On the Role of Argument Structure in Focus Projections*

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1 Introduction

One of the important issues in information packaging theory is how to capture the projection of focus up to the sentence level, that is, to explain why a pitch accent can serve to mark focus of more than just the accented word. Selkirk (1995) and Rochemont (1986, 1998) provide rather comprehensive syntactic analyses of focus projection in English. In the analysis of Selkirk (1984, 1995), the feature [F] is licensed in the syntax and can then be projected up to a larger syntactic constituent according to the algorithm in (1):

(1) Focus Projection (Selkirk 1984, 1995):

a. An accented word is F-marked.

b. F-marking of the head of a phrase licenses F-marking of the phrase.

c. F-marking of an internal argument of a head licenses F-marking of the head.

According to (1)a, an element with phonological prominence can be the focus, and recursive applications of (1)b and c allow syntactic constituents larger than the one with prominence to be focused. For example, let us consider (2) in which the noun *box* is pitch-accented:[1]

(2) [Mary [put [the book] [in [a new [BOX]$_F$]$_F$]$_F$]$_F$]$_{FOC}$.

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[1]We use capital letters to indicate the word bearing pitch accent.

In accordance with (1), the focus on *box* is passed to the phrase *a new box* and from there to the head preposition 'in'. Since the PP is an internal argument of *put*, the focus is projected to its head *put* and then from there to the VP and finally up to the sentence. Thus (2) can serve as an answer to a VP-focus question like *What did Mary do with the book?*.

This approach, assigning a special role to internal arguments, could then predict that neither adjuncts nor specifiers will project focus, and this is borne out:

(3) I bought a SMARTLOOKING hat.

In (3) the phonologically nonprominent head *hat* cannot inherit focus from the prominent adjunct *SMARTLOOKING*, and so the example cannot be a well-formed response to a question like *Did you buy anything at the sale?* (Rochemont 1986). The account also predicts that no daughter in a non-headed structure (e.g., coordination) will project wide focus, correctly.

Another positive aspect of this analysis is that it does not license the pitch-accented subject to project its focus up to the S level:[2]

(4) *[[MARY]$_F$ put the book in a new box]$_{FOC}$.

Even if the subject 'Mary' in (4) is F-marked, its focus cannot be projected up to S since it is neither the head of S nor an internal argument of the verb.

Selkirk's algorithm is thus able to capture the systematic relations between the distribution of pitch accents and the focus structure of English. However, such a purely syntax-based analysis faces several difficulties. For example, as noted by Gussenhoven (1999), the theory makes an incorrect prediction for cases like (5):

(5) [She [[SENT]$_F$ a book to Mary]$_F$]$_{FOC}$.

According to the algorithm in (1), the F feature on the head *sent* can be projected to the mother VP and then to S. However, (5) cannot function as an appropriate answer to a question like *What did she do?*.

Another problem arises from the fact that in (1), focus domains correspond only to syntactic constituents. Such a tight one-to-one mapping does not obviously extend to examples like (6):

[2]In such a theory, the focus feature F has dual functions, to mark focus and to place constraints on the focus interpretations, as summarized in (i):

(i) Constraints on Focus Interpretation: (Selkirk 1995: 555–556)
  a. F-marked constituent but not FOC: New in the discourse
  b. Constituent without F-marking: Given
  c. FOC: either Given or New

The F-marking algorithm thus defines Given-New articulation, the basic information structure partition of the sentence.

(6) A: What happened to the China set?

B: [The BUTLER BROKE] the set. (EV-96: (24))

As noted in Vallduví and Engdahl (1996), the focus domain in (6) consists of the subject and the verb. Since the algorithm in (1) allows the focus domain only to be a phrase, there seems to be no easy way to make the subject NP and V *the butler broke* in (6) into the appropriate domain.

One more issue concerns the projection of focus from any internal argument to the VP. As suggested by Bresnan (1971), focus projection is only possible if the pitch-accented item is the peripheral one.

(7) a. The butler [offered the president [some COFFEE]$_F$]$_{FOC}$.

b.*The butler [offered [the PRESIDENT]$_F$ some coffee]$_{FOC}$.

c. The butler offered [the [PRESIDENT]$_F$]$_{FOC}$ some coffee.

