_2$, is selected depending on w_1 .

Comments

1. Congruence is, so to speak, a particular case of agreement, namely, ‘agreement *in absentia*!’ while genuine agreement obtains between an ADJ/a V and the N it combines with syntagmatically, congruence obtains between a substitute pronoun and the N it replaces. Agreement marks semantic and/or syntactic **D**s within the borders of a clause, and congruence marks anaphoric links, basically outside the borders of a clause. For congruence, correspondence according to the meaning (rather than according to grammatical properties of the controller) is especially typical. Recall that congruence is not a syntactic dependency, but a morphological one; therefore, the typical absence of its controller in the clause is not a problem.

2. Congruence presupposes the choice of a particular inflectional form of a given lexeme. Thus, in Spanish, the noun *caballo* ‘horse’ [MASC, SG] is replaced with the pronoun *él* ‘he’, *mosca* ‘fly’ [FEM, SG] with *ella* ‘she’, *caballos* [MASC, PL] with *ellos*, and *moscas* [FEM, PL] with *ellas*, and this is congruence: *él*, *ella*, *ellos*, and *ellas* are forms of one lexeme (= ÉL), which is inflected for gender and number. (The same state of affairs obtains in any language in which substitute pro-

nouns grammatically distinguish gender and/or number: Romance, Slavic, Semitic, Bantu languages.) However, the choice between different pronominal lexemes as a function of w_1 to be replaced is not congruence. Thus, in English, *general* or *Alan* is replaced by HE, *sister* or *battleship*, by SHE, and *warning* or *fly*, by IT; but HE, SHE and IT are different lexemes rather than inflectional forms of the same lexeme—because English has no inflectional category of gender. The selection of the appropriate lexeme has to do with lexical correspondences, mentioned in **1**, p. 00, not with congruence—because no Morph-**D** is involved (no grammeme is imposed).

Examples

(13) a. French

Nous étudions un suffixe [MASC.SG] *et deux* alternances [FEM.PL] ; *nous traiterons celui-là* [MASC.SG] *immédiatement, et nous analyserons celles-ci* [FEM.PL] *au chapitre suivant*

‘We will study a suffix and two alternations; we will deal with the former right away, and we will analyze the latter in the next chapter’.

The wordforms *celui* and *celles* are inflectional forms of the lexeme CELUI, so that their choice illustrates congruence. (In contrast, the English wordforms *former* and *latter* belong to two different lexemes, and therefore their use is not related to congruence.)

b. In Bushong (Bantu), a noun is replaced by different inflectional forms of the same substitute pronoun lexeme -N ‘(s)he, it, they’, namely—by the form of the corresponding nominal class:

- | | | | |
|-----|------------|------------|---------------------------------------|
| I | <i>aa</i> | + <i>n</i> | replaces a noun of the class I; |
| II | <i>baa</i> | + <i>n</i> | replaces a noun of the class II; |
| III | <i>muu</i> | + <i>n</i> | replaces a noun of the class III; |
| IV | <i>mii</i> | + <i>n</i> | replaces a noun of the class IV; etc. |

To conclude this subsection, let me state three reasons that underlie the intuitive desire of a linguist to distinguish these three types of Morph-**D** (cf. also **6**, p. 00):

1) A morphological reason: under agreement and congruence (which is a particular case of agreement) the target ‘reflects’ some properties of the controller; under government, this cannot happen.

2) A semantic reason: under agreement the target is prototypically the Sem-governor of the controller, which is its Sem-actant; under government the target is prototypically the Sem-dependent of the controller, i.e. its Sem-actant; under congruence the target and the controller cannot be linked by a Sem-**D**: they are coreferential.

3) A syntactic reason: under agreement the target can be or not be linked by a direct Synt-**D** to the controller; under government the target is necessarily linked by a direct Synt-**D** to the controller; under congruence the target and the controller cannot be linked by a Synt-**D**.

4. Syntactic Dependency

4.1. General Remarks

Paraphrasing R. Jakobson, we can say that Sem-**D** is directly related to meaning and therefore it is conceivable or understandable, while Morph-**D** is directly related to (phonological) form and therefore it is perceivable. The Synt-**D** is, however, not DIRECTLY related either to meaning or to form—it is more abstract, more indirect than Sem-**D** and Morph-**D**, and, as a consequence, more questionable; even its mere existence needs justification.

Syntactic dependency has been used to talk about the structure of sentences from Antiquity and throughout the Middle Ages to modern times. All respectable pre-20th century grammatical traditions in syntax have been based on it, as has much language teaching. By the 8th century, Arab grammarians (e.g. Sībawaih, who died in 798) already distinguished the governor *vs.* the dependent in syntax and used this distinction when formulating rules for word order and inflection (Owens 1988: 79-81). One finds dependency trees as a means of describing sentence structure in German syntax books from the 19th century (Weber 1992: 13). In point of fact, constituency representation in syntax, i.e. what became known as phrase-structure, was first introduced—and that, almost exclusively in the domain of the English language!—in the early 20th century. The dependency approach [= **D**-approach] was properly presented for the first time in Tesnière 1959 (the first sketch of Tesnière's theory appearing in Tesnière 1934; see Ch. II); this profound treatise made syntactic dependency available for serious theorizing. Yet, due to the dominance of Chomskian Transformational-Generative Grammar—which used, as its main syntactic tool, the phrase-structure representation (i.e. constituency)—the **D**-approach did not become popular in modern linguistics until the beginning of the 1980s.

Nevertheless, starting in the early 60s and over a period of about ten years, a number of publications which laid foundations for the **D**-approach had appeared (Hays 1960 [1961], 1964a, b, Lecerf 1960, Fitialov 1962, 1968, Mel'čuk 1962, 1963, 1964a, b, Iordanskaja 1963, 1967, Padučeva 1964, Gaifman 1965, Baumgärtner 1965, 1970, Marcus 1965a, b, Robinson 1970a, b, Heringer 1970). All these studies were more or less inspired by computational applications of linguistics—primarily machine translation and other types of computer text processing. Gradually, the field grew into real theoretical research, continuing to rely heavily on computer applications (e.g., Kunze/Priess 1967-1971, Sgall *et al.* 1969, Goralčíková 1973, Machová 1975, Kunze 1975, Hudson 1976, 1980a, b, 1984, Garde 1977, Korhonen 1977, Schubert 1987). And more recently, several general linguistic theories have emerged, based partially or completely on the **D**-approach,

including Case Grammar (Fillmore 1968, Anderson 1977), Meaning-Text Theory (Mel'čuk 1974 [1999], 1979, 1988, 1997b), Lexical-Functional Grammar (Bresnan 1982), Relational Grammar (Perlmutter 1983), Word Grammar (Hudson 1984, 1990), Functional Generative Description (Sgall *et al.* 1986, Petkevič 1995), Lexicase Theory (Starosta 1988)—cf. Hudson 1993b: 330-332. Cognitive Grammar (Langacker 1987, 1991, 1997) is also dependency-oriented. One finds a few university manuals which use the **D**-approach (e.g., Matthews 1981, Tarvainen 1981, Weber 1992). The description of German syntax in Engel 1977 [1982, 1994] and the syntactic part of Engel 1988—one of the most authoritative German reference grammars—are developed explicitly within the **D**-approach (see especially Engel 1988: 21-26). A formal **D**-grammar for German syntax (a list of rules and theoretical discussion) is found in Heringer 1996.

Let it be clear that, when speaking of the **D**-approach in what follows, I mean exclusively a DEPENDENCY REPRESENTATION of the structure of sentences rather than a DEPENDENCY GRAMMAR, or a logical device consisting of rules that ensure the generation/parsing of sentences. The two notions are of course logically related, but should be kept distinct. (Cf. Hudson 1993a: 266-269 on the difference between syntactic heads in sentence structure and syntactic heads in grammar rules.)

4.2. The Rationale for Syntactic Dependency

The notion of Synt-**D** is proper to Syntactic Structure [= SyntS]: a formal object used to depict the organization of a sentence as opposed to its meaning, which is the target of the Semantic Structure [= SemS]. Synt-**D**s are building blocks of a SyntS, and so it will be useful to start with a brief characterization of the latter.

Formal considerations

The SyntS of a sentence is called upon to 'mediate' between its SemS and its Morph(ological)S. The SemS is formalized as an arbitrary (n -dimensional) graph, i.e. a *network*, as we see in (2). The MorphS is a 1 -dimensional (linear) graph, i.e. a *string*, cf. (5). The SyntS constitutes a convenient bridge between the SemS and the MorphS: under text synthesis—that is, in the transition from meaning to text—the SyntS must be easily produced from the Sem-network and easily converted into the Morph-string; under analysis—that is, in the transition from text to meaning—it must allow for ease of the inverse operations. The simplest formal object that satisfies these requirements is a 2 -dimensional (planar) graph, i.e. a *tree*. Networks are relatively easy to arborize, and trees are easy to linearize (text synthesis); vice versa, strings are relatively easy to arborize, and trees are easy to convert to networks (text analysis). In other words, the Synt-tree is the most convenient intermediary between the Sem-network and the Morph-string. That is how the idea of SyntS as a dependency tree composed of lexemes is formally arrived at. If the SyntS is a tree, then any of its arcs, or *branches*, represents an anti-reflexive, anti-symmetrical

and anti-transitive binary relation between lexemes—i.e. a Synt-**D** relation. This reasoning leads us to the notion of Synt-dependency as an order relation (see Definition 3.5, 4.3, p. 00) and to the notion of dependency tree as an appropriate formalism for the representation of SyntSs (see the end of 4.4, p. 00).

What has just been said should not be construed as a proposal to consider the dependency tree as an artifact of the linguist, a figment of his imagination—without any claim to psychological reality. On the contrary, I think that the dependency tree is a reasonably good model of how sentences are organized in the brain of the speakers. The dependency tree is proposed here as an exclusive means for representing the SyntSs of sentences exactly because I believe that my brain is using it when I am writing these lines.

Substantive considerations

Now I will consider the problem of SyntS from another angle. Suppose we want to represent the SyntS of the sentence *Leo knows that Alan is in love with Helen*. There are exactly four types of linguistic means that this sentence uses to express its meaning: lexemes, order of lexemes (i.e. word order), prosody, and inflection. Note that:

- 1) there do not exist other types of linguistic means that could be used to express meanings;
- 2) these four types of linguistic means are used by all languages in all sentences—with the notable exception of inflection, which does not exist in quite a few languages and which, even in the languages where it does exist, does not appear in all sentences and on all the wordforms;
- 3) each of these means can be used either as a direct expression of meaning, i.e. in a SEMANTIC CAPACITY, or without a direct relation to meaning—that is, purely in order to indicate links between wordforms in the sentence, i.e. in a SYNTACTIC CAPACITY, see Table 1.

Linguistic means	used in semantic capacity	used in syntactic capacity
lexical units	full words (<i>for, decades, cocoa, farming, escape, the, when, etc.</i>)	governed prepositions and conjunctions (as in <i>depend on, to order that, etc.</i>)
word order	arrangements that mark communicative structure (theme ~ rheme, given ~ new, etc.)	arrangements that mark syntactic constructions: N + N, PREP + N, ADJ + N, V + N [= DirO], etc.
prosody	prosodies that mark question vs. assertion, focus, emphasis, ..., irony, threat, tenderness, etc.	prosodies that mark borders of constituents
inflection	number in nouns; aspect and tense in verbs	case in nouns; person and number in verbs; gender, number and case in adjectives (agreement and government categories)

Table 1: Linguistic Expressive Means and Their Possible Uses

Non-lexical means used in syntactic capacity (shown in a double box in Table 1) should not appear in a SyntS:¹³ they are MEANS USED TO EXPRESS the SyntS, therefore they cannot be part of it. All of them appear closer to surface, in the DMorphS of the sentence, while the SyntS must replace them with a formal simple homogeneous device. This device must be able to encode the

future linear arrangement of wordforms, i.e. word order, in an explicit, clear and elegant way. Note that syntactic prosody applies to a previously ordered sequence of wordforms, and inflection is absent in many cases, so that these two linguistic means are secondary from the viewpoint of the SyntS. The SyntS has to tell us, first of all, where to position a wordform w_2 : before or after another wordform w_1 —and then give us more details about mutual positions of different wordforms which have to be positioned on the same side of w_1 . The most economical way to do this is using a binary anti-reflexive, anti-symmetrical, and anti-transitive relation between the wordforms of the sentence—an order relation (in the logical sense). This is nothing but a Synt-**D**; thus, we have once again, this time via substantive reasoning, come to the same conception of Synt-**D** relation.

As a bridge between the SemS and the DMorphS of a sentence, the D-/S-SyntS must encode all the relevant semantic contrasts that are expressed on the surface and all the relevant formal contrasts that carry meaning. Therefore, the specific Synt-**D** relations that are introduced for a given language must be such as to satisfy this requirement.

4.3. The Concept of Syntactic Dependency

What is of special importance for a good understanding of syntactic dependency is the fact that at the very beginning it was not, and even now it is still not always, rigorously distinguished from Sem-**D** and Morph-**D**. Linguists would often talk about dependency *tout court*, aiming at the Synt-**D**, but in actual fact taking in a mixture of the three.

Since Synt-**D** is an abstract formal concept, it is not as easy to define as Sem-**D** and Morph-**D**. Three groups of criteria for Synt-**D** have to be introduced; but first, let me emphasize that for simplicity's sake I will be dealing exclusively with Surface-Syntactic [= SSynt-]dependency. The results can be easily generalized to cover Deep-Syntactic dependency as well.

To establish a SSynt-**D** relation between two wordforms in a sentence we need (at least):

- A. Criteria for SSynt-CONNECTEDNESS of the two wordforms (= for the presence of a SSynt-**D** between them).
- B. Criteria for the SSynt-DOMINANCE between the two wordforms (= for the orientation of the SSynt-**D** between them).
- C. Criteria for the specific TYPE of the given SSynt-**D** between the two wordforms (= for the type of the SSynt-relation between them; as will be shown, to ensure a proper representation of syntactic structure of utterances, we have to distinguish, in a particular language, many different specific types of Synt-**D**).

These criteria are necessary, but unfortunately not sufficient. Thus, when establishing the types of SSynt-**D**s in a given language, the researcher has to invoke relevant linguistic properties of different dependents subsumed under the same SSyntRel (Iordanskaja & Mel'čuk 2000). While deciding on the presence and orientation of SSynt-dependencies some heuristic principles have to

be recurred to (see Ch. III, 1.1.1, p. 00). And more than anything else, reasoning by analogy remains the most necessary tool: the description, in terms of Synt-**D**, of a 'dubious' phrase P_1 should correspond to the SSynt-description adopted for the similar phrase P_2 where the situation is clearer or outright obvious.

4.3.1. Criteria A: SSynt-Connectedness

First of all, one has to know whether two wordforms in a sentence, w_1 and w_2 , are syntactically directly linked—or not. To answer this question, we need Criteria A1 and A2.

Criterion A1: Linear arrangement of wordforms

Wordforms w_1 and w_2 considered in a communicatively neutral sentence of language **L** have a direct Synt-**D** link between them only if the linear position in this sentence of one of them must be specified with respect to the other.

Comments

1. In languages where word order is used semantically—among other things, to express communicative organization (the Rheme/Theme division, the Old vs. New, Focalization, Emphasis, Contrast, etc.)—Criterion A1 applies in a limited way: it has to be applied only to communicatively neutral expressions, i.e. to expressions without extractions, permutations or other communicative transformations of all kinds.

2. When we say that the linear position of the wordform w_1 is specified with respect to the wordform w_2 , this means that w_2 either precedes w_1 , or follows it, or else can precede or follow it (optionally or under some conditions). Thus, if in a language, the manner adverbial can indiscriminately precede or follow the verb it modifies, we still formulate the possible positions of the adverbial with respect to the verb, rather than the other way around.

3. The wordform determining the linear position of the other is not necessarily its Synt-governor (cf. item **B** below): thus, in the phrase PREP→N, it is the Synt-governor PREP that is positioned with respect to its Synt-dependent N. Of course to say that a PREP precedes the N it introduces is logically equivalent to saying that an N introduced by a PREP follows this PREP. However, linguistically these two statements are not equally acceptable: since a noun can appear without a preposition, while a preposition cannot appear without a noun, it is more natural to specify the place of the preposition with respect to the noun than the other way around. (By the way, the etymology of the word *preposition* is a witness to exactly this intuition: it is an element that is PRE-posed to the noun.)

4. In some 'exotic' cases Criterion A1 has to be applied, so to speak, with special caution. Thus, in Serbo-Croatian, in the construction $V_{Aux} \rightarrow V_{non-fin}$ ($V_{non-fin}$ is a Past Participle in the compound past tense, and an Infinitive or a clause with the conjunction DA 'that' in the compound

future) it is V_{Aux} that is the SSynt-governor: *Ja sam*→*pisao* ‘I [MASC.SG] have written’, *Ti si*→*pisala* ‘You [SG.FEM] have written’, *Ja ću*→*pisati* or *Ja ću*→*da pišem* ‘I will write’, etc. (I cannot cite here the arguments in favor of this description: see Milićević 2000: 00-00.) However, the linear position of G [= V_{Aux}] is determined without any reference to its D [= PPart/Inf/DA-clause]: V_{Aux} is a clitic, and Serbo-Croatian clitics are placed as a cluster, roughly speaking, after the first constituent of the clause, whatever the syntactic class and syntactic role of this constituent (some more specific conditions apply). Nevertheless, BEFORE the clitics are placed where they belong, the V_{Aux} clitic—the SSynt-head (= top node) of the clause—serves as the reference point for the linear placement of all the other clause elements, exactly in the same way as any other top node of a clause does. Therefore, even if one of the wordforms w_1 and w_2 is a clitic, Criterion A1 is still fully applicable (but *cum grano salis*).

Criterion A2: Potential prosodic unity

Wordforms w_1 and w_2 considered in a given sentence of the language \mathbf{L} can have a direct Synt-**D** link between them only if:

- (a) Either w_1 and w_2 can form an utterance in \mathbf{L} , i.e. a special prosodic unit—a phrase

[general case]:

e.g., N + V, N + ADJ, V + N, PREP + N, ADV + ADJ, NUM + N, etc.

- (b) Or the wordforms w_1 and w_2 cannot form a phrase, but the wordforms w_1 , w_2 and a set of wordforms \mathbf{W} can, such that 1) in this phrase, w_1 is the Synt-head and 2) w_2 and \mathbf{W} also form a phrase in which w_2 is the Synt-head [special case]:

e.g., *escape* [= w_1] *from* [= w_2] *many problems* [= the set \mathbf{W}], where *escape from many problems* is a phrase in which *escape* is the Synt-head; *from many problems* is also a phrase in which *from* is the Synt-head; therefore, we say that *escape* and *from* have a direct syntactic link: *escape*–**synt**→*from*.¹⁴

Of course not every prosodic unit in an actual sentence is a phrase; the concept of phrase needs an elaborate definition, which is outside of my frame here, because it is a concept of the Deep-Morphological, rather than Syntactic, level. I take it to be one of my *indefinibilia*, see Ch. I, 1, p. 00. However, recall that a phrase must be perceived by speakers as existing in the language, whatever this means.

Criteria A1 and A2 must of course not contradict each other. For instance, in (1), *for* has to be positioned before *decades*, and *escaped* after *has*, etc.: therefore Criterion A1 indicates the presence of a Synt-**D** in these pairs. Criterion A2 does not contradict this: in (1), *for decades* is a phrase of English, and so is *has escaped* (but, e.g., **to new* is not); therefore, in *for decades* and *has escaped* the wordforms can be linked by a Synt-**D**. Again in (1), *by moving* is positioned after

escaped, and *by*—before *moving* (Criterion A1); *escaped by moving* is a phrase, with *escape* as the Synt-head, and so is *by moving*, where the preposition *by* is the Synt-head; therefore, by Criterion A2-b, *escaped* and *by* can be linked by a Synt-**D**. Both criteria are again fulfilled.

For Criteria A to be satisfied, that is, for there to be w_1 —synt— w_2 , both Criterion A1 and Criterion A2 must be satisfied.

4.3.2. Criteria B: SSynt-Dominance

Next, in each pair of wordforms w_1 and w_2 which are syntactically directly linked in the sentence under consideration, one of them syntactically dominates the other, i.e. is its Synt-governor. In the phrase w_1 —synt— w_2 the Synt-governor is the wordform that determines—at least, to a greater extent than the other wordform (its Synt-dependent)—different properties of the phrase according to Criteria B1, B2 and B3.

Criterion B1: The passive SSynt-valency of the phrase

|| In the phrase w_1 —synt— w_2 , the wordform w_1 is the Synt-governor of w_2 if the passive SSynt-valency of the whole phrase is determined by the passive Synt-valency of w_1 to a greater extent than by that of w_2 .

To put it differently, the passive Synt-valency of w_1 —synt— w_2 is rather that of w_1 than that of w_2 ; the Synt-head of a phrase determines more than any other of its elements all the external syntactic links of the phrase. (For passive SSynt-valency, see Ch. I, 1, item 14, p. 00.)

Note that Criterion B1 does not require EXACT distributional equivalence between the Synt-head of a phrase and the whole phrase, as is the case in some similar approaches. For us, it is sufficient if, in the phrase w_1 —synt— w_2 , the wordform w_1 contributes to the passive SSynt-valency of w_1 —synt— w_2 more than w_2 does.

Examples

(14) a. The passive SSynt-valency (= the distribution) of the phrase *for decades* is fully determined by the preposition; therefore, *for*—synt—*decades*.

b. Similarly, a phrase like *has escaped* or *does not escape* shows the distribution of, or plays the same Synt-role as, *has/does* (i.e. that of a finite, or tensed, verb) rather than that of the past participle *escaped* or the infinitive *escape*; therefore,

has—synt—*escaped*, *does*—synt—*escape*.

c. The phrase *Sir Wanner* has the passive SSynt-valency of *Wanner*, not that of *Sir*: *I see Sir Wanner* ~ *I see Wanner* ~ **I see Sir*; therefore, *Sir*←synt—*Wanner*.

By analogy with such nouns as *Sir* or *Mister* all other nouns possible in this construction are treated alike:

General←**synt**–*Wanner*, *Professor*←**synt**–*Wanner*, *President*←**synt**–*Wanner*, etc.¹⁵

Let us consider now a more difficult case where it is not immediately obvious what element is the SSynt-governor.

(15) a. French

<i>un</i> a.SG.MASC	<i>drôle</i> strange.SG.MASC	<i>de garçon</i> of boy[MASC].SG	‘a strange boy’
<i>une</i> a.SG.FEM	<i>drôle</i> strange.SG.FEM	<i>de voiture</i> of car[FEM].SG	‘a strange car’
<i>ces</i> this.PL.MASC	<i>drôles</i> strange.PL.MASC	<i>de garçons</i> of boy[MASC].PL	‘these strange boys’
<i>ces</i> this.PL.FEM	<i>drôles</i> strange.PL.FEM	<i>de voitures</i> of car[FEM].PL	‘these strange cars’

The passive SSynt-valency of the phrase *drôle de garçon* (ADJ+*de*+N) is that of a noun and not that of an adjective; what should be taken as the head of the phrases in (15a)?

- Solution I: the noun (GARÇON, VOITURE) is the head. The internal SSynt-structure of the

phrase is as follows: $\overbrace{\text{drôle} \text{---} \text{synt} \text{---} \text{de} \text{---} \text{garçon}}^{\text{synt}}$. We have then to treat DE not as a preposition, but as a special adjectival marker (homophonous with the preposition DE and depending on the adjective). The adjective agrees in gender and number with its SSynt-governor, which is the rule in French.

- Solution II: the adjective (DRÔLE) is the head. The internal SSynt-structure of the phrase is as follows: $\text{drôle} \text{---} \text{synt} \text{---} \text{de} \text{---} \text{synt} \text{---} \text{garçon}$. We have then to admit that an adjective of such a type (French has a handful of those: DRÔLE, CHOUETTE, VACHE¹⁶) has bizarre SSynt-properties: it can be the head of a noun phrase, while governing a DE-phrase and agreeing with the dependent noun of this DE-phrase, instead of with its own SSynt-governor.

Solution I requires the postulation of a special grammatical element—an adjectival marker DE—which does not exist in French elsewhere, i.e. outside of the construction under analysis. Solution II, on the contrary, requires only the admission of a special character of three French adjectives, which has to be admitted anyway (since even under Solution I, such a construction will be possible only with these adjectives). Moreover, the construction with an adjective that heads an NP while governing a DE-phrase and agreeing with the dependent noun does exist in French independently: *le plus intelligent*←**synt**→*des garçons* ‘the most intelligent of the boys’ ~ *la plus intelligente*←**synt**→*des filles* ‘the most intelligent of the girls’; it is an absolutely regular and completely productive construction. Therefore, Solution II has to be preferred. (As we see, the decision is again arrived at by analogy.)

While the construction of the type *un drôle de garçon* is very restricted in French, it is quite productive in Sardinian:

b. Sardinian

<i>unu</i> a.SG.MASC	<i>bette</i> big.SG.MASC	<i>de pittsinnu</i> of boy[MASC].SG	‘a big boy’
<i>una</i> a.SG.FEM	<i>ruja</i> red.SG.FEM	<i>de mákkina</i> of car[FEM].SG	‘a red car’
<i>sa</i> the.SG.MASC	<i>manna</i> big.SG.FEM	<i>de ampulla</i> of bottle[FEM].SG	‘the big bottle’
<i>čudda</i> that.SG.FEM		<i>de mákkina</i> of car[FEM].SG	‘that car’

Although I do not have enough data on Sardinian, I think that all the phrases of the type illustrated in (15b) have to be described on the SSynt-level as it is proposed for (15a)—with the adjective as the Synt-head of the phrase:

unu←synt–bette→synt→de→synt→pittsinnu.

Thus, the examples in (15) show that in more complicated, 'exotic' cases one has to proceed with utmost caution. The main tool here is ANALOGY with more normal (= more current, less restricted) constructions. We have to make decisions that will agree with accepted descriptions and try to relegate the eccentricities to restricted sets of phenomena, without allowing these eccentricities to spread on more normal areas of the language.

Criterion B2: The morphological links between the elements of the phrase and its external context

|| If in the phrase w_1 –synt– w_2 , in which the passive SSynt-valency does not allow us to establish the Synt-governor, it is w_1 is the Synt-governor of w_2 if w_1 controls the inflection of wordforms external to the phrase or w_1 's inflection is controlled by such wordforms.

The wordform w_1 is called the morphological contact point of the phrase w_1 –synt– w_2 .

Examples

(16) **a.** The Russian phrase *jubka-štany*, lit. ‘skirt-pants’, does not allow for the application of Criterion B1 (both its members are nouns and have the same passive Synt-valencies); but Criterion B2 singles out *jubka* as the Synt-governor: *èta* [SG.FEM] *jubka-štany byla* [SG.FEM]... ‘this skirt-pants was...’, where the external agreement is with *jubka* [FEM.SG], and not with *štany* [PL] ⟨**èti jubka-štany byli...*⟩; therefore, *jubka*–synt→*štany*.

- b. In the phrase *v štate Nebraska* ‘in [the] state [of] Nebraska’, *štat* is declined regularly (*štat, štata, štate, ...*) in conformity with external context, while *Nebraska* remains in the nominative (*v Nebraske*, but **v štate Nebraske*); thus *štat* is here the morphological contact point, and it is again picked by Criterion B2 as the Synt-governor:

štat–synt→*Nebraska*.

- c. Similarly, in the phrase of the type *čudo-jabloko*, lit. ‘miracle-apple’, *jabloko* ‘apple’ is the Synt-governor, since it is declined according to the requirements of the external context while *čudo* remains invariable: *čudo-jabloka, čudo-jabloku, ..., čudo-jabloki, čudo-jablokami, ...* Thus, we have *čudo*←synt–*jabloko*.

- d. In the phrase [*pjat*] *kilogramm^{ov} kolbasy* ‘[five] kilos of-sausage’, the noun *kilogramm^{ov}* is the Synt-governor, since it is the morphological contact point:

[*s pjat ju*] *kilogrammami*–synt→*kolbasy* ‘[with 5] kilos [of] sausage’,
[*v pjati*] *kilogramm^{ax}*—synt→*kolbasy* ‘[in 5] kilos [of] sausage’, etc.

- e. Likewise in Germ. [*zwei*] *Gläser Wein*, lit. ‘[two] glasses [of] wine’, the Synt-governor is *Gläser*, which is the morphological contact point:

- i. [*zu diesen zwei*] *Gläser+n Wein*, lit. ‘[to these two] glasses [of] wine’, where *Gläsern* is in the dative, imposed by the preposition ZU;
ii. *Dies+e* [PL] *zwei Gläser Wein sind* [PL] *notwendig* ‘These two glasses [of] wine are necessary’, where *Gläser* [PL] imposes the plural grammeme on the adjective and on the verb. Therefore, *Gläser*–synt→*Wein*.

By analogy, the same structure is accepted in the cases where the measure noun remains invariable:

drei Kilo–synt→*Brot* ‘three kilos [of] bread’,
vierzig Gramm–synt→*Fleisch* ‘forty grams [of] meat’.

- f. In Dutch, the situation is slightly different from that in German: here, the N_{measure} does not inflect under the impact of the external context (it has no case forms), but when in plural, it imposes plural agreement on the verb:

Twee glazen wijn zijn [PL] ⟨**is* [SG]⟩ *noodzakelijk* ‘two glasses [of] wine are necessary’;
therefore, in Dutch we also have *glazen*–synt→*wijn*.

But in semantically equivalent phrases of Chinese, which has no inflection at all, the Synt-Ds are different, see (17b).

Criterion B3: The semantic content of the phrase

In the phrase w_1 -synt- w_2 , in which neither the passive SSynt-valency nor the morphology allow us to establish the Synt-governor, w_1 is the Synt-governor of w_2 if w_1 -synt- w_2 means 'a kind/an instance of w_1 ' rather than 'a kind/an instance of w_2 '.

