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**COMPLEX SENTENCE AS A STRUCTURE FOR REPRESENTING
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Abstract

Structural variations involving both morphological and syntactic features of the complex sentence of the type “When S, S” and their relevance for the interpretation of sentence meaning are analyzed. It is hypothesized that the constraints on certain sequences intuitively felt by native speakers are due to semantic contradictions that arise between the indexical content of the verbal tense and aspect and the syntactic structure of the sentence which iconically reflects the cognitive processing of perceptual data. The cognitive value of different syntactically acceptable sequences is assessed from the point of view of the relationship between the morphosyntactic categories of tense and aspect and sentence iconicity.

1. INTRODUCTION

The problem of discourse interpretation, despite a long history of studies and a variety of related theories, is still looming large and defiant on the linguistic horizon. Although the basic constituent of discourse, the sentence/utterance, seems to have been exhaustively analyzed and described within different theoretical frameworks such as generative grammar (Chomsky 1965), functional grammar (Halliday, 1985; Dik, 1989; Givón, 1993), typology (Greenberg, 1978; Hawkins, 1983; Givón, 1990), semantics (Ullmann, 1962; Lyons, 1977), pragmatics (Verschueren, 1999), etc., there does not seem to be a universal understanding of *how sentential grammar works in discourse*.

As a sign system, natural language operates on two levels of knowledge representation: the level of text (discourse), and the level of linguistic units that add up to produce a text. The resulting informative value of a text largely depends on the informative value of its constituents. The traditional approach to language grammar attempts to provide an explicit set of features of meaning allegedly associated with a given form. In contemporary linguistic science these features are viewed as an assembly of concepts we have about the world, which are acquired via natural language and with the help of language. The outcome of this acquisition process is the sum total of our linguistic experiences; thus, grammar is viewed as a system of categorized patterned cognitive experience (Bod, 1998).

With this in view, the principal objective of a grammatical theory (that is, morphology and syntax) should be the explication of the relationship between linguistic structures and cognitive concepts behind them (cf. Taylor & MacLaury, 1995; Shibatani & Thompson, 1996; Heine, 1997; Kravchenko, 2001). In other words, grammar is called upon to provide a means for encoding *cognitive experience* via conceptualization and categorization (cf. Svorou, 1994; Kravchenko, 2002a).

On the level of syntactic structure such encoding is associated with *iconicity* (cf. Haiman, 1985; Givón, 1995), when the syntactic properties of the sentence are analyzed from the point of view of *information flow*. However, the term *information flow* may refer to two cognitively different processes. On the one hand, the linear structure of the sentence or its parts may reflect the order in which the described situation is processed

perceptually, with perceptually salient elements becoming *figures* as opposed to *ground* (Tomlin, 1987). A trivial example would be the particular order of adjectives used in strings of attributes preceding a noun in a noun phrase, as in (1):

- (1) (a) Suddenly I was approached by a *tall young* man
- (b) ?? Suddenly I was approached by a *young tall* man

This perceptual salience may be called *salience of the first order*.

On the other hand, the linear structure of the sentence may depend on *salience of the second order*, when the speaker assigns to a thing or property a degree of significance determined by the speaker's relative system of values rather than by perceptual salience, as in (2):

- (2) "What's your new neighbor like?"
"Well, John Bradley is a rather *young, tall* man..."

Examples like (1) and (2) illustrate an important distinction between two cognitive types of discourse: we speak either about *what we perceive*, or about *what we know* as a result of the processing of the phenomenological input and integrating it into our system of beliefs and values.

The most important issue in natural language processing is determining the source to which a given text-level concept can be traced (cf. Hill, 1994). Because "everything said is said by an observer" (Maturana, 1970), the ultimate point-of-reference for any concept, however complex, associated with any linguistic structure regardless of its complexity, is *sensory data input*. The two types of discourse mentioned above rely on two kinds of input that may be described, following Goldsmith & Woisetschlaeger (1982), as *phenomenological* and *structural*. Due to inherent circularity of language as a cognitive phenomenon (cf. Kravchenko, 2002b; 2003), the boundary between phenomenological and structural input is not rigid or clear-cut, and this poses a serious problem for machine processing of natural language.

2. *THE DATA*

This paper addresses the problem of the relationship between the form and meaning of the complex sentence of the type “When S, S” in the context of admissible structural variations (involving both morphological and syntactic features) and their relevance for the interpretation of sentence meaning (cf. Haiman and Thompson, 1989; Kovalyova et al., 2001). The following theoretically possible sequences are brought under scrutiny:

Set I.

