Information Structure, Phrase Structure, and Their Interface

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1 Introduction

In this paper, I will examine several informationally triggered syntactic constructions and propose an interface approach between i-s (information structure) and c-s (constituent structure). In the first part of the paper, I will introduce a model of information-structure developed in Choi (1996), which is based on two crossclassifying discourse features 'newness' and 'prominence', called [New] and [Prom] respectively. In the second part, I will discuss and give an account of several types of syntactic realizations of information-structure in English, Catalan, and German.

2 Information Structure

2.1 Binomial Partition

Information structure is a level of representation which reflects the discourse-contextual or discourse-functional information of the sentence (Vallduví 1992, Lambrecht 1994). As displayed in (1), which is Vallduví's (1993) summary of the field survey, binomial partitions have been a prevailing approach in this area of research: theme–rheme; topic–comment; oldinfo–newinfo; given–new; categorical–thetic; topic-focus; focus–presupposition/open proposition; categorical–thetic. See Vallduví (1993) for references.

(1) Vallduví (1993)
   a. **Theme–Rheme**: Ammann 1928; Daneš 1968; Firbas 1964, 1971, 1975; Halliday 1967, 1985; Contreras 1976
   b. **Topic–Comment**: Mathesius 1915; Hockett 1958; Strawson 1964; Gundel 1974, 1988; Dahl 1974; Li & Thompson 1976; Kuno 1980; Reinhart 1982; Davison 1984
   c. **Topic–Focus**: Sgall & Hajičová 1977–78; Hajičová 1984; von Stechow 1981
   d. **Focus–Presupposition/Focus–Open Proposition**: Akmajian 1970; Chomsky 1971; Jackendoff 1972; Dahl 1974; Rochemont 1978, 1986; Wilson & Sperber 1979; Williams 1981; Prince 1981, 1984, 1986; Selkirk 1984; Ward 1988; Lambrecht 1987, 1988
   e. **Oldinfo–Newinfo**: Välimaa-Blum 1988
   f. **Given–New**: Halliday 1967, 1985; Clark & Haviland 1977
   g. **Categorical/Thetic Judgments**: Kuroda 1972; Sasse 1987

For example, a sentence can be partitioned into 'ground' and 'focus' in such a context as in (2). *John* is the given or known part of the sentence and *drinks beer* is the new or informative part.

(2) (Back)Ground–Focus
   a. What about John? What does he do?
   b. [$_G$ John] [$_F$ drinks BEER].

The same sentence can also be partitioned into 'topic' and 'comment' as shown in (3). In this case, *John* is what the sentence is 'about', and the remaining part is a comment to that topic.

(3) Topic–Comment
a. What about John? What does he do?
b. [$_T$ John] [$_C$ drinks BEER].

In this type of context, ground can be equated to topic, and focus to comment. However, this is not always the case. Some contexts call upon a finer-grained partition. We will see this in the next subsection.

2.2 Trinomial Partition

Let's look at the following question-answer pair. This is a context where a binomial partition does not work.

(4) Dahl (1974)
a. What about John? What does he drink?
b. John drinks BEER.

In terms of the ground-focus partition, the sentence is divided into *John drinks* and *beer*. However, in terms of the topic-comment partition, this sentence is divided into *John* and *drinks beer*.

(5) a. [$_G$ John drinks] [$_F$ BEER].
b. [$_T$ John] [$_C$ drinks BEER].

To solve this bracketing problem, Vallduví (1992) proposes a trinomial partition of information structure as given in (6).

(6) Vallduví (1992)
S={focus, ground}
ground={link, tail}

He divides a sentence into ground and focus too, but ground is further divided into link and tail in addition. I will equate link with topic for the purposes of this paper although link may be different from the traditional notion of topic as it is defined more toward the goal of efficient information storage in the hearer's knowledge-store in Vallduví (1992). This trinomial partition captures the fact that each of the three elements of the sentence in (4b) has a distinct informational import, especially that *drinks* is distinct from the topic *John* although both are given information.

(7) [$_G$ [$_L$ John] [$_{Tl}$ drinks]] [$_F$ BEER].

This trinomial information structure is crucial in explaining the detachment pattern in Catalan. According to Vallduví (1992), all non-focal elements should be out of IP, and interestingly, the tail is detached rightward as shown in (8b) while the topic is detached leftward as shown in (8c). He argues that only the focal part of the sentence remains in situ, i.e., in IP, in Catalan.