Examples

(17) a. In *jam sandwich*, the Synt-governor is *sandwich*, because "*jam sandwich* refers to a kind of sandwich, rather than to a kind of jam" (Hudson 1990: 98).

b. In Chinese, where no inflection exists, the phrase *shí bàng ròu* 'ten pounds [of] meat' consists of morphologically invariable wordforms. Here again, Criterion B3 applies: *shí bàng ròu* refers to an instance of meat, not to an instance of pounds, so *ròu* 'meat' is the Synt-governor: *shí*←-synt-*bàng*←-synt-*ròu*.

One can say (with Zwicky 1991: 4) that in a two-word phrase the Synt-governor is the syntactic category determinant, or—if there is no such syntactic determinant—the morphological behavior determinant, or—in case both syntactic and morphological determinants are absent—the semantic content determinant. In one word (Bazell 1949: 11), the Synt-governor is more PROMINENT than its Synt-dependent, namely—more prominent syntactically, or else morphologically, or at least semantically.

Most approaches dealing with Synt-**D**s require concord between these properties, i.e. between Criteria B1-B3. In sharp contrast, in the Meaning-Text Theory such a concord is not required. Only Criterion B1 is genuinely syntactic; B2 is morphological, and B3 semantic. And we know already that the orientations of Sem-**D**, Synt-**D** and Morph-**D** can differ (cf. 5); therefore, we must expect that these criteria will be in conflict more often than not. For me, Criteria B1-B3 form a hierarchy: B1 > B2 > B3. Thus, if Criterion B1 is applicable, its indication is sufficient. Only if it is not applicable (because w_1 and w_2 are both of the same part of speech and thus have the same passive SSynt-valency), Criterion B2 applies—but only in a language having inflection and only for w_1 and w_2 with different morphological properties. Otherwise, Criterion B3 applies. Therefore, these criteria are never applied together (= simultaneously) and, as a result, they cannot contradict each other. To put it in a slightly different form: The ability of Synt-governors to control the inflectional form of their Synt-dependents/to have their own inflectional form controlled by a Synt-dependent or their ability to be or not to be semantically dominant should not be taken into account when deciding on the Synt-governor status of a wordform: morphological and semantic properties of heads are, as already stated, freely distributed among Synt-governors and Synt-dependents, so that a consistent combination of these properties cannot be expected.

For Criteria B to be satisfied, at least one of the Criteria B1-B3 must be satisfied, such that other Criteria B higher in the hierarchy are not applicable.

The criteria for the orientation of Synt-**D** ('Head-*vs.*-Dependent' problem) are thoroughly discussed in Pittman 1948, Zwicky 1985, 1991, Hudson 1987, 1990: 106-107, and in Corbett *et al.* (eds) 1993. For a more rigorous formulation of Criterion B1, see Mel'čuk 1988: 132-135.

Criteria B1-B3 call for the following two important remarks.

First, Criteria B1-B3 are LANGUAGE-SPECIFIC: if, in the phrase X + Y of language **L** (X and Y being of different parts of speech), these criteria pick X as the Synt-governor—i.e. we have X→Y—this will not necessarily be the case for a synonymous construction with similar parts of speech in some other language. Thus in Russian and German $N_{\text{measure}} \rightarrow N$, because N_{measure} is the morphological contact point (cf. [*v pjati kilogramm+ax kolbasy* in (16d) and [*zu diesen zwei Gläser+n Wein* in (16e)]; yet it does not follow that N syntactically depends on a quantifying N_{measure} in any language: in a language where the N_{measure} does not inflect under the impact of an 'external' wordform and does not itself control the inflection of the quantified N, Criterion B3 picks this N as the Synt-governor: cf. (17b), where we have $N_{\text{measure}} \leftarrow N$ in Chinese.

Second, Criteria B1-B3 are INHERENTLY INSUFFICIENT: there are cases where all the three fail. This must happen where, in a phrase X + Y, both X and Y are of the same part of speech, neither does inflect nor can impose different inflections, and both are semantically 'equal.' Take, for example, the Russian phrase of the type *včera utrom*, lit. 'yesterday morning', or *segodnja popozže*, lit. 'today later'. Both wordforms in this phrase are adverbs, both have no morphology, and both denote time; which one is the Synt-governor? Note that both are equally omissible: *Alen priexal včera* 'Alan came yesterday' and *Alen priexal utrom* 'Alan came in the morning'. In such cases, a more or less arbitrary solution imposes itself: the preceding element will be taken as the Synt-governor, so that we have *včera-synt→utrom*, *segodnja-synt→popozže*. However, there could be semantic motivation for this solution, after all: 'yesterday' and 'today' are in a sense more important than 'in the morning' and 'later', since 'yesterday'/'today' denotes a whole day, of which 'in the morning'/'later' is but a part. Then Criterion B3 applies: 'yesterday morning' is a particular moment of yesterday, and 'today later' a particular moment of today. We can also invoke a syntactic consideration: *yesterday morning* represents a kind of coordination, and in coordinate strings, the subsequent element depends on the preceding one.

An even more problematic case is that of compound numerals in languages where numerals are morphologically invariable themselves and do not govern special inflections of the quantified nouns.¹⁷ Take, for instance, Fr. *soixante-neuf* '69'. Since both its components are numerals, Criterion B1 is not applicable (*soixante* and *neuf* have the same passive SSynt-valency); since almost all French numerals have no morphology and do not affect the morphology of the noun quantified,

Criterion B2 is not applicable, either; finally, their meanings are strictly of the same type (= numbers), so that neither Criterion B3 can be used. The only way open is then to reason by analogy. The compound numeral *soixante et un*, lit. ‘60 and 1’ (and a few others with 1 as the last digit), would suggest the Synt-dominance *soixante*→*et*→*un*; by analogy with regular conjoined strings of the type *Alan*→*and*→*Leo* or *beautiful*→*and*→*intelligent*. But then consider two facts that contradict this solution:

- The numeral UN ‘one’ agrees in gender with the noun quantified: *vingt et un garçons* [MASC] ‘twenty-one boys’ vs. *vingt et une filles* [FEM] ‘twenty-one girls’; according to Criterion B2, it is UN that must be the Synt-head.

- Take the ordinals, such as *soixante et unième* ‘sixty first’ or *soixante-cinquième* ‘sixty-fifth’ (similarly, *soixante et onzième*, lit. ‘60 and 11th’ = ‘71st’ et *quatre-vingt-onzième*, lit. ‘80-11th’ = ‘91st’); here the Synt-governor is, according to Criterion B1, clearly the ordinal numeral *unième* ‘1st’, *cinquième* ‘5th’ and *onzième* ‘11th’, i.e. the last numeral in a compound ordinal:

trois←*cent*←*soixante*←*cinquième* ‘365th’,
trois←*cent*←*soixante*←*et*←*onzième* ‘371st’, etc.

Then, continuing our analogy and taking these two facts into account, we arrive at the same SSyntS in compound cardinals: *trois*←*cent*←*soixante*←*cinq* ‘365’. And, of course,

trois←*cent*←*soixante*←*et*←*un* ‘361’.

In a language like German, where some numerals are regularly linked by a conjunction (*und* ‘and’), this gives the following Synt-structures:

drei←*hundert*←*fünf*←*und*←*sechzigster* ‘365th’, lit. ‘three hundred five and sixtieth’,
 where *sechzigster* ‘sixtieth’ is clearly the Synt-head of the compound ordinal numeral; in a similar way, *drei*←*hundert*←*fünf*←*und*←*sechzig* ‘365’, lit. ‘three hundred five and sixty’.

It is possible that elements like ‘and’ (Fr. *et*, Germ. *und*) that appear within compound numerals should not be considered coordinate conjunctions; then the SyntSs shown above would look less exotic; cf. the Chukchee marker of compound numerals in (24c), p. 00.

4.3.3. Criteria C: Labeled SSynt-Dependencies

Last, for each pair of wordforms w_1 -synt→ w_2 which are syntactically directly linked in a particular direction, one has to know exactly which specific type of the Synt-**D** links them. In order to represent successfully the SyntSs of utterances, we have to use DIFFERENT types of Synt-**D**. Thus, I←synt-LOVE-synt→YOU does not distinguish between ‘I love you’ and ‘You love me’; [JOHN] I←synt-SEND-synt→YOU can be implemented as ‘John sends me to you’ or ‘John sends you to me’; etc. In all these and a host of similar cases, different types of Synt-**D**s, or different Surface-Syntactic Relations [= SSyntRels] have to be distinguished:

I←**r**₁-LOVE-**r**₂→YOU, [JOHN] I←**r**₂-SEND-**r**₃→YOU, ...

As we see, SSyntRels must be labeled, the label being meaningful (as is the case with Morph-**D**): the label **r** of a SSyntRel refers to a family of specific syntactic constructions which implement, in the DMorphS of the sentence, the SSyntRel **r**. Thus, consider the label «**subj(ectival)**» of a SSyntRel in Russian, i.e. the SSyntRel that appears in phrases of the type

$$V_{\text{fin}}[= \mathbf{w}_1] - \text{subj} \rightarrow N[= \mathbf{w}_2]$$

(*Mal'čik prixodit/Devočka prixodit* 'The boy comes'/ 'The girl comes'; *Mal'čik prišël/Devočka prišla* 'The boy came'/ 'The girl came'). The label «**subj**» identifies a set of SSynt-rules that make the finite verb \mathbf{w}_1 agree with the noun \mathbf{w}_2 in person and number (if the verb is in the present or the future) or in number and gender (if the verb is in the past or the subjunctive); these rules also position \mathbf{w}_2 [= N], with respect to \mathbf{w}_1 [= V]. In other words, the SSyntRel «**subjectival**» is the signified (= Saussure's *signifié*) of every construction in this family; generally speaking, a SSyntRel is a component of a linguistic sign, whose signifier is the construction in question (an ordered pair of lexemic classes with particular morphological characteristics).¹⁸

In phrases of the form $\mathbf{w}_1 - \mathbf{r} \rightarrow \mathbf{w}_2$, the Synt-**D** that links the two wordforms can be labeled **r** (i.e., it can be the SSyntRel **r**) only if it satisfies the following three criteria: C1-C3. If at least one of Criteria C1-C3 is not satisfied, the presumed SSyntRel **r** should be split in two (or more) SSyntRels.

Criterion C1: Absence of semantic contrast

Notations: $\mathbf{w}(L)$ is a wordform of lexeme **L** (\mathbf{w}_i and \mathbf{w}_j can be different or identical); \oplus is the operation of linguistic union, which links signs, in particular—wordforms, according to their syntactics and general rules of **L**.

A SSyntRel must not describe two different phrases

$$\mathbf{w}_i(L_1) \oplus \mathbf{w}_j(L_2) \text{ and } \mathbf{w}_m(L_1) \oplus \mathbf{w}_n(L_2), \text{ where } L_1 - \text{synt} \rightarrow L_2,$$

which 1) contrast semantically [$\mathbf{w}_i(L_1) \oplus \mathbf{w}_j(L_2)$] [$\mathbf{w}_m(L_1) \oplus \mathbf{w}_n(L_2)$]

and 2) differ formally only by some syntactic means of expression (i.e. by word order, by syntactic prosody, or by syntactic grammemes).

Criterion C1 corresponds to what is known in linguistics as 'the *minimal pair test*,' which is used in phonology (= two phones cannot be relegated to one phoneme if they are the only distinguishers of the signifiers of two semantically contrasting wordforms), morphology, and semantics.

Examples

(18) **a**. In Russian, the construction DESJAT' ← **r** - DOLLAR has two different implementations with different meanings:

desjat' dollarov '10 dollars' vs. *dollarov desjat'* 'approximately 10 dollars';

the formal difference between the two phrases is purely syntactic: word order; therefore, the presumed SSyntRel \mathbf{r} must be split in two different SSyntRels:

DESJAT'←**quantitative**–DOLLAR \Leftrightarrow *desjat' dollarov*

DESJAT'←**approx-quantit**–DOLLAR \Leftrightarrow *dollarov desjat'*

b. In English, the construction STARS– \mathbf{r} →VISIBLE also has two different implementations with different meanings (Quirk *et al.* 1985: 419; cf. Mel'čuk/Pertsov 1988: 136-137):

the visible stars ('stars that can be seen in principle')

vs.

the stars visible ('stars that can be seen currently');

the formal difference between the two phrases is again purely syntactic: word order; therefore, there are two different SSyntRels as well:

VISIBLE←**modificative**–STARS \Leftrightarrow *the visible stars*

VISIBLE←**post-modificative**–STARS \Leftrightarrow *the stars visible*

Cf. other pairs with the same semantic/formal difference: *navigable rivers* ~ *rivers navigable*, *a written word* ~ *a word written*, *a sitting figure* ~ *the people sitting*, etc.

Criterion C2: Syntactic substitutability

The first formalization of the SSynt-substitutability of syntactic subtrees as a means for establishing SSyntRels was proposed by the German researcher J. Kunze (Kunze 1972: 23; see also Kunze 1975: 5.3, p. 235ff): the so-called Kunze property. I start with presenting it here, in order to show that a weaker version of it must be preferred.

Let there be, in \mathbf{L} , lexemes $L_{(X)}$, $L_{(Y)}$, ... of syntactic classes X, Y, ..., complete SSynt-configurations $\Delta_{(Z)}$ and $\Delta_{(W)}$ (i.e. subtrees having as their top nodes lexemes $L_{(Z)}$ and $L_{(W)}$), and a SSyntRel \mathbf{r} .

Definition 3.1: The Kunze Property

|| A SSyntRel \mathbf{r} has the *Kunze Property* if, and only if, for any pair of SSynt-configurations $L_{(X)}$ – \mathbf{r} → $\Delta_{(Z)}$ and $L_{(Y)}$ – \mathbf{r} → $\Delta_{(W)}$, replacing $\Delta_{(Z)}$ by $\Delta_{(W)}$ and vice versa does not affect their SYNTACTIC¹⁹ well-formedness.

To put it differently, for a SSyntRel that has the Kunze property, any of its potential Ds can be attached to any of its potential Gs (= all Ds of a SSyntRel are mutually substitutable in all SSyntSs *salva correctione*). In Mel'čuk 1988: 142 it was required that any SSyntRel in any \mathbf{L} has the Kunze property.²⁰ Now, however, I think that the Kunze property is too rigid, since it does not allow for some desirable generalizations. For instance, it does not admit the same SSyntRel for nominal and infinitival SSynt-Subjects, as in the following French sentences:

(19) *La course*←**r**-*fatigue*, lit. 'The running tires'.

Courir←**r**-*fatigue*, lit. 'To-run tires'.

Since far from any verb in French takes an infinitive as its SSynt-Subject (**Pleuvoir m'a surpris*, lit. 'To-rain has caught me (out)'), the SSyntRel **r** in (19) does not possess the Kunze property: with $L_{(X)} = \text{SURPRENDRE}$, $\Delta_{(Z)} = \text{NP}$ (e.g., *La pluie*←**r**-*surprend*) and $L_{(Y)} = \text{FATIGUER}$, $\Delta_{(W)} = \text{Infinitival Phrase}$ (*Courir*←**r**-*fatigue*), the replacement produces the syntactically ill-formed configuration $*V_{\text{inf}} \leftarrow \mathbf{r} - \text{SURPRENDRE}$ '[to] catch N (out)'. As a result, using the Kunze property leads to having two different SSyntRels for nominal and infinitival SSynt-Subjects (as stated in Kunze 1975: 279). But I think that in (19) the SSyntRel **r** should not be split: all the SSynt-Subjects, whether nominal or infinitival, share a set of important unique properties, and it is preferable to describe all of them by the same SSyntRel.

Therefore, it is proposed to use the *quasi-Kunze Property*, which is weaker: substitutability is required only in one direction and only by at least one particular subtree (which is not a substitute pronoun, since substitute pronouns—see Footnote 12, p. 00—constitute a 'secondary' syntactic class, being introduced by a 'transformational' rule), rather than in both directions and by any subtree. (The concept of the quasi-Kunze Property has been elaborated jointly with L. Iordanskaja; it is introduced in Iordanskaja & Mel'čuk 2000. Another weaker version of the Kunze Property was considered in Mel'čuk 1977: 261.)

Definition 3.2: The Quasi-Kunze Property

A SSyntRel **r** has the *quasi-Kunze Property* if, and only if, there exists in **L** a syntactic class (part of speech) X, which is different from substitute pronouns and such that for any SSynt-configuration $L - \mathbf{r} \rightarrow \Delta_{(Y)}$, replacing $\Delta_{(Y)}$ by $\Delta_{(X)}$ (but not necessarily vice versa!) in any SSyntS does not affect its syntactic well-formedness.

The element $\Delta_{(X)}$ that 'passes' with any governor of the SSyntRel **r** is nothing else but the PROTOTYPICAL D of the SSyntRel **r**.

The SSyntRel **r** in (19) possesses the quasi-Kunze property, since this **r** has a prototypical D: a prepositionless noun—because in French any finite verb admits a nominal SSynt-Subject.²¹ As a result, the SSyntRel **r** is allowed: this is the **subjectival** SSyntRel.

Let it be emphasized that, while in definitions 3.1 and 3.2 the G is a particular lexeme, $\Delta_{(Y)}$ is considered UP TO THE SYNTACTIC CLASS. Thus, for instance, different prepositions are not distinguished: the SSyntRel **r** in the phrases *insist*-**r**→*on*, *supply*-**r**→*with* and *compare*-**r**→*to* has the quasi-Kunze property—because a PREP+N phrase can be substituted for its D with any of these verbs, provided the appropriate preposition is chosen according to the verb's Government Pattern.

Criterion C2 can now be formulated as follows:

|| Any SSyntRel \mathbf{r} must possess the quasi-Kunze Property.

Criterion C2 is a particular case of what is known as the 'substitution criterion,' or 'substitution test,' except that here we deal with the substitution of subtrees which have to hang on the same SSyntRel \mathbf{r} .

Examples

(20) a. In Russian, in the phrases $v\text{-}\mathbf{r}\rightarrow\textit{Pari}\check{z}$ ('to Paris') and $\check{c}toby\text{-}\mathbf{r}\rightarrow\check{c}itat'$ ('in-order-to read') the presumed SSyntRel \mathbf{r} does not possess the quasi-Kunze Property: $*\check{c}toby\text{-}\mathbf{r}\rightarrow\textit{Pari}\check{z}$, $*v\text{-}\mathbf{r}\rightarrow\check{c}itat'$ (Russian has no prototypical D for this SSyntRel: no element can pass with both a preposition and a conjunction);

therefore, there are two different SSyntRels:

V-prepositional→PARIŽ

and

ČTOBY-conjunctive-infinitival→ČITAT'.

b. In English, in the phrases $have\text{-}\mathbf{r}\rightarrow\textit{been}$ and $be\text{-}\mathbf{r}\rightarrow\textit{going}$ the presumed SSyntRel \mathbf{r} does not possess the quasi-Kunze Property: $*have\text{-}\mathbf{r}\rightarrow\textit{going}$ and $*be\text{-}\mathbf{r}\rightarrow\textit{been}$;

therefore, there are two different SSyntRels:

HAVE-perfect-analytical→BEEN

and

BE-progressive-analytical→GOING.

Criterion C3: Repeatability with the same Synt-governor

Let me consider the possible number of occurrences of a given SSyntRel \mathbf{r} with the same governor. In this respect, any \mathbf{r} of language \mathbf{L} can be either non-repeatable or unlimitedly repeatable.

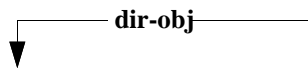
Definition 3.3: Non-repeatable SSyntRel

|| A SSyntRel \mathbf{r} is *non-repeatable* if, and only if, no more than one branch labeled \mathbf{r} can start from any G(overnor).

In other words, in a given sentence of \mathbf{L} , a G of a non-repeatable \mathbf{r} can have only one D (= one clause element) of the corresponding type. For instance, actantial SSyntRels whose Ds are marked by purely syntactic means (word order, prosody, inflection)—such as the **subj** and the **dir(ect)-obj(ectival)** SSyntRels—are obligatorily non-repeatable: otherwise, they would violate Criterion C1, because their Ds would contrast semantically, while differing only in syntactic

means. (Only actantial SSyntRels whose Ds are marked by lexical means, that is, by different prepositions—such as the **oblique-objective** SSyntRel— can be repeatable.)²²

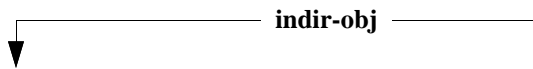
An important warning: In some languages, a clause element can be DUPLICATED by what is called a *resumptive clitic*. Such is, for instance, the D of the **dir-obj** SSyntRel in Spanish, where we have the construction of the type (21a):



(21) a. Sp. *A Alain le←dir-obj-veo todos los días*, lit. ‘Alan him [I] see every day’

[a human DirO in Spanish is introduced by the preposition A ‘to’].

We do not consider pronominal duplication of a clause element as repeatability, since such duplication has a grammaticized character and is ‘orthogonal’ to the genuine cooccurrence of SSyntRels, since the noun and the clitic that duplicates it are necessarily coreferential; in spite of expressions of the type (21a), the **dir-obj** SSyntRel is considered non-repeatable in Spanish. Similarly, in spite of (21b), the **indir-objective** SSyntRel is also considered non-repeatable in French:



b. Fr. *À mes enfants, je leur←indir-obj-permets tout*,

lit. ‘To my children, I permit them everything’.

Here is another example of grammaticized duplication by clitic:

c. Albanian

(i) *Mësuesi u foli fëmijëve*, lit. ‘The-teacher to-them talked to-the-kids’,
where *fëmijëve* and *u* also are both IndirOs.

(ii) *Njerëzit më panë mua*, lit. ‘The-people me saw me’,
where *mua* and *më* are both DirOs.

In all such cases, the corresponding SSyntRel is considered non-repeatable.

Definition 3.4: (Unlimitedly) Repeatable SSyntRel

|| A SSyntRel **r** is (*unlimitedly*) *repeatable* if, and only if, several branches labeled **r** can start from a G (of course with the exclusion of resumptive clitics).

For instance, the **modificative** and the **circumstantial** SSyntRels in English are unlimitedly repeatable; so is the **obl(ique)-obj(ectival)** SSyntRel. For a repeatable SSyntRel **r** the number of branches labeled **r** that can start from a G in any particular case is theoretically unlimited, although in practice, this number can be limited either by pragmatic considerations or by the lexicographic properties of concrete Gs, for instance, by their Government Pattern—as is the case with the **obl-obj** SSyntRel; this number cannot be limited by any general syntactic factors.

In other words, a SSyntRel cannot be LIMITEDLY repeatable (without being constrained by Government Pattern of the G).

Now I can formulate Criterion C3:

|| Any SSyntRel **r** must be unlimitedly repeatable or non-repeatable.

As is always the case, exceptions are possible. Thus, in English, the **relative** SSyntRel is non-repeatable: generally speaking, a noun cannot have more than one relative clause. There is, however, a contradicting phenomenon: two restrictive relative clauses with the same noun are possible under specific conditions in highly colloquial speech, cf. (22):

(22) a. *A student [who comes to my class]₁ [who broke the news to me]₂ left the building.*

b. *We are in the room [I will never forget]₁ [where she kissed me for the first time]₂.*

If we decide—in spite of their marginality—to consider such facts, they can be fully and exactly circumscribed. Therefore, they constitute a legitimate exception, which does not prevent us from declaring the **relative** SSyntRel non-repeatable in English. (This case has been brought to my attention by L. Iomdin.)

Criterion C3 corresponds roughly to the 'cooccurrence test,' used in linguistics on all levels of analysis. In morphology, an element of a morphological category is either non-repeatable (tense or number in English or French) or unlimitedly repeatable (the causative in Turkish). When we see, for instance, just two possible repetitions—like nominal case suffixes in Basque or Georgian, we speak of two different case categories (semantic case *vs.* syntactic case; governed case *vs.* agreeing case).

Example

(23) In Persian, we find extremely widespread expressions of the following type:

Rāmin+rā←r-kard-r→bedār,
Ramin DirO made awakening [Noun]

lit. '[He/she/it] made [the] awakening Ramin' = 'He/she/it awoke Ramin'.

These expressions are built on verbal collocations of the type *bedār kard* 'awakening make' = 'wake' or *dars dad*, lit. 'lesson give' = 'teach', which, although they seem to include a DirO, such as *bedār* or *dars*, behave as transitive verbs and take—as a whole—a 'genuine' DirO (since the suffix **-rā** is an unmistakable marker of DirO with verbs meaning 'kill', 'see', 'build', etc.).

The presumed SSyntRel **r** [direct-objectival?] in such expressions would be limitedly repeatable—just twice, while no obvious naturally-looking conditions can be formulated; at the same time, this phenomenon can by no means be treated as an exception. Therefore, there are two different SSyntRels:

$\bar{R}\bar{A}M\bar{I}N\leftarrow\text{dir-obj(ectival)}-\text{KARD}-\text{quasi-dir-obj}\rightarrow\text{BED}\bar{A}\bar{R}.$

The nominal element in verbal collocations of the above type is considered to be a Quasi-Direct Object. Here is another similar example (Lazard 1994: 93):

Samāvar *ateš* *kardand*
 samovar fire do.PAST.3PL,
 lit. '[They] samovar fire did' = 'They lit a samovar',

with the SSyntS SAMĀVAR←dir-obj-KARD-quasi-dir-obj→ATEŠ.

A very similar situation exists in Korean (O'Grady 1991: 236):

John+i *enehak +ul* *kongpwu+lul* *hay+ss +ta*
 NOM linguistics ACC study ACC do PAST DECL(arative)
 lit. 'John linguistics study made' = 'John studied linguistics'
 ['make [the] study' = '[to] study'].

The SSyntS is here as follows: ENEHAK←dir-obj-HAY-quasi-dir-obj→KONGPWU.

For Criteria C to be satisfied, all three criteria C1 - C3 must be satisfied.

The SSyntRels of a language form a systematic inventory, just like phonemes or inflectional grammemes; Criteria C1-C3 are part of a methodology for establishing SSyntRels' inventories. Note Criteria C1 and C2 are paradigmatic, while Criterion C3 is syntagmatic.²³

Now we are ready for a definition of Synt-D.

Definition 3.5: Syntactic dependency

|| The wordform w_2 is said to *syntactically depend* on the wordform w_1 via SSyntRel r in a sentence if the three groups of Criteria A, B and C are satisfied for this pair of wordforms and r .
 I write $w_1-r \rightarrow w_2$.

4.4. The Logical and Linguistic Properties of Syntactic Dependency

a) Synt-D is anti-symmetrical: w_1 -synt $\rightarrow w_2$ entails $\neg(w_1 \leftarrow \text{synt} - w_2)$, i.e. $*w_1 \leftarrow \text{synt} \rightarrow w_2$. This means that a wordform w_1 cannot be the Synt-governor of another wordform w_2 and simultaneously have w_2 as its own Synt-governor. This follows from our decision to use the dependency tree as the formalism for the representation of Synt-structures. Moreover, since w_1 -synt $\rightarrow w_2$ signals that one of the two wordforms, e.g. w_2 , is linearly positioned with respect to the other, i.e. w_1 , it is paradoxical to claim that at the same time $w_1 \leftarrow \text{synt} - w_2$, so that w_1 is linearly positioned with respect to w_2 .

b) Synt-D is anti-reflexive: $* \begin{array}{c} \text{synt} \\ \diagdown \quad \diagup \\ \circ \\ \text{w} \end{array}$. This means that a wordform cannot be linearly positioned

with respect to itself. As with Sem-D, anti-reflexivity of Synt-D follows from its anti-symmetry.

c) Synt-D is anti-transitive:

w_1 -synt $\rightarrow w_2$ and w_2 -synt $\rightarrow w_3$ (in one sentence) entails $\neg(w_1$ -synt $\rightarrow w_3)$.

Otherwise, the principle of the unique governor—see below, item e)—would be violated. This does not preclude, however, the presence of an INDIRECT Synt-**D** between w_1 and w_3 : w_3 is part of the Synt-subtree hanging from w_1 .

d) Synt-**D**s must be distinctively labeled: to properly represent *Mary loves John*, in the phrases *Mary*← r_1 -love and *John*← r_2 -love the SSyntRels r_1 and r_2 must be different; otherwise the semantic contrast will not be preserved in the SSyntS. (The SSyntS *Mary*← r -loves- r →*John* does not show who loves whom.)

e) Synt-**D** presupposes the uniqueness of the governor: a wordform can syntactically depend only on ONE other wordform (or be independent, as is the top node of a Synt-tree).

f) Synt-**D** is universal in the following three respects: it is present in all languages; it appears in all sentences of a language; and it embraces all wordforms of a sentence (that is, for a sentence, Synt-**D**s always form a *connected* structure—like Sem-**D**s, but unlike Morph-**D**s).

The logical properties of Synt-**D** as defined above correspond to the fact that Synt-**D**s between the wordforms of a sentence form a *dependency tree*: a connected graph in which 1) each node can depend only on one other node (= the uniqueness of the Synt-governor) and 2) one and only one node does not depend on anything—the *top node*, or the *root* of the SSyntS (= the presence of the absolute head). The linear order of the nodes in the SSyntS is of course not defined; in this way, the **D**-description of the SSyntS consistently separates the SSynt-links between wordforms and the linear order of the latter. (Word order is computed by syntactic rules of the language on the basis of Synt-**D**s.)

Examples of Deep-Synt-**D**s and Surface-Synt-**D**s, i.e. DSyntRels and SSyntRels, are given in the structures (3) and (4). For a detailed description of the SSyntRels of English, see Mel'čuk/Pertsov 1987: 85-156 (and 4.8 below), as well as Apresjan *et al.* 1992: 71-121; the inventories of SSyntRels for Russian are found in Mel'čuk 1974: 221-235, and Apresjan *et al.* 1989, 1992: 204-208; for the inventories of SSyntRels ('dependent types') for German, Danish, Polish, Bangla, Finnish, Hungarian, Japanese, and Esperanto, see Maxwell/Schubert 1989; a list of Synt-**D**s, illustrated in English, is attached to Petkevič 1995. A sketch of syntactic word order rules based on Synt-**D**s for Russian, see Mel'čuk 1967 and 1974: 260-302; see also Sgall *et al.* 1995 (for Czech and German).