- (a₁) ? When John came home, Ann cooked
- (a₂) When John came home, Ann cooked dinner
- (b₁) ? Ann cooked when John came home
- (b₂) Ann cooked dinner when John came home
- (c₁) * John came home when Ann cooked
- (c₂) ? John came home when Ann cooked dinner
- (d₁) ?? When Ann cooked, John came home
- (d₂) ?? When Ann cooked dinner, John came home

Set II.

- (a₁) When John came home, Ann was cooking
- (a₂) When John came home, Ann was cooking dinner
- (b₁) Ann was cooking when John came home
- (b₂) Ann was cooking dinner when John came home
- (c₁) ? John came home when Ann was cooking
- (c₂) John came home when Ann was cooking dinner
- (d₁) ? When Ann was cooking, John came home
- (d₂) When Ann was cooking dinner, John came home

Set III.

- (a₁) ?? When John came home, Ann had cooked

- (a₂) When John came home, Ann had cooked dinner
- (b₁) ?? Ann had cooked when John came home
- (b₂) Ann had cooked dinner when John came home
- (c₁) ?? John came home when Ann had cooked
- (c₂) ? John came home when Ann had cooked dinner
- (d₁) ?? When Ann had cooked, John came home
- (d₂) ? When Ann had cooked dinner, John came home

These sample data were obtained with the help of a questionnaire offered to a number of educated adult native speakers of English who were asked to assess the sentences as either “normal”, “doubtful (?)”, “highly doubtful (??)”, or “unacceptable (*)”. Although there was a slight dispersion of answers for the latter three categories, the tendency to mark down certain types of sequences as deviant appeared to be quite obvious. The data are summed up in Table 1.

Acceptability	Sequence			
	<i>When S₁, S₂</i>	<i>S₂ when S₁</i>	<i>When S₂, S₁</i>	<i>S₁ when S₂</i>
Normal	1a ₂ 2a ₁ 2a ₂ 3a ₂	1b ₂ 2b ₁ 2b ₂ 3b ₂	2d ₂	2c ₂
Doubtful	1a ₁	1b ₁	2d ₁ 3d ₂	1c ₂ 2c ₁ 3c ₂
Highly Doubtful	3a ₁	3b ₁	1d ₁ 1d ₂ 3d ₁	3c ₁
Unacceptable				1c ₁

Table 1. Degree of Acceptability of Possible Clause Sequences

Out of the 24 sentences in the sample, 14, or almost 60%, have been marked down as doubtful. Out of the ten normal sentences, four have the structure *When S₁, S₂* and

four — S_2 *when* S_1 . The main difference between the syntactically similar S_1 and S_2 in our sample is that while in S_1 the verb is in the simple form in all the examples, in S_2 it varies from simple to progressive to perfect. Note that most of the doubtful sequences in Table 1 (more than 71%) are the sequences where S_2 is pre-posed by *when*. Obviously, there are some constraints on the combinability of *when* with a clause imposed by the aspect form of the verb used in the clause. And of course, the question is, “What is going on here?”

As the data show, the constraints seem to depend on the interplay of the following factors:

- (i) the order in which the clauses are combined ($S_1 S_2$ or $S_2 S_1$),
- (ii) the relative position of *when* (*when* S_1 or *when* S_2),
- (iii) the aspect form of the verb used in each clause,
- (iv) the presence/absence of the verb complement in a clause.

2.1 Clause Combining and the Position of When

Traditionally, the term *sentence* refers to an utterance or written sequence of words which is regarded as capable of standing alone to express a coherent thought (Trask, 1993). In our case, it means that the syntactic structure of the type *When S, S* should express a coherent thought to qualify as a sentence. However, as our sample shows, not all possible sequences with this structure possess the necessary degree of coherence. For some reason, certain sequences are felt by native speakers to be less acceptable than others.

If we look at the propositional content of the two clauses S_1 and S_2 (*John came home* and *Ann cooked dinner*), there doesn't seem to be anything there to tie one to the other in terms of inherent semantic properties accounting for the coherence of thought expressed by the complex sentence as a grammatical unit. A sequence of two simple sentences such as *John came home. Ann cooked dinner* would iconically reflect the sequence of respective events as they took place from the point of view of an observer who happened to be there at the time and now, as a speaker, is sharing his knowledge with

others. Whether Ann cooked dinner *because* John came home, or it was just a coincidence, remains an open question as long as there is no indication to contextual parameters (background knowledge) necessary for the adequate interpretation of the relationship between the two events. In the same manner, a sequence such as *Ann cooked dinner. John came home* could be interpreted either causally as ‘John came home because Ann cooked dinner’, or simply iconically as two unrelated events occurring successively. To show that a certain relationship really exists, conjunctions are used to specify this relation either as subordinate or coordinate (or hypotactic and paratactic — we are not concerned with the terminological issue here).