(8) Vallduví (1992:93)
a. [$_F$ Parará la taula la COIA].
b. [$_F$ Parará la TAULA], la Coia.
c. La Coia [$_F$ Parará la TAULA].
'Coia will set the table.'

Without the distinction of link and tail, it would be difficult to explain the informational differences between (8b) and (8c).

2.3 Information Structure with Crossclassifying Features

2.3.1 Completive Focus and Contrastive Focus

Choi (1996) argued for a further distinction in the focus domain in addition to the ground domain in Vallduví's. The main argument comes from the fact that some focal elements behave differently from other focal elements just as link behaves differently from tail, e.g., in the Catalan detachment case.

One such case is found in German scrambling. See examples (9) and (10). (9) illustrates a focus constraint which applies generally in German scrambling: that is, a focal phrase cannot scramble while a non-focal phrase can. (9b') is ruled out because the focus phrase *das Geld* is scrambled.

(9) Lenerz (1977:43)
a. Was hast du dem Kassierer gegeben?
what have you the cashier given
'What did you give the cashier?'

b. Ich habe dem Kassierer [$_F$ das GELD] gegeben.
I have the cashier the money given
'I gave the cashier the money.'

b'. ?*Ich habe [$_F$ das GELD] dem Kassierer gegeben.
I have the money the cashier given
'I gave the money to the cashier.'

However, this focus constraint does not hold any more if the scrambled phrase is contrastively focused.

(10) Moltmann (1990:15)
weil Hans [$_F$ das BUCH] dem Mann gegeben hat
because Hans the book the man given has

(nicht die ZEITUNG)
not the newspaper
'because Hans gave the book to the man, not the newspaper'

So (10) is acceptable even though the focused phrase *das Buch* is scrambled because it is contrastively focused here. In other words, a regularly focused phrase cannot scramble whereas a contrastively focused phrase can.

Another example is the English 'topicalization' or 'focus fronting' case. It is often noted that a focus phrase in situ is not equivalent to a preposed focus phrase in its informational import. Ward (1988) argues that in (11) the fronted phrase actually refers to two discourse elements: one, a set or scale, and two, a specification of a value or an element in that set or scale. In (11), the set is the set of dog names, and the value is the extremely clichéd name *Fido*.

(11) Prince (1981:259)
  a. They named their dog FIDO.
  b. FIDO they named their dog.

Similarly, the set-value relation is evoked in the contrastive focus case in (10) too. Here the set is the set of 'readable' or 'givable' items which includes 'the book' and 'the newspaper' as alternatives. The type of focus in (10) or (11b), which I call 'contrastive focus', evokes a set of alternatives, and this set contextualizes the potential value and thus makes it feel less 'new' in a sense. Also, the existence of an alternative set makes the value more 'prominent': because the current value is compared with or opposed to potential alternatives, it receives more attention than when it alone is presented.

Dik et al. (1981) also distinguish contrastive focus from regular focus and list the kinds of contrastive focus as in (12).

(12) Dik et al. (1981)
  1a. Did Andrew buy chocolate or flour?
  1b. He bought CHOCOLATE. (selecting)

  2a. Since Andrew bought chocolate and flour, he can make a cake.
  2b. No, he only bought CHOCOLATE. (restricting)

  3a. Since Andrew bought chocolate, he will be happy.
  3b. Yes, but he also bought FLOUR, so he can make a cake. (expanding)

  4a. Andrew went to New Mexico.
  4b. No, he went to UTAH (not NEW MEXICO). (replacing)

  5. Andrew bought a STARSHIP, but Peter bought a PLANET. (parallel)

Not surprisingly, in all cases they listed, a set of alternatives is either presupposed or accommodated at the time of utterance. And the alternative set gives 'prominence' to the current value.

To summarize, I divide the focus domain in two, and following Dik et al. (1981), I call the regular, pure new information type of focus 'completive focus' and the alternative-set-evoking focus 'contrastive focus'. More importantly, I argue that the distinctive feature between these two types of focus is discourse 'prominence'.