4.5. Some Non-Definitorial Properties of Synt-Governors and Synt-Dependents

Synt-governors and Synt-dependents possess three important properties, which, however, cannot be taken as definitorial: some Synt-governors and Synt-dependents in particular languages do not have them. Nevertheless, these properties are sufficiently characteristic of Synt-governors and Synt-dependents so that they can be resorted to as convenient HEURISTIC means. These properties are omissibility, cooccurrence control, and incorporability.

Omissibility

This is the most important non-definitorial property that distinguishes Synt-governors and Synt-dependents. Typically, in the configuration $w_1\text{-synt}\rightarrow w_2$, the Synt-dependent w_2 can be omitted without affecting the Synt-correctness of the SSyntS (and without producing an ellipsis), while the Synt-governor w_1 cannot. Such is the case in the constructions

$$\text{ADJ}\leftarrow\text{N}, \quad \text{N}\rightarrow\text{N}_{\text{gen}}, \quad \text{V}\rightarrow\text{PREP} + \text{N}, \quad \text{X}\rightarrow\text{Conj}_{\text{coord}} + \text{Y}$$

and a few others. (Let it be emphasized that we speak here of omissibility in the Synt-structure, not in the actual sentence.) But this is not always the case:

- The Synt-dependent may be obligatory (= non-omissible): either in some contexts (e.g., the DET in a DET←N construction), or always—as in exocentric constructions (e.g., the N in a PREP→N construction). Cf., for instance, non-omissible adjectives in phrases like *a man of various talents*.

- The Synt-governor can be omissible: for example, 1) the Russian preposition OKOLO ‘about’ with a numeral phrase (*okolo trëx tonn* ‘about three tons’ is syntactically equivalent to *tri tonny*) or the English prepositional configuration *from - to*, again with a numeral phrase (*from three to six girls* is syntactically equivalent to *six girls*); 2) the English subordinate conjunction THAT (*John knows that Mary is in town* is syntactically equivalent to *John knows Mary is in town*).

Cooccurrence (= Subcategorization) Control

Typically, in the configuration $w_1\text{-synt}\rightarrow w_2$, it is the Synt-governor w_1 that is subcategorized for by the Synt-governor w of the whole phrase. To put it differently, the lexicographic description of w must take into account some properties of w_1 , but not of w_2 . Thus, if a verb admits a noun as its actant, the lexicographic properties of the noun may be relevant (this verb admits only human nouns, or only mass nouns, etc.); but it is not the case that a verb admits as its actant a noun with a particular determiner—say, only with EVERY, or only with A/AN, etc.²⁴ This fact points to N as the Synt-governor in the constructions DET←N or ADJ←N. Similarly, in the construction $\text{CONJ}_{\text{subord}}\rightarrow\text{V}_{\text{subord}}$ (...*whether [he] comes*, ...*that [I] am [here]*), it is $\text{CONJ}_{\text{subord}}$ that determines the subcategorization of the MV in the matrix clause: some verbs take WHETHER, some others take THAT, etc.; but the verb of the subordinate clause is immaterial in this respect. Consequently, we have $\text{V}_{\text{matrix}}\rightarrow\text{CONJ}_{\text{subord}}[\rightarrow\text{V}_{\text{subord}}]$.

More generally, the Synt-governor w_1 tends to subcategorize for its Synt-dependent w_2 (i.e. w_1 tends to determine the choice of w_2): we say *many*←*books*, but *much*←*noise*, etc.; or else *depend*→*on*, but *borrow*→*from*, etc.

Incorporability

Typically, a language with incorporation manifests two phenomena concerning the orientation of Synt-**D** in a configuration w_1 -synt- w_2 :

- Internal incorporability. If w_2 can be incorporated into w_1 , and not the other way around, then w_1 is the Synt-governor of w_2 ; if w_2 has its own dependents, they can be incorporated together with it into w_1 or remain stranded in the sentence (as a function of the language and the context). Well-known examples include the incorporation of actants into the verb and of modifying adjectives into the nouns. Cf., for instance (the incorporated stem is boldfaced):

(24) a. Chukchee (Chukchee-Kamchatkan family, Russia)

nə +tur +qine+te←-----kupre+te ‘with [a] new net’
 ADJ new 3SG INSTR net INSTR
 vs.

***tur**+kupre+te* ‘with [a] new-net’
 new net INSTR

[Non-incorporated adjectives in Chukchee have a special prefix **nə-**, marking them as adjectives, and a person/number suffix.]

- External incorporability. If w_1 (or both w_1 and w_2 , but not w_2 alone) can be incorporated into the Synt-governor w of the whole phrase, then w_1 is the Synt-governor of w_2 ; we can thus have $[w+w_1]$ -synt- w_2 , but not $*[w+w_2]$ -synt- w_1 . Again, if w_2 has its own dependents, they can be incorporated with it into w or remain stranded; but it seems impossible to have a Synt-dependent of w_i incorporated, while w_i itself is not (Payne 1993):

b. Southern Tiwa (Kiowa-Tanoan family, New Mexico, USA)

Wisi seuan+in←-bi +mũ +ban ‘I saw two men’.
 two man PL 1SG see PAST
 vs.

Wisi bi +seuan+mũ+ban, lit. ‘I two man-saw’.
 two 1SG man see PAST
 vs.

*Seuan+in *bi +wisi+mũ +ban* ‘I men two-saw’.
 man PL 1SG two see PAST

Thus, in the phrase *wisi seuanin* ‘two men’ we have *wisi←seuanin*, because *seuanin* can be incorporated alone into the verb, while *wisi* alone cannot.

c. Chukchee

ñireqqlikkin amñərootken parol←-lili +t ‘forty-eight gloves’
 forty eight extra glove PL.NOM
 vs.

ñireqqlikkin amñərootken parol+lele +γə ‘to forty-eight gloves’
 forty eight extra glove PL.DAT

[Incorporation of numerals into the quantified N is obligatory in Chukchee if this N is in an oblique case.]

For a compound numeral, only the marker of compound numerals *parol*, meaning ‘extra, added’, is incorporated, other components of the numeral remaining ‘outside.’ (We see that the noun stem *lili* is modified to *lele* in the incorporated form: this is the effect of vowel harmony under the influence of the incorporated element.) Therefore, the marker *parol* is the Synt-head of the whole numeral, so that the SSynt-dependencies in a Chukchee compound numeral are as follows:

$$\begin{array}{ccc} \eta i r e q q l i k k i n \leftarrow a m \eta \text{rootken} \leftarrow p a r o l \\ \text{forty} \qquad \qquad \text{eight} \qquad \qquad \text{extra} = \text{'48'} \end{array}$$

As we see, from a logical standpoint, incorporability could be a definitorial property of Synt-governors, if it weren't for the restricted character of incorporation itself: it is far from being universal, since it is not found in a majority of languages; therefore, it cannot be used as a general criterion for the orientation of Synt-**D**.

Other non-definitorial properties of Synt-governors (listed as early as Pittman 1948) include CLASS SIZE (a Synt-governor belongs, as a rule, to a larger word-class than its dependent), VERSATILITY (a Synt-governor appears in a greater variety of syntactic environments), FREQUENCY (a particular Synt-governor is less frequent than a particular dependent), as well as some others. However, all of them are violated by many types of Synt-governors, so that they can be used as heuristic considerations only.

4.6. The Absolute Head of the Synt-Structure of a Sentence

Since Synt-**D** presupposes uniqueness of the governor (= no wordform in the sentence can depend syntactically on more than one other wordform), the SyntS of a sentence must have one absolute head, or a **top node**—a wordform which does not syntactically depend on anything and on which all the other wordforms of the sentence depend (directly or indirectly). Practically speaking, in most versions of the **D**-approach known to me, in a complete clause/a complete sentence this role is filled by the *finite*, or *tensed*, verb—the Main Verb (at least in languages that obligatorily have one in each complete clause/sentence, cf. below).²⁵ Thus, in the DSyntS (3), where any form of the MV, even an analytical one, is represented by a single node, the top node of the sentence is the verb ESCAPE (in the finite form of the Present Perfect); in the SSyntS (4), where each wordform, including the auxiliaries, is represented by a separate node, the top node is the auxiliary verb HAVE (in the finite form of the Present Indefinite). The choice of the MV as the Synt-head of the sentence is by no means arbitrary: the finite verb is, on Criteria B1-B3, the Synt-governor vis-à-vis all its partners in the sentence, and in this way it ends up as the absolute head. Let us consider the application of Criteria B1-B3 to the MV of a sentence.

By Criterion B1, the finite verb is the governor of the subject, since the passive Synt-valency of the phrase Subject–synt–MV is determined by the verb: for a phrase to be insertable in the construction *I know that...* (or any similar context), it has to contain a finite verb; with respect to the phrases Object–synt–MV or Circumstantial–synt–MV the syntactically dominant status of the verb is obvious (and has never been doubted). To this, two arguments can be added:

- In many languages, subjectless sentences exist (Chinese, Japanese, Lezgian): for instance, in the Lezgian sentence *Meqizva*, lit. ‘Cold-is’ = ‘It is cold’ no Synt-Subject is possible, even a zero one—the Lezgian verb knows no agreement, so that nothing would justify positing a zero dummy subject. Even in languages where the subject is not omissible, such as English or French, the imperative sentence uses a finite verb, but has no surface subject; in PRO-drop languages (Spanish, Polish, ...), sentences without an overt subject are quite typical (Sp. *Está muy ocupado* ‘He is very busy’ is a current example). Sentences without objects and circumstantials are even more widespread. However, languages that admit full sentences without the MV, or more precisely, without a Synt-predicate, are not known (at least, to me). Thus, the presence of the MV (more generally, of a Synt-predicate) is the necessary and sufficient condition for the existence of a ‘genuine’ sentence.

- The Sem-valency and the active Synt-valency of the MV determine the syntactic organization of the sentence/the clause. Thus, if the MV is SLEEP, only one Sem-Actant is possible and, consequently, the clause allows only the Synt-Subject; with SEE, two Sem-Actants and, consequently, a Synt-Subject and a DirO are necessary; KISS involves three Sem-Actants (**who** kisses **what part** of **whom**), but there can be two Synt-Actants (the Synt-Subject and the DirO: either with the Possessor depending syntactically on the DirO or the bodypart being not mentioned) or three Synt-actants (the Synt-Subject, the DirO and an Oblique Object): *Alan kissed Helen's hand/Helen* vs. *Alan kissed Helen on the forehead*.

Strictly speaking, we do not need to try Criteria B2 and B3, since Criterion B1 establishes the MV as the top node of a sentence/a clause beyond any doubt; however, I will do this here in order to show that in this case they all agree. By Criterion B2, it is the finite verb that is the morphological contact point in a subordinate clause (minus the complementizer); for instance:

- In French, after the conjunction QUOIQUE ‘although’, the MV of the subordinate clause has to be in the subjunctive: *quoiqu'il soit* ⟨*est⟩ *malade*, lit. ‘although he should-be ill’).

- In French and English, after the conjunction SI/IF the MV of the subordinate clause has to be in the present, even if it refers to the future: *S'il vient* ⟨*viendra⟩ *demain .../If he comes* ⟨*will come⟩ *tomorrow...*

- If a clause is nominalized in order to be used in the Synt-Structure as a noun, it is its MV that actually undergoes the nominalization: *After John arrived*, ... ⇒ *After John's arrival*, ...

And, finally, by Criterion B3 the whole sentence is semantically reducible to its MV rather than to its Synt-Subject; thus, *John works at IBM* is more an instance of work than an instance of John or of IBM.

However, two complications arise in connection with the Main-Verb-as-the-Synt-Head-of-the-Sentence principle: zero verb forms and verbless sentences.

Zero verb forms

What is the top node of the SyntS of the Russian sentence (25a), which does not contain any overt verb at all?

(25) a. *Leo moj drug*, lit. ‘Leo my friend’ = ‘Leo is my friend’.

Our first clue is that as soon as this sentence is transposed into the past, the future, the subjunctive or the imperative, a wordform of the verb BYT’ ‘[to] be’ obligatorily appears:

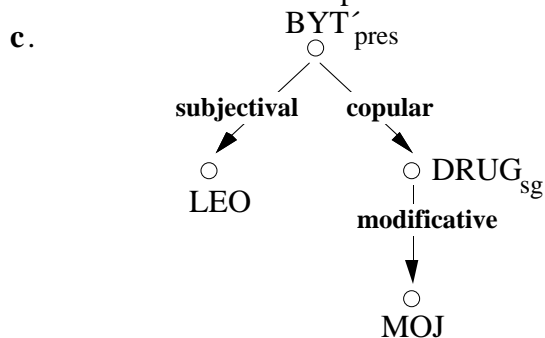
b. *Leo byl moim drugom* ‘Leo was my friend’.

Leo budet moim drugom ‘Leo will-be my friend’.

Leo byl by moim drugom ‘Leo would be my friend’.

Leo, bud’ moim drugom! ‘Leo, be my friend!’

Since (25a) stands in an obvious paradigmatic relation to (25b), we conclude that the meaning ‘present indicative’ is expressed in (25a) by a zero wordform or, to put it differently, that the verb BYT’ has a zero wordform in the present indicative. The SSyntS of (25a) looks then as follows:



BYT’_{pres} is expressed by a zero signifier on the SMorph-level only; thus it does not create a problem for the **D**-Synt-Structure of a sentence.

See Mel’čuk 1988: 303ff or 1995a: 169ff on zero verb forms in syntax.

Verbless sentences

In quite a few languages, a full sentence does not have to include a finite verb. Thus, in Turkic languages, an equative or locative sentence in the present of the indicative (‘John is a doctor/John is Canadian/John is in the room’) does not admit a finite verb ‘[to] be’; instead, the predicative noun or adjective is supplied with a predicative suffix, which thus marks its Synt-role. In Salishan languages (West Coast, Canada), in particular, in Lushootseed, all types of full sentences are possible without a finite verb and—unlike Turkic—without any morphological marker of predicativity.

(26) a. Turkish²⁶

İngiliz+im
English 1SG

‘I [am] English’.

Çocuk+lar+Ø Ankara+da +dir+lar
kid PL NOM Ankara LOC 3 PL

‘Kids [are] in Ankara’.

Ev +Ø +de +sin
house SG LOC 2SG

‘You_{SG} [are] in the house’.

Asker+siniz
soldier 2PL

‘You_{PL} [are] soldiers’.

b. Lushootseed (Beck 1997: 98ff; the syntactic predicate is underlined)

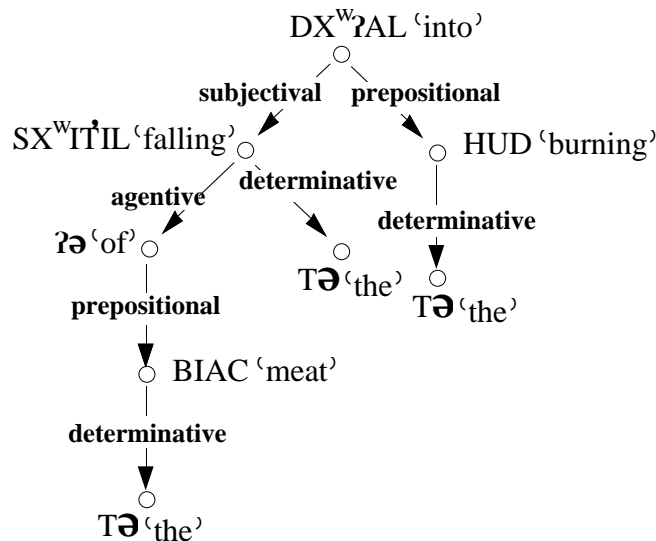
i. *sʔuladx^w tiʔiʔ* lit. ‘Salmon that’ = ‘That [is/was] a salmon’.
salmon that

ii. *saliʔ tiʔəʔ sq^wig^wac* lit. ‘Two this deer’ = ‘These deer [are/were] two’.
two this deer

iii. *dx^wʔal tə hud tə s +x^witil ʔə tə biac*
into the burning the NOMINALIZER fall of the meat

lit. ‘Into the fire [is/was] the fall(ing) of the meat’ =
‘The meat falls/fell into the fire’.

This situation is typical for other Salishan languages as well: any lexeme, whatever its part of speech, can be turned into the syntactic predicate, provided it is rhematic (in Salishan languages, the SyntS of sentences very closely parallels their communicative structure). In such sentences, the top node of the SSyntS can really be anything—for instance, here is the SSyntS of (26b-iii); it has as its top node the preposition *DX^wʔAL* meaning ‘into’:



To take into account languages with verbless sentences, we have to generalize our Main-Verb-as-the-Head-of-the-Sentence principle. This is readily done:

|| The top node of the SyntS of a sentence is its main, or primary, Synt-Predicate, whatever its surface realization.

In the languages of what Whorf called the 'Standard Average European' type the Synt-predicate of a full-fledged clause is (almost) invariably a finite verb. However, even these languages have 'incomplete' clauses of different types, in which the top node of the SyntS is not a finite verb, but a noun, an infinitive, an adverb:

Best wishes to you and your family; Down with Saddam Hussein!; Yours sincerely;

Rus. *Mne eščë domoj idti*, lit. 'To-me still home to-go' = 'I still have to go home';

Fr. *Et elle de rire*, lit. 'And she to laugh' = 'She broke out laughing', *Heureusement qu'elle est venue!*, lit. 'Luckily that she has come!' = 'Thank goodness she has come!';

Germ. "*Ich kann wieder Farben unterscheiden*", *so Charlotte Falk*, lit. 'I can distinguish colors again," so Ch. F.' = '... says/said Ch. F.?'; etc.

Language-specific rules define the admissible top node for each of these 'minor' sentence types.

4.7. The Three Major Classes of Syntactic Dependencies

There are three MAJOR classes of Synt-**D**s, recognized universally: complementation, modification, and coordination. (Complementation and modification are particular cases of subordination.) SPECIFIC types of Synt-**D**s, i.e. Deep and Surface SyntRels, introduced above, are distributed between these major classes.

Complementation, modification and coordination have been discussed for a long time (cf., e.g., Matthews 1981: 147-167, Lehmann 1985, Zwicky 1993), so here I simply formulate the corresponding definitions 3.6-3.8. Note that on the SSynt-level there are several Synt-**D**s to which the distinction of these three classes of Synt-**D** does not apply in a clear-cut way; we have to allow for some SSynt-**D**s that belong to neither of these classes (*is*→*reading* or *from*→*to* [as in *from two to five pounds...*]; in such a case, I will speak of ancillary SSyntRels). On the DSynt-level, however, the distinction between complementation, modification and coordination creates no problems.

In all of the following definitions, the wordform w_2 depends syntactically on the wordform w_1 in the given sentence: w_1 -synt→ w_2 .

Each one of Definitions 3.6-3.8 is approximate: it covers only the PROTOTYPICAL cases. In order to take into account all possible cases, I would have to add more conditions and thus make the definitions more complex; but in the present context, it seems not worthwhile.

Definition 3.6: Complementation

|| The wordform w_2 is a complement, or a Synt-Actant, of the wordform w_1 if w_2 is also
 || a Sem-dependent of w_1 :

$$\begin{array}{ccc} & \text{-synt}\rightarrow & \\ w_1 & & w_2 \\ & \text{-sem}\rightarrow & \end{array}$$

Complementation is always controlled by the active valency of the Synt-governor; formally, this means that the complements of the wordform w must be specified in the lexical entry of $L(w)$, more precisely—in its Government Pattern. In other words, a complement of w corresponds necessarily to a DSyntA(w), the inverse being untrue: a DSyntA(w) can be expressed, as we will see, by a modifier of w .

Examples (Synt-actants, or complements, are in boldface): *Alan loves **Helen**; during [the] meeting; worth [a] **trip**; **This must be** [seen]; but [not] **Helen**.*

Comment

Definition 3.6 does not cover, for instance, the construction where a Synt-actant w_2 of the wordform w_1 depends semantically on a different wordform w_3 which also stands in a complementation relation to w_1 : e.g., *He believed [= w_1] **John** [= w_2] to be sick [= w_3].* Here, *John* is a DSynt-actant of *believe*, without being its Sem-actant, that is, without depending on *believe* semantically. (On the discrepancy between Sem- and DSynt-actants of the same lexeme, as well as on cases where a Sem-actant of w is implemented as a modifier of w , see, e.g., Boguslavskij 1985: 10-19 and 1996: 23-43.)

Definition 3.7: Modification

|| The wordform w_2 is a modifier, or a Synt-attribute, of the wordform w_1 if w_2 is a
 || Sem-governor of w_1 :

$$\begin{array}{ccc} & \text{-synt}\rightarrow & \\ w_1 & & w_2 \\ & \leftarrow\text{-sem} & \end{array}$$

Modification is typically not controlled by the active valency of the Synt-governor; this means that the modifiers of the wordform w are, as a rule, not specified in the lexical entry of $L(w)$.

Examples (modifiers are in boldface): *good friend, love **passionately**; **only** him; **not** serious; wrote **in** [Stuttgart]; wrote **when** [he was in Stuttgart].*

Comments

1. Definition 3.7 does not cover, for instance, the construction where a SSynt-modifier w_2 of the wordform w_1 depends semantically on it, since w_2 expresses one of w_1 's Sem- and DSynt-actants: e.g., *French [= w_2] participation [= w_1].* Here, *French* depends both syntactically and

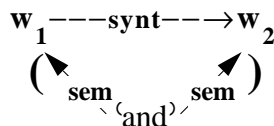
semantically on *participation*, but in spite of this it is a SSynt-modifier of *participation* rather than its Synt-actant (it is an adjective, and adjectives are modifiers by definition—because of their specific SSynt-behavior). Another similar example is *a book [= w₁] hard [= w₂] to find*: the adjective *hard* depends syntactically on *book*, but semantically bears on *find*; however, it is considered as a modifier of *book*.

The opposition 'complementation ~ modification' underlies, in an obvious way, the problem of distinguishing between actants (*complements*, Germ. *Ergänzungen*, Rus. *dopolnenija*²⁷) and circumstantials (*modifiers*, Germ. *Angaben*, Rus. *obstojatel'stva*). This distinction, first introduced explicitly probably in Tesnière 1959, is discussed in Engel 1977: 98-103, 158-179, and in Helbig 1992: 75-98 (with rich bibliography).

2. Interestingly, as indicated in Bazell 1949: 7-9, some languages strongly prefer complementation, while some others stress modification. Thus, Turkic languages or Japanese formally mark the complements, using morphological government: in particular, they possess developed case systems. On the other hand, Bantu languages formally mark only modification: they actively use agreement and completely lack cases; even in complementation constructions, they make the Synt-governor (say, the verb) agree with its Objects, leaving the latter unmarked. Of course many languages mix the two techniques in different proportions; thus, Classic and most Slavic languages richly mark both complementation (government) and modification (agreement).

Definition 3.8: Coordination

The wordform w_2 is a **conjunct** of the wordform w_1 if, and only if, semantically neither of them depends on the other (w_1 and w_2 are not directly related semantically), but w_1 and w_2 both are or at least can be Sem-dependents of a semanteme 'and' (or of 'or', or else of any of their semantic 'parents,' like 'but', etc.) while syntactically w_2 depends on w_1 :



Comments

1. The coordination of w_1 and w_2 can be of two types:

- Either **DIRECT** coordination, where w_1 and w_2 have a direct Synt-**D** between them:

$$w_1 \text{--- coord ---} \rightarrow w_2;$$

this coordination is called **asyndetic** ('conjunctionless').

Examples: *Alan, Leo, Helen; eat, drink, sing, dance; [something] red, [not] white.*

- Or **INDIRECT** coordination, where w_1 and w_2 are syntactically linked via a conjunction **CONJ_{coord}**:

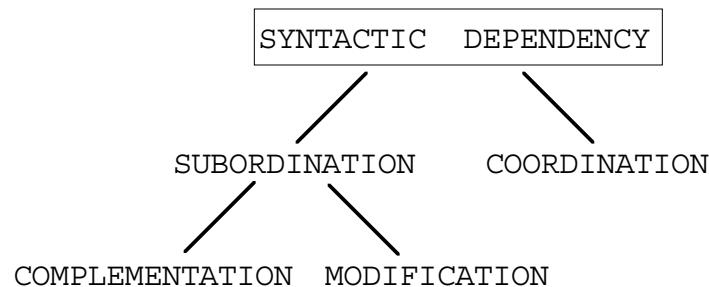
$$\mathbf{w}_1 \text{-coord} \rightarrow \text{CONJ}_{\text{coord}} \text{-conjunct} \rightarrow \mathbf{w}_2.$$

Examples: *Alan and Helen; either Alan or Leo; eat and drink, but not sing and dance; red, but [not] white.*

2. As two preceding definitions, Definition 3.8 does not cover all cases of coordination. Thus, on the SSynt-level, formally coordinate structures can be used to express DSynt-subordination. For instance, in Russian we have *izlovčilsja i ukusil*, lit. ‘[he] managed and bit’ = ‘[he] managed to bite’, where the conjunct *ukusil* implements the DSynt-A II of *izlovčilsja* (example from Boguslavskij 1996: 28-32); a similar English example: *Try and catch the train.*²⁸

The above distinctions between the three major classes of Synt-**D**s are reflected in the DSynt-component of the Meaning-Text model by the three-pronged division of the DSyntRels: *actantial* (**I**, **II**, ..., **VI**) = *complementation* vs. *attributive* (**ATTR**) = *modification* vs. *coordinative* (**COORD**) = *coordination*; see Mel’čuk 1988: 63-65.

The inclusion relations between the three major classes of Synt-**D** can be shown in the following diagram:



These classes of Synt-**D** were clearly distinguished by L. Bloomfield (1933: 194-198; I change here Bloomfield's formulations, without modifying his main idea):

- In a *complementation* phrase $\mathbf{w}_1 + \mathbf{w}_2$ the passive Synt-valency of the whole phrase is different from those of both of its elements, although it is determined by the passive Synt-valency of one of them, namely that of the Synt-head of the phrase.
- In a *modification* phrase $\mathbf{w}_1 + \mathbf{w}_2$ the passive Synt-valency of the whole phrase is the same as that of one of its elements, namely that of its Synt-head.
- In a *coordination* phrase $\mathbf{w}_1 + \mathbf{w}_2 + \dots + \mathbf{w}_n$ the passive Synt-valency of the whole phrase is the same as that of each of its elements (= conjuncts; we abstract of course from conjunctions, if there are any).

The constructions manifesting the SyntRels of the first class, i.e. *complementation*, are called *exocentric*; the constructions manifesting the SyntRels of the second and third classes, i.e. *modification* and *coordination*, are called *endocentric*.

For the SURFACE SyntS, a fourth major class of SSyntRel is needed—to link 'syntactically-induced' wordforms (so-called structural words, chunks of idioms, parts of compound numerals, etc.), which do not appear in the Deep-SyntS and cannot be covered by the dependencies of the three above-mentioned classes. As proposed at the beginning of Subsection 4.7, I will call these SSyntRels *ancillary*, to emphasize their 'subserving' character.

4.8. Syntactic Dependencies of a Language: Surface-Syntactic Relations of English

In order to give the reader a better idea about SSyntRels, as they can be used in a description of a language, I cite here a tentative list of SSyntRels of English, taken—with some corrections and additions—from Mel'čuk/Pertsov 1987: 85-160. No claims are laid as to completeness of this list; its purpose is strictly illustrative.

In the examples, the SSynt-dependent is boldfaced and words not participating in the construction illustrated are included in brackets.

For a better surveyability of the list, the SSyntRels are grouped as follows:

- First, they are divided into subordinate and coordinate ones.
- Second, the subordinate SSyntRels are subdivided into two subsets:
 - clausal SSyntRels, or those that can hold between (the heads of) noun, verb, adjective, and adverb phrases (they can also appear within these phrases); and
 - phrasal SSyntRels, or those that can hold only between the elements within phrases (never between phrases).
- Third, inside each subdivision, the line is drawn between valency-controlled SSyntRels (that necessarily embody complementation) and non-valency-controlled SSyntRels (that can be either modificative or ancillary).

I. Subordinate SSyntRels: 1 - 51

CLAUSE-LEVEL (= CLAUSAL) SSYNTRELS: 1 - 22

Valency-controlled SSyntRels: Complementation (1 - 15)

Actantial SSyntRels

1. Subjectival:

I←subj-*am...*; ***Smoking***←subj-*is* [*dangerous*].

That [*Alan comes*]←subj-*is* [*clear*].

It←subj-*is* [*clear that Alan comes*].

2. Quasi-Subjectival:

[*It*] *is* [*clear*]—quasi-subj→***that*** [*Alan comes*].

3. Direct-Objectival:

sees—dir-obj→***me***; [*to have*] *written*—dir-obj→***novels***;

[Helen] *wants*–dir-obj→**Alan** [to read];
worth–dir-obj→[a] **trip**; *prefer*–dir-obj→[her] **staying** [home];
explain [to him]–dir-obj→**that** [Alan was absent];
make–dir-obj→**it** [possible to neutralize the consequences]

4. Quasi-Direct-Objectival:

make [it possible]–quasi-dir-obj→**to** [neutralize the consequences]

5. Indirect-Objectival:

gives–indir-obj→**Alan /him** [some money];
convince [Alan]–indir-obj→**that** [he should work less]

6. Oblique-Objectival-1:

depends–obl-obj1→**on** [Alan]; *respect*–obl-obj1→**for** [Alan];
translation–obl-obj1→**from** [Lushootseed into Polish];

7. Oblique-Objectival-2:

translation [from Lushootseed]–obl-obj2→**into** [Polish]

8. Infinitival-Objectival:

can–inf-obj→**read**; *want*–inf-obj→**to** [read];
[Helen] *wants* [Alan]–inf-obj→**to** [read]; [Helen] *makes* [Alan]–inf-obj→**read**;
[her] *desire*–inf-obj→**to** [come]

9. Completive:

find [this]–compl→**easy**; *consider* [Alan]–compl→**happy**;
make [it]–compl→**possible**; *make* [Helen]–compl→[a good] **wife**

10. Copular:

be–copul→**easy**; *be*–copul→[a] **teacher**;
be–copul→**without** [a hat]; *seem*–copul→**in** [a difficult position]

11. Agentive:

written–agent→**by** [Alan]; *arrival*–agent→**of** [Alan];
shooting–agent→**of** [the hunters: ‘the hunters shoot’];
[a] *translation*–agent→**by** [Alan];
[I like] **for** [Alan to]←agent–play [cards].