Thus, with an addition of *when*, the clause *John came home* becomes subordinate to *Ann cooked dinner* in (Ia₂), and vice versa in (Ib₂). This subordinate relation means that in the first case John’s coming home is perceived as less relevant than Ann’s cooking dinner, while in the second case it is the other way around. But what, then, is the difference between (Ia₂) and (Ib₂) in terms of their informative value? If both possess the same degree of iconicity reflecting the perceptual processing of information flow, how can the different clausal order be explained? This is the first question we will attempt to answer by discussing the relevant data in Table 1. (It is necessary to note here that the explanation of the difference in clause sequencing in terms of manifestation of their *thematic status* (Halliday, 1967; Fries, 1983; Matthiessen & Thompson, 1988 *inter alia*) does not answer the question how a certain thematic status is assigned in the first place, so we are not going to probe into that area.)

2.2 Verbal Aspect and Complementation

Now, what kind of relationship exists between verbal aspect and complementation in, say, *S*₂ on the one hand, and the resulting acceptability of the complex sentence in relation to clause combining, on the other hand? Upon a closer look a certain pattern emerges.

If the verb has no complement in *S*₂, only two normal complex sentences are possible with the structure *When S*₁, *S*₂ and *S*₂ *when S*₁: (IIa₁) and (IIb₁). All the four interplaying factors considered, this can be put down only to the aspect form of the verb (the

progressive). As soon as the progressive is replaced by the simple or the perfect, the resulting complex sentence begins to lack coherence necessary to view it as an acceptable structure for expressing thought (representing knowledge). However, if the verb is followed by a complement (*dinner* in our examples), the constraint on sentence acceptability for the structures *When S₁, S₂* and *S₂ when S₁* disappears.

Moreover, the progressive is the only form which, when used in *S₂* with a complement, yields acceptable complex sentences with the structure *S₁ when S₂* and *When S₂, S₁*. Both the sequences *When S₁, S₂* and *S₂ when S₁* are acceptable regardless of the kind of aspect used in *S₂* as long as the verb is followed by a complement. However, the sequences *When S₂, S₁* and *S₁ when S₂* yield only one acceptable sentence each, again with the progressive verb in *S₂*. So, the second question we will attempt to answer is, "What cognitive mechanisms are at work here?"

3. THE HYPOTHESIS AND DISCUSSION

The data presented above allow to suggest the following hypothesis:

Constraints on certain sequences in the complex sentence with an adverbial when- clause are the result of cognitive discordance between the indexical meaning of specific aspect forms of the verb and the conjunction when, on the one hand, and clause sequencing which iconically reflects the cognitive processing of perceptual data, on the other hand.

In keeping with the basic tenets of the theory of linguistic indication (Kravchenko, 1992), indexical phenomena in language (in the Peircean sense of the term) are related to the perceptual processing of information flow represented by linguistic structures on the morphological and syntactic levels. Counter to the tradition set by Russell (1963), the information processor is not always the speaker (cf. Russell's 'egocentric particulars'): although the speaker, by default, is always the observer at the same time, the reverse is not necessarily true, particularly, in written discourse (Kravchenko, 1993). In order to become a speaker one has to be an observer in the first place, so the primary point-of-

reference for indexical phenomena is the observer as an identifiable source of information.

Every time an indexical is used in discourse it is a signal that a certain quantum of information is tied to an identifiable source whose perceptual experiences are an inalienable part of the propositional content of the linguistic expression.

The examples from our sample contain three types of indexicals, the tense, the aspect, and the conjunction *when*. Since there is no tense variation affecting the interpretation of the sentence, this indexical is not considered here. As for the morphosyntactic category of aspect, within the framework of the Cognitive Theory of Tense and Aspect (CTTA) (Kravchenko, 1990; 1992; 1997) its cognitive content is related to the contrast between two basic concepts of events: verbal referents are categorized either as those identified empirically (through direct observation), or those identified on the basis of existing (background) knowledge. These concepts reflect the two modes of knowledge representation mentioned above, *phenomenological* and *structural*, which are based on cognitively different channels for data input. These different types of input may be pragmatically interpreted as “observer’s competence/knowledge” and “speaker’s competence/knowledge”.