2.3.2 Topic and Contrastive Focus

Now, returning to the ground domain again, i.e., topic and tail, we can see a similar distinctive feature involved here too: that is, topic is more prominent than tail. For example,

John is more prominent than *drinks* in (4b). Since the sentence is 'about' the topic phrase *John*, and not about the tail 'drinking', or about another potential topic *Mary* for example, topic can also be conceived of as 'contrastive' and thus 'prominent'. Then it leads to the conclusion that topic and contrastive focus share the same property. I argue this indeed is the case.

First, topic and contrastive focus can share the same phrase structural position. The so-called topicalization in English is an example. The topicalized or fronted phrase can either be interpreted as topic as shown in (13), or as contrastive focus as discussed earlier, repeated here as (14).

(13) Chafe (1976:49)
a. **John** saw the play yesterday.
b. **Yesterday** John saw the play.
c. **The play** John saw yesterday.

(14) Prince (1981:259)
FIDO they named their dog.

In other words, the sentence-initial position can encode both topicality and contrastive focality of a phrase. It is a 'prominence' position.

Also, topic and contrastive focus can share the same morphological marking. The so-called topic marker *nun* in Korean sometimes encode topicality as in (15b) or it can encode contrastive focality as in (16b).

(15) a. Swuni-**ka** Inho-lul mannassta.
Swuni-Nom Inho-Acc met
'Swuni met Inho.'

b. Swuni-**nun** Inho-lul mannassta.
Swuni-Top Inho-Acc met
'As for Swuni, she met Inho.'

(16) a. Swuni-ka Inho-**lul** mannassta.
Swuni-Nom Inho-Acc met
'Swuni met Inho.'

b. Swuni-ka Inho-**nun** mannassta.
Swuni-Nom Inho-Top met
'Swuni met Inho (but nobody else).'

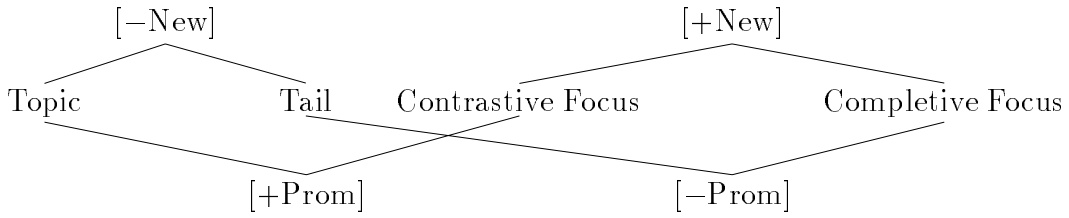
This *nun* marking is distinguishable from the regular case marking, e.g., nominative in (15a) and accusative in (16a), in that it always mark either topic or contrastive focus, but never tail or completive focus, while the regular case markers can mark tail and completive focus as well. In other words, *nun* is a 'prominence' marker.

2.3.3 [New] and [Prom]

To summarize the discussion so far, both ground and focus can further be divided with respect to prominence: topic is prominent old information and tail is nonprominent old information; contrastive focus is prominent new information and completive focus is nonprominent new information.

I will use the discourse feature [+/– New] and [+/– Prom] to represent newness and prominence respectively. Using these features, we can get the crossclassification among the four informational units as follows.

(17)



One of the advantages of this feature-based information structure is that it can crossrefer to more than one distinct informational type. For example, topic and tail can be grouped together as being [–New], as Vallduví does by calling them 'ground'. Also, we can crossrefer to topic and contrastive focus together as [+Prom] elements. This crossclassification is very useful in capturing the double function of the English topicalization or the Korean *nun* marking.

Going back to the example discussed earlier in section 2, each element can be marked with these feature as follows.

(18) a. What about John? What does he drink?
b. $[_{[-N]}\ [_{[+P]}$ **John**$]\ [_{[-P]}$ drink$]]\ [_{[+N,-P]}$ BEER$]$.

First of all, *beer* is marked [+New] since it is the focus, and the remaining part of the sentence is marked [–New]. Among the [–New], *John* is [+Prom] because it is the topic while *drinks* is [–Prom]. The focus *beer* is [–Prom] as well because it does not have the contrastive value in this context.

