# More Thoughts on the Semantic Representation in RRG:
## Event Types and the Semantics of Clause Linkage

**Toshio Ohori**
**University of Tokyo**

## 1. Introduction

Since Foley and Van Valin (1984), lots of advances have been made in RRG, especially in the realm of clause-internal syntax. Recently, some interesting proposals have been made regarding the typology of complex sentences, some of which are incorporated in Van Valin (to appear). In this paper, I wish to give some more thoughts on the semantic aspect of the interclausal relations hierarchy [henceforth IRH], elaborating on Ohori (2000, 2001). The presentation will be largely programmatic, and a detailed application of the theory is expected to be furnished in the future.

The overall line of argument in this paper is this: The semantics of clause linkage can be more systematically captured by referring to the structure of the event which a linkage construction purports to encode. In section 2, I will comment on the problems of previous approaches inside and outside RRG. In section 3, I will explore some possibilities of systematizing the interclausal semantic relations adopting a decompositional approach. Examples will be mainly drawn from English for ease of understanding, although the model is intended for typological application. Section 4 will be devoted to the discussion of the role of the IRH and how it interacts with the notion of grammatical constructions in typological investigation. Section 5 will be a summary.

## 2. Problems of previous approaches
### 2.1 The classical IRH re-examined

In RRG, the interclausal semantic relations are given in the form of an ordered list, arranged according to the tightness of linkage. The semantic hierarchy corresponds to the structural hierarchy of clause linkage, which constitutes the other half of the IRH. (1) is taken from Van Valin and LaPolla (1997: 480) [henceforth VVL].

(1)       Causative
          Aspectual
          Psych-action
          Purposive
          Jussive

> Direct perception
> Propositional attitude
> Cognition
> Indirect discourse
> Conditional
> Simultaneous states of affairs
> Sequential states of affairs
> Unspecified temporal order

Foley and Van Valin (1984: 270) also list "modality" and "temporal adverbial clause", and divide the "sequential states of affairs" (which is labeled "sequential actions") into overlapping and non-overlapping classes, which is not done in VVL. Going back even further, Silverstein (1993: 481; originally written in 1980) proposes a list of "logical relations of clauses", in which he gives such relations as "possessive", "habitual actor", "habitual agent", and "relative clause (making definite reference)" on the upper part of the hierarchy. If I understand correctly, these relations are all concerned with the nominal structure. Particularly, the first three should be considered as labels for nominal units, rather than as those for the relations between linked units. For example, (2) may serve as an example of "habitual actor", but this label applies to the semantic structure of the gerundive subject *exercising everyday*, not to the clause linkage relation as such.

(2)      *Excercising everyday is good for health.*

Silverstein also lists the relations "disjunction" and "conjunction" on the lower part of the hierarchy, which seem to correspond to "simultaneous states of affairs" in (1).

Now the semantic relations posited as part of the IRH have several problems. However, it should be made explicit at the outset that significant improvements are made in Van Valin (to appear), and that most of the points raised in this section are in a sense an attempt to elucidate the motivations that lie behind the latest advances in RRG. The main problems with the classical IRH are as follows.

(i) Some commonly recognized semantic relations are missing in (1). For example, where would such relations as "reason" and "manner" be located? If we look at the attempts to define interclausal semantic relations in other frameworks, we may find dozens of labels for capturing different aspects of the semantics of clause linkage. It is left to us to consider where on the IRH the relations not given in (1) would be located.

(ii) As a consequence, there is a question of how many semantic relations

one should posit. A dozen? A hundred, as some natural language processing models have proposed? Or even a thousand, reflecting the subtleties of our cognitive processing?

(iii) It is often very difficult to distinguish the contribution of semantic information from that of pragmatic information. Could we systematically factor out the contribution of these types of information? The interpretation of conditionals is one such example. Another problematic case would be the treatment of concessives, not listed in (1). Further, how might we like to handle concessive conditionals (signaled by *even if* in English) in relation to conditionals and concessives?

(iv) There is no established way to assign semantic interpretation to individual structures. On which basis could we assign semantic relation to a given structure? Possible sources of information include, but are not limited to, verb semantics, the meaning of conjunctive morphemes, and the linear order of clauses.

These problems become obvious when we encounter clause linkage constructions which carry no overt signal of a semantic relation. The English *to*-infinitives are one such example. Participial-like constructions in clause-chaining languages are likewise problematic, as the following Japanese examples illustrate (for an earlier attempt to formulate an algorithm for identifying semantic relations in *te*-linkage, see Hasegawa 1996).