In the course of using language, we speak either about what we perceive or about what we just know. In the first case, the source of information about the verbal referent is definite because the observer may be identified. In the second case, no immediate identification is possible, so the source of information about the event is indefinite. The grammatical meaning of aspect is thus defined as “indication to the source of information about the event” which can be definite (based on observation), or indefinite (based on the speaker's knowledge whose source is not specified). So, the category of aspect falls within a wide range of linguistic means of expressing *evidentiality* found across different languages of the world (cf. Willett, 1988).

The definite aspect forms are represented by the progressive and the perfect. The progressive verb (that is, *the present participle* with a copula) is used to describe an observed situation in which the referent of the verb *is before the senses* (which is the literal meaning of the Lat. *praesens*, see Kravchenko, 2002c), while the perfect verb (*the past*

participle with a copula) is used to describe an observed situation in which the referent of the verb is *past the senses*. In other words, in the case of the progressive it is the process itself unfolding before the observer's eyes (we speak about what we see actually happening), whereas in the case of the perfect it is only some sign(s) telling the observer that a certain process must have taken place (we speak about something we see and compare with what we saw some time before to make an inference). When the two categorial situations underlying the grammatical meaning of the progressive and the perfect overlap, the perfect progressive is used which is, basically, a combination of the two, both in form and meaning.

The lexical item *when* in traditional functionally oriented grammars (Quirk et al. 1973; Leech & Svartvik 1975; Givón 1993) is assigned different roles and defined either as an adverb (*When will he leave?*), subordinating conjunction (see our sample), or relative pronoun (*Since when has this been going on?*). However, functional-syntactic differences aside, one cannot rid oneself of the feeling that in all the three cases there is some basic sameness in meaning in the sense that there is one core concept (cognitive structure) underlying the meaning of *when* regardless of its syntactic function .

Following the tenet of the bio-cognitive philosophy of language about the experiential nature of meaning (Kravchenko, 2002b; 2003), and in view of the fact that *when* is traced etymologically to the Gothic accusative of *who* (Skeat, 1956) and thus belongs to the pronominal class (interrogative pronoun), we claim that its meaning can be understood only in the context of its *indexical properties*, that is, *its role in identifying the source of information* that constitutes the propositional content of the complex sentence it is a part of.

By pre-posing *when* to a clause, the speaker indicates that at least part of the information contained in the sentence has an identifiable source. But who is this source, John, Ann, or the speaker/writer? Actually, the question "Whose point of view is reflected in the sentence?" was also in the questionnaire used to obtain the data; interestingly, almost all the respondents said it was the speaker's in all the sentences. However, were it really so, and were the speaker (or the so-called 'moment of speech') the point-of-reference of indexical temporal expressions as claimed by traditional grammar (Jespersen

1929; Hudleston 1984; Bache 1985), why would the very same respondents mark certain sentences as doubtful? Obviously, the speaker is not always at liberty to choose any of the possible linguistic structures for expressing a particular thought in a coherent way. This coherence depends on the interplay of the four factors mentioned in Section 2. Specifically, there seems to be a certain dependency of the sentence acceptability on the relative position of *when* with respect to the aspect forms of the verb used in the clauses. Let us compare structurally similar sentences from the three sample groups.

In Set II, (a₁), (a₂), (b₁), (b₂), (c₂) and (d₂) have been all checked as normal as if it really did not matter which clause with what verbal aspect in it in what sequence was pre-posed with *when*. But the picture changes as soon as the progressive form of the verb in *S*₂ is changed either to the simple as in Set I, or the perfect as in Set III. Sentences (a₁) and (b₁) from Set II become doubtful in Set I and highly doubtful in Set III; sentence (IIc₂) becomes doubtful as (Ic₂) and (IIIc₂), and sentence (IID₂) becomes doubtful as (IID₂) and highly doubtful as (ID₂). Moreover, sentences marked as doubtful change their degree of acceptability: (IID₁) from doubtful becomes highly doubtful both as (IIId₁) and (ID₁), and (IIc₁) from doubtful becomes highly doubtful as (IIIc₁) and unacceptable as (Ic₁). How can this phenomenon be explained?