3 Syntactic Realizations of Information Structure

3.1 C-S/I-S Mismatch and Syntactic Flexibility

Having information structure established, now let's examine some informationally triggered syntactic constructions. I approach these constructions as a result of constituent-structure(c-s)/information-structure(i-s) interactions. I argue that these interactions are motivated by c-structure/i-structure mismatches. The mismatches arise because a c-structural configuration may not be equivalent to its i-structural configuration. That is, a c-structural constituent may not be an i-structural constituent; or a c-structurally most prominent phrase, e.g., subject in a c-commanding position, may not be the i-structurally most prominent element.

See (19) for example.

(19) a. What did you put in the top drawer?
b. I put the knife in the top drawer.

In the c-structural description, the subject *I* is one constituent and *put the knife in the top drawer* is another. However, in terms of i-structure, *the knife* is one thing, i.e., a focus ([+New]), and *I put in the top drawer* is another, [–New]. This is illustrated in (20).

(20) c-s: $[_{IP}$ I $[_{VP}$ put the knife in the top drawer]]
i-s: $[_{[+N]}$ the knife] $[_{[-N]}$ I put in the top drawer]

Because of this mismatch, a tension is created in this context. A similar tension exists in Catalan. A parallel example is shown in (21).

(21) a. What did you put in the top drawer?
b. $[_{[+N]}$ El GANIVET], $[_{[-N]}$ vaig ficar al calaix de dalt].
the knife 1s-past-put in.the drawer of top
'I put the knife in the top drawer.'

Although the canonical c-s has the object 'the knife' as part of VP as shown in (22), the i-s in this context separates 'the knife' from the VP and the rest of the sentence.[1]

(22) c-s: $[_{IP}$ $[_{VP}$ put the knife in the top drawer] *pro*]
i-s: $[_{[+N]}$ the knife] $[_{[-N]}$ I put in the top drawer]

Similarly, if the focus of the sentence is 'in the top drawer' as in the context (23) below, this PP breaks the c-s constituency and creates the tension shown in (24) both in English and Catalan.

(23) a. Where did you put the knife?
b. I put the knife in the top drawer.
b'. $[_{[+N]}$ Al calaix de DALT], $[_{[-N]}$ vaig ficar el ganivet].
in.the drawer of top 1s-past-put the knife
'In the top drawer I put the knife.'

(24) c-s (English): $[_{IP}$ I $[_{VP}$ put the knife in the top drawer]]
c-s (Catalan): $[_{IP}$ $[_{VP}$ put the knife in the top drawer] *pro*]
i-s: $[_{[+N]}$ in the top drawer] $[_{[-N]}$ I put the knife]

There may be several different measures to resolve the c-s/i-s mismatches and languages may differ in the degree and the way they take these measures. Some languages may rely heavily on prosodic (e.g., high tone on focused elements) or morphological (e.g., special focus markers) measures, and little on syntactic ones. Others may rely more on syntactic measures such as placing in a special topic/focus position or constituent reordering. Focusing only

[1] I use c-s in this paper as the canonical phrase structural description, unlike its usual usage as the surface phrase structure in LFG, to visualize the conflict between the two components of grammar. However, I do not intend syntax to be derivational. The canonical c-s is always available along with other alternative c-s candidates in the OT (Optimality Theory) framework I assume in this paper (see Bresnan (1996) and Choi (1996) for the basic theoretical assumptions).

on the syntactic realizations and putting aside the morphological or prosodic realizations in this paper, we can think of the mismatch resolution to be a result of the competition between the c-structural constraints which are responsible for the default c-structural configuration, and the i-structural constraints which are responsible for alternative syntactic or other realizations of the i-structure.

English, for example, use minimal syntactic measures in resolving the tension created by the difference in newness ([New]) among the constituents. See (25).

(25) a. I put $[_{[+N]}$ the KNIFE] in the top drawer.
b. I put the knife $[_{[+N]}$ in the TOP DRAWER].

In English, as in many other languages, (a subset of) the focus is marked in situ by intonational prominence. The newness is marked prosodically and not syntactically in this case.[2]

In contrast, Catalan adopts rather drastic syntactic method as shown in (26).

(26) a. $[_{[+N]}$ El GANIVET], $[_{[-N]}$ vaig ficar al calaix de dalt].
the knife 1s-past-put in.the drawer of top
'The knife I put in the top drawer.'

b. $[_{[+N]}$ Al calaix de DALT], $[_{[-N]}$ vaig ficar el ganivet].
in.the drawer of top 1s-past-put the knife
'In the top drawer I put the knife.'