If an F-feature on any internal argument can project focus as in (1)c, nothing would block examples like (7)b (also see Engdahl and Vallduví 1996).

Given the observations here, it seems that we need a theory of focus projection that is more flexible in terms of syntactic constituency and yet perhaps more restricted in terms of argument types. In what follows, we will review focus projection in three typologically different languages (English: SVO, Korean: SOV, Greek: VSO) and show that argument structure and its interactions with other grammatical components plays an important role in determining various possibilities of focus projection (more than linear order does).[3]

The point that we would like to defend here is that in SVO and VSO languages like English and Greek, focus can be wide from the lowest ranking (internal) argument, whereas in an SOV language like Korean, focus can be wide from the highest internal argument. In formalizing this basic idea, we will adopt the framework of HPSG that allows us to constrain the interface of argument structure and focus representation.

2 Focus Projection in English

To overcome the problems of purely syntax-based analyses of focus projection in which the focus domain matches syntactic constituents, Vallduví (1992), Vallduví and Engdahl (1996), Engdahl and Vallduví (1996) (henceforth EV-96) posit a new level of focus interpretation, called Information Structure (IS). IS is an integral part of grammar and interacts in principled ways with both syntax and phonology. Slightly revised for our purposes here, it can be represented in the HPSG feature structure system as in (8):[4]

[3]Godjevac (2000) also argues for the importance of argument structure in focus projection of Serbo-Croatian.

[4]In EV-96, the primitives of IS include Focus, Link and Tail. Focus is the new information that the speaker wants to convey and the informative part that makes some contribution to the discourse or the

(8)
$$\begin{bmatrix} \text{PHON(OLOGY)} \ \ldots \\ \text{ARG-ST} \ \ldots \\ \text{INFO-STR(UCTURE)} \begin{bmatrix} \text{TOP(IC)} \ \ldots \\ \text{FOC(US)} \ \ldots \end{bmatrix} \end{bmatrix}$$

As given in (8), IS is an independent level of linguistic representation interacting with the other grammatical components of the grammar such as ARG-ST. One main difference from a purely syntax-based focus projection is that the structure of IS represents only the partitions in information structure, which may be independent of syntactic constituency. What we claim in this paper is that the ordering of grammatical functions in the ARG-ST and its interactions with other grammatical levels play an important role in determining the focus domain.

Let us look at the main aspects of the structure of lexical entries. A transitive verb like *put* will have at least the lexeme information given in (9):

(9)
$$\begin{bmatrix} \textit{transitive-lxm} & \\ \text{PHON} & \langle \text{put} \rangle \\ \text{HEAD} & \left[\textit{verb} \right] \\ \text{ARG-ST} & \left\langle \text{NP, NP, PP} \right\rangle \end{bmatrix}$$

Like other lexemes, such a lexeme observes the Argument Realization Constraint in (10), when realized in syntax as a word.

(10) Argument Realization Constraint (ARP):

$$\begin{bmatrix} \textit{word} & \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \boxed{A} \\ \text{COMPS} & \boxed{B} \end{bmatrix} \\ \text{ARG-ST} & \boxed{A} \oplus \boxed{B} \end{bmatrix}$$

The ARP in (10) ensures that all elements in the argument structure are realized on the appropriate valence list as the correct grammatical functions: SUBJ and COMPS. For example, the word *puts* will be instantiated as follows:

hearer's mental world. In terms of phonology, focus carries the pitch accent known as A-accent (H*) (see Jackendoff 1972). Link is the material that is assumed to be already known to the hearer. It is thus similar to topic in traditional terms and bears B-accent (L+H*). Tail is the rest of the ground or the given information which is less prominent in the sentence and has no accent. In this paper, we just follow the traditional dichotomy of IS topic and focus for ease of exposition.