(4)     *Aruite gakkoo-ni itta.*
         walk.TE school-DAT go.PAST
         '(X) walked to school' or '(X) went to school by walking.' (manner)
(5)     *Atama-ga itakute ie-ni ita.*
         head-NOM ache.TE home-DAT stay.PAST
         'Since (X) had a headache, (s/he) stayed at home.' (reason)
(6)     *Reezooko-o akete gyuunyuu-o tori-dasita.*
         fridge-ACC open.TE milk-ACC take-move.out.PAST
         '(X) opened the fridge and took out (a pack of) milk.' (sequence)
(7)     *Hontoo-no koto-o wakatteite uso-o tsuita.*
         true-GEN thing-ACC know.STAT.TE lie-ACC tell.PAST
         'While knowing the truth, (X) told a lie.' (concessive)
(8)     *Asa-wa sanpo-o shite, yoru-wa jimu-ni kayou.*
         morning-TOP walk-ACC do.TE evening-TOP gym-DAT go
         '(X) takes a walk in the morning, and goes to the gym in the evening.'
(juxtaposition)

Whereas the English translations of (4)-(8) contain conjunctions which make clear the

semantic relations of the linkage, the original sentences contain no formal indication of semantic relations as such. In this sense, clause-chaining constructions provide a very interesting testing ground for the theory of IRH.

2.2 Other approaches

Outside RRG, no other model of grammar has paid serious attention to interclausal semantic relations, partly because their main interest has been clause-internal syntax. Even when complex constructions are in focus, semantics does not play a significant role in accounting for their morpho-syntactic properties. For example, the selection of complement type is usually handled by appealing to lexical subcategorization which by itself is not semantic in nature.

The attempts to characterize interclausal semantic relations have been mainly carried out by those working either on language processing (Hobbs 1979; Grosz and Sidner 1986) or on the rhetorical structure of the text (Longacre 1983; Mann and Thompson 1986) under the name "coherence relations" (for a reasonable synthesis, see Knott and Sanders 1998).

To take one example, the framework of Rhetorical Structure Theory (known as RST) proposed by Mann and Thompson (1986, 1988) include the following relations for describing the structure of discourse:

(9)     solutionhood
        evidence
        justification
        motivation
        reason
        sequence
        enablement
        elaboration          etc.

These relations certainly capture some important aspects of interclausal relations, and in some way they are more fine-grained than the semantic categories posited in the IRH.

At the same time, there are two remarks to be made with the listing of this sort. Of course, models other than RRG are not primarily concerned with grammatical structure, and thus my criticisms should be taken with caution. The first point is that the mutual relations among the semantic categories are not obvious. Mann and Thompson (1988: 250) group the relations they propose under a small number of headings (e.g. "cause" is subdivided into "volitional cause",

"non-volitional cause", "volitional result", "non-volitional result", and "purpose"), but they are not concerned with formulating the relative tightness of linkage. From a grammarian's viewpoint, what is in need is a hierarchically arranged semantic categories which would correlate with structural categories.

The second point to be made about the rhetorical structure approach is that it is designed to capture the interactional aspect of discourse organization, and consequently the gap between the list like (9) and the semantic relations in the IRH is much bigger than it at first looks. For example, "reason" in (9) may apply either to the conceptual relation that holds between the events depicted by the sentence or to the writer/speaker's act of justifying a certain statement in the discourse context. This distinction may be obscured under certain circumstances, but relations such as "solutionhood", "evidence", and "elaboration" are obviously more interactionally oriented. In this sense, the pertinence of the rhetorical structure approach to the present concern, i.e. the semantically motivated explanation of the morpho-syntax of complex constructions, is somewhat restricted.

Another thread of works on interclausal semantic relations, namely those having AI-like orientations, are not immune to the problems of (i)-(iv) either. But they often contain interesting ideas, and one idea that is relevant here is the system of semantic network developed by Beaugrande and Dressler (1981). In their framework, all sorts of semantic structure are described in terms of an extensive set of coherence relations, regardless of the type and size of linguistic unit encoding them. I will discuss this point further in the next section.