All [–New] elements including the finite verb are detached rightward, so the sentence is completely restructured in accordance with the i-structural description.

To put it in terms of the competition between c-s constraints and i-s constraints, in English, the c-s constraints are fairly strong so that the default c-s configuration is seldom changed, whereas in Catalan, i-s constraints are stronger enough to break the canonical c-s configuration.

Abstracting away from the particular c-structural descriptions of each language, I will call the c-structural constraint(s) all CANON, which generate the default or canonical c-s description of each language. It may be highly articulated or flat depending on the language.

Then I propose that there are three types of i-structural constraints relevant on syntax. The first kind is one which makes an i-structurally salient element c-structurally salient as well, by placing it in a c-structurally prominent position. I will discuss this kind in section 3.2. The second kind is one which realigns the c-structural constituents in terms of relative order according to their i-structural status. This will be discussed in section 3.3. The last kind is one which makes an i-structural constituent also a c-structural constituent, by excluding non-constituent elements out of a certain c-structural constituent domain. This is discussed in section 3.4. Languages may adopt one or more of these three types of i-structural constraints to instantiate various i-s descriptions. Now let us look at each case.

[2] I do not claim that English never instantiates [New] c-structurally. The *there*-construction may be an example of the c-structural instantiation of newness although I do not examine this construction in this paper.

3.2 Placing in a Salient Position

First, placing a certain i-structurally salient element in a c-structurally salient position. Hungarian 'focus' position is an example. It is well-known that the immediately preverbal position is a focus position in Hungarian (Kiss 1981, Horvath 1986). For example, the [+New] element 'the earthquake' cannot be placed in the postverbal position as shown in (27a), but should be placed in the preverbal position as shown in (27b).

(27) Horvath (1986:91–92)

a. *Attila félt [$_{[+N]}$ a FÖLDRENGÉSTÖL].
Attila 3s-Past-fear the earthquake.from
'Attila feared the earthquake.'

b. Attila [$_{[+N]}$ a FÖLDRENGÉSTÖL] félt.
Attila the earthquake.from 3s-Past-fear
'Attila feared the earthquake.'

We can interpret this Hungarian case such that the discourse 'newness' ([New]) is a salient i-s property in Hungarian and the immediate preverbal position is the c-structurally salient position for newness.

Another example of this kind is the English 'topicalization'. In this case, [Prom] seems to be a salient i-s property. We have seen in section 3.1 that English does not structurally instantiate 'newness': a [+New] element receives a prosodic prominence in the base position. However, a [+Prom] element goes to a special position, i.e., to the sentence-initial position.[3] See (28). Both topic and contrastive focus is fronted in English.

(28) a. [$_{[-N,+P]}$ **The play**] John saw yesterday.
b. [$_{[+N,+P]}$ FIDO] they named their dog.

Let us first look at the topic case in (29).

(29) a. What about the play? When does John see it?
b. **The play** John saw YESTERDAY.

In this context, *yesterday* is [+New] and *John saw the play* is [–New], while *the play* is [+Prom] and *John saw yesterday* is [–Prom].

(30) c-s: [$_{IP}$ John [$_{VP}$ saw the play] yesterday]
i-s: [$_{[+N]}$ yesterday] [$_{[-N]}$ John saw the play]
[$_{[+P]}$ the play] [$_{[-P]}$ John saw yesterday]

While the [+New] element *yesterday* stays in situ, the [+Prom] element *the play* is fronted. In other words, only 'prominence' is instantiated c-structurally in this case.

This tells us that it is 'prominence' that motivates the fronting in the contrastive focus case too.

[3] Whether this is a Spec position or an adjoined position is not the key issue in this paper. Other syntactic evidence particular in this language will settle this issue. Similarly with the Hungarian focus position.

(31) a. What did they name their dog?
b. FIDO they named their dog!

In this context, *Fido* is [+Prom] as well as [+New], while the rest of the sentence is [–New,–Prom].

(32) c-s: $[_{IP}$ They $[_{VP}$ named their dog Fido]
i-s: $[_{[+N]}$ Fido] $[_{[-N]}$ They named their dog]
$[_{[+P]}$ Fido] $[_{[-P]}$ They named their dog]

As shown above, the sentence-initial position in English is a salient position for prominence. *Fido* in (32b) is placed in this position not because it is [+New] but because it is [+Prom] although in this case a [+Prom] element happens to be [+New] too.