(11)
$$\begin{bmatrix} \textit{transitive-word} & \\ \text{PHON} & \langle \text{puts} \rangle \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} \langle \boxed{1} \rangle \\ \text{COMPS} \langle \boxed{2}, \boxed{3} \rangle \end{bmatrix} \\ \text{ARG-ST} & \langle \boxed{1}\text{NP}, \boxed{2}\text{NP}, \boxed{3}\text{PP} \rangle \end{bmatrix}$$

The mapping from ARG-ST to the valence structure thus crucially hinges on the ordering of the elements in ARG-ST. Such a level of argument structure that reflects the grammatical functions, rather than semantic roles, receives strong motivation from phenomena such as binding, control, relativization, and so forth (see Keenan and Comrie 1977, Pollard and Sag 1987, Sag and Wasow 1999, among others). The elements in the ARG-ST follow the ordering of grammatical functions given in (12):

(12) ARG-ST Hierarchy:
SUBJ < OBJ < OBJ2 < OBL (where if A precedes B in the argument-structure, A has a higher rank than (i.e. outranks) B.)

These grammatical functions do not play a role in the theory directly, but define the relation between the ARG-ST and the valence lists: the first element on ARG-ST is the sole member of the SUBJ list, the next element on ARG-ST is the first COMPS element (i.e., direct object), and so on.

Together with this notion of argument structure, we propose that what is relevant for determining the possibility of focus projection hinges upon the argument ranking. As a start, following Selkirk (1995), we also assume that a word accented with the A-accent (see Jackendoff 1972) is FOC-marked as represented in (13):[5]

(13) FOC(US) Realization:

$$\boxed{1}\begin{bmatrix} \textit{word} \\ \text{PHON} \mid \text{ACCENT A} \\ \text{ARG-ST ...} \\ \text{INFO-ST} \mid \text{FOC} \left\{ \boxed{1} \right\} \end{bmatrix}$$

In addition, adopting the idea of EV-96, we posit the INFO-ST Instantiation Principle in (14) to govern focus projection in English:

(14) INFO-ST Instantiation Principle (IIP):

(i) If a DAUGHTER's INFO-ST is instantiated, then the mother inherits this instantiation (for narrow foci and topics), OR

[5]In a more precise representation, the FOC value needs to be the semantics of the accented element.

(ii) the non-agentive lowest ranking argument's FOC is instantiated, then the FOC of the mother is the sign itself (wide focus).

Here we have replaced 'internal argument' in the discussion above by 'non-agentive' argument (see (28) below). The principle in (14) says that the INFO-ST value of a syntactic element will be inherited to its mother without projection and the FOC value on the lowest argument can extend its focus domain to the mother.

Now let us see how focus is projected in a simple example like (15):

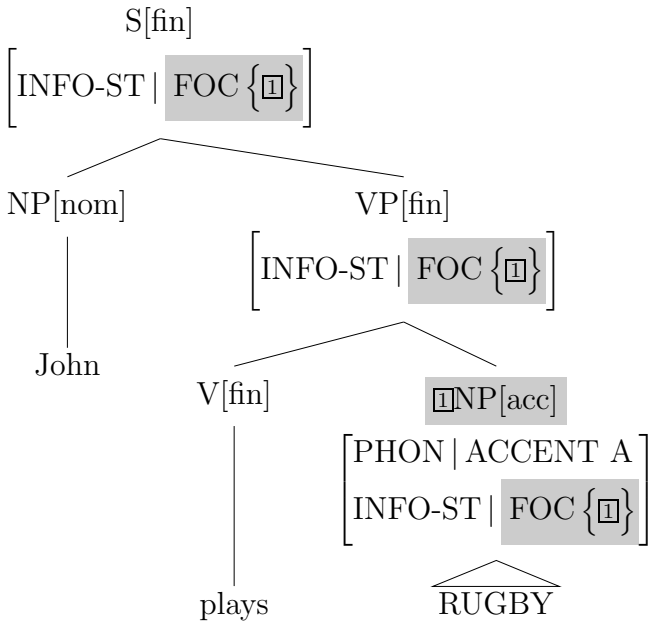
(15) John plays RUGBY.