12. Patientive:

translation–patient→**of** [this text];
shooting–patient→**of** [the hunters: ‘the hunters are shot’]

Copredicative SSyntRels

13. Subject-copredicative: [Alan] *returned*–subj-copred→**rich**.

14. Object-copredicative:

[Alan] *likes* [Helen]–obj-copred→**slim**.

[Alan] hammered [the coin]—obj-copred→*flat*.

Comparative SSyntRel

15. Comparative:

older—compar→*than* [Leo]; [Alan loves Helen] *more*—compar→*than* [Leo];
more [important]—compar→*than* [Leo]; *as* [important]—compar→*as* [Leo];

Non-Valency-controlled SSyntRels: Modification (16 - 22)

Absolutive SSyntRel

16. Absolute-predicative:

[His first] attempt—abs-pred→[a] *failure*, [Alan ...].

[He went out, his] anger—abs-pred→*gone*.

[He went out, his] gun—abs-pred→*in* [his left hand].

Adverbial SSyntRels

17. Adverbial:

walk—adverb→*fast*; [will] write—adverb→[next] *week*;

delve—adverb→*deeply*; [He] works—adverb→*there* ⟨*in* [this office]⟩.

[He]went [out,]—adverb→[his] gun [in his left hand].

With [her paper finished, Helen]←adverb—can afford this trip.

18. Modificative-adverbial:

[As always] *elegant*,←mod-adverb—[Alan] walked [away].

19. Appositive-adverbial:

[An old] *man*,←appos-adverb—[Alan] works [less].

20. Attributive-adverbial:

Abroad,←attr-adverb—[Alan] works [less].

Sentential SSyntRels

21. Parenthetical:

Oddly,←parenth—[Alan] works [less].

As [we have known for some time,]←parenth—[Alan] works [less].

To [give an example,]←parenth—[I] consider [now nominal suffixes].

22. Adjunctive:

OK,←adjunct—[I] agree.

PHRASE-LEVEL (= PHRASAL) SSYNTRELS: 23 - 51

General Phrase SSyntRels

Non-valency-controlled SSyntRels: Modification

23. Restrictive:

still←restr—*taller*, *most*←restr—*frequent*;

not←restr→*here*; [*Alan has*] *just* ←restr→*arrived*.

Noun Phrase SSyntRels

Valency-controlled SSyntRels: Complementation

24. Elective:

[*the*] *poorest*←elect→*among* [*peasants*]; [*the*] *best* [*ones*]←elect→*from* [*these boys*]

Mixed Type SSyntRels = Valency-controlled/Non-Valency-controlled: Modification

25. Possessive:

Alan's←poss→*arrival*; *Alan's*←poss→*bed*

26. Compositive:

man[-*machine*]←compos→*interaction*; *car*←compos→*repair*;
noun←compos→*phrase*; *color*←compos→*blind*

Non-Valency-controlled SSyntRels: Modification

27. Determinative:

my←determ→*bed*, *a*←determ→*bed*, *those*←determ→*beds*

28. Quantitative:

three←quant→*beds*; [*three*←num-junct→] *thousand*←quant→*people*

29. Modificative:

comfortable←modif→*beds*, *visible*←modif→*stars*, *French*←modif→*production*

30. Post-modificative:

stars←post-modif→*visible* (vs. *visible stars*)

31. Descriptive-Modificative:

[*these*] *beds*,←descr-modif→*comfortable* [*and not expensive*], ...

32. Relative:

[*the*] *paper*←relat→[*that I*] *read* [*yesterday*]; [*the*] *paper*←relat→[*I*] *read* [*yesterday*];
the girl←relat→[*who*] *came* [*first*]

33. Descriptive-Relative:

[*this*] *paper*,←descr-relat→[*which I*] *read* [*yesterday*];
Alan,←descr-relat→[*who*] *loves* [*her so much*]

34. Appositive:

General←appos→*Wanner*; [*the*] *term*←appos→'*suffix*'

35. Descriptive-Appositive:

[*This*] *term*←descr-appos→(''*suffix*'') [*will be considered later*].
[*You forget about*] *me*,←descr-appos→[*your*] *mother*.
Alan←appos→[*the*] *Powerful*;
you←descr-appos→*children*, *we*←descr-appos→*linguists*

36. Sequential:

man–sequent→***machine*** [interaction]; *fifty*–sequent→***to*** [seventy dollars]

37. Attributive:

learners–attr→***with*** [different backgrounds]; *dress*–attr→***of*** [a beautiful color];
[a] *man*–attr→[the same] ***age***; *years*–attr→***of*** [war], [the] *bed*–attr→***of*** [Alain]

38. Descriptive-Attributive:

[Professor] *Wanner*,–descr-attr→***from*** [Stuttgart, was also present].

Prepositional Phrase SSyntRels

A valency-controlled SSyntRel: Complementation

39. Prepositional:

in–prepos→***bed***, *without*–prepos→[three hundred] ***dollars***

A non-valency-controlled SSyntRel: Complementation (by analogy)

40. Prepositional-infinitival:

to–prepos-infinit→***go*** [to bed]

Verb Phrase (= Analytical Form) SSyntRels

Non-valency-controlled SSyntRels: Ancilliary

41. Perfect-analytical:

has–perf-analyt→***written***, *has*–perf-analyt→***been*** [beaten]

42. Progressive-analytical:

was–progr-analyt→***writing***

43. Passive-analytical:

was–pass-analyt→***written***

Conjunction Phrase SSyntRels²⁹

Valency-controlled SSyntRels: Complementation

44. Subordinate-Conjunctival:

[Suppose] *that*–subord-conj→[Alan] ***comes***.

[so] *as* [not]–subord-conj→***to*** [irritate Leo]

45. Coordinate-Conjunctival:

[Alan] *and*–coord-conj→***Helen***

46. Comparative-Conjunctival:

than–compar-conj→***Helen***; *as*–compar-conj→***always***

47. Absolute-Conjunctival:

If–abs-conj→[a] ***pronoun***, [the grammatical subject may...]

while–abs-conj→***in*** [bed]

Word-like Phrase SSyntRels

Non-valency-controlled SSyntRels: Ancillary

48. Verb-junctive:

give–verb–junct→*up*, *bring*–verb–junct→*down*

49. Numeral-junctive:

fifty←num–junct–*three*; *fifty*←num–junct–*third*

50. Binary-junctive:

if...–bin–junct→*then*...; *the* [more...]–bin–junct→*the* [more...];

till–bin–junct→*after*; *from* [...]–bin–junct→*to* [...];

either [...]–bin–junct→*or* [...]

51. Colligative:

[*is*] *dealt*–collig→*with* [stranded prepositions]

II. Coordinate SSyntRels: 52-53

Non-valency-controlled SSyntRels: Coordination

52. Coordinative:

Alan–coord→*and* [*Leo*]; *Alan*–coord→*but* [*not Leo*];

rich,–coord→*intelligent*–coord→*and* [*beautiful*]

53. Quasi-coordinative:

[*Alan was*] *abroad*–quasi-coord→*without a penny*–quasi-coord→*in a desperate situation*.

[*These moneys we keep hidden under a loose*] *board*–quasi-coord→*under the floor*–quasi-coord→*under a chamber pot*–quasi-coord→*under my friend's bed* (T. Capote, "A Christmas Memory").

Comment

As suggested above (4.7, **Comment** after Definition 3.6), some of the modification class SSyntRels can be valency-controlled, so that their dependents correspond to DSynt-Actants of their governors:

my←determ–*arrival*

⇔ I←I–ARRIVE;

American←modif–*participation*

⇔ AMERICA←I–PARTICIPATE;

treat [someone]–adverb→*friendly*

⇔ TREAT–III→FRIENDLY;

income←compos–*tax*

⇔ INCOME←II–TAX;

etc.

Similarly, the coordinative SSyntRel can be valency-controlled:

try–coord→*and* [*come*] ⇔ TRY–II→COME.

In point of fact, the correlation between complementation and modification, as well as between complementation/modification and coordination on the DSynt- and SSynt-levels is complex and cannot be discussed here in depth.

5. Possible Combinations of the Three Types of Linguistic Dependency

The three types of linguistic syntagmatic dependency that we are studying—semantic, syntactic, and morphological—are logically independent of each other, which means that they can occur in all possible combinations. Thus, two wordforms in a sentence can be related by a Sem-**D** with no Synt-**D** or Morph-**D** between them (a); or they can have a Sem-**D** and, at the same time, an inverse Synt-**D**, with still no Morph-**D** (b); or there can be a Synt-**D** with a Morph-**D** having the same orientation, but no Sem-**D** (c); etc.

$$(a) \mathbf{w}_1 \xrightarrow{-\text{sem}} \mathbf{w}_2 \quad (b) \mathbf{w}_1 \begin{array}{c} \xrightarrow{-\text{sem}} \\ \xleftarrow{\text{synt}} \end{array} \mathbf{w}_2 \quad (c) \mathbf{w}_1 \begin{array}{c} \xrightarrow{-\text{synt}} \\ \xrightarrow{-\text{morph}} \end{array} \mathbf{w}_2$$

All in all, there are fourteen logically possible combinations of direct Sem-**D**, Synt-**D** and Morph-**D** between two wordforms, \mathbf{w}_1 and \mathbf{w}_2 , of a sentence (cf. Mel'čuk 1964, 1988: 118-128); all of them are actually found in languages and will be illustrated below.

CASE 1: \mathbf{w}_1 \mathbf{w}_2 , i.e. no syntagmatic dependency whatsoever between two wordforms.

Example: The wordforms *cocoa* and *new* in (1).

CASE 2: $\mathbf{w}_1 \xrightarrow{-\text{sem}} \mathbf{w}_2$, i.e. two wordforms are linked by a Sem-**D**, unsupported by any Synt-**D** or Morph-**D**.

Example: The wordforms *farming* and *problems* in (1) are semantically directly related—*farming* depends on *problems* ('problems are-for farming'), yet there is no Synt-**D** or Morph-**D** between them. Another example could be an expression of the type *He drives me mad*, where we have *mad*—sem→*me*, while syntactically and morphologically *me* and *mad* are not linked.

CASE 3: $\mathbf{w}_1 \xrightarrow{-\text{synt}} \mathbf{w}_2$, i.e. two wordforms are linked by a Synt-**D**, but there is no Sem-**D** or Morph-**D** between them.

Examples

(27) a. In Japanese, a numeral or a quantitative adverb, while bearing semantically on the SSynt-Subject or the DirO as in 'Five people were injured' or 'He reads many books' (and—for numerals—morphologically depending on it), depends syntactically on the verb, with which it has neither semantic nor morphological links, cf.:

- i. *Sono ziko +de keganin +ga go+nin deta,*
 this accident LOC injured.people SUBJ(ective) five CLASS(ifier) emerged
 lit. 'In this accident, injured-people five-ly←synt-emerged' =

'In this accident, five people were injured'.

- ii. *Nihongo+no hon +o takusan yomimasita,*
 Japanese GEN book ACC many read-PAST
 lit. 'Japanese-language books many-ly←synt→read' =
 '[I] have read many Japanese books'.

For a detailed characterization of this Quantifier Float construction and its relations to other numeral constructions in Japanese, see Kim 1995; cf. also Case 8, (31b).

- b. In Russian, a numeral adverb of the type VDVOËM 'being-two', VTROËM 'being-three', etc. is used in a similar construction, where this adverb semantically bears on the SSynt-Subject of the clause, having with it no syntactic or morphological links:

My sideli [na beregu] včetverom,
 lit. 'We sat→synt→being-four [on the-shore]'.

The same holds about most of Floating Quantifiers of different types in various languages.

- c. In English, French and many other languages, a measure noun used as a DirO depends syntactically on the verb, but does not have a semantic or morphological link with it (semantically the verb dominates the noun quantified):

John bought→synt→[five] kilos [of potatoes].
 Fr. *Jean a acheté→synt→[cinq] kilos [de pommes de terre].*

Cf. Case 9, example (32b).

- d. Any conjoined elements that are morphologically invariable, as, e.g., *Alan, Helen, Leo*, are linked syntactically without any direct semantic or morphological link between them.

CASE 4: w_1 -morph→ w_2 , i.e. two wordforms are linked by a Morph-**D** only, without any Sem-**D** or Synt-**D**.

Examples

- (28) a. In Tabassaran (Eastern Caucasian), the M(ain) V(erb) can agree with the 1st/2nd person Possessor of the SSynt-Subject, the Possessor being not directly related to the verb semantically or syntactically, cf.:

Ič mudur učvuhna he+b+gnu+jič 'Our kid ran away to your place'
 Our goat-kid[II] to-you left II left 1PL

where the verb *hegnu* 'ran away, fled' agrees in class with *mudur* (class II, the class-marking infix in the verb is **-b-**), but in person and number with *ič* 'our'.

The same type of agreement of the MV is also characteristic, among others, of Chickasaw (Muscogean, USA), Wichita (Caddoan, USA), Tangut, and Maithili (Indian).

CASE 6: w_1 $\begin{array}{l} \text{--sem--} \\ \leftarrow \text{synt--} \end{array}$ w_2 i.e. two wordforms are linked by a Sem-**D** and a Synt-**D**, this time oriented the opposite ways, with no Morph-**D** present.

Examples

(29) a. An adjective and the modified noun in ADJ + N phrase in a language where adjectives are invariable, cf. *new* and *areas* in (1).

b. In Lushootseed, a PREP + NUM phrase syntactically depends on the clause predicate (underlined in the example), which is its Sem-dependent, and there is no Morph-**D** between them:

ʔəbs +s+qʷ əb+qʷ əbayʔ əlgʷ əʔ ʔə tiʔəʔ bə+saliʔ
 POSS dog dog PL by this two

lit. '[They are] dog-dog-possessor + s by these two' =
 '[They] have two dogs' (example of D. Beck).

CASE 7: w_1 $\begin{array}{l} \text{--sem--} \\ \text{--morph--} \end{array}$ w_2 i.e. two wordforms are linked by a Sem-**D** and a Morph-**D**, oriented the same way, but no Synt-**D** is present.

Example: In a language where Clitic Raising exists, a clitic—in the SSyntS—can semantically and morphologically depend on an infinitive, while there will be no direct Synt-dependency between them, the clitic being a Synt-dependent of a higher verb, which 'hosts' it, cf.:

(30) Sp. *Le ←synt-quisiera poder enviar este libro*,
 lit. 'To-him [I] would-like to-be-able to-send this book'.

Semantically, *le* 'to him' depends as an actant on *enviar* '[to] send'; its dative form is also imposed by this verb, so that morphologically *le* also depends on *enviar*.

CASE 8: w_1 $\begin{array}{l} \text{--sem--} \\ \leftarrow \text{morph--} \end{array}$ w_2 i.e. two wordforms are linked by a Sem-**D** and a Morph-**D**, oriented the opposite ways, without any direct Synt-**D**.

Examples

(31) a. An attributive or copredicative adjective and the Subject/the DirO in a language with adjectival agreement illustrate Case 8. The adjective shows agreement with the Subject/the DirO, which is its Sem-dependent, and there is no direct Synt-link between them:

Fr. *Elle semblait fatiguée* 'She seemed tired',

where semantically *elle* depends on *fatiguée* [= 'fatigué'('elle')], but morphologically *fatiguée* depends on *elle* for its singular and feminine; syntactically, the two are not directly related.

Similar examples: Fr. *Elle est rentrée heureuse* 'She returned happy', *Il buvait son thé froid/sa tisane froide* 'He drank his tea cold/his herbal tea cold', etc.

For a detailed analysis of the copredicative construction, see Nichols 1978.

les fleur +s que je t' ai offert+es
 the flower[FEM] PL that I to-you have given **PL.FEM**

‘the flowers that I have given to you’,

where *que* ‘that’ semantically and syntactically depends on *offertes* ‘given’, but morphologically controls its gender and number (QUE gets its gender and number from its antecedent, FLEURS, so that, in final analysis, OFFERTES is feminine and plural because of FLEURS; yet, technically speaking, it agrees with QUE).

In point of fact, the situation here is more complex, since *que* is an accusative form, imposed by the transitive verb *offrir* ‘[to] give’; so that *que* morphologically depends on *offertes* at the same time that *offertes* depends on *que*. This is then a case of reciprocal morphological dependency.

CASE 14: —**sem**→ i.e. two wordforms are linked by all three types of dependency, of which Synt-**D** and Morph-**D** are oriented the same way, but in the opposite direction with respect to Sem-**D**.

 W₁ ←**synt**-- W₂
 ←**morph**--

Example: An agreeing adjective and the modified noun in a language with adjectival agreement (Slavic, Romance, Semitic, German, etc.), where the adjective bears semantically on the noun, but syntactically and morphologically depends on it.

Consistent distinction of the three types of dependency allows for some elegant formulations, for instance:

- The adjective as a part of speech can be characterized in terms of Sem-**D** vs. Synt-**D** (see Beck 1998):

|| In a prototypical case, an adjective semantically dominates the noun on which it depends syntactically. (Morph-**D** can go both ways or be absent altogether: cf. Cases 6, 12, and 14.)

Similarly, for the adverb (replacing ‘noun’ with ‘verb or adjective’).

- Taking into account the three types of linguistic dependency, Zwicky (1993) presents the differences between complements and modifiers in a compact form:

Properties	Complement	Modifier
Semantic	argument	predicate
Syntactic	obligatory	optional
	unique	repeatable
Morphological	agreement controller	agreement target
	government target	government controller

The properties stated in this table hold only in the most current, prototypical cases; as has been shown above, the syntactic and morphological properties of complements vs. modifiers can in principle be inverted. However, the semantic—definitorial—property is stable.

- In the literature, one finds heated debates concerning the split of head-related properties between different sentence elements, which presumably makes the identification of heads difficult and/or dubious: a given element seems to be the head in one respect, but the dependent in another one. However, if one distinguishes the three types of dependency and uses Criteria B1-B3 in the hierarchical way (p. 00), such a split is logically impossible. Thus, a Synt-head must be determined exclusively according to the properties of SYNTACTIC heads; it is irrelevant whether or not it has properties of Sem-heads or Morph-heads (as the 14 combinations above show, in many cases a Synt-head does not have such properties.)

6. Correlations between the Three Types of Linguistic Dependency

The three types of dependency are linked by the following correlations (these correlations hold only for PROTOTYPICAL cases of morphological agreement and government and are no more than tendencies).

Sem-**D** vs. Morph-**D**

- Sem-governors agree morphologically with their Sem-dependents;
- Sem-governors govern morphologically their Sem-dependents.

This is the Keenan's principle (Keenan 1974: 298-303 and 1978: 94-98); cf. Zwicky's slogan: 'Functors are agreement targets and government triggers' (1991: 2).

Synt-**D** vs. Morph-**D**

- If w_2 morphologically agrees with w_1 , then w_1 and w_2 sometimes are, and sometimes are not, linked by a direct Synt-**D** (there also may be no Sem-**D** between w_1 and w_2).
- If w_2 is morphologically governed by w_1 , then w_1 and w_2 are always linked by a direct Synt-**D** (however, a Sem-**D** can be absent).

As can be seen in our review of theoretically possible cases, in the configuration w_1 -synt \rightarrow w_2 , the Morph-**D**s can go both ways: the Synt-governor can be either the controller or the target of a Morph-**D**. The same holds with respect to the linear position: rules for positioning can also go both ways, such that in some cases the linear position of the Synt-dependent w_2 must be stated with respect to its Synt-governor w_1 (ADJ \leftarrow N, N \leftarrow V, ADV \leftarrow V, etc.), and in some others the linear position of the Synt-governor w_1 must be stated with respect to its Synt-dependent w_2 (PREP \rightarrow N, AUX \rightarrow V, CONJ \rightarrow V, etc.). **NB**: The reference point for linear positioning of the one of two syntactically-linked elements X—synt—Y is the element which can appear without the other, the inverse being untrue. Thus, in ADJ \leftarrow -synt—N, N can appear without ADJ, but not vice versa, which means that ADJ is positioned with respect to N, its SSynt-governor. Similarly, for PREP—synt \rightarrow N, N can be used without a PREP, but a PREP never appears without its N; there-

fore, the position of PREP is stated with respect to N, its SSynt-dependent (cf. 4.3.1, Criterion A1, Comment 1, p. 00).

Sem-**D** and Synt-**D** are global in that they 'embrace' ALL the wordforms in a sentence; therefore, they are represented explicitly in the SemS and the D-/S-SyntS of the sentence. On the other hand, Morph-**D** is not global in this sense: it does not 'embrace' all the words in a sentence (in addition, it is by no means present in all sentences and can be altogether absent from a language); therefore, no special structure is foreseen in which it would be explicitly represented: Morph-**D**s are computed by syntactic rules of the language during the SSyntS \Rightarrow DMorphS transition and encoded in the DMorphS via corresponding grammemes.

Chapter III: Syntactic Dependency

Among the three types of linguistic dependency that we are studying, it is the Synt-**D** that attracts the lion's share of attention; it is, beyond any doubt, the most important type of dependency and, at the same time, the most controversial one. I will discuss the Synt-**D** additionally, touching on the following points:

- Some false dogmas on the subject of Synt-**D** (1).
- Analysis of some constructions 'difficult' for the attribution of Synt-**D** (2).
- Advantages of Synt-**D** (3).

1. Current Fallacies Concerning Syntactic Dependency

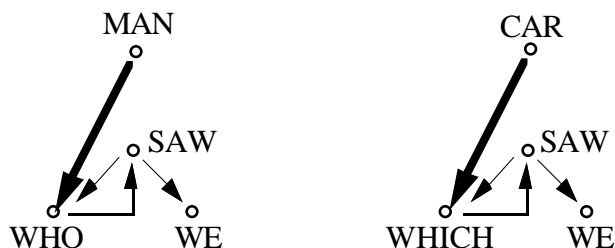
One finds in the literature a number of criticisms leveled at the **D**-approach in syntax; these can be grouped under four headings: 'double dependency,' 'mutual dependency,' 'no dependency,' and 'insufficient dependency.' I will consider below examples of each in order to show that these criticisms are unjustified, since they stem from the confusion of different types of dependency or from using unlabeled dependencies.

1.1. 'Double Dependency'

There are three typical cases where many see double syntactic dependency: relative pronouns, raisings and subordination of coordinate expressions.

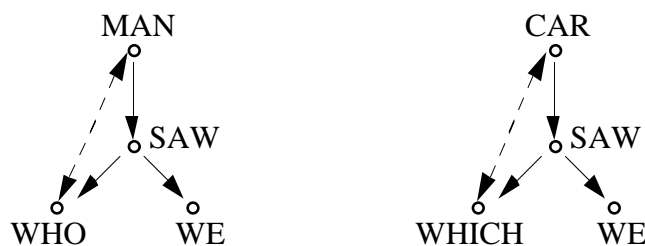
1.1.1. Relative Pronouns

In *the man **whom** we saw/the car **which** we saw*, many linguists—for instance, Tesnière 1959: 560 and Hudson 1990: 117—say that the relative pronoun syntactically depends both on the MV of the relative clause (here, *saw*) and on its own antecedent (here, *man/car*; this second Synt-**D** is shown by a boldfaced branch); at the same time, the relative pronoun being the Synt-head of the relative clause syntactically governs the MV on which it, at the same time, syntactically depends:

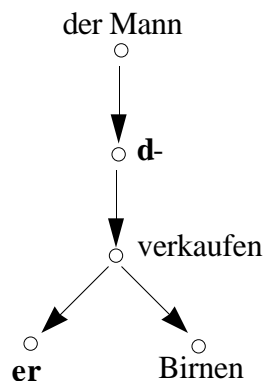


Were it so, this would be a problem for the **D**-approach, since it would mean the violation of the uniqueness-of-Synt-governor principle, as well as the principle of the absence of cycles in the Synt-structure. This would, in turn, destroy a clear understanding of the substantive nature of Synt-**D**, which is supposed to specify the linear positioning of one of its members with respect to the other—and nothing else.

However, the representation above is simply a case of confusion between different types and/or levels of dependency. I think that in the SSyntS the relative pronoun depends SYNTACTICALLY only on the MV of the relative clause, while standing in an anaphoric relation to its antecedent; and in many languages the relative pronoun also has a Morph-**D** with its antecedent (namely, congruence). This masks the fact that the Synt-head of a relative clause is its finite MV, and by no means the relative pronoun: it is only the presence of a finite verb in a clause that licenses the speaker to use this clause as a relative, and it is this use that imposes the pronominalization of the relativized clause element, which thus becomes a marker of relativization. Here is the SSyntS of a relative clause as proposed in the Meaning-Text theory (the dashed arrow is part of SSynt-Anaphoric Structure):



It is, however, obvious that the relative pronoun has indeed a double syntactic nature: it is both a Synt-dependent of the MV of the relative and, at the same time, the marker of the relative. This leads some researchers to split the relative pronoun into two abstract lexical elements, one of which represents the Synt-head of the relative clause (its MV depends on this element), while the other occupies its legitimate dependent Synt-position with respect of the MV of the relative. Thus, Engel (1977: 234-235 [1988: 292-293]), following the proposal of Tesnière (1959: 561), represents the SSyntS of the German relative clause *der Mann, der Birnen verkauft* ‘the man who sells pears’ by splitting the relative pronoun DER ‘that’ [= ‘which/who’] into the relative marker part D- and the pronominal anaphoric part -ER ‘he’, obtaining something like *the man that he* [= *der*] *sells pears* and thus avoiding double dependency:



Relative clauses with a separate expression of the relative marker and the pronominal anaphoric element (= resumptive pronoun) exist in many languages, for instance, in Arabic, Turkish, Albanian, Persian, Middle High German, Provençal, etc. (see, e.g., Suñer 1998). But this is exactly what proves that there is no need for such a *tour de force* in English, French or German: here, the syntax of the relative clause is different. The double role of the relative pronoun in these languages is reflected on different levels of representation in terms of the three types of dependency plus the separate anaphoric relation. As far as the Synt-**D** is concerned, the relative pronoun does not depend on its antecedent and does depend on the MV of the relative clause:

On the one hand, it does not Synt-depend on its antecedent because the antecedent of a relative pronoun and the pronoun itself cannot form a phrase; thus, **[a] man whom* and **[a] car which* are by no means phrases of English. See Criterion A2, Ch. II, 4.3, p. 00.

On the other hand, some properties of the relative pronoun clearly point to its dependent Synt-role within the relative. The most important in this respect is the fact that relativization may be restricted by the dependent Synt-role of the relative pronoun: for instance, in some languages relativization is possible only if the would-be relative pronoun is the SSynt-Subject, or if it is the SSynt-Subject or the DirO, or if it is the SSynt-Subject, the DirO or the IndirO, etc. Thus, the type of the Synt-**D** of the relative pronoun on the MV of the relative clause is crucial. To this, one could add, for instance, that the relative pronoun can be omitted in some languages (as in *the man I saw* or *the man I talk with*) without any effect on the relative; omissibility is a typical feature of Synt-dependents—although it happens to the Synt-heads as well (Ch. II, 4.5). Also, in some languages, the relative clause is marked by a special form of the MV of the relative, without any relative pronoun (Bantu).

But my strongest arguments against the double dependency of a relative pronoun are as follows:

- Deep-Synt-Structure of the Relative Clause. In the DSyntS, the (future) relative clause has no relative pronoun at all—only its nominal source N is allowed to appear there. And this N syntactically depends of course only on the MV of its clause, being anaphorically related to its antecedent (as

is the case with all substitute, i.e. anaphoric, pronouns). When in the transition DSynt \Rightarrow SSyntS this N is replaced with the corresponding relative pronoun, what could be the reason to add another Synt-**D** between it and its antecedent? I can see no one. This consideration can be formalized by the following heuristic principle:

As-Little-DSynt \Rightarrow SSynt-Restructuring-as-Possible Principle

When deciding on the SSyntS of a phrase/a clause, the researcher should maintain for it the same orientation of syntactic **D**s as in the DSyntS—except in cases of obvious necessity to reverse the dependencies, which have to be explicitly justified. (In other words, the default case must be that a DSynt-**D** remains a SSynt-**D**.)

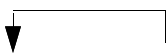
- The SSynt-Structure of the Related Interrogative Clause. The full-fledged sentence *Who wants a lift?* has the SSyntS with the top node WANT, and this is for me an important argument in favor of establishing the same top node in the corresponding relative [*the boy*] *who wants a lift*—because I adopt the following principle:

Always-the-same-SSyntS Principle

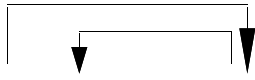
When deciding on the SSyntS of a phrase/a clause, the researcher should try to maintain for it always the same SSyntS no matter where this phrase/this clause appears in a larger formation.

Therefore, the same phrase *who wants a lift* in a sentence of the type *Who wants a lift has to sign up*—this time, a headless relative—has the SSyntS with the finite verb as its top node. Thus, if I have accepted the MV as the head of an independent interrogative clause, I want this clause to have the same SSyntS even when it is used as a relative. If I have accepted the MV as the head of a 'normal' relative clause, I prefer to treat the corresponding headless relative in the same way; and so forth. This means, among other things, that in English, the finite, or 'tensed,' verb has in its passive valency the role of the head of such phrases (= actually, full-fledged clauses) that can be used as equivalents of noun phrases—under specific conditions, of course (such as the presence of relative pronouns).