## 3. Event structure and interclausal semantic relations
3.1 The outline

Now the strategy I will take is to analyze interclausal semantic relations by extending the method proposed for another realm of grammar where the problems of (i)-(iv) are also encountered, namely the characterization of thematic roles. Ever since Fillmore (1968), the need to posit thematic roles has been obvious, but the questions of "how many" and "how to tell" have remained unanswered in many theories. Likewise, the semantics-pragmatics distinction has also remained a troublesome issue, as typically observed in the interpretation of volitionality (e.g. *I spilled coffee* with or without volitionality).

The extention of the categories proposed for the description of lexical meanings to that of interclausal semantic relations looks promising on several grounds. For example, it has been demonstrated in the AI-oriented approach to coherence relations that causality may manifest itself sublexically (as in causative accomplishment verbs such as *break*), subclausally (as in the resultative construction *I*

*wiped the table clean*), or interclausally (as in the form of adverbial subordination *Since I had a headache, I stayed home* as well as in the form of coordination *He worked too hard and it drove him crazy*). Cross-linguistically too, it is often found that case markers are also used as clause linkage markers (e.g. ablative for reason, comitative for circumstantial, allative for purpose, etc.), suggesting an inherent parallel between the clause structure and the complex structure (Genetti 1986; Ohori 1995). Further, when it comes to complementation, the lexical meaning of the complement taking predicate directly determines the semantic relation between the main clause and the complement clause.

When extending the theory of thematic roles to the analysis of interclausal relations, RRG is in an advantageous position, because it offers a systematic and motivated way to characterize thematic roles. Namely, RRG solves the problem of how to define thematic roles by adopting lexical decomposition and identifying thematic roles as corresponding to the slots in that decomposed representation. Hence my proposal is to extend the schema-based decompositional approach to the characterization of interclausal semantic relations, with modifications when necessary.

## 3.2 Primitive events and elaboration

The first type of semantic relations to be analyzed include "causative" and "aspectual" in (1). Here I define "primitive event" as either a state or an activity. They are both unbounded, i.e. non-terminative. The aspectual relation is defined straightforwardly as in (10):

(10) Aspectual

ASP p, where ASP is any aspectual operator and p is a primitive event.

In some cases the *ASP p* unit is simply lexicalized as a single verb while in others temporal contouring is carried out by some grammatical means such as derivational morphology or by the addition of an aspectual predicate (e.g. English *begin to*).

In addition, the directional meaning is handled in the same way as aspectual.

(11) Directional

DIR p, where DIR is any directional operator.

The encoding strategies include affixing (as in German *abfahren* 'depart (lit. from-go)'), particles (as in English *in, away, out*, etc.), and complex verbs (as in Japanese *tobi-dasu*

'jump out'). Very often directional meanings extend to aspecual meanings.

Next, the causative relation is defined as in (12):

(12) Causative

p1 CAUSE p2, where p1 is a null activity.

In some cases, the event *p1 CAUSE p2* may be realized in the form of a simple verb as in the English example (13) while in others it may be part of derivational morphology as in the Tepehua example (14) and, though less productively, in the Japanese example (15). Still in other cases, two predicates are combined to form a tightly integrated causative construction as in the French example (16).

(13)    a. *The glass broke.*
        b. *He broke the glass.*
(14)    a. *talakcahu-y* 'become closed'
        b. *ma:lakcahu-y* 'cause to close'
(15)    a. *shimaru* 'become closed'
        b. *shimeru* 'cause to close'
(16)    a. *manger* 'eat'
        b. *faire manger* 'cause to eat'

When p1 is non-null and p2 is an accomplishment predicate, we obtain the resultative relation.

Taken together, aspectual, directional, and causative relations all correspond to what Hasegawa (1996) called "operator constructions". These relations are handled by derivation in the lexicon in many languages.

3.3 Control and mental states

Primitive events or events after basic elaboration of the above sort can be combined to form a larger semantic complex. Here I would like to introduce the notion of anchoring. By anchoring is meant the process of locating a predicate (and by extension proposition) in a mental model having its own epistemic status, e.g. tense and mood (cf. Fauconnier 1985; Langacker 1987). Let us call an event complex with only a single anchoring predicate *unitary event*. An unitary event may, however, consist of multiple predicates, in which case only one of them is anchored. When this happens, the relation between the predicates is called *supportive relation*.

(17) Supportive relation

p1 SUPPORT p2=any relation between two predicates, where only p1 is an anchoring predicate.

The supportive relation can be subdivided into several categories. When p1 is a mental predicate and anchoring is its sole function, we have psych-action which is exemplified by *want* in English.