Now, let us reconsider this case in terms of constraint competition between c-structure and i-structure. Constraint competition is one of the key ideas in Optimality Theory (Prince and Smolensky 1993, Grimshaw 1995). Constraints are ranked in Optimality Theory: a higher-ranked constraint is a stronger constraint in grammar than a lower-ranked one so that a candidate which violates the higher-ranked constraint is penalized more severely than a candidate which violates the lower-ranked constraint, and thus the former loses to the latter. Since the purpose of this paper is not to illustrate a specific OT account, but to show a c-s/i-s interface approach to the syntax/discourse interaction problems, I will not go into the details of the Optimality-Theoretic mechanisms. See Choi (1996) for an example of a full-fledged OT account.

The canonical phrase structure constraints, which I call CANON regardless of any language-particular differences,[4] generate the default, unmarked, canonical c-s configuration.

(33) Canonical Phrase Structure Constraints (c-s):
CANON: a set of phrase structural constraints which generate the default c-structural configuration.

Among other i-s constraint, I posit the salient-position constraints as follows.

(34) Salient-Position Constraints (i-s):
a. [NEW]-X: Place [+New] in a salient position X.
b. [PROM]-Y: Place [+Prom] in a salient position Y.

These constraints require that an i-structurally salient property, [+New] or [+Prom], be placed in a c-structurally salient position. What the c-structurally salient position would be in each language will be determined by other c-structural considerations in that language.

Then, the Hungarian focus-position case can be accounted for if we rank [NEW]-X higher than CANON. If [Prom] does not play any role in the syntax of Hungarian, we can rank the [Prom] constraint lower than CANON. On the other hand, the English topicalization can be explained if we rank [PROM]-Y higher than CANON. Also, that [New] is not instantiated c-structurally can be captured if we rank the [New] constraint lower than CANON.

[4] These language-particular differences can (and should) also be captured by a ranking among the universal CANON constraints or with other c-s constraints.

3.3 Aligning

The second case is about realigning the c-s constituents according to their i-structural status. Czech may be an extreme example of this kind. As shown in (35), constituents can be completely reordered left to right from the least focal to the most focal, or in the Praguean terms, from the least dynamic to the most dynamic.

(35) Sgall et al. (1986)

a. Jeden voják poslal jednomu děvčeti DOPIS
a soldier sent a girl a letter

b. Poslal jeden voják jednomu děvčeti DOPIS
sent a soldier a girl a letter

c. Jeden voják jednomu děvčeti poslal DOPIS
a soldier a girl sent a letter

German scrambling is a moderate case of this kind. See (36) and (37).

(36) Lenerz (1977:43)

a. Was hast du dem Kassierer gegeben?
what have you the cashier given
'What did you give the cashier?'

b. Ich habe $[_{[-N]}$ dem Kassierer] $[_{[+N]}$ das GELD] gegeben.
I have the cashier the money given
'I gave the cashier the money.'

b'. ?*Ich habe $[_{[+N]}$ das GELD] $[_{[-N]}$ dem Kassierer] gegeben.
I have the money the cashier given
'I gave the money to the cashier.'

(37) Lenerz (1977:20–21)

a. Wann hast du das Buch gelesen?
when have you the book read
'When did you read the book?

b. Ich habe $[_{[+N]}$ GESTERN] $[_{[-N]}$ das Buch] gelesen.
I have yesterday the book read
'I read the book yesterday.'

b'. Ich habe $[_{[-N]}$ das Buch] $[_{[+N]}$ GESTERN] gelesen.
I have the book yesterday read
'I read the book yesterday.'

If we see (36) alone, it looks a lot like the Hungarian case where the immediate preverbal position is the focus position. However, German is not the first type, the salient position type, because unlike the Hungarian case, [+New] can be in situ as shown in (37b) as well as in the preverbal position as illustrated in (37b').

The German scrambling is not the third type either, the domain exclusion type, which we will see shortly. One might argue that VP is the focus ([+New]) domain in German and *das Buch* is scrambled out of VP because it is [–New] in (37). However, scrambling of the object is possible not only when the whole remaining part *gestern gelesen* is the focus, but also when *gestern* alone is the focus. Therefore, the German case is better explained if we assume an alignment or precedence constraint as follows.