The phrase *who wants a lift* is a partial syntactic equivalent of a noun phrase—it can be, e.g., a SSynt-Subject. The phrase *what Alan bought* in a sentence of the type *What Alan bought is important*—again, a headless relative—also has a finite verb as its top node: *Alan*←***bought***→*what*. It is also a partial syntactic equivalent of a noun phrase, since it can be the SSynt-Subject, or the DirO of the MV, or else depend on a preposition:



What Alan←***bought***←*is important*.

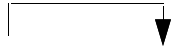

I like what Alan ←bought.


for Alan←bought→what = For what Alan bought [I could pay him \$ 15].

The phrase *whatever apples Alan bought* (Van Langendonck 1994: 256), which is as well syntactically equivalent to a noun phrase, has a similar SSyntS—in the sense that its top node is the finite verb *bought* and the WH-pronoun depends on it (in this case, indirectly):

whatever←apples←bought→Alan.

(The SSyntS of *whatever apples that Alan bought* is different, its SSynt-head being APPLES:


whatever←apples that←bought→Alan.)

The situation is the same with indirect-interrogative pronouns, as in *I wonder whom you love* or *He asked what book Alan had brought*. Such a pronoun depends syntactically—directly or indirectly—only on the MV of the completive clause, although there is a direct Sem-**D** between the pronoun and the MV of the matrix clause: *I wonder—sem→whom...* and *He asked—sem→what...* (for more on the representation of indirect questions of this type, see Kahane/Mel'čuk 1999).

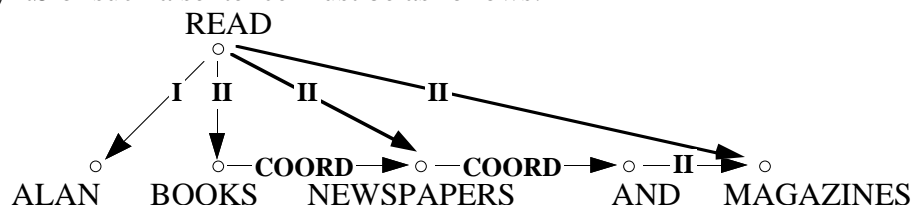
To conclude, let it be mentioned that in the **D**-descriptions of various languages (English, Danish, Esperanto, etc.) for a Machine Translation system (Schubert 1987: 100-102, Maxwell/Schubert 1989), the relative pronoun is treated as a Synt-dependent of the MV of the relative clause.

1.1.2. Raisings

It is also said that in sentences of the type *He keeps talking*, the pronoun *he* depends both on *keeps* and *talking*, because it is the subject of both (cf. Hudson 1988b: 194ff; the construction is even commonly known as 'Subject Raising'). However, if Sem-**D** and Synt-**D** are distinguished, this reasoning does not apply: *he* is the SYNTACTIC Subject of *keeps* (HE controls the agreement of KEEP, is positioned with respect to KEEP, undergoes inversion with DO) but the 1ST SEMANTIC actant of *talking* (this allows one to account easily for cooccurrence restrictions: **Something talks*, etc.). At the SSynt-level, there is no direct Synt-link between *he* and *talking*: **he talking* is not a phrase of English. The situation is slightly different with 'meteorological' verbs: in *It keeps raining*, the impersonal pronoun *it* is the SSynt-subject of *keeps*, but it does not appear in the SemS nor in the DSyntS, since it is semantically empty; it is inserted in the SSyntS by a special rule, based on the lexical entry for [*to*] RAIN, so that the question of its semantic compatibility with the verb does not even rise (the verb [*to*] RAIN has no semantic actant).

1.1.3. Subordination of Coordinate Expressions

In sentences of the type *Alan reads books, newspapers and magazines*, the elements *newspapers* and *magazines* are often said to have two Synt-governors each: *newspapers* depends on *books* and on the verb *reads*, while *magazines* depends on *and* and again on the verb *reads*. Formally, then, the DSyntS of such a sentence must be as follows:



'Duplicating' Synt-**D**s are shown by bolder branches. This type of representation is discussed in detail on basis of Russian data in Sannikov 1989: 32-41.

Whichever the advantages of this representation,³⁰ it reflects again a confusion of different types of **D**s: in point of fact, 'duplicating' branches show Morph-**D**s (if any: *Alan sees Helen and me* *<*I>*) and Sem-**D**s; they do not have the same nature as the coordinate Synt-**D**s, which—as all Synt-**D**s—essentially specify linear positioning of wordforms. The intuition that I would like to capture in the case of coordinate, or conjoined, strings on the Surface-Synt-level is not that every element of a conjoined phrase depends 'in parallel' on the same Synt-governor, but rather that a conjoined phrase as a whole depends on its Synt-governor via its Synt-head (= its first element, see 1.3 below).

1.2. 'Mutual Dependency'

Fairly often, grammarians insist on mutual dependency between the MV of a clause and its SSynt-Subject, saying that even if it is the MV that 'represents' the whole clause, the Subject controls the form of the verb (*The cat is sleeping* vs. *The cats are sleeping*); moreover, the Subject and the MV constitute a communicative unit consisting of a theme/topic and a rheme/comment. Again, such statements are due to confusion between different levels of dependency: the fact that the Subject depends on the MV syntactically does not prevent the MV from depending on its Subject morphologically. In many languages the MV agrees not only with the Subject but with the DirO (and sometimes with the IndirO) as well: cf. (35a) above, p. 00; this, however, does not belie the universally accepted syntactic status of objects as dependents of the MV.

1.3. 'No Dependency'

While some linguists treat coordination by means of double dependencies (1.1 above), it is also frequently said (Matthews 1981: 196, Hudson 1988a: 314) that there is no Synt-**D** at all within conjoined, or coordinate, expressions: in *Leo and Alan [came]*, as well as in *Leo or Alan [will do it]* nothing is the Synt-head. This viewpoint goes back to Tesnière 1959: 339ff.³¹ Once again,

Synt-**D** is being confused with subordination (which is a particular case of Synt-**D**). *Leo and Alan* is a phrase of English, and so is *and Alan*, while **Leo and* is not (the fact that a pause is possible after AND—as, for instance, in *Leo and*, || *believe me or not*, || *Marga...*—does not impart to the expression **Leo and* the status of a phrase; it still is not an utterance of English). The phrase *Leo and Alan* has thus the passive Synt-valency of *Leo*, and not that of *and Alan*, the passive Synt-valency of the phrase *and Alan* being determined by *and* rather than by *Alan* (the phrases such as ... *and Alan*, ... *or Alan*, ... *but not Alan* etc. can be only conjoined constituents, and this property comes from the coordinate conjunction); therefore the Synt-**D**s in *Leo and Alan* are as follows:

LEO—**coordinative**→AND—**conjunctional**→ALAN.

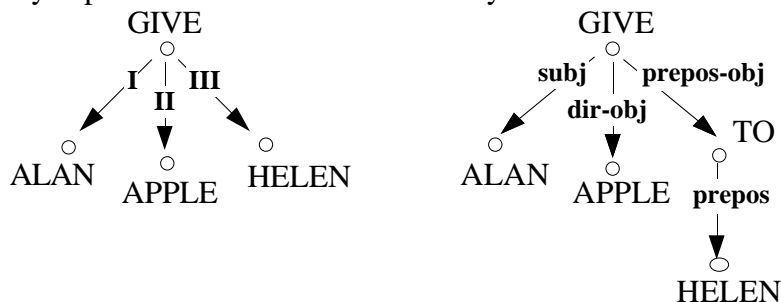
In a conjunctionless coordinate phrase such as *Leo, Alan, Helen* the Synt-**D**s are

LEO—**coordinative**→ALAN—**coordinative**→HELEN.

The Synt-head of a conjoined phrase is, at least in English and similar languages, its first element (independently of the presence/absence of a coordinate conjunction). Note that in a number of languages, the first element in a coordinate string has some special properties. Thus, in some Bantu languages, only the first verb in a coordinate string of verbs (*stood up*, *drank his coffee*, *took the book and left*) has a complete morphological marking, including tense; all the following verbs are in a special—**conjunctive**—form, which precludes the expression of tense. In Nias (Indonesia), in a string of coordinated nouns, only the first noun is inflected according to the external context, while all the others remain in the unmarked nominative; etc. The proposed **D**-description of coordinate phrases is shared, for instance, by Engel (1982: 263ff). For more on Synt-**D** in connection with coordination, see **5** below; a concise review of possible solutions to the problem of **D**-description of coordination is presented in Schubert 1987: 104-119.³²

1.4. 'Insufficient Dependency'

Many linguists have criticized the **D**-approach for its incapacity to express what they call the multi-layer character of syntactic structure. Thus, in *Alan gives an apple to Helen*, APPLE is somehow closer—syntactically, not linearly!—to GIVE than is HELEN; and ALAN has the loosest link to the verb ('external argument,' as it is known in some approaches). Without going into a discussion of what this syntactic closeness really means, I can point out simply that all such distinctions are easily and naturally expressed via the names of D-/S-SyntRels:



Labeled SSyntRels guarantee the capacity of any **D**-description to state the 'closeness' (or 'remoteness')—of course, in the structural sense—of any elements of the sentence.

2. Syntactic Dependency in Action: Eight Illustrative Case Studies

Let us consider now several particular syntactic constructions and show how they are described using Synt-**D**; I will mainly concentrate on the ORIENTATION of Synt-**D**, i.e. on the problem of Synt-head. Since in some cases all theoretical arguments advanced in support of this or that viewpoint concerning the treatment of a given phrase in terms of Synt-**D** seem inconclusive, I will try to argue, when need be, based on the RULES necessary to produce the construction in question within the framework of a stratificational multilevel semantic-oriented linguistic model (more specifically, the Meaning-Text Model). I will try to show that the opposite decision concerning the choice of the Synt-governor entails a complexification of the processing rules.

2.1. Russian Numeral Phrases

In Russian, a numeral phrase NUM + N shows rather complex behavior:

—if the numeral does not end in ODIN '1' and is in the nominative or the accusative, the noun is in the genitive and its number depends on the numeral (with DVA '2', TRI '3', and ČETYRE '4' or any numeral that ends in these three—23, 32, 44, ..., 1452, etc.—the noun is in the singular, while with all other numerals it is in the plural);

—if the numeral ends in ODIN '1' (e.g., 1231), no matter in what case it is, the number of the noun is singular;

—if the case of the numeral (other than ODIN '1') is the nominative or the accusative, and if it is (or ends in) DVA, it agrees with the noun in gender; etc.

This complexity engendered much discussion concerning the orientation of Synt-**D** in the NUM + N phrase; all logically possible solutions have actually been proposed (NUM→N; NUM←N; NUM↔N; in the nominative and the accusative it is NUM→N, in other cases NUM←N; etc.). In actual fact, the orientation of Synt-**D** in Russian numeral phrases is always NUM←N, since the passive Synt-valency of the phrase is obviously that of N, and not that of NUM. What obscures the picture is again confounding the Synt-**D** with variegated Morph-**D**s (Mel'čuk 1985: 59-102; for the opposite view—NUM→N, i.e. the numeral is the Synt-head, see Corbett 1993).

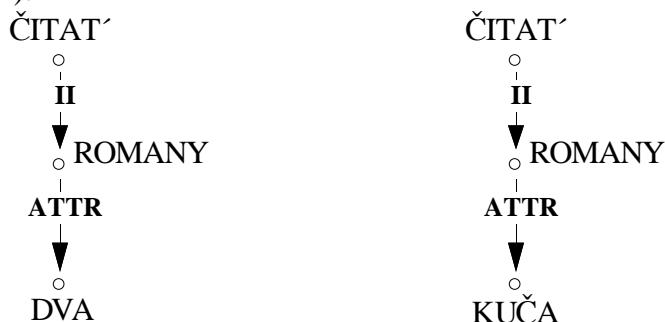
To make my point clearer, I will describe in parallel the production of two phrases, one with a genuine numeral DVA 'two' and another one with a measure noun KUČA 'heap, a lot':

[*On pročěl*] *dva romana* '[He read] two novels'
and
[*On pročěl*] *kuču romanov* '[He read] a-lot of-novels'.

In the SemS, both phrases have a similar representation, where quantification appears as any semantic modification would:

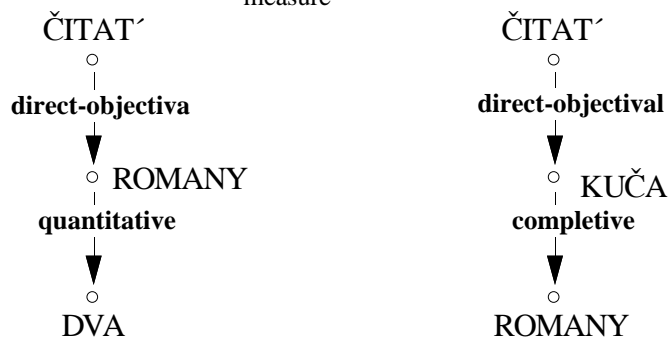


In the SemS \Rightarrow DSyntS transition, the direct DSynt-link between ČITAT' 'read' and ROMANY 'novels' is preserved, such that the quantifying expression remains a modifier of ROMANY (via the DSyntRel ATTR):



This allows one to take care of all cooccurrence constraints holding between the verb and the DirO noun, including collocational constraints expressed in terms of Lexical Functions.

Under the DSyntS \Rightarrow SSyntS transition, the situation changes: the NUM DVA remains subordinated to the quantified N, while the N_{measure} KUČA becomes the SSynt-governor of it:



This is done since, from a purely SSynt-viewpoint, the phrase *čítat' kuču* '[to] read a-lot' behaves exactly as any other pair $V_{(transitive)} - \mathbf{dir-obj} \rightarrow N$: the N is inflected and positioned as any regular DirO should. On the other hand, *kuča romanov* behaves as any other pair $N - \mathbf{compl} \rightarrow N$ does. Because of this, for *čítat' kuču romanov*, the inversion of the Synt-**D** between KUČA and ROMANY is justified by a considerable economy of rules, which otherwise would have to be doubled: a special set of rules would be needed to describe the treatment of a quantifying modifier (= KUČA) that behaves as a DirO and another set of rules for the treatment of a DirO (= ROMANY) that behaves as an adnominal complement. But for *čítat' dva romana* nothing justifies such an inversion: the extremely complex rules that compute the inflection of the NUM, of the quantified N and eventually of some depending adjectives remain the same, whichever element is taken to be the Synt-

head in the phrase NUM + N (see these rules in Mel'čuk 1985: 162-210). Therefore, the overall simplicity of DSynt-rules requires not to invert the Synt-**D** between NUM and N. *Ergo*, on both the DSynt- and SSynt-levels, we have NUM←N.

The treatment proposed for *čitat' kuču romanov* '[to] read a lot of novels' can be easily extended to cover all the constructions including quantifying expressions, in particular the measure phrase, as in Rus. *vypit' tri litra piva* '[to] have drunk three liters of beer', Eng. *have eaten ten dollars of bagels*, Fr. *faire deux heures de sieste*, lit. '[to] have two hours of nap', etc. In the DSyntS, the measure phrase is represented as a modifier of the noun quantified—in the same way as the synonymous expressions *vypit' pivo v količestve trëx litrov*, lit. '[to] have drunk beer in quantity of three liters', Eng. *have eaten bagels for ten dollars*, Fr. *faire une sieste de deux heures*, lit. '[to] have a nap of two hours'. It is on the level of Surface-Syntax Structure that the inversion of dependency takes place.

2.2. A Russian 'Approximation'-Marking Preposition

In the Russian phrase *okolo pjati kilogramm* 'about five kilos' the preposition OKOLO (lit. 'close to', here 'approximately'), is the Synt-head of the phrase: without it, the numeral phrase has the exact distribution, i.e. the passive Synt-valency, of a noun, but with OKOLO the numeral phrase can only be used as the Synt-Subject or DirO. Thus, the phrase with *okolo* cannot be the complement of a preposition (**dlja okolo pjati kilogramm* 'for about five kilos') or an IndirO (**raven okolo pjati kilogrammam* '[is] equal to about five kilos'). Therefore, we obtain, on the SSynt-level, *okolo*→*kilogramm*→*pjat'*. (In English *about* 'approximately' does not have the same properties: *for about five kilos* is OK; and therefore its SSynt-status is different: *about*←*five*←*kilos*.) This representation is buttressed by the complete identity in syntactic behavior of this *okolo* and all other 'genuine' Russian prepositions; thus, all of them, together with the numeral, follow the noun quantified in the approximate-quantitative construction: *dlja pjati kilogramm* 'for five kilos' ~ *kilogramm dlja pjati* 'for approximately five kilos' and *okolo pjati kilogramm* 'about five kilos' ~ *kilogramm okolo pjati* 'approximately about five kilos'.

A similar construction exists in Latin:

- (36) Lat. *Circa quingentos Romanorum cecid +erunt*
 around 500.ACC Roman.PL.GEN fall.PERF 3PL
 'About 500 Romans fell'.

The preposition CIRCA governs the case (namely, the accusative) of *quingenti* '500', as all Latin prepositions do: it is the Synt-head of the phrase *circa quingentos Romanorum*; however, it is omissible without any syntactic effect on the phrase.

In Russian, as in Latin, taking the preposition OKOLO/CIRCA to be the Synt-governor of the numeral phrase as any other preposition is allows us to avoid writing special syntactic rules to treat these syntactically quite ordinary prepositions, which are only semantically 'deviant' (they

manifest a kind of adverbial meaning: semantically, they are monoactantial—in contrast to genuine prepositions, which are biactantial).

2.3. Determiners as Heads?

Several linguists argue that in the DET + N phrase the determiner is the Synt-head: thus, in English we should have THE \leftarrow synt \rightarrow N, ANY \leftarrow synt \rightarrow N, etc. (Hudson 1984, 1990: 271ff, Hewson 1991; cf. also Vennemann 1977: 270, 296). I cannot analyze their argumentation in depth, but within the framework expounded above, such a description is unacceptable, and this, for the following three reasons.

First, the passive Synt-valency of the phrase *the dog* is that of the noun *dog*, not of the article *the*. If in some syntactic positions DOG cannot appear without an article (or any other determiner), this happens because articles and the determiners in general are analytical exponents of grammemes of an inflectional category—namely, of the definiteness of the noun—and in these positions an English noun cannot be used without a marker of its definiteness, just as a Latin noun cannot be used without a case-number suffix. The expression **Dog is barking* is ungrammatical, independently of the fact that its SSyntS is well-formed: the problem here is the incorrect grammatical form of the lexeme DOG, very much like the bad expression **The dogs is barking*, where the SSyntS is also 100% correct, but the grammatical form *is* is not. Ergo, the SSyntS is here *the* \leftarrow synt \rightarrow *dog*, *any* \leftarrow synt \rightarrow *dog*, etc.; cf. the phrase *that (stupid) John*, which has the distribution of *John* and not that of the determiner *that*, or *Dogs are faithful*, where the noun *dogs* appears without any overt determiner.

Second, it is necessary to reflect the parallelism in the syntactic behavior of such phrases as *the dog*, *this dog* and *Alan's dog*; are we prepared to say that *this* and *Alan's* are the SSynt-governors of *dog*?

Third, analytical exponents of grammemes of a lexeme in most cases syntactically depend on this lexeme—in the SSyntS, since they do not appear at all in the DSyntS (auxiliary verbs that express the grammemes of tense, mode, aspect or voice constitute an important exception, see below, 2.5). For instance, in Tagalog an analytical case marker of an N—**ang** [NOM], **ng** [OBL] and **sa** [DAT]—syntactically depends on the noun, while the preposition (that syntactically dominates N) imposes the choice of the case: in the DSyntS, we have, for instance, PARA ‘for’ \leftarrow synt \rightarrow BABAE ‘woman’, and in the SSyntS, PARA \leftarrow synt \rightarrow BABAE \leftarrow synt \rightarrow SA, which gives *para sa babae* ‘for [the] woman’ (the preposition PARA requires the dative). In languages where the plural of a noun is expressed by a separate word (Dryer 1989), this plural exponent equally depends syntactically on the noun: Yapese (Austronesian) *ea pi* \leftarrow synt \rightarrow *kaarroo neey* ‘the PL car this’ = ‘these cars’ or Mixe (Mexico) *he pi' miš* \leftarrow synt \rightarrow *ʔaHkš* ‘the little boy PL’ = ‘the little boys’. Cf. also the Russian particle BY that expresses the subjunctive of a verb on which it depends: *Ja by* \leftarrow synt \rightarrow *poexal* ‘I

would go³. In Hawaiian (and other Polynesian languages) all markers of the verb's inflectional grammemes are analytical and syntactically depend on the verb: *ua←synt—hele au* 'COMPL(ative) go I' = 'I went', *ke←synt—kali—synt→nei au* 'PROGR(essive) wait I' = 'I am waiting', *e←synt—kali* 'IMPER(ative) wait' = 'Wait!', etc. Considering an analytical grammeme marker as a Synt-governor in the SSyntS would entail a restructuring of the DSyntS, where this marker does not appear at all; but why engage in something complex when one can easily do with something simple? Since the article is a particular case of an analytical grammeme marker, it should be considered a Synt-dependent of the noun. (The solution DET←synt—N is successfully defended in Van Langendonck 1994; for a different treatment of the DET + N phrase in Salishan, see Beck 1997: 109-118.)

2.4. Romance Clitics

Clitics in French (and other Romance languages, where Clitic Raising exists) pose a difficulty for a **D**-description: the clitic does not always syntactically depend on the same wordform on which its source [= the noun the clitic replaces] depends. Thus, compare (37a) with (37b), where the clitic changes Synt-governor vis-à-vis that of its source:

(37) a. *Elle a été fidèle→à Pierre* 'She has been faithful to Peter'.

b. *Elle lui←a été fidèle*, lit. 'She to-him has been faithful'.

On the Surface-Synt-level, where clitics first appear (the Deep-Synt-level admits only nominal sources of clitics-to-be), a clitic depends syntactically on its *host word*, with which it forms a possible utterance (= a prosodic unit, i.e. a phrase, as in Sp. *lo ve*, lit. '[(s)he] it sees' or *le da*, lit. '[(s)he] to-him/to-her gives') and with respect to which it is linearly positioned; in Romance languages, the host of a clitic in the SSyntS is not necessarily the same element on which the source of the clitic depends in the DSyntS. The 'new,' i.e. Surface-Syntactic, governor of the clitic is computed by special rules of the DSyntS \Rightarrow SSyntS transition; roughly speaking, it is the Synt-head of a dependency chain on the last element of which the source of the clitic depends.

2.5. AUX + V Phrases, English-Style

What is the orientation of Synt-**D** in the phrase AUX + V in English (and similar languages), *AUX—synt→V* or *AUX←synt—V*? As before, I will try to argue based on the rules necessary to produce the phrase in question from a SemS. Suppose we want to have the sentence *Alan has slept*. Starting with a SemS

'Alan' o←1-o 'sleep'

(plus the indication of time), the semantic rules of Lexicalization and Arborization construct the DSyntS of the form

ALAN_{sg} o←I-o SLEEP_{ind, pres, perf}

The compound, or analytical, form of the verb is represented, at this level, as one node directly linked to the subject node by the Deep-SyntRel **I**; thus, all the lexical selection constraints (that may exist between the verb and its Synt-Subject) can be easily accounted for. In the SSyntS, the DSynt-node

$$o \text{ SLEEP}_{\text{ind, pres, perf}}$$

is expanded into

$$\text{HAVE}_{\text{ind, pres}} \text{ } o\text{-perfect-analytical} \rightarrow o \text{ SLEEP}_{\text{past, participle}}$$

by the following Deep-Syntax rule:

$$L_{(V)\text{ind, pres, perf}} \text{ } o \Rightarrow \text{HAVE}_{(V)\text{ind, pres}} \text{ } o\text{-perf-analyt} \rightarrow o L_{(V)\text{past, participle}}$$

From the purely logical viewpoint, we can take HAVE as the SSynt-head of the phrase AUX + V (as shown in our illustration) or as the SSynt-dependent: for this rule itself it makes no difference. But for all the Surface-Syntax rules which have to compute the inflections on HAVE, linearly position it in the sentence and check the well-formedness of the SSyntS the difference is quite significant. If HAVE is considered to be the SSynt-head, all the SSynt-rules that apply to any pair $N \leftarrow \text{subj} - MV$ will automatically apply to the auxiliary HAVE—as they do to any verb in the role of SSynt-head, including the non-auxiliary HAVE. More specifically, aspects under which an auxiliary (BE, DO and HAVE) must be treated as any 'normal' finite verb of English include:

- Agreement with the Subject (*I have written* vs. *He has written* as *I read* vs. *He reads*; including all complex cases of the type *The committee has/have*, etc.).
- Word order, in particular, inversion (*Have I?* as *Can I?*).
- Being the only verb in the clause (*[I know that] he has* as *[I know that] he works*; or in tags: *He has not gone, has he?*; *He works, doesn't he?*).
- Carrying the grammemes of mood and tense.
- Parallelisms with the non-auxiliary BE, DO and HAVE (*He is astonished* vs. *He was astonished by John*; *He does his work* vs. *He does work*; *He has arrested John* vs. *He has John arrested*; *He has gone* vs. *He has to go*).
- Parallelisms with semi-auxiliaries such as GET (*He got robbed*), KEEP (*He keeps going*) or GOING TO (*He is going to read*), which have to be treated in a similar way to the genuine auxiliaries.

On the other hand, there are no idiosyncratic SSynt-properties of English auxiliaries that would require any specific rule to deal with them.

However, if the auxiliary HAVE (or BE, or DO) is not taken to be the SSynt-head of the AUX + V phrase, a bunch of additional rules have to be written to deal with a finite auxiliary verb which is not the SSynt-head of the clause, as well as with a non-finite verb form which is. There is no justification for such useless multiplication of entities; *ergo*, on the SSynt-level, we have

AUX→V (which corresponds to Criterion B1). For more argumentation in favor of AUX→V, see Hudson 1987: 117-118 (English) and Milićević 2000: 00 (Serbo-Croatian).

2.6. Conjoined Nominal Phrases N + CONJ + N

According to Criterion B1, in such a phrase as *Alan and Helen* the Synt-head is ALAN: the passive Synt-valency of the phrase is the same as that of the noun ALAN (rather than that of the phrase AND HELEN). Nevertheless, in many syntactic frameworks AND is considered the Synt-head of a coordinate string, ALAN and HELEN being its actants: ALAN←AND→HELEN (the same description is applied to all coordinate conjunctions: e.g., Schubert 1987: 104ff; cf. Footnote 32, p. 00).

Once again, purely theoretical argumentation proved to be of little use here, so I will reason from the viewpoint of the rules that have to synthesize such strings.

If we take the conjunction to be the SSynt-head of the coordinate string we run into the following difficulties.

First, to be able to specify the linear order of conjuncts, which in many cases is significant, both Synt-**D**s starting from CONJ have to carry different labels.

Second, rules for the conjoined strings without a coordinate conjunction—such as *Alan, Helen, Leo*—must be completely different, or else a 'dummy' artificial conjunction has to be added to the SyntS.

Third, the linguistic rules that deal with the SSynt-Subject, the DirO, the IndirO, the complement of a preposition, the Prolepsis (= Fronted Topic), and the like—in one word, with an N—have to be repeated for the conjunction! And this will be sufficient only for the conjunction that links two nouns; for conjunctions linking lexemes of other parts of speech still other additional rules are needed. More than that: these rules must be extremely complex, since they have, e.g., to assign grammatical case to the conjunction and then percolate it to the nouns linked by the conjunction, etc.

Fourth, must the conjunction be the Synt-head on the DSynt-level? Presumably so, since this is closer to its semantic role. Then all the selectional constraints acting between the verb and the conjoined nouns will not be easily checkable—again an unnecessary complication.

In case we take the initial (= first) element of the conjoined phrase to be its Synt-head, no rules dealing with nouns, verbs, adjectives or adverbs have to be doubled and no additional rules are required (just specific rules for the conjunction and the second conjoined element), nor any dummy added. At the same time, absolutely nothing is lost. Why should then anyone want to add complexity without any visible gain? *Ergo*, on both the DSynt- and SSynt-levels, we have, respectively:

$$X_1\text{-COORD}\rightarrow\text{CONJ-}\mathbf{II}\rightarrow X_2$$

and
 X_1 -**coordinative**→**CONJ**-**conjunctive**→ X_2 .

2.7. Russian 'Exotic' Coordination of Interrogative/Negative Pronouns

In Russian, the interrogative and negative pronouns which bear different Deep-Syntactic relations to the governing verb are allowed to form a coordinate string in the Surface-Syntactic structure (in the Deep-SyntS there are no direct syntactic links between these elements: they are subordinated to the verb 'in parallel'):

(38) a. *Kto, komu i čem pomog?*,

lit. 'Who, to whom and with what helped?'

b. *Nikto, nikomu i ničem ne pomog,*

lit. 'Nobody, to nobody and with nothing not helped'.

To represent the phrase *kto, komu i čem* on the SSynt-level simply as all other coordinate phrases are represented, that is, as

kto-**coord**→*komu*-**coord**→*i*-**conjunct**→*čem*,

is insufficient. In a 'regular' coordinate construction any SSynt-dependent element plays with respect to the SSynt-governor of the whole coordinate string the same SSynt-role as its SSynt-Governor itself; but in this case, *kto* [NOM] is the SSynt-Subject, but *komu* [DAT] is an IndirO and *čem* [INSTR] is another IndirO of the verb *pomog* 'helped'; accordingly, all three pronouns are inflected differently. To account for this, it has been proposed (Sannikov 1989) to use double dependency, namely to add to the SyntS above the indication of the direct Synt-**D** of each pronoun on the verb *pomog*. But these added Synt-**D**s do not have the same substantive nature as the Synt-**D**s covering the coordination in this case: the added links are needed only to compute the Morph-**D**s (under synthesis) and the Sem-**D**s (under analysis). However, as we have seen, Morph-**D**s and Sem-**D**s can link two wordforms that do not have a direct Synt-**D** between them. Therefore, it is preferable to introduce some special SSyntRels just for this very special construction: **coord-subj**, **coord-dir-obj**, **coord-indir-obj**, etc. Such SSyntRels indicate, in a natural way, the exotic character of this coordinate phrase and encode the 'actual' SSynt-roles of its 'displaced' elements.