The argument structure of the verb *play* is given in (16):

(16)
$$\begin{bmatrix} \textit{transitive-lxm} & \\ \textsc{phon} & \langle \text{play} \rangle \\ \textsc{arg-st} & \langle \boxed{1}\text{NP}, \boxed{2}\text{NP} \rangle \end{bmatrix}$$

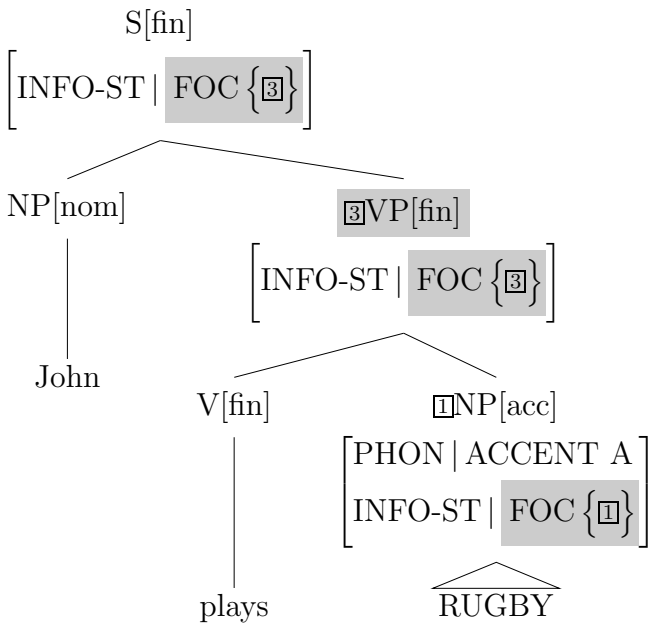
In (15) the object NP of the verb *play* is focused. According to (14i), the focus value on this NP either can simply be passed up to its mother, with no expansion of the focus domain. This leads to the possibility of the narrow focus reading as represented in (17):

(17) Narrow Focus Reading:



Now, since the object NP is the lowest ranking argument, the focus value on this NP allows its mother to be focused too, and this will then induce wide focus reading represented in (18):

(18) Wide Focus Reading:



Let us see how the present analysis predicts the FOC value on an adjunct as in (19):

(19) A: What did John cook for Tom?
A′: What did John do?
B: He [cooked [LASAGNA]$_F$ for Tom]$_F$.
B′: *He [cooked lasagna [for TOM]$_F$]$_F$.

As noted, only (19)B can be an answer to the questions in (19)A or (19)A′. This is due to the fact that the focused PP *for TOM* is not an argument of the verb *cooked*, but just an adjunct as shown in (20):

(20) $\begin{bmatrix} \textsc{phon} \langle \text{cooked} \rangle \\ \textsc{arg-st} <\text{NP, NP}> \\ \textsc{adjunct} \langle \textsc{pp}[\text{for}] \rangle \end{bmatrix}$

Accent on the object, the lowest non-agentive argument, is consistent with narrow focus or wide VP focus, and hence (19)B is a possible reply to the questions in A or A′. However, accent on the adjunct can only lead to narrow focus, and so (19)B′ is not an appropriate reply to either question.

The analysis also provides an account for Bresnan's examples in (7), repeated here:

(21) a. The butler [offered the president [some COFFEE]$_F$]$_{FOC}$.

b.*The butler [offered [the PRESIDENT]$_F$ some coffee]$_{FOC}$.

c. The butler offered [the [PRESIDENT]$_F$]$_{FOC}$ some coffee.

As noted earlier, the examples in (21) indicate that focus projection is only possible if the A-accented item is the peripheral one. In the present analysis, the verb *offered* will have the argument structure in (22):

(22) ARG-ST <NP, NP, NP>

According to (14ii), only when the lowest ranking NP is focused will the VP get focus. This explains the contrast between (21)a and (21)b: since the NP *the president* in (21)b is not the lowest element in the ARG-ST of the verb *offered*, the mother VP cannot be interpreted as wide focus.

The analysis, however, does not project focus from the verb itself:

(23) *[She [[SENT]$_F$ a book to Mary]$_F$]$_{FOC}$.

(14) gives no option for focus projection in this case: no argument has an instantiated FOC value. The FOC value is on the head verb itself which behaves as a predicate rather than as an argument. The rule that applies here is (14i), resulting in narrow focus reading.