(38) Alignment Constraints (i-s):
  a. ALIGN-[NEW]: Place [–New] before [+New], or vice versa.
  b. ALIGN-[PROM]: Place [+Prom] before [–Prom], or vice versa.

The ungrammaticality of (36b') is easily explained by (38a) because a [+New] is placed before a [–New] there. The in-situ focusing case in (37b) can be thought of to be a result of a close competition between the c-s constraint CANON and the i-s alignment constraint (38a). If we assume that both constraints are equally strong in German, then both orderings in (b) and (b') are possible. See Choi (1996) for an detailed OT account of German scrambling.

Similarly, the scrambling of contrastive focus case as in (39) can be explained by a similar alignment constraint (38b).

(39) Moltmann (1990:15)
  weil Hans $[_{[+N,+P]}$ das BUCH$]$ $[_{[-N,-P]}$ dem Mann] gegeben hat
  because Hans the book the man given has
  (nicht die ZEITUNG)
  not the newspaper
  'because Hans gave the book to the man, not the newspaper'

If ALIGN-[PROM] is ranked higher than ALIGN-[NEW] in German, the scrambling of a contrastively focused phrase is easily accounted for: a contrastively focused phrase, which is [+New,+Prom], scrambles because the higher-ranked [Prom] constraint motivates its scrambling even though the loser-ranked [New] constraint discourages it. Also, that the finite verb does not scramble in German unlike that in Catalan as shown earlier, can be accounted for if we rank another c-s constraint *ADJOIN-V higher than the i-s constraints in German. Then, a verb cannot scramble even though it is [–New] or [+Prom] because the *ADJOIN-V would prohibit the adjunction of a verb. In Catalan, in contrast, this c-s constraint would be ranked lower than the i-s constraints. According to Vallduví (1992), a verb in Catalan can be detached along with other elements if it is [–New].

3.4 Excluding from a Constituent Domain

Finally, making an i-s constituent also a c-s constituent by excluding nonconstituent elements out of a certain constituent domain. The Catalan detachment is a good example. As we have seen earlier, all [–New] elements should leave IP either leftward or rightward. In other words, IP is the [+New] domain in this language.

(40) Vallduví (1993:12)

a.	El Joan	$[_{[+N]}$	va deixar	una nota	damunt la TAULA$]_{IP}$.
b.	El Joan	$[_{[+N]}$ hi$_i$	va deixar	una NOTA$]_{IP}$,	damunt la taula$_i$.
c.	El Joan	$[_{[+N]}$ l$_j$'hi$_i$	va DEIXAR$]_{IP}$,	una nota$_j$,	damunt la taula$_i$.
	the Joan	cl	left	a note	on the table

'Joan left a note on the table.'

This is explained if we posit a domain constraint such as in (41a) and assume that this i-s constraint is stronger than CANON in Catalan.

(41) Domain Constraints (i-s):
   a. [NEW]-DOMAIN: Place [–New] out of [+New] domain, or vice versa.
   b. [PROM]-DOMAIN: Place [–Prom] out of [+Prom] domain, or vice versa.

It can also be explained that among the [–New] elements, topic ([+Prom]) is detached leftward and tail rightward, if we assume that an alignment constraint ALIGN-[PROM] is also active in Catalan, being ranked higher than CANON. This alignment constraint would place a [+Prom] phrase before a [–Prom] phrase, and thus fix the direction of the detachment. Therefore, the Catalan detachment case involves a domain-exclusion constraint and also an alignment constraint.

4 Closing

Before closing, let us briefly look at another case which combines more than one type of i-s constraints: the partial or remnant VP topicalization in German (Webelhuth and den Besten 1987, Uszkoreit 1987). The topicalized part in the examples in (42) is not a whole VP but only part of it. In (42a), only [V+Accusative Object] is topicalized, leaving the Dative Object behind. In (42b), [V+Dative Object] is topicalized, leaving the Accusative Object behind.