(18) Psych-action

p1 SUPPORT p2, where p1 is a mental predicate and supports p2 only by anchoring it in the epistemic world created by p1.

Alternatively, one may represent psych-action as *p1 SUPPORT[+dominate] p2*, where "dominate" means p1 completely dominates p2 in terms of mental space configuration.

When p1 is not specialized for anchoring and has a logical structure that involves elements other than mental disposition, i.e. the relation is SUPPORT[-dominate], and when the temporal extension of p2 is a subset of p1, the relation of manner or means holds between them.

(19) Manner/means

p1 SUPPORT p2, where p2 is an elaboration of the subpart of the causal structure of p1.

Let us use the notation [+elaborate] to represent this feature. Typically, p2 is a primitive event, i.e. unbounded. An example from Japanese is given.

(20)     *Naite ayamatta.*
         cry.TE apologize.PAST
         '(X) apologized in tears.'

A pure manner does not involve causality. Note that the act of crying does not cause apologizing. In contrast, with means causality is involved. Compare (20) with (21).

(21)     *Megane-o kakete yonda.*
         glasses-ACC wear.TE read.PAST
         '(X) read wearing glasses.'

Here, wearing glasses is still a sub-event of reading, but the former has a causative

(or more precisely enabling) relation to the latter.

In manner/means, the supportive relation between p1 and p2 is that of the containment of event extension, and the supporting event p1 has no causative or any other kind of conditioning relation to the sub-event p2. In contrast, we can conceive of supportive relations between the events that are more distinct. When p1 is a necessary condition for p2, the supportive relation is [+control] and when it is not, the relation is [-control]. A typical supportive relation with the feature [+control] is purposive, which is defined as follows.

(22) Purposive

p1 SUPPORT[+control] p2, where p1 is volitional; there is a causative relation p1 CAUSE p2 superimposed on it.

Thus in sentences like *I went out to buy some groceries*, going out is not only a necessary condition for buying some groceries but there is a causative relation between the two states of affairs. Here the supportive relation and causative relation have the same directionality unlike means. Note also that in the present case p1 is non-null unlike in the causative relation defined in (12).

Another variant of supportive relation is jussive. Unlike purposive, jussive is characterized by the semantic type of p1 and the presence of volitionality in p2.

(23) Jussive

p1 SUPPORT[+control] p2, where p1 is a speech act predicate and p2 is a volitional predicate; there is a causative relation p1 CAUS p2 superimposed on it.
(24)     *The Queen ordered the ministers to leave the hall.*

The last member of the supportive relation which has the feature [+control] is indirect causative.

(25) Indirect causative

p1 SUPPORT[+control] p2, where p1 is a null volitional activity and p2 is a volitional predicate; there is a causative relation p1 CAUS p2 superimposed on it.
(26)     *The Queen let the ministers leave the hall.*

In jussive and indirect causative, p2 has certain degree of autonomy, though it lacks the anchoring of its own.

Between unitary events and non-unitary events, which we shall turn to immediately, stands the relation of direct perception with the feature [-control].

(27) Direct perception

  p1 SUPPORT[-control] p2, where p1 is a perception predicate.

(28)  *The Queen saw the band play.*

Since direct perception projects the perceived contents in the subject's mind, there is only one fully anchored mental model in this event complex. However, the perceived event is taking place without the presence of the observer, so the control feature is negative for this relation. Unlike psych-action, p2 in direct perception may take place independently (i.e. (28) entails that the band did in fact play while *The Queen wanted to play the piano* does not necessarily entail that she did).

  Now we enter the realm of non-unitary events, i.e. event complexes whose constituent parts are propositional and can be separately anchored. All semantic relations in non-unitary events, which we shall call propositional relations, are [-control], i.e. the occurrence of one event does not constitute a necessary condition for another event. Non-unitary events can be put into two types. In the first type, the anchoring of one event is done from the vantage point of the other. That is, one event (which is a complement event) is anchored only by reference to another (which is a main event). This is labeled COMP and in the feature notation it is [+complement]. In addition, having only one autonomous anchoring predicate entails that there is no sequential order.

(29) Propositional complement

  p1 COMP p2, where p1 is fully anchored while p2's anchoring is relative to p1.

There are a lot of subtypes of complement relation. Van Valin (to appear) lists indirect perception, propositional attitude, cognition, and indirect discourse. Examples from English are given below in that order.