If the two propositions expressed by *S*₁ and *S*₂ are combined in one sentence of the type *When S*₁, *S*₂ to form a coherent thought, there must be something that allows to do so. According to our hypothesis, and taking into account sentence iconicity, it is indication that the information contained in the main clause is the result of the processing of perceptual data by an experiencer identified in the subordinate clause. Literally, the meaning of (IIa₁) could be described as follows: ‘When John came home, this is what he saw’ (i. e. ‘he saw Ann cooking’). The progressive in *S*₂ indicates that the event ‘Ann’s cooking’ is described as observed by someone, and *when* indicates that the observer is John. This iconic property of the sequence *When S*₁, *S*₂ probably accounts for the fact that the alternative sequence *S*₂ *when S*₁ is believed to be less frequent. However, it is not so infrequent in written discourse, where it serves, presumably, a specific grounding purpose: by placing the main clause with the progressive verb before the *when*-clause as in (IIb₁) and (IIb₂), the speaker/writer indicates that the source of information about the

event ‘Ann’s cooking’ is Ann herself (the situation described in the first clause is viewed as if from Ann’s perspective), while in the second clause the observer is still John. This results in a double cognitive perspective on the complex situation as a whole and falls within the scope of stylistic phenomena of *personification*.

Now, why in Set II both (a₁) and (a₂) have been marked as normal, and in Sets I and III the absence of the complement in *S*₂ results in anomalousness? The difference between (IIa₁) and (IIa₂) is only in the degree of informativeness of *S*₂: in the former, John sees enough to identify Ann’s activity as cooking, but he cannot tell what it is that Ann is cooking; in the latter, he evidently sees enough to infer that it is dinner being cooked. The perfect in (IIIa₁) and (IIIa₂) indicates that John sees something and compares it with a previous state of affairs: seeing dinner ready and waiting, he naturally infers that it has been cooked by Ann (example (IIIa₂)), while in (IIIa₁) it is indicated that John sees something as a result of Ann’s cooking but what it is that he sees is left unspecified, creating a semantic lacuna.

A similar semantic gap is found in (Ia₁). If we compare (Ia₂) and (IIa₂), we will see that because of the different aspects used in *S*₂ in these examples its informative value differs: *Ann was cooking dinner* represents phenomenological knowledge, it describes the situation as ‘here-and-now’, that is, at the time of John’s observation, so there is no causal relationship between the two propositions. By contrast, *Ann cooked dinner* represents structural knowledge, it describes the situation as a structural part of the world known to the speaker as a result of *accumulated experience* of similar situations, and a functional structure is characterized by *causal* relationships of its components, so in (Ia₂) the proposition in *S*₁ stands in a causal relationship to the proposition in *S*₂ yielding the following meaning: ‘Ann cooked dinner *every time* John came home so he could eat’. The omission of the complement in (Ia₁) creates a slight semantic anomaly *because* of the causal relationship between the two parts, as in the absence of the complement it is not quite clear *why* Ann should start cooking at all every time John came home.

Sentences (IIc₁) and (IId₁) are perceived as anomalous for the simple reason that by pre-posing *S*₂ with *when* the speaker indicates that Ann is the observer of the event ‘Ann’s cooking’, yet the absence of the complement creates a similar semantic lacuna

which is also obvious in (IIIc₁) and (IIIId₁) when compared with (IIIc₂) and (IIIId₂) as to the degree of acceptability. At the same time, all the (c) and (d) sequences in Sets I and III have been marked as anomalous. According to our hypothesis, in sequence (d) *when* identifies Ann as the observer of the event ‘John’s coming home’, while the indefinite aspect of the verb used in *S₁* indicates that the information about this event is part of the speaker’s background knowledge obtained in an unspecified manner (the speaker knows for a fact that John came home, but the source of this knowledge is unspecified). Thus, the specific relative positioning of the two indexicals in the complex sentence of the type *When S₂, S₁* results in *cognitive discord* with sentence iconicity inasmuch as the identification of the perceptual processor of the information flow is involved. Consequently, there is no sufficient *cognitive link* between the two clauses that would allow to view the whole sentence as a linguistic structure representing a quantum of knowledge (a complete thought) in a coherent way.

5. CONCLUSION

As we have tried to show, the cognitive value of different acceptable sequences of clauses in a complex sentence of the type *When S, S* may be assessed from the point of view of the relationship between their indexical and iconic properties. The suggested hypothesis may provide a useful tool for the analysis of sentential and, by extension, discourse grammar by making recourse to the concept of *cognitive processor* of the information flow iconically represented by the syntactic structure of the sentence. We have argued that the order of clause combining is influenced, on the one hand, by the interplay of such cognitive factors as the speaker and the observer identified as possible sources of information (knowledge) about the described events and, on the other hand, by the indexical meaning of the pronominal *when* and the markedness of definite aspect verbs for event observability.

The discussion of rather specific data about one particular type of complex sentence offered in this paper is by no means exhaustive and does not allow at this point to make broader generalizations encompassing other types of sentences. However, we be-

lieve that such generalizations may, in fact, be quite possible — but of course, only continued research into the matter may show if our assumptions are valid.

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