A similar method can be used in comparative constructions (Savvina 1976). For instance, in Russian, the two following comparative constructions have to be distinguished in their SSyntSs in the following way:

(39) [*Ja ljublju Mašu bol'še,*] *čem*—**conjunct-subj**→*Van+ja*

'I love Masha more than Vanya [does]'.

vs.

[*Ja ljublju Mašu bol'še,*] *čem*—**conjunct-dir-obj**→*Van+ju*

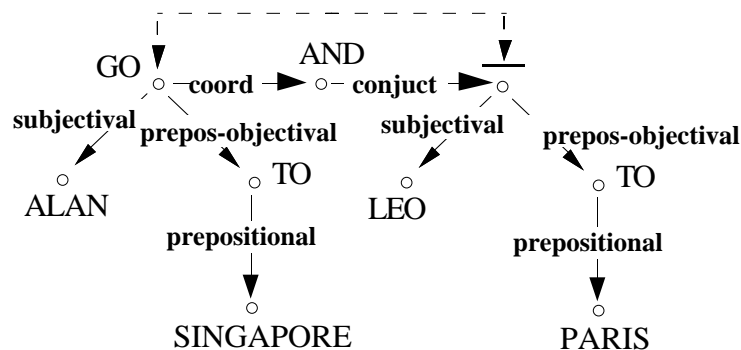
'I love Masha more than [I love] Vanya'.³³

Another possibility to represent the SSyntS of these constructions would be to consider the grammatical case of the SSynt-dependent in such coordinate or comparative strings as semantically meaningful and admit it into the SSyntS of these constructions; this is, however, too technical a point to be discussed here.

2.8. Elliptical Constructions

How should one describe in the SSyntS common gappings of the type *Alan went to Singapore and Leo to Paris*? Since the expression *and Leo to Paris* is not a phrase of English, it cannot—such as it is—be assigned a well-formed SSyntS. It is a 'mutilated' expression, which lost its top node, in this case a finite verb,—a 'non-canonical conjunct,' in Hudson's (1988: 305) terminology. But before the verb is deleted during the transition SSyntS \Rightarrow DMorphS, it imposes on its dependents—where appropriate—government-induced inflection grammemes. Therefore, to represent the SSyntS of the expression in question in terms of Synt-**D**, one has to use an empty node that stands for the elided verb; this node is marked with a blank «—», linked by an anaphoric relation (shown by a dashed line) to its antecedent, in this case, the verb GO:

(40)



In the DSyntS, the elided node is present and labeled with the appropriate lexeme, in our case, with the verb GO.—Note that the anaphoric relation between the empty node and the GO node is not one of coreference (the two nodes are not coreferential); it is a relation of lexical identity.

This is how the SSyntS of elliptical expressions—or, more precisely, of non-canonical conjuncts—is represented in the Meaning-Text approach (see also below, the last paragraphs of **3**). Such a 'dynamic' way of reflecting ellipses—which are, after all, operations—corresponds to Lobin's (1993: 111ff) proposal to use a procedural description for all coordinate structures, not just for ellipses.³⁴

3. Advantages of Syntactic Dependency

The remarks that follow are very sketchy and superficial: a systematic discussion of the advantages of the **D**-approach and its comparison with the constituency, or **C**-, approach would re-

quire another paper, perhaps longer than the present one. Still I think that these remarks can be useful—they point at least in the right direction.

Let me begin with two GENERAL considerations. First, in a linguistic description that takes semantics into account seriously, the **D**-approach in syntax imposes itself, since it ensures a much better fit of syntactic structure with semantic structure, where dependencies are universally recognized (most versions of predicate calculus language used in semantics are, in point of fact, **D**-based). A lack of interest in semantics and the postulate that syntax is autonomous are main factors that have led to the dominance of **C**-representations in syntax. In a theory where the Synt-structure of a sentence is produced (roughly) from the Sem-structure of this sentence, this Sem-structure being written in terms of Sem-**D**s, it is much more natural to see the Synt-structure as being based on Synt-**D**s.

Second, a **D**-representation with labeled SyntRels is formally more powerful than a 'pure' **C**-representation—in the sense that the former allows one to present all relevant syntactic details much better than the latter. As a result, linguists have been forced, practically from the beginning, to specify heads of the constituents as opposed to satellites (e.g., Pittman 1948) and the relations between them. But in a **C**-representation, as soon as one starts marking heads and indicating types of SyntRels between heads and satellites, the heavy machinery of constituency—particularly, non-terminal nodes, numerous empty nodes, and artificial ordering of elements in the SyntS—becomes useless, because redundant: all these pieces of information can be easily computed, if and when needed, from the **D**s specified. Because of this, most modern syntactic theories—such as Perlmutter's Relational Grammar, Bresnan's Lexical-Functional Grammar or Pollard and Sag's Head-Driven Phrase-Structure Grammar—are moving fast in the direction of the **D**-approach.

To these general considerations, one can add a number of SPECIFIC ones. Namely, there are at least five important linguistic phenomena for the description of which Synt-**D** is really crucial: valency, voice, restricted lexical cooccurrence, word order, and ellipses of all types. (I am not implying that the **C**-approach cannot handle them; but the **D**-approach does it, I think, in a more natural and therefore more economical way.)

1) Valency—or, more precisely, active valency—is a property of lexemes: a lexeme opens 'slots' for other lexemes that it 'attracts' as its dependents. Linguistic valency is obviously a metaphor based on valency in chemistry: atoms have valencies to link with other atoms and thus form molecules. In much the same way, a lexeme has semantic, syntactic and morphological valencies to link with other lexemes. Lexemes L_i that 'fill' the valencies of the lexeme L depend on it, exactly in the sense in which dependency has been defined above. Actually, valency and dependency are related in a very direct way; cf. Baumgärtner 1970: 62ff and also Eichinger/Eroms (eds) 1995. Active valency is of course not the only 'source' of dependency—there is passive

valency of lexemes as well; however, active valency shows the convenience of using Synt-**D** in an especially graphic way.

2) The inflectional category of *voice* is crucial to the understanding of semantics, syntax and morphology. Voice grammemes mark the change of the basic *diathesis* of the verb, i.e. the correspondence between its semantic and syntactic actants (Mel'čuk 1997a), or, to put it differently, between its Sem- and Synt-dependents. No wonder, then, that voice and voice-related categories are much better described in the **D**-approach; in particular, they have been the focus of research within the framework of Perlmutter's Relation Grammar or Foley/Van Valin's Function and Reference Grammar far more than in any **C**-based theory.

3) For a systematic description of restricted lexical cooccurrence, or collocations, the apparatus of Lexical Functions is proposed (Žolkovskij/Mel'čuk 1967, Mel'čuk 1996a). Each collocation is described as having the structure $f(x) = y$, where f is a particular lexical function, x is a lexical unit which is the base of the collocation, and y , a set of (more or less synonymous) lexical units each of which is the *collocate*—it expresses, contingent on x , the meaning of f . Here are a few examples:

Intensifier	Support Verb	Realization Verb
Magn (<i>smoker</i>) = <i>inveterate</i>	Oper ₁ (<i>favor</i>) = <i>do</i>	Real ₁ (<i>goal</i>) = <i>achieve</i>
Magn (<i>sleep</i>) = <i>like a log</i>	Oper ₁ (<i>order</i>) = <i>give</i>	Real ₃ (<i>order</i>) = <i>execute</i>
Magn (<i>hot</i>) = <i>burning</i>	Oper ₂ (<i>exam</i>) = <i>take</i>	Real ₂ (<i>exam</i>) = <i>pass</i>

The number of lexical functions is about 60, and they are universal; their values, on the contrary, are of course language-dependent—they are specified, for each language and each lexical unit, in a special lexicon. Using them greatly facilitates lexicalization in the transition SemS \Rightarrow DSyntS \Rightarrow SSyntS, when the appropriate collocates have to be selected.

Now, as is easy to see, the lexical-functional dependency between the base lexeme of a collocation and the collocate lexeme is supported by a Synt-**D** between them. Thus, **Magn**(*armed*) = *to the teeth*, and *armed*-synt \rightarrow *to the teeth*; similarly, **Oper**₁(*visit*) = [*to*] *pay*, and *pay*-synt \rightarrow *visit*, or **Real**₂(*exam*) = *pass*, and *pass*-synt \rightarrow *exam*. For each lexical function, a particular Synt-**D** between its base and its collocate is specified. Outside of Synt-**D**, there is no economical way to describe the collocations properly.

4) Synt-**D** is especially convenient for the description of word order. Using Synt-**D**s forces the linguist to separate strictly and consistently the hierarchical (= genuinely syntactic) 'order' from the linear order, which is a surface means for the expression of the former. Thus, the main task of natural language syntax—linearizing a two-dimensional Synt-structure (explicitly formulated in Tesnière 1959: 19-20)—can be solved with much more ease with Synt-**D**s than in any other way. The advantages of Synt-**D**s for the description of word order can be resumed in three points:

First, word order rules can be easily formulated in terms of positioning a Synt-dependent with respect to its Synt-governor (before or after it). Again, Tesnière (1959: 22-25, 32-33) stated this fact explicitly, dividing languages in *centripetal* (where a Synt-dependent precedes its Synt-governor) and *centrifugal* (where a Synt-dependent follows its Synt-governor); both can be so consistently or inconsistently. For some languages, this allows for very compact formulations; e.g., in Japanese all Synt-dependents precede their governors, in Welsh almost all Synt-dependents (the only exception being the article *y*) follow their governors (Hudson 1990: 105):

(41) a. Japanese [a consistently centripetal language]

Itiban takai siraga+de+no sensei+wa kono omosirokunai hon+o kai+ta
 very tall gray-haired professor this boring book wrote
 lit. 'Very tall gray-haired professor this boring book wrote'.

b. Welsh [a consistently centrifugal language]

Ysgrifennodd athro tal iawn a gwallt llwyd ganddo y llyfr undonnog hwm
 wrote professor tall very and hair gray to-him the book boring this
 lit. 'Wrote professor tall very and hair gray to-him the book boring this'.

But even in languages where the linear distribution of Synt-governors vs. Synt-dependents is not as clear-cut as in Japanese or Welsh, that is, in 'inconsistent' languages, resorting to these notions helps to state the word-order rules. Thus, in Arabic the majority of Synt-dependents follow their governors, with the notable exception of the demonstratives and numerals; in Hungarian, the majority of Synt-dependents precede their governors, with the notable exception of the relative clause; etc. Such facts were theoretically discussed already in Trubetzkoy 1939 and practically used in numerous language manuals and descriptive grammars; cf. an outline of word order typology in Xolodovič 1966. In this vein, a relatively complete description of word order in Synt-**D**-terms (within simple clauses) was proposed for Russian (Mel'čuk 1967, 1974 [1999]: 260-302).

Second, Synt-**D** has allowed for the discovery (Lecerf 1960, Hays 1960) of an important property of word order in all languages, called *projectivity*. If we supply an average sentence with its SyntS written in terms of Synt-**D** and draw a perpendicular from each wordform to the node that represents it in the SyntS, then:

- 1) no branches of the SyntS intersect;
- 2) no branch intersects with a projection perpendicular.

Let me illustrate this with sentence (1), associating its surface form with its SSyntS (next page).

As one can easily see, the sentence appears as a 'projection' of the SSyntS such that SSyntS's branches cross neither each other nor the projection perpendiculars; hence the name "projectivity".

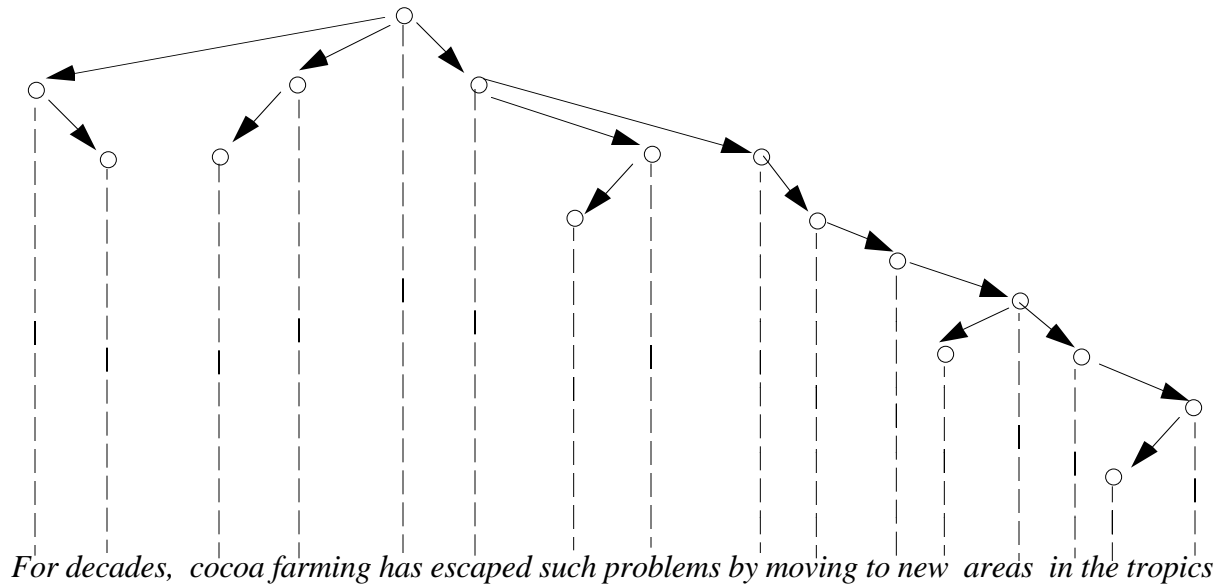
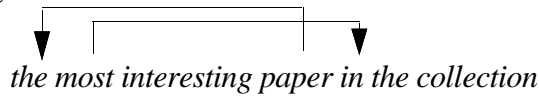


Figure 1: Sentence (1) and its SSynt-Structure

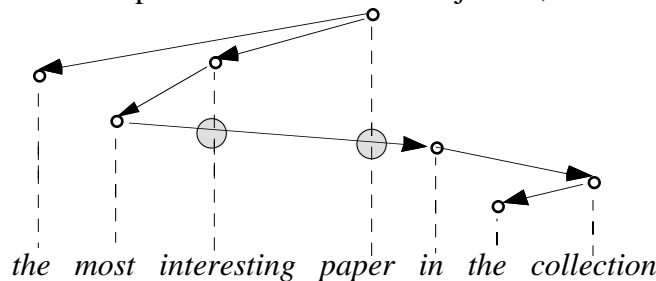
An absolute majority of sentences in most languages are projective. Taking this fact into account ensures a more elegant formulation of word-order rules and greatly facilitates the analysis and synthesis of texts: with the exception of particular cases (see immediately below), only projective sentences must be produced from a given SSyntS, and only SSyntSs that guarantee projectivity must be associated with a given sentence.

However, projectivity can be systematically violated in many special cases, for instance:

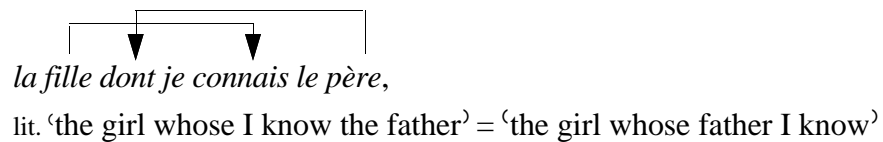
1) English



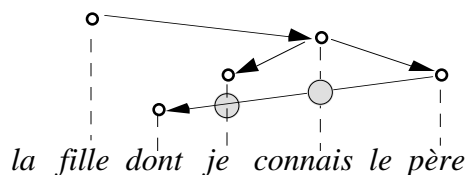
The culprit here is the superlative marker of the adjective; cf. the representation in a tree form:



2) French



The culprit is the extracted relative pronoun *dont*:



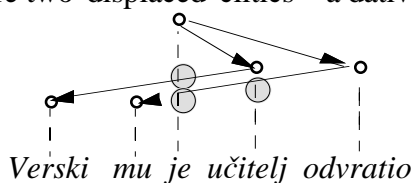
3) Serbo-Croatian

Verski mu je učitelj odvratio,

lit. 'Of-faith to-him has [actually, 'is'] the-teacher answered'

= 'The teacher of faith has answered to him'.

The culprits are two 'displaced' clitics—a dative pronoun *mu* 'to him' and the auxiliary verb *je* 'is':



I could indicate much more constructions in different languages where non-projectivity is possible or obligatory; all such cases must be isolated and specified in concrete linguistic descriptions. Now, while within the **D**-approach the representation of non-projective structures poses no problem whatsoever, the **C**-approach is unable to represent non-projective structures without some additional (and relatively clumsy) machinery—for instance, transformations. In this respect, the **D**-approach is again superior to its rival.

Third, the **D**-approach is much less rigid (than the **C**-approach) and has the inherent ability to accommodate easily what is known as 'non-configurationality' and long-range dependencies. The perturbations introduced into the word order of a sentence by its Communicative Structure—Frontings, Extractions, Postponings, etc. plus all sorts of 'displacements' in such languages as German or Russian—can wreak havoc on a **C**-structure, since even the closest-knit phrases can be torn apart and permuted. On the other hand, **D**-structure, without linearity and contiguity, is totally insensitive to such permutations: they happen in the linearized DMorphS of the sentence and do not at all affect the SSyntS. The reason is obvious—a strict and complete separation of hierarchical (= syntactic) and linear links in the **D**-approach. As a result, the **D**-approach does not know problems in representing discontinuities, which, in the literal sense of the word, simply do not exist in a **D**-structure. Thus, the sentence *Which violins are these sonatas easy to play on?* is assigned a natural SSynt-structure written in **D**-terms (Fig. 2, next page). The linear break of the phrase *on which violins* is produced by a word order rule that puts the phrase *which violins* in the first linear position in the sentence, i.e. extracts it (during the transition SSyntR \Rightarrow DMorphR). Note that such an extraction is not possible for a similar SSyntS of Fig. 3 (next page): the result **Which sonatas are these violins easy to play on?* is ungrammatical and can be precluded by imposing all

the necessary conditions on the extraction rule. (The SSyntS of Fig. 3 can be only realized with the WH-word *in situ*: *These violins are easy to play on WHICH sonatas?*) See Hudson 1988b: 199ff on the problem of extraction with a **D**-framework.

5) As Nichols 1993 has shown, ellipses, i.e. constituent-reducing operations, can be conveniently characterized in terms of Synt-**D**. Thus, four languages studied by Nichols—Russian, Nunggubuyu (Australian), English, and Chechen-Ingush (North-Caucasian)—differ with respect to their preferences in the domain of constituent-reducing: Russian prefers to remove Synt-heads, Nunggubuyu does it more frequently with Synt-dependents, English removes both with equal ease, while Chechen-Ingush does neither (which means that it has few ellipses). Cf. (42):

(42) a. Rus. *A Maška emu po morde*, lit. ‘And M. to-him on the-mug’ = ‘And M. gave him a blow in the face’, where the top node—a Synt-head, which is a verb meaning ‘[to] hit’ = ‘[to] give a blow’,—is elided.

b. Nung. *Anāgugu nāʔgalimaŋ; nāʔgalimaŋ*, lit. ‘[He] water fetched-for-him; fetched-for-him’, where the top node—a verbal Synt-head meaning ‘[to] fetch’—is repeated by the narrator for more expressivity, but with its dependent ‘water’ elided.

c. Eng. *Leo is from Chernigovsky, and Alan from Paris,*

where the top node—the Synt-head of the second conjunct clause (the verb BE)—is elided—or, more precisely, factored out;

or

Susan is fond of, while Marga looks askance at, profanity,

where the Synt-dependent of *fond of* is elided/factored out (Russian does not admit this type of dependent removal).

d. In Chechen-Ingush, the answer to the question ‘What did he give his son?’ must be *Sowʔat dennad*, lit. ‘[He a] gift gave’, rather than simply **Sowʔat* ‘[a] gift’, which is the norm in the other three languages: Chechen-Ingush does not tolerate the removal of Synt-heads. Even the sentence meaning ‘Good!/OK!’ must contain the verbal Synt-head: *Dika du!*, lit. ‘Good is’.

All the five above phenomena are related to the trend in modern linguistics that Hudson (1990) aptly dubbed *lexicalism*: putting at the center of the linguistic description facts about lexical units rather than facts about syntactic constructions, so that the lexicon is at last given a place of honor in linguistic studies; cf. as well Hudson 1983, 1984 and Mel’čuk 1995b. Stressing the importance of the lexicon goes quite well with the **D**-approach in syntax, because in this approach all the links are established between wordforms and based, in the final analysis, on their lexicographic properties.

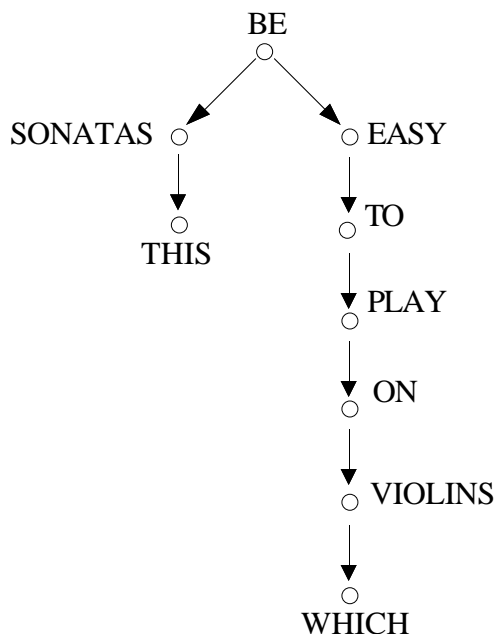


Figure 2:

The SSyntS of the sentence

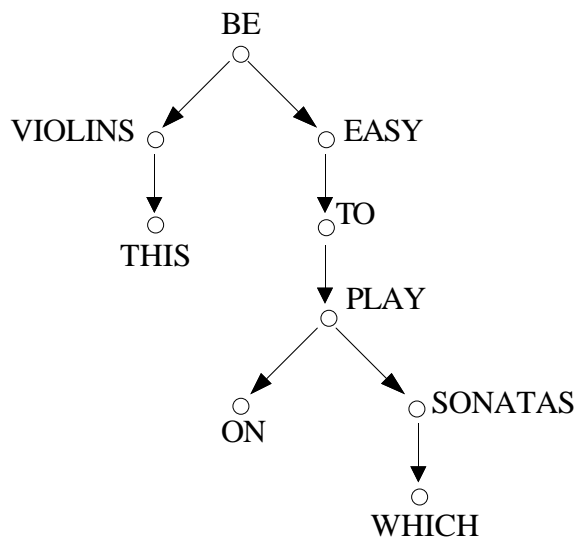


Figure 3:

The SSyntS of the sentence

Which violins are these sonatas easy to play on? These violins are easy to play on which sonatas?

4. Syntactic Dependency and Syntactic Constituency

I am not offering here a comparison in depth of **D**- and **C**-approaches in syntax (cf. Venne-
mann 1977, Nichols 1978, Hudson 1980a, b, Dahl 1980, Matthews 1981: 71-95, Mel'čuk 1988:
13-17, Sgall/Panevová 1988-89); I will, however, briefly touch upon two topics relevant to such a
comparison: **D**-approach vs. 'pure' **C**-approach in syntax and hybridization of **D**- and **C**-ap-
proaches.

4.1. Comparing Syntactic Dependency with Syntactic Constituency

To compare the **D**-approach in syntax to the **C**-approach (also known as the 'Phrase-Struc-
ture' approach), one needs to make precise the concept of syntactic constituent. Let me
first take the simplest, or 'naive,' interpretation of constituent as a linearly ordered string of actual
wordforms that shows a prosodic and semantic unity (i.e., a constituent an actual phrase) and
consider constituency exclusively as based on contiguity. Such constituents are not syntactic units
in the sense that the Synt-structure of a sentence cannot be described in terms of these formations:
they are linear, prosodic and morphological IMPLEMENTATIONS of (fragments of) the SSyntS,
rather than part of it. The legitimate place of such constituents is in the Deep-Morphological
structure of the sentence. (Cf. Langacker 1997 for a convincing discussion of the role constituency
plays in language on the semantic and phonological levels, while it has no place on the syntactic
level of sentence representation. According to Langacker, syntactic structure must ensure the

correspondence between semantic and phonological constituents, especially in cases of unavoidable numerous and variegated mismatches, due to the strictly linear character of human speech, which has to convey utterly 'non-linear' meaning. As a result, syntactic structure itself cannot be represented in terms of constituents.)

If, on the other hand, we consider the 'sophisticated' concept of a constituent as a set of lexemes that 'go together,' this set taken before linearization, prosodization and morphologization, then, in order for constituents to be able to carry relevant information about word order and inflection, each constituent has to have both its head and its constituent type specified; this means, more or less, indicating the type of the Synt-relation between the constituent's elements. But no sooner is this done than we have a **D**-representation! Or, to be more precise: a 'sophisticated' **C**-representation carries all **D**-information PLUS some other characteristics of the sentence represented. The question is then whether we need these extra data to be explicitly present in the Synt-structure of the sentence. The answer depends of course on our main theoretical postulates. I, for one, proceed from the postulate that every part of a linguistic representation must be as homogeneous and as compact as possible; in other words, phenomena of different nature should be represented in different components of the representation—so that a multi-layered representation must be preferred over a 'unified' one. If this postulate is accepted, then specifying the Synt-heads and the type of SyntRels between the sentence elements makes all other attributes of the **C**-approach redundant and therefore superfluous—I mean, particularly, 1) non-terminal nodes and 2) the categorization of constituents in the SyntS.

Non-terminal nodes indicate the Synt-constituents, but, as I have said, the constituents can be computed from the **D**-representation and are needed only on a closer-to-surface level—on the DMorph-level; therefore, they should not be present in the Synt-structure.

The categorization of the elements of a Synt-structure, i.e. the syntactic class and other syntactic features of lexemes, should not be part of the SyntS, either: this is not syntactic, but lexicographic information; as such it should remain 'behind the scenes,' in the lexicon's entries for the lexemes involved.

So, if one follows the above postulate—that is, stops specifying non-terminal nodes and keeps lexicographic information in the lexicon, rather than in the SyntS—then nothing remains of the 'classical' **C**-approach in syntax.

To avoid misunderstandings, it would probably be worthwhile to formulate the following two provisos concerning the problem of constituency in the **D**-approach.

1. The **D**-approach does not negate the existence of constituents—they do of course exist and have the primary importance for any complete linguistic description. (I mean here constituents as real linguistic items—strings of wordforms with an appropriate prosody—, not as formal abstract entities that are automatically specified by any dependency tree as projections of complete subtrees.)

However, their place is not in the SyntS, but rather, as pointed out above, in the DMorphS of the sentence: in the SSyntS \Rightarrow DMorphS transition, linearization is carried out in terms of constituents that have to be computed from the SSyntS; and prosodization affects the constituents after they have been linearized.

2. The **D**-approach extensively uses *standard subtrees* (non-linearized and non-morphologized), which specify different constructions that behave identically from the viewpoint of surface syntax. Such are, for instance, Δ NUMP or Δ APPROX—sources of the numeral and numeral-approximate phrases: *three kilos ~ about/over three kilos ~ more than three kilos ~ from three to ten kilos ~ ...* (Mel'čuk/Pertsov 1987: 487-489). Another example is Δ V, or the *verbal nucleus*: a chain consisting of verbs and some special non-verbal elements allowing for particular operations in which it participates as a whole (Kahane/Mel'čuk 1999). However, again, first, standard subtrees are not constituents; and second, their place is not in the SyntS of a sentence, but in (the syntactic rules of) the linguistic model, which identifies them in the SyntS and processes them as specified.

4.2. Crossing Syntactic Dependency with Syntactic Constituency

For many years, linguists have been talking about the integration of both approaches—that is, they have been looking for a hybrid between **D**- and **C**-representations to be used in syntax (e.g., Baumgärtner 1970, Vennemann 1977). The incentive for such an integration comes primarily from the problems related to representing COORDINATION in the **D**-approach (see **5**), as well as to some other linguistic phenomena such as EXTRACTION (*I know **which girl** you told my wife Alan was going out with*, the extracted component being boldfaced; extraction happens under focusing, relativization, or interrogation), ANALYTICAL FORMS (verbal and nominal, i.e. AUX \rightarrow V and DET \leftarrow N: *has been detected; the book*), IDIOMS, COLLOCATIONS (among others, with what is known as light verbs: *make headway, pay a visit, launch an attack*, Germ. *zur Aufführung bringen*, lit. 'to-the carrying-out bring' = '[to] carry out'), and the like. The main idea is to introduce for any of these syntactic constructions a special type of subtree that is allowed—as a whole—to occupy one node of a dependency tree. In this way, the linguist tries to capture the intuition that such a set of wordforms depends on or governs other wordforms as a unit. The first full-fledged specific proposal for a 'mixed' **D**-/**C**-representation of this type—by means of so-called *syntactic groups*—was advanced in Gladkij 1966 and 1968. A similar device is put forward in Lobin 1993: 42ff and 1995 (under the name of *complex elements*). The most recent move in this direction is, as far as I know, Kahane 1997, where the concept of *bubble* is introduced: a subset of nodes of a **D**-tree which is allowed to be treated as a node, while having inside a completely specified **D**-structure of its own, including other bubbles. It is natural that linguists feel the need for some

formation of this type; but to what extent such a 'hybridization,' or rather, 'extension' or 'enrichment,' of **D**-trees is welcome remains to be seen.