(30) Indirect perception

  *I see that John has gone home early.*

(31) Propositional attitude

  *Carl believes that UFOs are a menace to the earth.*

(32) Cognition

  *Aaron knows that the earth is round.*

(33) Indirect discourse

  *Frank said that his friends were corrupt.*

The differences between these relations largely derive from the meanings of the main events. So by giving a detailed specification to p1 in the formulation of (29) we can have various subtypes of complement relation. What matters at the moment is the fact that the temporal reference of complements (*has gone* in (30), *are* in (31), *is* in (32), and *were* in (33)) is determined in relation to the main predicates.

3.4 Linking of distinct events

The lower part of the IRH consists of semantic relations that hold within the non-unitary event complexes whose constituents are independently anchored. This class of relations is thus [-complement] and the linked events can have separate temporal reference.

(34) Propositional adjunct

p1 ADJUNCT p2, where p1 is fully anchored and p2 can also be fully anchored (though not always so).

Of the relations listed by Van Valin (to appear), citing English examples, circumstance, reason, conditional, concessive, and temporal belong to this category. At least in English, the independence of p2 is different from relation to relation. For example, conditionals involve what is called "backshifting" while reason does not.

(35)     *If he had helped me, I could have escaped trouble.*
(36)     *Because he helped me, I could escape the trouble.*

Unlike in the case of complement relations, the distinction among adjunct relations cannot be derived from lexical information. This is because in the former the complement event is part of the predication of the main event while this is not the case in the latter. In this sense, (29) and (34) can be modified in the following way.

(29') Propositional complement

p1 COMP p2, where p1 is fully anchored while p2's anchoring is relative to p1; the argument structure of p1 is not fully saturated without p2.

(34') Propositional adjunct

p1 ADJUNCT p2, where p1 is fully anchored and p2 can also be fully anchored (though not always so); the argument structure of p1 is fully saturated without p2.

In order to distinguish the subtypes of propositional adjuncts, I will introduce two more features, namely action coherence and temporal sequence. Action coherence is based on world knowledge, i.e. our understanding of conventional course of events. Since action coherence entails temporal sequence, there are only three possibilities. Here I give examples from Japanese.

(37) [+action coherence], [+temporal sequence]

*Hone-o otta-node sigoto-o yasunda.*

bone-ACC break-NODE work-ACC absent.PAST

'(X) broke a bone and so did not go to work.'

(38) [-action coherence], [+temporal sequence]

*Heya-ni hairu-to denwa-ga natta.*

room-DAT enter-TO telephone-NOM ring.PAST

'(X) entered the room and then the telphone rang.'

(39) [-action coherence], [-temporal sequence]

*Aki-ga kita-ga semi-ga naiteiru.*

autumn-NOM come.PAST-GA cicada-NOM screach.STAT

'Autumn has come, and yet the cicadas are screaching.'

As in the case of thematic roles, the labels for semantic relations are less important than their internal structure, but (37)-(39) may be labeled, in that order, fortuitous sequence, non-fortuitous sequence, and non-fortuitous juxtaposition. As I remarked in section 2.1, relations such as reason, conditional, concessive involve a lot of pragmatics, and so I consider it well-advised to take these relations as superimposable on the semantically defined schemata.

The semantic relations defined so far are listed below.

Figure 1. Summary of interclausal semantic relations
Operator elaboration
          Aspectual, Directional, Causative
Non-operator elaboration
          [+unitary]: Supportive relation
                    [+dominate]: Psych-action
                    [-dominate]
                              [+elaborate]: Manner/means
                              [-elaborate]
                                        [+control]: Purposive, Jussive, Indirect causative
                                        [-control]: Direct perception

[-unitary]: Propositional relation

    [+complement]: Indirect perception, Propositional attitude,
        Cognition, Indirect discourse

    [-complement]:

        [+action coherence, +temporal sequence]: Fortuitous
            sequence (e.g. Reason)

        [-action coherence, +temporal sequence]: Non-fortuitous
            sequence (e.g. Temporal)

        [-action coherence, -temporal sequence]: Non-fortuitous
            juxtaposition (e.g. Circumstance)

One interesting consequence of this feature-systemic decomposition is that it enables us to handle the relations that show up under different guises. For example, the causative relation can be superimposed on various relations so far defined.