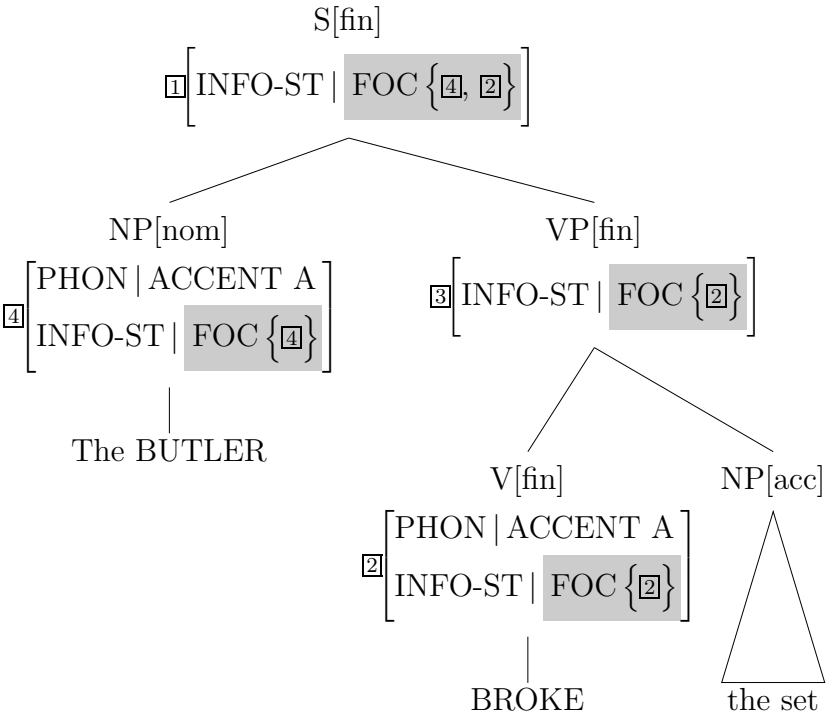
Another advantage of the present analysis concerns mismatches between informational partitioning and syntactic constituency. As noted above in (6), we could have cases where informational partitioning does not correspond to syntactic constituency as given in (24):

(24) A: What happened to the China set?

B: [The BUTLER BROKE] the set. (EV-96: (24))

A pure-syntax theory would have difficulties in predicting that the focus is constituted by the subject and the verb. Within the present analysis, even if the subject and the verb do not form a syntactic constituent, the instantiation of a FOC value on both elements will be inherited to their respective mother nodes, as represented in the structure in (25):

(25)



It has been noted that an A-accent on the external argument in English cannot project focus value up to the mother as seen in (4) (see Selkirk 1995, Rochemont 1998). When the subject is a non-agentive argument as in (26), there is nothing wrong for the A-accent on the subject to license sentence focus:

(26) a. $[[\text{TOM}]_F \text{ died}]_{FOC}$.

b. $[[\text{The } [\text{SKY}]_F]_F \text{ is falling}]_{FOC}$.

c. $[[\text{The } [\text{SUN}]_F]_F \text{ came out}]_{FOC}$.

However, this pattern cannot be found with unergative verbs like *run*:

(27) *$[[\text{TOM}]_F \text{ ran}]_{FOC}$.

The present analysis does not license focus projection here, for the lowest argument is an agentive; we represent the relevant differences as follows:

(28) a. Unergative:

$$\begin{bmatrix} \textsc{phon} \langle \text{ran} \rangle \\ \textsc{arg-st} \langle \textsc{np}_i \rangle \\ \textsc{content} \begin{bmatrix} \textsc{relation} \ \textit{run} \\ \textsc{agent} \ \text{i} \end{bmatrix} \end{bmatrix}$$

b. Unaccusative:

$$\begin{bmatrix} \textsc{phon} \langle \text{died} \rangle \\ \textsc{arg-st} \langle \textsc{np}_i \rangle \\ \textsc{content} \begin{bmatrix} \textsc{relation} \ \textit{die} \\ \textsc{theme} \ \text{i} \end{bmatrix} \end{bmatrix}$$

The rule in (14) allows only a non-agentive lowest ranking argument to project its focus. The subject of the unergative verb *run* is agentive, whereas that of the unaccusative verb *die* is a non-agentive. Thus, only the focus value on the subject of the verb *die* can be projected up to its mother S.