In particular, using multistructural and multilevel representations (cf. **3**) allows for elegant solutions of many problems that otherwise have to be treated via bubble-like entities. Thus, the difficulties of representation related to various extractions can be overcome in a natural way by recourse to the Communicative Structure (Kahane/Mel'čuk 1999). Similarly, the special character of AUX + V or DET + N phrases, as well as of idiomatic phrases (= full phrasemes) such as *with respect to* or *the same*, is reflected by the fact that in the DSyntS all these phrases are represented each by one single node. Collocations are described, as pointed out in III-**3**, p. 00, in terms of lexical functions, which makes explicit the specific character of the former. For instance, in the DSyntS, a phrase such as *pay a visit* or *do a favor* is represented as

Oper₁ o-**II**→o VISIT or **Oper**₁ o-**II**→o FAVOR

Here, **Oper**₁ is the symbol of a lexical function which specifies for a deverbal noun the support verb that joins this noun as its DirO to its subject; **Oper**₁'s values, as those of the other LFs, are given in the lexical entries for nouns:

Oper₁(VISIT) = *pay* [ART ~] **Oper**₁(FAVOR) = *do* [ART ~]

To sum up: For the time being, I believe that more progress is needed in the domain of the **D**-approach to syntax before we can determine where and how to use this or that element of the **C**-approach within the **D**-framework. However, what is already clear is that a SINGLE **D**-tree is not sufficient to represent all the information that might be necessary at the syntactic level. The linguistic model I propose uses TWO **D**-trees—namely the D- and S-SyntS; in addition, it has recourse to a separate Communicative Structure. And that is not all: in some specific cases, more special machinery is used (groupings, see immediately below).

5. Insufficiency of Syntactic Dependency: Coordination

If we agree to use two levels of representation for syntactic structures, that is, the DSyntS and SSyntS, plus Communicative Structures on both levels, then a pure **D**-representation in syntax seems to be sufficient for all syntactic phenomena, except for one type of construction, and that is in the domain of COORDINATION (cf. Hudson 1990: 97ff and Lobin 1993 on a special place coordination occupies with respect to Synt-**D**). The problem arises because the following situation is possible: A wordform **w** 'relates' either to a whole conjoined phrase or just to its Synt-head alone, such that the two constructions are morphologically, linearly or prosodically distinct and have different meanings; however, within the strict **D**-approach, both types of structure can be shown only by the direct Synt-**D** of **w** on the Synt-head of the conjoined phrase (the 'pure' **D**-formalism does not allow for the dependency on a phrase as a whole). Consequently, one SSyntS written in

terms of Synt-**D**s corresponds in such cases to two different meanings, which is not admissible.

Here are two examples:

(43) a. The SyntS *old←men→and →women* represents two meanings, that is

—either a meaning that corresponds to a *joint* reading [the adjective bears on both nouns]:

‘old {men + women}’ = ‘{old men} and {old women}’;

—or a meaning that corresponds to a *disjoint* reading [the adjective bears on one noun only]:

‘{old men} and women [the women are not necessarily old]’.

b. The SyntS [*He is*] *not←tall →and→fat* also represents two different meanings:

—either ‘[he is] not {tall and fat}’ [joint reading: he is neither tall nor fat];

—or ‘[he is] {not tall} and {fat}’ [disjoint reading: he is not tall, but fat].³⁵

In such cases, different surface implementations that formally distinguish intended meanings are in principle available (depending on the language and particular lexical means used; ‘||’ stands for a pause):

in (43a), *old men and women* [without a pause] vs. *old men || and women*;

in (43 b), *He is not || tall and fat* vs. *He is not tall || and fat*.

The semantic contrast accompanied by a formal contrast requires that the semantic distinction be maintained in the SSyntS (cf. Criterion C1, p. 00). The only way to do so—sticking to ‘pure’ Synt-**D**, that is, using exclusively **D**-formalism and without admitting multiple Synt-dependencies—seems to be to label differently the SSyntRels involved, i.e. to have in (43a) something like

*old←**modif**–men→and→women* for the disjoint reading

and

*old←**coord-modif**–men→and→women* for the joint reading.

However, this solution is no good: First, it is not natural enough linguistically; among other things, it entails doubling all SSyntRels that can link Synt-dependents to conjoined phrases. Second, it is not sufficient formally: it cannot help in the case of more than two conjuncts, such as in *hungry men, and women, and children* ‘hungry {men, women and children}’ vs. ‘{hungry {men and women}} and children’. Therefore, a real alternative is to complement the ‘pure’ **D**-approach with groupings—specification, within the SyntS, of the **D**-subtrees relevant in such cases (Mel’čuk 1974[1999]: 214-216, 1988: 28-33). For instance:

*old←**modif**–men→and→women* (without grouping)

stands for the disjoint reading (‘{old men} and women’), but

*old←**modif**–[–men→and→women]* (with a grouping indicated by square brackets)

for the joint reading (‘old men and old women’).

For (43b), we will also write two different SSyntSs:

*He is not ←**restr**–tall→and→fat* (for the disjoint reading: ‘He is {not tall} and fat’)

and

He is not ←**restr**–[–*tall*→*and*→*fat*] (for the joint reading: ‘He is not {tall and fat}’).

Note that a grouping is not a constituent in the strict sense: there is no higher node to represent it as a whole (because a grouping is not a projection of a complete subtree), and it does not participate in **D**-links as such (because in a consistent **D**-approach, only single nodes do; this is in contrast to the approach advanced in Kahane 1997, where a configuration of nodes in a dependency tree—a bubble—can be treated as a *bona fide* node). As we see in the example

old←**modif**–[–*men*→*and*→*women*],

the branch «**modif**» leaves the node *men* within the grouping, but not the grouping as such.³⁶

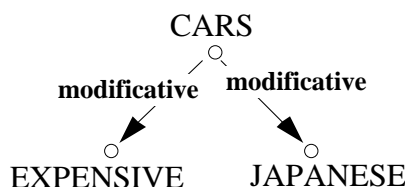
An overall theory of coordination within the **D**-approach is put forth in Lobin 1993. The main idea is to consider syntactic coordination as a dynamic phenomenon and to describe it—remaining within **D**-syntax—essentially based on OPERATIONS of structure reduction and linearization (rather than on static SyntS representations); the book also offers a thorough review of coordinate constructions of German.

I would like to mention two other syntactic phenomena where groupings in the SSyntS may be necessary:

- The first one is 'layered,' or recursive, modification:

expensive {Japanese cars} vs. *Japanese {expensive cars}*

The linear order of adjectives is here not arbitrary: it reflects the successive, or stepwise, inclusion of sets of the objects on which bear the modifiers, and is thus semantically relevant. (The problem is again created by 'quasi-coordination,' i.e. by co-subordination.) Under the **D**-approach, both expressions have the same SSyntS:



so that a semantic difference is lost. It is not, however, clear to me whether this difference should be accounted for in the SSyntS as such (then groupings are needed) or rather in the Syntactic-Communicative or Referential Structure (and then groupings in the SSyntS are avoided). For the time being, I prefer the second solution; if it is adopted, either we have to introduce a special Sem-Communicative opposition, which will represent the order of (sub)set inclusions, or—and this seems more natural—we have to use different referential indications (S. Kahane): in the first, but not the second, reading, the meaning ‘Japanese cars’ has a direct referent: the set of (all) Japanese cars is characterized by the property of being expensive; the situation is inverse in the second reading: the set of (all) expensive cars is characterized as being Japanese.

- The second phenomenon is modification of the type [a] *typical American woman* ⟨*an American typical woman⟩ or [a] *former German minister* ⟨*a German former minister⟩. These cases resemble the syntactic behavior of quantifiers, which also deserves a special study from the viewpoint of **D**-representation. However, it is possible to deal with the adjectives of the TYPICAL or FORMER type on the basis of their special lexicographic properties: they can be linked to their Synt-governor by the same SSyntRel as any other adjective, but their positioning is controlled by their lexicographic features. Therefore, in this case, groupings in the SSyntS are not necessary.

6. Syntactic Dependency in Computational Linguistics

As pointed out above, the **D**-approach was born more or less out of the necessity to describe languages for computer processing, especially so in the domain of Machine Translation. (In my personal case, I had to reinvent dependencies in 1956-57—since Tesnière was then not yet known in the Soviet Union—while working on French-to-Russian and Hungarian-to-Russian Machine Translation systems. Using dependencies was the only feasible approach to formal syntactic description of languages with 'free' word order, such as Russian and Hungarian.) Therefore it would be important to discuss here the use of Synt-**D**s in computer applications of modern linguistics, in the first place for synthesis and analysis of sentences, as well as studies of formal properties of syntactic **D**-representations. Unfortunately, this is quite a special topic, which would require much additional competence, research and space—and I am not in a position to implicate myself to the necessary degree. The reader will have to be satisfied with a few references to the work where the respective problems are covered: Kunze (ed.) 1982, Schubert 1987, Maxwell/Schubert (eds) 1988, Apresjan *et al* 1989, 1992, Covington 1990, Fraser/Hudson 1992 (with further bibliography), Badia 1993, Rambow/Joshi 1997, and Lombardo/Lesmo 1998.

Acknowledgments

This article was written in May-July 1998 during my stay in Germany under a Humboldt Foundation scholarship and reworked several times since. The final version of it has profited a great deal from my joint work with L. Iordanskaja (Iordanskaja & Mel'čuk 2000): I have included in the present article several of our common results and findings. The text has been read and commented upon by D. Beck, I. Bolshakov, N. Bröker, P. Hellwig, R. Hudson, L. Iomdin, L. Iordanskaja, S. Kahane, H. Lobin, J. Milićević, E. Savvina, L. Wanner, and D. Weiss; N. Pertsov has caught several mistakes and incongruities at the very last moment. The remarks and objections of D. Beck and S. Kahane have been especially deep and constructive and have led to many substantial changes in the text. I did my best to take into account all the suggestions of my friends and colleagues, and I am happy to extend my heartfelt gratitude to all of them, as well as to the Humboldt Foundation; the usual disclaimers apply of course.

Notes

¹ (I, 1, p. 00) The formulations that follow are not really rigorous definitions, but rather approximate characterizations, which are hopefully sufficient for the purposes of the present paper.

² (I, 1, p. 00) In case of compounding or incorporation, a wordform may represent two or more lexemes. This complication is, however, irrelevant for our purposes here.

³ (I, 1, p. 00) I allow myself, stretching the terminology a bit, to use the term *phrase* for the structural representation of an actual phrase; thus I will speak of 'the ADJ + N phrase,' meaning the set of phrases like *intelligent child, expensive houses, former minister, blue sky*, etc. This is simply a convenient abbreviation.

⁴ (I, 1, p. 00) Note that the notion of passive Synt(actic)-valency cannot be reduced to that of part of speech. First, passive Synt-valency characterizes not only lexemes, but phrases as well, to which I think the notion of part of speech is not applicable. Second, and more importantly, passive Synt-valency of a lexeme L is determined, generally speaking, by the part of speech of L only partially: syntactic features of L play here a crucial role. That is, two lexemes of the same part of speech may have different passive Synt-valencies because of their syntactic features (subcategorization). Thus, nouns like MONTH, WEEK or DAY may appear in the duration construction with a verb (*work the whole month, travel day after day*, etc.), in which other nouns are impossible; this fact is expressed by the syntactic feature « temp » assigned to such nouns. For more on syntactic features, see Mel'čuk/Pertsov 1987: 471ff.

⁵ (I, 2, p. 00) Some further DSyntRels might be needed: e.g., the *qualificative* attributive DSyntRel as opposed to the *restrictive* attributive DSyntRel; or a special DSyntRel for Direct Speech. However, this problem cannot be dealt with here.

⁶ (I, 2, p. 00) The other structure of the DMorphR of a sentence is the Deep-Morphological Prosodic Structure, which specifies the pauses, i.e. phonological phrases, as well as intonation contours, phrase and sentence stresses, etc. It is here that what are known as constituents in the strict sense of the term first appear. Cf. 4.1, p. 00ff.

⁷ (II, 1, p. 00) In point of fact, Sem-**D** holds between lexical MEANINGS (of wordforms), i.e. between semantemes in the Semantic Structure rather than between actual wordforms in an actual

sentence. However, I have allowed myself this *abus du langage* in order to be able to compare different **D**s between wordforms, doing this in a parallel fashion.

⁸ (II, 2.2, p. 00) The English verb [*to*] ORDER is such that if its meaning takes as the 2nd Sem-argument the meaning 'go', which in turn has the 1st Sem-argument 'he', then the meaning '[*to*] order' has to take 'he' as the 3rd Sem-argument (such verbs are known as 'subject-to-object raising verbs'). This shows the transitivity of the Sem-**D** under consideration.

⁹ (II, 3.2, p. 00) According to Definition 2, Morph-**D** means the imposition of a grammeme. A wordform cannot impose a grammeme upon itself, but it can, by some of its properties, condition the choice between several grammemes imposed on it by a different wordform.

¹⁰ (II, 3.2, p. 00) The Russian verb ZNAT' '[*to*] know' is such that if it has a Morph-dependent w_2 which has a Morph-dependent w_3 of its own, then—under specific syntactic conditions (w_2 is a DirO, etc.)— w_3 is a Morph-dependent of ZNAT' as well. This shows the transitivity of the Morph-**D** under consideration.

¹¹ (II, 3.3, p. 00) For a different analysis of the corresponding notions (and a rich bibliography), see Schmidt/Lehfeldt 1995.—Recall that agreement and government have been treated for a long time as types of SYNTACTIC dependency, which created confusion.

¹² (II, 3.3, p. 00) Substitute, or anaphoric, pronouns are pronouns of the type HE, SHE, IT, THEY, and all the relative pronouns, which replace nouns: a substitute pronoun is always used instead of a noun, so it is really a PRO-noun. Substitute pronouns must be distinguished from personal pronouns of the type I, YOU, WE, which never replace a noun.

¹³ (II, 4.2, p. 00) Lexical means used in syntactic capacity, i.e. what is known as 'structural,' or 'empty,' words, complicate the picture without affecting the essence of my reasoning: they do not appear in the DSyntS, but they are present in the SSyntS—since they are separate wordforms, and the SSyntS is supposed to represent all the wordforms actually found in the sentence. To keep my formulations as simple as possible I leave the lexical means used in a syntactic capacity out of the discussion.

¹⁴ (II, 4.3.1, p. 00) Here is a more complex case (brought to my attention by N. Pertsov): Rus. *k domu* [= w_1], *cvet kryši kotorogo menja razdražæet* [= w_2] 'to [the] house [the] color of [the] roof of which irritates me', where *cvet kryši kotorogo razdražæet* is **W**. The wordforms w_1 , w_2 and **W** constitute a phrase: *domu, cvet kryši kotorogo razdražæet*, whose Synt-head is *domu*; w_2

and **W** also constitute a phrase: *cvet kryši kotorogo razdražæet*, whose Synt-head is *razdražæet*; therefore, *domu* and *razdražæet* are directly linked by a Synt-dependency:

domu–synt→*razdražæet*.

¹⁵ (II, 4.3.2, p. 00) But in *I saw the Pope John-Paul* the Synt-**D**s are different: since *I saw the Pope* is perfectly grammatical, we have *the Pope*–synt→*John-Paul*.

¹⁶ (II, 4.3.2, p. 00) Here are two more examples (for a detailed analysis of the construction in question, further examples and a bibliography, see Gaatone 1988):

<i>un</i> a.SG.MASC	<i>vache</i> impressive.SG.MASC	<i>de</i> of	<i>garçon</i> boy[MASC].SG	‘an impressive boy’
<i>une</i> a.SG.FEM	<i>vache</i> impressive.SG.FEM	<i>de</i> of	<i>voiture</i> car[FEM].SG	‘an impressive car’
<i>ce</i> this.SG.MASC	<i>chouette</i> nice.SG.MASC	<i>de</i> of	<i>garçon</i> boy[MASC].SG	‘this nice boy’
<i>cette</i> a.SG.FEM	<i>chouette</i> nice.SG.FEM	<i>de</i> of	<i>voiture</i> car[FEM].SG	‘this nice car’

Some French expletive interjections can also appear, along with the above-mentioned adjectives, as the SSynt-head of this construction: *cette nom d'un chien de machine* ‘this darned machine’, *cette bon sang de Julie* ‘this bloody J.’, *ces sacré nom de Danois* ‘these bloody Danes’, *ma nom de Dieu de parole d'honneur* ‘my damned word of honor’, *ce putain de garçon* ‘this bloody boy’, etc. The construction has the SSyntS of the following form:

CE←synt–[NOM D'UN CHIEN]–synt→DE–synt→MACHINE;

the determiner agrees in gender and number with the noun rather than with its own SSynt-governor — the head of the phrase, which, unlike an adjective, cannot 'borrow' the gender and number from the noun. A similar English construction (*a bitch of a problem*, *'Ulysses' is murder to read*, etc.) is analyzed in McCawley 1987.

Let it be emphasized that the construction illustrated in (15) is different from such constructions as *ce cochon de Polyte* ‘this swine of P.’, *l'imbécile de ton mari* ‘the fool of your husband’ or *ce fou de prof*, lit. ‘this crazy of professor’, where the head is a noun (it can be a nominalized adjective, but it is anyway a noun). In (15), the head adjective cannot be nominalized: **un drôle*, **un chouette*, etc.

¹⁷ (II, 4.3.2, p. 00) Otherwise, numerals do not create problems. Thus, in Russian, in *šest' desjat tri* ‘63’ the Synt-head is *tri*, because in compound numerals the last (= rightmost) numeral is the morphological contact point: *šest' desjat*←*tri stol+a*, but *šest' desjat*←*pjat* ‘65’ *stol+ov* and

šest' desjat ← odin '61' *stol + Ø*. This means that Criterion B2 applies here and indicates the Synt-governor.

¹⁸ (II, 4.3.3, p. 00) A SSyntRel is by no means a meaning; but a signified is not necessarily a meaning—it can even be a command to perform some modifications in the syntactics of a sign (as is the case with voices). I cannot, however, enter here in the discussion of the types of linguistic signifieds.

¹⁹ (II, 4.3.3, p. 00) A violation of semantic/lexical constraints is not considered as syntactic ill-formedness. Thus, cf. *inside the car*, but **inside Stuttgart* or *according to Leo*, but **according to the car*; however, the starred phrases are considered as syntactically well-formed (PREP + N being a legitimate phrase of English).

²⁰ (II, 4.3.3, p. 00) A property similar to the Kunze property was used for the identification of SSyntRels in the METATAXIS system (see Schubert 1989: 10: "Interchangeable dependents are grouped in classes and the relations that are definitional for these classes are given names").

²¹ (II, 4.3.3, p. 00) The SSynt-Subject of impersonal verbs (PLEUVOIR '[to] rain', NEIGER '[to] snow', etc.)—the 'impersonal' IL—is considered as a particular case of noun (= a pronominal noun, which is not a substitute pronoun). Note that with the Kunze property, SSynt-Subjects in *II* [= *Alain*, i.e. a substitute pronoun] *dort* 'He is sleeping' and *II pleut* 'It is raining' must be described by two different SSyntRels.

²² (II, 4.3.3, p. 00) It is sometimes claimed that even actantial SSyntRels can be repeatable. The best-known example is the repeatability of the **dir-obj** SSyntRel in Kinyarwanda: it is said that in this language, a clause can have up to three DirOs (Kimenyi 1980: 229); cf.:

- (i) *Umo +góre á +r +úubak+iish +iriz +a ábá+ana umu+gabo inzu*
 Class I woman I PRES build CAUS BENEF CONT II children I man house
 'The woman, on behalf of the children, is making the man build the house'.

A detailed analysis of 'repeated DirOs' in Kinyarwanda in Gary & Keenan 1977: 87-94 shows that indeed all of them possess the same relevant linguistic properties, which set them off with respect to oblique objects: they passivize, reflexivize and relativize, they can be cross-referenced in the verb, etc. And yet, in our framework, all three of them cannot be considered DirOs, because they contrast semantically, that is, they violate our Criterion C1. The presumed **dir-obj** SSyntRel in Kinyarwanda has to be split into three different SSyntRels, which are, so to speak, the subtypes of an abstract SSyntRel: the **dir-obj** SSyntRel, the **caus-dir-obj** SSyntRel and the **benef-dir-obj** SSyntRel. In this way, the commonality of their important properties is explicitly shown.

Similarly, in Sanskrit, two objects in the accusative (= 'double accusatives') cannot be both DirOs, either:

- (ii) *Tā* *yajamānam* *vāc+aya +ti*
 them-ACC sacrificer-ACC name CAUS IND.PRES.3SG
 '[He] makes [the] sacrificer name them'.

Tā is a DirO, but *yajamānam* must be described by a different SSyntRel: the **caus-dir-obj** one.

In other languages (e.g., Latin, German and Serbo-Croatian) the situation with 'double accusatives' is even clearer:

- (iii) a. Lat. *Quis music+am* [ACC]←?–*docuit*–?→*Epaminond+am* [ACC]?,
 lit. 'Who taught Epaminondas music?' = 'Who taught music to Epaminondas?'
 or
Me [ACC]←?–*rogavit*–?→*sententi+am* [ACC],
 lit. '[He] asked me opinion' = 'He asked me for my opinion'.

- b. Serb.-Cr. *Ta slika m+e* [ACC]←?–*košta*–?→*hiljad+u* [ACC] *maraka*
 'The painting costs me one thousand mark'.

- c. Germ. *Was* [ACC]←?–*fragst* [*du*]–?→*mich* [ACC]? 'What are you asking me?'

All these sentences do not have two DirOs: the two accusatives do not display the same syntactic behavior. Thus, in (iii-b) *me* is omissible, while *hiljadu* is not: *Ta slika košta hiljadu maraka* vs. **Ta slika me košta*; this shows that *me* is here an IndirO, despite its accusative form. In (iii-c), only *mich* is the DirO, *was* being an ObIO; etc.

For more on multiple objects in Latin, Ancient Greek and Modern Hebrew, see Lazard 1994: 89-96.

An interesting case of double accusatives is found in Korean (O'Grady 1991):

- (iv) *Kay +ka* *John+ul* *son +ul* *mwul+ess +ta*
 Dog NOM ACC hand ACC bite PAST DECLAR
 'The dog bit John's hand'.

There can even be multiple double accusatives:

- (v) *John+i* *mwune+lul* *tali+lul* *kkuth pwupwun+ul* *cokum+ul* *cal+lass+ta*
 NOM octopus ACC leg ACC end part ACC bit ACC cut PAST DECL
 'John cut the octopus on the end part of the leg a bit'.

But only the first one in such a chain of accusatives is a DirO; all the others behave like adverbials (O'Grady 1991: 74-75, 77-78): they 1) cannot accept modifiers and 2) cannot be permuted with the DirO, cf. (iv) vs. **Kay ka son +ul John+ul mwulessta*.

²³ (II, 4.3.3, p. 00) Along with Criteria C1-C3, the researcher can use the following heuristic test in order to establish the type of a SSyntRel:

Coordinability with one SSynt-governor

Within a coordinated phrase D_1 -coord $\rightarrow D_2$ which is subordinated as a whole to a SSynt-governor G, each element must in principle bear the same SSyntRel **r** to G:

if G -**r** $\rightarrow D_1$ -coord $\rightarrow D_2$, then G -**r** $\rightarrow D_1$ and G -**r** $\rightarrow D_2$.

Examples

(i) French

a. *Il craint d'être découvert et que l'administration le punisse*, lit. 'He fears to be discovered and that the administration punish him'.

b. *Il veut partir et aussi que je parte avec lui*, lit. 'He wants to leave and that I leave with him'.

c. *le rendement augmente successivement et par degré*, lit. 'The yield rises successively and by degrees'.

In (i), the boldfaced phrases stand in the same SSyntRel to the Main Verb.

Unfortunately, this test cannot be raised to the rank of a genuine formal criterion: coordination—at any rate, in many languages—is strongly semantically motivated; therefore, in some cases, syntactically different clause elements can be coordinated, while in some other cases identical clause elements cannot. Here are a few examples.

Coordination of different clause elements (cf. Grevisse 1993: 371):

French

(ii) **a.** *Elle vieillissait dans l'aisance et entourée de considération*

'She was aging in well-being and surrounded with consideration'.

b. *augmentation successive et par degré*, lit. 'a rise successive and by degree'.

c. *Je me demande si et sous quelles conditions on pourra régler le problème*

'I ask myself whether and under what conditions it will be possible to solve the problem'.

(iii) (Defrancq 1998: 118-119)

a. *Je me demande qui travaille et où* 'I ask myself who is-working and where'.

b. *Je me demande qui décide et quoi* 'I ask myself who decides and what'.

(iv) *couper les cheveux très court et de façon à ce qu'ils ne lui tombent pas sur le front*

Other examples can be drawn from Russian:

(v) **a.** *Èto otkrytie bylo sdelano v Anglii i angličaninom,*

lit. 'This discovery was made in England and by an Englishman'.

b. *Ja govorju s poètom i o poète*, lit. 'I talk with a poet and about a poet'.

c. *Nikto, nikomu i nikogda ne pomogaet*, lit. 'Nobody, to nobody and never helps'.

(Russian coordinate constructions of this 'exotic' type are described in detail in Sannikov 1989: 14-20.)

Impossible coordination of identical clause elements:

(v) French

a. **Ils étaient cinq et très blonds*, lit. 'They were five and very blond'.

b. **des plats français et exquis* 'French and exquisite dishes'.

c. **Tout le monde préfère le repos maintenant et partir plus tard* 'Everybody prefers the rest now and to leave later'.

Consequently, the result of coordination test can serve as an argument in favor of or against a particular solution (especially in less obvious cases); but the test as such cannot be accepted as a rigorous criterion. Cf. the discussion of the role coordination plays in establishing grammatical relations in Sag *et al.* 1985 (*I am neither an authority on this subject nor trying to portray myself as one, Pat was awarded the prize and very upset about it*, and the like) and Hudson 1988.

²⁴ (II, 4.5, p. 00) A particular syntactic or communicative role may require a noun in a particular inflectional form, for instance, 'DEF(inite)' or 'INDEF(inite)'; thus, in French, the boldfaced quasi-subject in the construction *Il est venu 10 étudiants*, lit. 'It has come 10 students', may be only indefinite. D. Beck pointed out to me another interesting example: in Lushootseed, the negative predicate $x^wi\Omega$ '[to] be not' requires its actant to be in the subjunctive and have the hypothetical determiner k^wi :

$x^wi\Omega$	k^wi	g^w	+ad	+s	+ Ω	Δ ed
be.not	DET	SUBJ	2SG	NOM(inalizer)	eat	
lit. 'Is-not your eating' = 'You did not eat'.						

Yet, I think, in all such cases the Synt-governor DIRECTLY requires a particular form of its dependent—rather than the presence of a particular dependent of its dependent.

²⁵ (II, 4.6, p. 00) This view was held, at least in Europe, as early as in the 13th-14th centuries. Weber 1992: 13 speaks of Siger von Kortrijk, who preached the absolute dominance of the finite verb in a sentence around 1300; cf. the following remark by Nicolò Macchiavelli in 1516: '...dicono che chi considera bene le 8 parti de l'orazione...troverrà che quella che si chiama verbo è la catena e il nervo de la lingua;' quoted in Koch/Krefeld 1991, V. For objections to the status of the Main Verb as the Synt-head of the sentence, see Hewson 1992: 49-51; these objections are

(again and again) due to the confusion of different types of **D** (syntactic, morphological, and communicative).

²⁶ (II, 4.6, p. 00) In Turkish we cannot postulate a zero copula form in the present based on paradigmatic considerations, as we have done for Russian. The main reason is that the forms in (26a) contain the marker of predicativity that precludes the use of the copula: in the past tense of the indicative, both the expression with the marker of predicativity but without copula and the expression with the copula I(-mek) ‘[to] be’ but without a marker of predicativity are possible (the latter being typical of colloquial speech, while the former is current in the written language):

Çocuk+tu	+m	and	Çocuk	i+di	+m
kid	PAST 1SG		kid	be PAST 1SG	

both meaning ‘I was a kid’. Note that the verb I(-mek) has no present tense.

²⁷ (II, 4.7, p. 00) In modern linguistic literature, the terms *arguments* or *terms* (vs. *non-arguments/non-terms*) are also current for the corresponding concept. I prefer avoiding them in linguistics, to reserve their use for logic: *arguments/terms of a predicate*.

²⁸ (II, 4.7, p. 00) Languages also differ with respect to the meanings they allow to be coordinated. Cf. numerous examples of coordinate phrases in Latin which should be translated with subordinate phrases in French (Tesnière 1959: 315-316): Lat. *orare atque obsecrare* ‘[to] pray and-also implore’ ~ Fr. *prier instamment* ‘[to] pray insistently’, Lat. *interdicit atque imperat* ‘He forbids and-also orders’ ~ Fr. *Il défend expressément* ‘He forbids expressly’, Lat. *diuellere ac distrahere* ‘[to] separate and-also tear-apart’ ~ Fr. *séparer violamment* ‘[to] separate violently’, Lat. *doctrina et ratio* ‘teaching and method’ ~ Fr. *un enseignement méthodique* ‘a methodical teaching’, Lat. *studium et aures* ‘favor and ears’ ~ Fr. *une oreille favorable* ‘a favorable ear’, etc. However, the study of the relationship between coordination and subordination falls outside the scope of this paper.

²⁹ (II, 4.8, p. 00) For an argumentation in favor of the SSyntS Conj→MV see Hudson 1987: 119-121.

³⁰ (III, 1.1.3, p. 00) One of its disadvantages is immediately clear: it presupposes the repeatability of actantial dependencies, which contradicts the postulate of unicity of each actant, widely shared by linguists of all schools of thought.