(40)    *John broke the glass.* (Operator elaboration)

(41)    *John unlocked the key to enter the room.* (Purpose)

(42)    *John told the kids to be quiet.* (Jussive)

(43)    *John let the dog run out of the room.* (Indirect causative)

(44)    *John arranged everything perfectly so that the party will be a big success.* (Fortuitous sequence)

Likewise, temporal sequentiality and temporal overlap can be treated as secondary features superimposable on the relations defined above. This approach is harmonious with the intuition that sequentiality is qualitatively different in controlled purposive relation and uncontrolled non-fortuious sequence.

### 4. On the role of constructions

So far, we have tried to provide a systematic characterization of interclausal semantic relations making no reference to grammatical structure. The next step is to re-establish the correspondence between meaning and form in the IRH. Due to the space limit, I will take up only a small set of examples from Japanese. Let us review the examples of *te*-linkage given at the beginning.

(4)    **Aruite** *gakkoo-ni itta.*
    walk.TE school-DAT go.PAST
    '(X) walked to school' or '(X) went to school by walking.'

Here *aruite* is in participial form and its temporal extension is a sub-part of *itta*. Thus it is an instance of elaboration relation, which is means/manner. In (5), on the other hand, both p1 and p2 are states, so the relation is [-elaborate].

(5)    *Atama-ga **itakute** ie-ni ita.*
       head-NOM ache.TE home-DAT stay.PAST
       'Since (X) had a headache, (s/he) stayed at home.'

If pragmatic conditions allow a [+control] reading, it is an instance of proximate reason relation, which belongs to the same category as purposive, jussive, and indirect causative. Otherwise, (5) is an instance of non-fortuitous juxtaposition. Here we find a form-meaning mismatch in that the *te*-marked clause, while bearing no tense marker, can be separately anchored. An example that is unambiguously [-control], a pure reason clause, is (45).

(45)    *Atama-ga **itakatta-node** ie-ni ita.*
        head-NOM ache.PAST-NODE home-DAT stay.PAST
        'Since (X) had a headache, (s/he) stayed at home.'

Although the linkage marker *node* is used in this example as in (37), the relation is not fortuitous sequence as in the latter, due to the lack of action coherence.
       Regarding (6), again depending on pragmatic conditions, the semantic relation can be either manner or fortuitous sequence.

(6)    *Reezooko-o **akete** gyuunyuu-o tori-dasita.*
       fridge-ACC open.TE milk-ACC take-move.out.PAST
       '(X) opened the fridge and took out (a pack of) milk.'

Here too the form-meaning mismatch with *te*-form is observed. If we replace p2 with an activity predicate such as *nonda* 'drink.PAST', a manner/means reading ('(X) opened the fridge and drank milk without closing it') will be reinforced. If one wants to explicitly encode sequentiality, the ablative *kara* can be added to *te*.

(46)    *Reezooko-o **akete-kara** gyuunyuu-o tori-dasita.*
        fridge-ACC open.TE-KARA milk-ACC take-move.out.PAST
        '(X) opened the fridge and then took out (a pack of) milk.'

In (7) and (8), neither of which is a unitary event, the semantic relation is

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non-fortuitous juxtaposition.

(7)     *Hontoo-no koto-o **wakatteite** uso-o tsuita.*
        true-GEN thing-ACC know.STAT.TE lie-ACC tell.PAST
        'While knowing the truth, (X) told a lie.'

(8)     *Asa-wa sanpo-o **shite**, yoru-wa jimu-ni kayou.*
        morning-TOP walk-ACC do.TE evening-TOP gym-DAT go
        '(X) takes a walk in the morning, and goes to the gym in the evening.'

The only difference between these two examples is the background knowledge they assume and the pragmatic inferences based on such knowledge. Thus in (7), which contradicts our commonsense scenario of communication, a concessive reading is preferred and in (8), in which there is no such contradiction, we have a near-empty juxtsposition reading.

From a structural viewpoint, (4)-(6) are clearly core junctures. (4) is core cosubordination and (5) and (6) are core coordination (in (4) there is a dependence of aspect besides other operators). (7) and (8) are clausal cosubordination. The overall meaning-structure correspondence is shown below. The structural hierarchy is based on Van Valin (to appear).