(42) Uszkoreit (1987)

a.	$[_{[-N,+P]}$ Den Brief	zustecken]	sollte	der Kurier	nachher $[_{[+N]}$	dem Spion].
	the note(Acc)	slip	should	the courier(Nom)	later	the spy(Dat)
b.	$[_{[-N,+P]}$ Dem Spion	zustecken]	sollte	der Kurier	nachher $[_{[+N]}$	den Brief].
	the spy(Dat)	slip	should	the courier(Nom)	later	the note(Acc)
c.	$[_{[-N,+P]}$ Nachher	dem Spion zustecken]	sollte	der Kurier	$[_{[+N]}$	den Brief].
	later	the spy(Dat) slip	should	the courier(Nom)		the note(Acc)

These examples can be explained by the combination of a domain constraint and a salient-position constraint. First, a [+New] element is placed out of the VP domain, which is [–New] in this case ([NEW]-DOMAIN). Then, the remaining part of the VP, which is now uniformly [–New], is placed in the topic position because it is [+Prom] ([PROM]-Y).

To summarize, I first presented a model of information structure based on two discourse features [New] and [Prom], and then examined the English topicalization, the Catalan detachment, and the German scrambling as involving different types of i-s constraints. These constructions were viewed to be cases of syntax/discourse interface and accounted for by the constraint competition between c-structure and i-structure.

Bibliography

Bresnan, Joan. 1996. Optimal syntax: Notes on projection, heads, and optimality. MS. Stanford University.

Chafe, Wallace. 1976. Givenness, contrastiveness, definiteness, subjects, topics and point of view. In Charles Li (ed.), *Subject and Topic*, 25–56. New York, Academic Press.

Choi, Hye-Won. 1996. *Optimizing Structure in Context: Scrambling and Information Structure.* Doctoral dissertation, Stanford University.

Dahl, Östen. 1974. Topic-comment structure revisited. In Östen Dahl (ed.), *Topic and Comment, Contextual Boundedness and Focus (Papers in Text Linguistics 6)*, 1–24. Hamburg, Helmut Buske.

Dik, Simon, et al. 1981. On the typology of focus phenomena. In Teun Hoekstra, Harry van der Hulst, and Michael Moortgat (eds.), *Perspectives on Functional Grammar*, 41–74. Dordrecht, Holland, Foris.

Grimshaw, Jane. 1995. Projection, heads, and optimality. To appear in *Linguistic Inquiry.*

Horvath, J. 1986. *FOCUS in the Theory of Grammar and the Syntax of Hungarian.* Dordrecht, Foris.

King, Tracy Holloway. 1993. *Configuring Topic and Focus in Russian.* Doctoral dissertation, Stanford University. Published by CSLI Publications, 1995.

Kiss, Katalin É. 1981. Structural relations in Hungarian. *Linguistic Inquiry* 12, 185–213.

Lambrecht, Knud. 1994. *Information Structure and Sentence Form.* Cambridge, Cambridge University Press.

Lenerz, Jürgen. 1977. *Zur Abfolge nominaler Satzglieder im Deutschen.* Tübingen, TBL Verlag Gunter Narr.

Moltmann, Friederike. 1990. Scrambling in German and the specificity effect. MS., MIT.

Prince, Alan, and Paul Smolensky. 1993. Optimality theory: Constraint interaction in generative grammar. To appear in LI monograph, MIT Press.

Prince, Ellen F. 1981. Topicalization, focus-movement, and Yiddish-movement. In *Proceedings of the Berkeley Linguistics Society*, Vol. 7, 249–264.

Sgall, Petr, Eva Hajičová, and Jarmila Panevová. 1986. *The Meaning of the Sentence in its Semantic and Pragmatic Aspects.* Prague, Academia.

Uszkoreit, Hans. 1987. Linear precedence in discontinuous constituents: Complex fronting in German. In Geoffrey J. Huck and Almerindo E. Ojeda (eds.), *Syntax and Semantics 20: Discontinuous Constituency*, 406–427. Academic Press.

Vallduví Enric. 1992. *The Informational Component.* New York, Garland.

Vallduví Enric. 1993. Information packaging: A survey. MS. Centre for Cognitive Science and Human Communication Research Centre, University of Edinburgh.

Ward, Gregory L. 1988. *The Semantics and Pragmatics of Preposing.* Doctoral dissertation, University of Pennsylvania.

Webelhuth, Gert, and Hans den Besten. 1987. Remnant topicalization and the consitituent structure of the Germanic SOV-languages. Presented at GLOW, Venice, Italy.