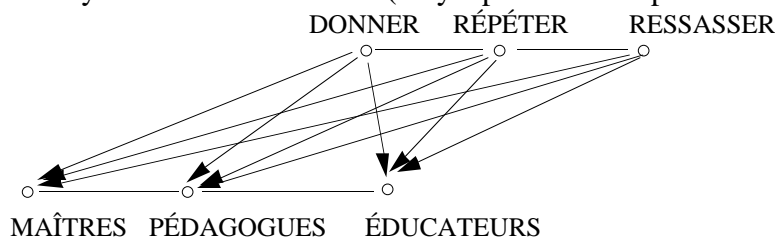
³¹ (III, 1.3, p. 00) Tesnière distinguishes *junction*, which is coordination, from *connexion*, which is subordination. In Tesnière's trees (= *stemmas*) conjoined elements are linked horizontally, showing in this way their equal nature. Each of them is then subordinated to the same Synt-gover-

nor. Among other examples of how the coordination is represented, one finds in Tesnière 1959: 345 the following complex structure with parallel Synt-**D**s between the elements of coordinate phrases which themselves are not linked by Synt-**D**s:

Les maîtres, les pédagogues et les éducateurs donnent, répètent et ressassent des avis, des conseils et des avertissements aux écoliers, aux collégiens et aux lycéens

‘Teachers, pedagogues and educators give, repeat and trot out opinions, pieces of advice and warnings to the school kids, college students and high-school students’.

The structure proposed by Tesnière is as follows (only a part of it is represented here):



³² (III, 1.3, p. 00) The solution Schubert himself prefers is to take as the head of a conjoined phrase the coordinate conjunction: LEO←AND→ALAN. But this solution is unacceptable for me; see 2.6.

³³ (III, 2.7, p. 00) Note that, for instance, in English the situation is different, because of the impossibility of **I like her more than he*:

I like her more than—conjunct→[he] does vs. *I like her more than—conjunct→him*

For this case, we do not need special conjunctive SSyntRels.

³⁴ (III, 2.8, p. 00) Alternatively, the elision process could be relegated to a 'later' stage, that is, to the SSyntS ⇒ DMorphS transition; then no artificial nodes in the SSyntS would be required for the representation of such ellipses. For the time being, I do not see any serious objections to such a strategy. The only reason for which I keep ellipsis in the SSyntS of a sentence is the intuitive feeling that a complete sentence and a sentence with ellipsis are different SYNTACTICALLY and, therefore, this difference should be reflected on a SSynt-level. In any event, I consider this an open question.

³⁵ (III, 5, p. 00) We take the negative particle NOT in this example to be a Synt-dependent of TALL rather than of BE; cf. *He is, as everybody knows since the period when ..., not ←tall and fat* vs. *He is→not (isn't), as everybody knows since the period when ..., tall and fat* .

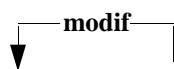
³⁶ (III, 5, p. 00) Three remarks concerning relevant aspects of groupings seem in order.

- Dependence on the head of a coordinate string vs. dependence on the whole string

These two cases of dependency are distinguished in the proposed SSyntS with groupings by including into a grouping all 'private' (= disjoint) dependents of its head: thus, for

‘old { {fat men} and women }’,

where ‘old’ bears on the whole conjoined string (joint reading), but ‘fat’ on ‘men’ only (disjoint reading), we write



old [*fat←men→and→women*].

- Dependence of the head of a coordinate string vs. dependence of the whole string

Here again, groupings allow for efficient disambiguation. Let us consider the following French example (Abeillé 1997a: 19): *Paul rêvait d'acheter et collectionner des pistolets anglais* ‘P. was dreaming of buying and collecting English pistols’. The boldfaced conjoined string of infinitives depends on the verb *rêver* ‘[to] dream’ as a whole—it has a shared DirO *pistolets anglais* ‘English pistols’; therefore, the preposition DE that introduces the infinitive need not to be repeated (joint reading). However, if the two conjoined infinitives do not depend on *rêver* as a whole, the preposition has to be repeated: *Paul rêvait de voyager et de collectionner des pistolets anglais* ‘P. was dreaming of traveling and collecting English pistols’ ⟨**Paul rêvait de voyager et collectionner des pistolets anglais*⟩ (disjoint reading). This difference is readily expressed using groupings: for the joint reading, we write *rêvait* –[→*acheter* →*et*→*collectionner*–]→*des pistolets anglais*, and for the disjoint one, *rêvait*→*voyager*→*et*→*collectionner*→*des pistolets anglais*.

- Multiple coordinate conjunctions depending on the same Governor

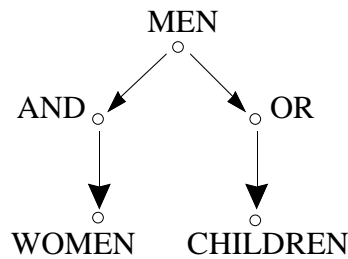
This is another problematic case for 'pure' dependency. Thus, consider the expressions (i) - (ii), where both conjunctions—AND and OR—syntactically depend on the same noun (MEN, in this case):

(i) { *men and women* } or *children*

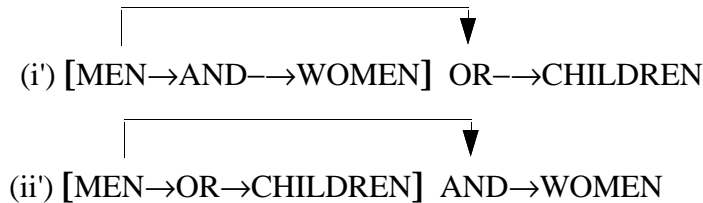
vs.

(ii) { *men or children* } and *women*,

These expressions clearly have different meanings; however, in terms of pure dependency, both have the same SSyntS:



We thus see that a pure-dependency SSyntS is unable to preserve the intended meaning in cases of such a type. In order to distinguish (i) and (ii) in the SSyntS, we need groupings—and there is no other way to achieve this goal:



References

- Anderson, John (1977): *On Case Grammar. Prolegomena to a Theory of Grammatical Relations*. London.
- Anderson, John/Ewen, Colin (1987): *Principles of Dependency Phonology*. Cambridge: Cambridge University Press.
- Anderson, Stephen (1992): *A-Morphous Morphology*. Cambridge: Cambridge University Press.
- Apresjan, Jurij/Boguslavskij, Igor'/Iomdin, Leonid *et al.* (1989): *Lingvističeskoe obespečenie sistemy ÈTAP-2*. Moscow: Nauka.
- Apresjan, Jurij/Boguslavskij, Igor'/Iomdin, Leonid *et al.* (1992): *Lingvističeskij processor dlja složnyx informacionnyx sistem*. Moscow: Nauka.
- Árnason, Kristján (1989): Dependency Phonology. *Linguistics*, 27, 319-339.
- Badia, Toni (1993): Dependency and Machine Translation. In: Eynde, Frank van (ed.), *Linguistic Issues in Machine Translation*, London/New York: Pinter, 105-137.
- Baumgärtner, Klaus (1965): Spracherklärung mit den Mitteln der Abhängigkeitsstruktur. *Beiträge zur Sprachkunde und Informationsverarbeitung*, 5, 31-53.
- Baumgärtner, Klaus (1970): Konstituenz und Dependenz. Zur Integration der beiden grammatischen Prinzipien. In: H. Steger (Hg.), *Vorschläge zu einer strukturellen Grammatik des Deutschen*, Darmstadt, 57-77.
- Bazell, Charles (1949): Syntactic Relations and Linguistic Typology. *Cahiers F. de Saussure*, 8: 5-

- Beck, David (1997): Theme, Rheme, and Communicative Structure in Lushootseed and Bella Coola. In: L. Wanner (ed.), *Recent Trends in Meaning-Text Theory*, Amsterdam/Philadelphia, 93-135.
- Beck, David (1998): Adjectives and the Organization of Lexical Inventories. *Toronto Working Papers in Linguistics*, 16: 2.
- Bloomfield, Leonard (1933): *Language*. New York: Holt, Rinehart and Winston.
- Boguslavskaja, Ol'ga (1991): Razdvoenie grammatičeskix kategorij čisla i soglasovatel'nogo klassa i aspektnye konstrukcii v dagestanskix jazykax. In: *Tipologija grammatičeskix kategorij*, Leningrad: Nauka, 10-12.
- Boguslavskij, Igor' (1985): *Issledovanija po sintaksičeskoj semantike*. Moskva: Nauka.
- Boguslavskij, Igor' (1996): *Sfera dejstvija leksičeskix edinic*. Moskva: Škola «Jazyki ruskoj kul'tury».
- Bresnan, Joan (ed.) (1982): *The Mental Representation of Grammatical Relations*. Cambridge, MA—London: The MIT Press.
- Corbett, Greville (1993): The Head of Russian Numeral Expressions. In: Corbett *et al.* (eds) 1993, 11-35.
- Corbett, Greville/Fraser, Norman/McGlashan, Scott (eds) (1993): *Heads in Grammatical Theory*. Cambridge.
- Covington, Michael (1990): A Dependency Parser for Variable-word-order Languages. *Computational Linguistics*, 16: 4, 234-236.
- Dahl, Östen (1980): Some Arguments for Higher Nodes in Syntax: A Reply to Hudson's 'Constituency and Dependency.' *Linguistics*, 18: 5/6, 485-488.
- Dryer, Matthew (1989): Plural Words. *Linguistics*, 27, 865-895.
- Durand, Jacques (ed.) (1986): *Dependency and Non-linear Phonology*. London—Dover, N.H.: Croom Helm.
- Eichinger, Ludwig/Eroms, Hans-Werner (eds) (1995): *Dependenz und Valenz*. Hamburg.
- Engel, Ulrich (1977): *Syntax der deutschen Gegenwartssprache*. Berlin: Erich Schmidt. 307 pp. [3rd rev. ed.: 1994.]
- Engel, Ulrich (1988): *Deutsche Grammatik*. Heidelberg: Julius Groos/Tokyo: Sansyusya. 888 pp.
- Evans, Nicholas (1988): Odd Topic Marking in Kayardild. In: P. Austin (ed.), *Complex Sentence Construction in Australian Languages*, Amsterdam/Philadelphia: Benjamins, 219-266.
- Fillmore, Charles (1968): The Case for Case. In: E. Bach/R. Harms (eds), *Universals in Linguistic Theory*, New York: Holt, Rinehart, Winston, 1-88.
- Fitialov, Sergej (1962): O modelirovanii sintaksisa v strukturnoj lingvistike. In: S. Šaumjan (ed.), *Problemy strukturnoj lingvistiki*, Moskva, 100-114.

- Fitialov, Sergej (1968): Ob èkvivalentnosti grammatik NS i grammatik zavisimostej. In: S. Šaumjan (ed.), *Problemy strukturnoj lingvistiki-1967*, Moskva, 71-102.
- Fraser, Norman/Hudson, Richard (1992): Inheritance in Word Grammar. *Computational Linguistics*, 18: 2, 133-158.
- Gaetone, David (1988): *Cette coquine de construction*: remarques sur trois structures affectives du français. *Travaux de linguistique*, 17: 159-176.
- Gaifman, Haim (1965): Dependency Systems and Phrase Structure Systems. *Information and Control*, 8, 304-337.
- Garde, Paul (1977): Ordre linéaire et dépendance syntaxique : contribution à une typologie. *Bulletin de la Société de linguistique de Paris*, 72: 1, 1-19.
- Gary, Judit/Keenan, Edward (1977): On Collapsing Grammatical Relations in Universal Grammar. In: P. Cole/J. Sadock (eds), *Grammatical Relations* [= *Syntax and Semantics*, 8], New York etc.: Academic Press, 83-120.
- Gladkij, Aleksej (1966): *Lekcii po matematičeskoj lingvistike dlja studentov NGU*. Novosibirsk. [French translation: *Leçons de linguistique mathématique*, fasc. 1, 1970, Paris.]
- Gladkij, Aleksej (1968): Ob opisaniï sintaksičeskoj struktury predloženiïa. *Computational Linguistics* 7, Budapest, 21-44.
- Goralčíková, Alla (1973): On One Type of Dependency Grammar. In: W. Klein/A. von Stechow (eds), *Functional Generative Grammar in Prague*, Kronberg: Scriptor, 64-81.
- Hays, David (1960): *Basic Principles and Technical Variations in Sentence Structure Determination*. Santa Monica, CA. [Reprinted in: C. Cherry (ed.), *Information Theory*, 1961, Washington, 367-374.]
- Hays, David (1964a): Connectability Calculations, Syntactic Functions and Russian Syntax. *Mechanical Translation*, 8, 32-51. [Reprinted in: D. Hays (ed.), *Readings in Automatic Language Processing*, 1966, New York, 107-125.]
- Hays, David (1964b): Dependency Theory: A Formalism and some Observations. *Language*, 40: 4, 511-525.
- Helbig, Gerhard (1992): *Probleme der Valenz- und Kasustheorie*. Tübingen: Niemeyer. 194 pp.
- Heringer, Hans Jürgen (1970): Einige Ergebnisse und Probleme der Dependenzgrammatik. *Der Deutschunterricht*, 4, 42-98.
- Heringer, Hans Jürgen (1993a): [Dependency Theory] Basic Ideas and the Classic Model. In: Jacobs *et al.* 1993: 298-315.
- Heringer, Hans Jürgen (1993a): [Dependency Theory] Formalized Models. In: Jacobs *et al.* 1993: 315-328.
- Heringer, Hans Jürgen (1996): *Deutsche Syntax Dependentiell*. Tübingen: Stabenburg. 292 SS.
- Hewson, John (1991): Determiners as Heads. *Cognitive Linguistics*, 2: 4, 317-337.

- Hewson, John (1992): Review Article: R. Hudson, *English Word Grammar* and R. Langacker, *Concept, Image, and Symbol. The Cognitive Basis of Grammar. Canadian Journal of Linguistics*, 37: 1, 41-53.
- Hudson, Richard (1976): *Arguments for a Non-transformational Grammar*. Chicago.
- Hudson, Richard (1980a): Constituency and Dependency. *Linguistics*, 18: 3/4, 179-198.
- Hudson, Richard (1980b): A Second Attack on Constituency: A Reply to Dahl. *Linguistics*, 18: 5/6, 489-504.
- Hudson, Richard (1983): Word Grammar. In: Sh. Hattori/K. Inoue (eds), *Proceedings of the XIIIth International Congress of Linguists, Aug. 29-Sept. 4, 1982, Tokyo, Tokyo*, 89-101.
- Hudson, Richard (1984): *Word Grammar*. Oxford.
- Hudson, Richard (1987): Zwicky on Heads. *Journal of Linguistics*, 23, 109-132.
- Hudson, Richard (1988a): Coordination and Grammatical Relations. *Journal of Linguistics*, 24, 303-342.
- Hudson, Richard (1988b): Extraction and Grammatical Relations. *Lingua*, 76, 177-208.
- Hudson, Richard (1990): *English Word Grammar*. Oxford: Basil Blackwell. 445 pp.
- Hudson, Richard (1993a): Do We Have Heads in Our Minds? In: Corbett *et al.* (eds) (1993): 266-291.
- Hudson, Richard (1993b): Recent Developments in Dependency Theory. In: Jacobs *et al.* (eds) (1993): 329-338.
- Iordanskaja, Lidija (1963): O nekotoryx svojstvax pravil'noj sintaksičeskoj struktury (na materiale russkogo jazyka). *Voprosy Jazykoznanija*, n° 4, 102-112.
- Iordanskaja, Lidija (1967): *Avtomatičeskij sintaksičeskij analiz. Tom II: Mežsegmentnyj sintaksičeskij analiz*. Novosibirsk: Nauka.
- Iordanskaja, Lidija/Mel'čuk, Igor (2000): Towards the Notion of Surface-Syntactic Relation.
- Jacobs, Joachim/von Stechow, Arnim/Sternefeld, Wolfgang/Vennemann, Theo (eds) (1993): *Syntax. An International Handbook of Contemporary Research*. Vol. 1. Berlin—New York: W. de Gruyter.
- Kahane, Sylvain (1997): Bubble Trees and Syntactic Representations. In: T. Becker/H.-U. Krieger (eds), *Proceedings of the 5th Meeting of Mathematics of Language (MOL 5)*, Saarbrücken, 70-76.
- Kahane, Sylvain/Mel'čuk, Igor (1999): Synthèse des phrases à extraction en français contemporain. *t.a.l.*, 40: 2, 25-85.
- Keenan, Edward (1974): The Functional Principle: Generalizing the Notion of 'Subject-of'. *CLS-10*, 298-310.
- Keenan, Edward (1978): Logical Semantics and Universal Grammar. *Theoretical Linguistics*, 5, 83-107.

- Kimenyi, Alexander (1980): *Relational Grammar of Kinyarwanda*. Berkeley: UCLA Press.
- Kibrik, Aleksandr (1977): O sootnošenii ponjatija sintaksičeskogo podčinenija s ponjatijami soglasovanija, upravljenija i primykanija. In: *Problemy teoretičeskoj i eksperimental'noj lingvistiki*, Moskva: Izd-vo MGU, 161-179. [Reprinted in: A. Kibrik, *Očerki po obščim i prikladnym voprosam jazykoznanija (universal'noe, tipovoe i specifičeskoe v jazyke)*, Moskva: Izd-vo MGU, 102-123.]
- Kim, Alan (1995): Word Order at the Noun Phrase Level in Japanese: Quantifier Constructions and Discourse Functions. In: P. Downing/M. Noonan (eds), *Word Order in Discourse*, Amsterdam/Philadelphia: Benjamins, 199-246.
- Koch, Peter/Krefeld, Thomas (eds) (1991): *Connexiones Romanicae. Dependenz und Valenz in romanischen Sprachen*. Tübingen.
- Korhonen, Jarmo (1977): *Studien zu Dependenz, Valenz und Satzmodell. Teil I. Theorie und Praxis der Beschreibung der deutschen Gegenwartssprache*. Frankfurt am Main.
- Kunze, Jürgen (1972): Die Komponenten der Darstellung syntaktischer Strukturen in einer Abhängigkeitsgrammatik. *Prague Bulletin of Mathematical Linguistics*, 18, 15-27.
- Kunze, Jürgen (1975): *Abhängigkeitsgrammatik*. Berlin: Akademie-Verlag.
- Kunze, Jürgen/Priess, W. (1967-1971): Versuch eines objektivierten Grammatikmodells. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung*, 20: 415-448, 21: 421-466, 23: 347-378, 24: 373-402.
- Kunze, Jürgen (ed.) (1982): *Automatische Analyse des Deutschen*. Berlin: Akademie-Verlag.
- Langacker, Ronald (1987): *Foundations of Cognitive Grammar, vol. 1. Theoretical Prerequisites*. Stanford: Stanford University Press.
- Langacker, Ronald (1991): *Foundations of Cognitive Grammar, vol. 2. Descriptive Application*. Stanford: Stanford University Press.
- Langacker, Ronald (1997): Constituency, Dependency, and Conceptual Grouping. *Cognitive Linguistics*, 8: 1, 1-32.
- Lazard, Gilbert (1994): *L'actance*. Paris: Les Presses Universitaires de France.
- Lecerf, Yves (1960): Programme des conflits, modèle des conflits. *Traduction automatique*, 1: 4, 11-18; 1: 5, 17-36.
- Lehmann, Christian (1985): On Grammatical Relationality. *Folia Linguistica*, 19, 67-109.
- Lobin, Henning (1993): *Koordinationsyntax als prozedurales Phänomen*. Tübingen.
- Lobin, Henning (1995): Komplexe Elemente — Indizien aus Nominalphrase und Verbalkomplex. In: Eichinger/Eroms (eds) 1995, 117-133.
- Lombardo, Vincenzo/Lesmo, Leonardo (1998): Formal Aspects and Parsing Issues of Dependency Theory. In: *COLING-ACL '98 (Proceedings of the Conference)*, vol. II, 787-793.

- McCawley, James (1987): A Case of Syntactic Mimicry. In: R. Dirven/V. Fried (eds.), *Functionalism in Linguistics*, Amsterdam/Philadelphia: Benjamins, 459-470.
- Machová, Svatava (1975): *Die Abhängigkeitsgrammatiken. Einführung in die generative Grammatik (Prager Autorengruppe)*, Kronberg: Scriptor, 146-154.
- Marcus, Solomon (1965a): Sur la notion de projectivité. *Zeitschrift für mathematische Logik und Grundlagen der Mathematik*, 11, 181-192.
- Marcus, Solomon (1965b): Sur une description axiomatique des liens syntaxiques. *Zeitschrift für mathematische Logik und Grundlagen der Mathematik*, 11, 291-296.
- Matthews, Peter (1981): *Syntax. Cambridge etc.*: Cambridge University Press.
- Maxwell, Dan/Schubert, Klaus (eds.) (1989): *Metataxis in Practice. Dependency Syntax for Multilingual Machine Translation*. Dordrecht—Providence: Foris.
- Mel'čuk, Igor (1962): Ob algoritme sintaksičeskogo analiza jazykovyx tekstov (obščie principy i nekotorye itogi). *Mašinnyj perevod i prikladnaja lingvistika*, 7, 45-87.
- Mel'čuk, Igor (1963): Avtomatičeskij analiz tekstov (na materiale russkogo jazyka). In: *Slavjanskoe jazykoznanie*, Moskva: Nauka, 477-509.
- Mel'čuk, Igor (1964a): Tipy svjazej meždu èlementami teksta i tipologija jazykov. In: L.I. Rojzenzon (red.), *Materialy konferencii «Aktual'nye voprosy sovremennogo jazykoznanija i lingvističeskoe nasledie E.D. Polivanova»*, tom I, Samarkand: Samarkandskij Un-tet, 57-59.
- Mel'čuk, Igor (1964b): *Avtomatičeskij sintaksičeskij analiz. Tom I: Obščie principy. Vnutrisegmentnyj sintaksičeskij analiz*. Novosibirsk: Nauka.
- Mel'čuk, Igor (1967): L'ordre des mots dans la synthèse automatique du texte russe. *T.A. Informations*, n° 2, 65-84.
- Mel'čuk, Igor (1974): *Opyt teorii lingvističeskix modelej «Smysl ⇔ Tekst»*. Moskva: Nauka. [Reprinted by Škola «Jazyki ruskoj kul'tury» in 1999.]
- Mel'čuk, Igor (1977): O tipax poverxnostno-sintaksičeskix otnošenij (tri kriterija različenija). *Russian Linguistics*, 3: 3-4, 245-270.
- Mel'čuk, Igor (1979): *Studies in Dependency Syntax*. Ann Arbor: Karoma.
- Mel'čuk, Igor (1981): Types de dépendance syntagmatique entre les mots-formes d'une phrase. *Bulletin de la Société de linguistique de Paris*, 76: 1, 1-59.
- Mel'čuk, Igor (1985): *Poverxnostnyj sintaksis russkix čislovyx vyraženij*. Wien: WSA.
- Mel'čuk, Igor (1988): *Dependency Syntax*. Albany, NY: SUNY Press.
- Mel'čuk, Igor (1993): Agreement, Government, Congruence. *Linguisticae Investigationes*, 17, 307-373.
- Mel'čuk, Igor (1995a): *The Russian Language in the Meaning-Text Perspective*. Moscow—Vienna: Škola «Jazyki ruskoj kul'tury»—Wiener Slawistischer Almanach.

- Mel'čuk, Igor (1995b): The Future of the Lexicon in Linguistic Description and the Explanatory Combinatorial Dictionary. In: Ik-Hwan Lee (ed.), *Linguistics in the Morning Calm 3 (Selected Papers from SiCOL-1992)*, Seoul: Hanshin, 181-270.
- Mel'čuk, Igor (1996a): Lexical Functions: A Tool for the Description of Lexical Relations in the Lexicon. In: L. Wanner (ed.), *Lexical Functions in Lexicography and Natural Language Processing*, Amsterdam/Philadelphia: Benjamins, 37-102.
- Mel'čuk, Igor (1996b): *Cours de morphologie générale. Vol. 3. Troisième partie : Moyens morphologiques. Quatrième partie : Syntactiques morphologiques*. Montréal—Paris: Les Presses de l'Université de Montréal — CNRS.
- Mel'čuk, Igor (1997a): Cas grammaticaux, construction verbale de base et voix en massai : vers une meilleure analyse de concepts. *Bulletin de la Société de linguistique de Paris*, 92: 1, 49-113.
- Mel'čuk, Igor (1997b): *Vers une linguistique Sens-Texte. Leçon inaugurale*. Paris: Collège de France.
- Mel'čuk, Igor/Pertsov, Nikolaj (1987): *Surface Syntax of English. A Formal Model within the Meaning-Text Framework*. Amsterdam: Benjamins.
- Milićević, Jasmina (2000): Linear Placement of Serbian Clitics: A Description within a Dependency-Based Approach. In: Wanner (ed.), ...
- Nichols, Johanna (1978): Double Dependency? *CLS-14*, 326-339.
- Nichols, Johanna (1986): Head-marking and Dependent-marking Grammar. *Language*, 62: 1, 56-119.
- Nichols, Johanna (1993): Heads in Discourse: Structural Versus Functional Centricity. In: Corbett *et al.* (eds) 1993, 164-185.
- O'Grady, William (1991): *Categories and Case. The Sentence Structure of Korean*. Amsterdam/Philadelphia: Benjamins.
- Owens, Jonathan (1988): *The Foundations of Grammar: An Introduction to Mediaeval Arabic Grammatical Theory*. Amsterdam: Benjamins.
- Padučeva, Elena (1964): O sposobax predstavljenija sintaksičeskoj struktury predloženija. *Voprosy Jazykoznanija*, n° 2, 99-113.
- Perlmutter, David (ed.) (1983): *Studies in Relational Grammar I*. Chicago—London: The University of Chicago Press.
- Petkevič, Vladimír (1995): A New Formal Specification of Underlying Structures. *Theoretical Linguistics*, 21: 1, 7-61.
- Pittman, Richard (1948): Nuclear Structures in Linguistics. *Language*, 24: 287-202.
- Quirk, Randolph/Greenbaum, Sidney/Leech, Geoffrey/Svartvik, Jan (1985): *A Comprehensive Grammar of English Language*. London and New York.

- Rambow, Owen/Joshi, Aravind (1997): A Formal Look at Dependency Grammars and Phrase-Structure Grammars, with Special Consideration of Word-Order Phenomena. In: L. Wanner (ed.). *Recent Trends in Meaning-Text Theory*, Amsterdam/Philadelphia: Benjamins, 167-190.
- Robinson, Jane (1970a): A Dependency-based Transformational Grammar. In: *Actes du X-ème Congrès international des linguistes (Bucarest, 1967)*, 2, Bucarest, 807-813.
- Robinson, Jane (1970b): Dependency Structures and Transformational Rules. *Language*, 46: 2, 259-285.
- Sannikov, Vladimir (1989): *Russkie sočinitel'nye konstrukcii: semantika, pragmatika, sintaksis*. Moskva: Nauka.
- Savvina, Elena (1976): Fragment modeli rusaskogo poverxnostnogo sintaksisa. III. Sravnitel'nye konstrukcii (sravnitel'nye i sojuznye sintagmy). *Naučno-texničeskaja informacija, serija 2*, n° 1, 38-43.
- Schmidt, Peter/Lehfeldt, Werner (1995): *Kongruenz, Rektion, Adjunktion. Semantische und historische Untersuchungen zur allgemeinen Morphosyntax und zu den Wortfügungen (slovosočetanija) im Russischen*. München: Sagner.
- Schubert, Klaus (1987): *Metataxis. Contrastive Dependency Syntax for Machine Translation*. Dordrecht—Providence, RI: Foris. [Rev.: B. Sigurd, *Studia Linguistica*, 1988, 42: 2, 181-184.]
- Sgall, Petr/Nebeský, Ladislav/Goralčíková, Alla/Hajičová, Eva (1969): *A Functional Approach to Syntax in Generative Description of Language*. New York.
- Sgall, Petr/Hajičová, Eva/Panevová, Jarmila (1986): *The Meaning of the Sentence in its Semantic and Pragmatic Aspects*. Prague.
- Sgall, Petr/Panevová, Jarmila (1988-89): Dependency Syntax—A Challenge. *Theoretical Linguistics*, 15:1, 73-86.
- Sgall, Petr/Pfeiffer, Oskar/Dressler, Wolfgang/Puček, M. (1995): Experimental Research on Systemic Ordering. *Theoretical Linguistics*, 21:2/3, 197-239.
- Starosta, Stanley (1988): *The Case for Lexicase*. London.
- Suñer, Margarita (1998): Resumptive Restrictive Relatives: A Crosslinguistic Perspective. *Language*, 74: 2, 335-364.
- Tarvainen, Kalevi (1981): *Einführung in die Dependenzgrammatik*. Tübingen.
- Tesnière, Lucien (1934): Comment construire une syntaxe. *Bulletin de la Faculté des lettres, Université de Strassbourg*, 7, 219-229.
- Tesnière, Lucien (1959): *Éléments de syntaxe structurale*. Paris: Klincksieck.

- Trubetzkoy, Nikolaj (1939): Le rapport entre le déterminé, le déterminant et le défini. In: *Mélanges de linguistique offerts à Charles Bally*, 75-82. [Reprinted in: E. Hamp *et al.* (eds), *Readings in linguistics*, II, 1966, 133-138.]
- Van Langendonck, Willy (1994): Determiners as Heads? *Cognitive Linguistics*, 5: 3, 243-259.
- Vennemann, Theo (1977): Konstituenz und Dependenz in einigen neueren Grammatiktheorien. *Sprachwissenschaft*, 2: 3, 259-301.
- Weber, Heinz (1992): *Dependenzgrammatik. Ein Arbeitsbuch*. Tübingen.
- Xolodovič, Aleksandr (1966): K tipologii porjadka slov. *Naučnye doklady vysšej školy—Filologičeskie nauki*, n°3. [Reprinted in: A.A. Xolodovič, *Problemy grammatičeskoj teorii*, 1979, Leningrad: Nauka, 255-268.]
- Zwicky, Arnold (1985): Heads. *Journal of Linguistics*, 21: 1, 1-30.
- Zwicky, Arnold (1993): Heads, Bases and Functors. In: Corbett *et al.* (eds) 1993: 292-315.
- Žolkovskij, Aleksandr & Igor' Mel'čuk (1967): O semantičeskom sinteze. *Problemy kibernetiki*, 19: 177-238. [There is a translation into French: *T.A. Informations*, 1970, n° 2, 1-85.]