Figure 2. The IRH correspondence

|  *Structural type* | *Semantic type* |
|---|---|
| | **Tightest integration** |
| Nuclear Cosubordination | Causative |
| Nuclear Subordination | Aspectual |
| | Directional |
| Nuclear Coordination | Psych-action |
| Core Cosubordination | Manner/means |
| | Purposive |
| Core Subordination | Proximate reason |
| Core Coordination | Jussive |
| | Indirect causative |
| Peripheral Subordination | Direct perception |
| Clausal Cosubordination | Indirect perception |
| Clausal Subordination | Propositional attitude, Cognition |
| Clausal Coordination | Indirect discourse |
| | Fortuitous sequence |
| Sentential Subordination | Non-fortuitous sequence |
| Sentential Coordination | Non-fortuitous juxtaposition |
| | **Weakest integration** |

As observed earlier, there are certain form-meaning mismatches depending on constructions. We already saw the problems with *te*-linkage in Japanese. The linkage by *to* as in (37) is another case. Because tense marking is suspended in this linkage (only *-ru* ending, which in the simple clause would be labeled "present", is allowed), (37) encoding a fortuitous sequence is clausal cosubordination. But some semantic relations on the upper part of the hierarchy, namely those having the feature [+complement], are typically encoded by clausal subordination. Compare (37) with (47), in which the subordinate clause is marked by a homophonous morpheme *-to*.

(47)     a. *Ashita-wa **kateru-to** omou.*
         tomorrow-TOP can.win-TO think
         '(I) think (X) can win tomorrow.'
         b. *Kinoo-wa **kateta-to** omou.*
         yesterday-TOP can.win.PAST-TO think
         '(I) think (X) could win yesterday.'

Then, what is the theoretical status of the IRH after all? Obviously it does not predict the form-meaning correspondence in all the clause linkage constructions found in the world's languages. Rather, IRH represents general constraints on the way natural language is structured: it narrows down the possible range of form-meaning correspondences and rejects unlikely ones. Language-specific constructions may deviate locally, but not globally. Let us look at one such case.

In Japanese, simultaneity can be encoded by the clause linkage particle *-nagara*. The *nagara*-construction may or may not involve concessivity.

(48)     *Ongaku-o **kiki-nagara** shigoto-o suru.*
         music-ACC listen-NAGARA work-ACC do
         '(X) works listening to the music.'
(49)     *Keehoo-ni **kizuki-nagara** shigoto-o suru.*
         alarm-DAT notice-NAGARA work-ACC do
         '(X) works while noticing the alarm.'

In both (48) and (49) simultaneity is observed. In the present framework, temporal overlapping and sequentiality can be superimposed on more than one semantic relation. In the present case, (48) is manner and (49) is non-fortuitous juxtaposition. The former is an unproblematic case, since the semantic relation of manner, which is

[+unitary] and [+elaborate], is encoded by core cosubordination. But (49) is a case of form-meaning mismatch, because its structural type is clausal cosubordination (note that *-nagara* suppresses any tense-modality marking), which is not highly fitting for the semantic relation of non-fortuitous juxtaposition compared with, for example, clausal coordination. However, the deviation turns out to be less dramatic when we examine other concomitant properties of the constructions more closely. For example, aspect marking on the *-nagara* clause is as predicted by the IRH. It is suppressed in (48) where manner is encoded by core cosubordination.

(50)　　*\*Ongaku-o **kiitei-nagara** shigoto-o suru.*
　　　　music-ACC listen.STAT-NAGARA work-ACC do

On the contrary, with the *-nagara* clause in (49), which is non-fortuitous juxtaposition encoded by clausal cosubordination, aspect marking is possible.

(51)　　*Keehoo-ni **kizuitei-nagara** shigoto-o suru.*
　　　　alarm-DAT notice.STAT-NAGARA work-ACC do
　　　　'(X) works while noticing the alarm.'

Further, when the negative imperative expression *-tewa ikenai* is attached to the main clause, there is a scope difference.

(52)　　*Ongaku-o **kiki-nagara** shigoto-o shi-tewa ikenai.*
　　　　music-ACC listen-NAGARA work-ACC do-NEG.IMP
　　　　'Don't work listening to the music.

(53)　　*Keehoo-ni **kizuki-nagara** shigoto-o shi-tewa ikenai*
　　　　alarm-DAT notice-NAGARA work-ACC do-NEG.IMP
　　　　'Don't work while noticing the alarm.'

In (52), both linked units are within the scope of the negative imperative marker, while in (53) the *-nagara*-clause falls out of its scope. In this way, even when a clause linkage construction deviates from the general prediction of IRH, other accompanying features of the construction in question normally conform to the constraints on form-meaning correspondence.

　　　　At this point, I wish to introduce the notion of *meta-construction* as a bridge between typological and language-specific studies. One shortcoming of recent construction-based approach (e.g. Fillmore et al. 1988; Goldberg 1995; Michaelis and Lambrecht 1996) is that it may not be carried over to typological studies

straightforwardly. Constructions, like words, are by definition language-specific, and cannot be directly compared cross-linguistically. In this sense, there is a strong need for conceptual sophistication. Croft (2001) attempts to solve this problem by providing fine-grained semantics and locating language-specific constructions in a multi-dimensional semantic space, but he seems to consider the cross-linguistic notion of construction as merely conventional.

The present RRG-based framework, while acknowledging the importance of fine-grained semantics and language-specific details of constructions, takes the position that significant typological generalizations can be obtained by positing language-independent meta-constructions and examining their properties and mutual relations. Of course, such entities are not created out of the blue, but are empirical generalizations based on known languages and can be modified when demanded by new data. In Ohori (to appear), I explored the possibility of applying the construction-based model of grammar for typological research. That time, I proposed that language-independent schematic constructions get instantiated by incorporating the information specific to individual languages, and that the general properties of such schematic constructions put constraints on the form-meaning correspondence cross-linguistically. But now it seems more appropriate to reserve the term construction for form-meaning pairs in individual languages and to introduce the term meta-construction to denote more schematic form-meaning pairs abstracted from different languages. Thus the meta-construction NUCLEAR COSUBORDINATION is paired with the meaning ASPECTUAL and may be realized by various language-specific constructions, for example by the Japanese aspectual operator constructions *V.te-V[+aspectual]* and *V.INF-V[+aspectual]*.

An interesting point that is worth mentioning in this connection is that in individual languages, the grammatical construction has the effect of coercion, i.e. the information contained in the lexical item or sub-construction occurring in a particular construction may be partially overriden by the information superimposed by the host construction. Conversely, the information contained in a meta-construction has no coercion effect and can be overriden by that of the language-specific constructions. This is understandable because meta-constructions are post-hoc generalizations and only represent constraints on the default situation in language.

Finally, I wish to comment on the advantage of the functionalist conception of human language, which RRG fully adopts, in light of the role meta-constructions play. It is a commonplace understanding among linguists that UG is a set of specifications for a "possible human language" and that the noblest goal of the discipline is the discovery of such specifications.

The functionalist commitment to establishing semantic/pragmatic motivations for linguistic forms can be seen as a promising way to lay out the specifications for UG. That is, meta-constructions constitute constraints on possible form-meaning correspondences and in this sense they characterize a possible human language more narrowly than the theories which only focuses on form. If a more constrained theory is a better theory, the functionalist conception of grammar is clearly superior to its autonomist counterpart.

Take, for example, the basic conception of phrase structure. Many autonomist theories adopt binary branching, but it is merely an arbitrary, theory-internal decision. If a Martian linguist lands on our planet and asks why, all we (or *they*) can say is "That's the way we like it to be." But if the same alien linguist asks why the phrase structure of RRG is laid out that way, the answer is a motivated one, namely "The phrase structure is constrained by the predicational structure it serves to encode." Thus the layered structure of the clause is a more constrained theory than the unmotivated binary branching and therefore can be a better candidate for UG.

Advocates of the functionalist conception of language have somewhat avoided comparing their models with the autonomist ones. What I tried to show above is that, paradoxically, the functionalist theory is preferable even against the desiderata of UG as originally defined by the autonomist theory.

**5. Final remarks**

In this paper, I have re-examined the representation of the interclausal semantic relations in RRG and proposed a revised model of IRH based on event decomposition. In this model, the relative tightness of linkage is more systematically captured by the feature system. Then I gave thoughts to the role of constructions in typological research and introduced the notion of meta-constructions. They are abbreviatory formulations of the form-meaning correspondence across languages and can thus be seen as putting constraints on the specifications for a possible human language. A more detailed cross-linguistic exploration of IRH is expected to be done in the future.

**Glossing conventions**

Clause linkage forms are not translated in the gloss but given in capitals, e.g. *-te* is glossed TE. Verbal morphology was not analyzed in detail. Abbreviations are as follows:

ACC     accusative
ASP     aspectual

| | |
|---|---|
| CAUS | causative |
| COMP | complement |
| DAT | dative |
| DIR | directional |
| GEN | genitive |
| IMP | imperative |
| NEG | negative |
| NOM | nominative |
| STAT | stative |
| TOP | topic |

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