The account presented so far shows that the grammatical interfaces between PHON, ARG-ST, and INFO-ST are interwoven in the projection of focus, and allows a flexibility necessary when extending the analysis to other languages types.

3 Focus Projection in Korean

It has been observed that languages adopt different means to encode their information structure: English employs intonation while Catalan relies on word order (Engdahl and Vallduví 1996). Languages like Greek use both. In addition to prosody and constituent order changes from the underlying SOV, Korean also uses morphology directly in realizing information structure, though here we again concentrate on the focus properties most closely linked to argument-structure.

Like English, accented constituents in Korean are also interpreted as foci.[6] The constituents in capital letters in (29) represent the locus of A-accent or phonological prominence and the interpretations given illustrate the focus assignment on these elements:

(29) a. JOHN-I maykcwu-lul masiesse
John-NOM beer-ACC drank
'It is John who drank beer.'

b. John-i MAYKCWU-LUL masiesse
'It is beer that John drank.'

c. John-i maykcwu-lul MASIESSE
'What John did with beer was drink it.'

The important role of the argument hierarchy based on grammatical functions is also observed even in a free word order language like Korean. Let us consider a simple example in which the accusative object NP is focused:

(30) John-un [$_F$ ecey [$_F$ YENGHWA-lul] poasse]
John-TOP yesterday movie-ACC watched
'John watched a movie yesterday.'

The verb *poasse* 'watched' has the argument structure in (31):

(31) ARG-ST <NP[*nom*], NP[*acc*]>

[6]Korean may also have a dedicated 'focus position', immediately in front of the verb (see Kim (1985) and Jo (1986) for the properties of this preverbal position). Such a focus position necessarily corresponds to narrow scope of focus.

According to the algorithm in (14), the focus value on the lowest ranking argument, the object NP *yenghwa-lul* 'movie' in (31) then can extend its FOC value to the mother VP. This eventually induces a wide focus reading, making (30) a felicitous reply to a question like *What did John do yesterday?*.

The FOC value on the noun phrase can also be accounted for:

(32) John-un ecey [yenge-eykwanhan [CHAYK-ul]$_F$]$_F$ ilkesse
John-TOP yesterday English-about book-ACC read
'John read a BOOK about English yesterday.'

The A-accent on the NP head *chayk-ul* 'book' in (32) can be projected to its mother in accordance with (14i). This is why (32) can serve as an answer to *What did John read yesterday?*.

However, the FOC value of the verb itself will not project focus, as in English:

(33) John-un cip-eyse [NOLASSE]$_F$
John-TOP home-LOC played
'John PLAYED at home.'

An example like this could not be an appropriate answer to a question like *What did John do yesterday?*. This is simply because the predicate *nolassse* 'played' does not serve as as an argument of any lexical element. (33) can thus serve only as an answer to a narrow focus question *What did John do at his home yesterday?*.

Korean shows the same agentive/non-agentive argument sensitivity as English. An agentive argument cannot project its focus value up to its mother in either language. For example, A-accent on the subject *John* in (34)a can not induce a wide focus reading (presentational reading), and hence the example is not a felicitous answer to an all-focus question. However, focus on the subject of an unaccusative predicate like *come* as in (34)b can be projected up to the mother, as in English:

(34) What happened?

a.*[[JOHN-i]$_F$ sakwa-lul mekesse]$_F$
John-NOM apple-ACC ate
'John ate apples.'

b. [[SENSAYNGNIM-i]$_F$ o-si-ess-e]$_F$
teacher-NOM came(HON)
'The teacher came.'

The focused subject *sensayngnim* 'teacher' is a theme argument of the unaccusative verb *come*. Thus, the FOC value on this lowest ranking element can instantiate FOCUS onto its mother S, too.

What is interesting is that unlike English, Korean prohibits focus on an oblique argument from being extended up to its mother phrase, as in (35)a; the domain of focus interpretation cannot be VP or S. Focus can only project wide from the object *senmwul*, as in (35)b.

(35) a.*[[MARY-EYKEY]$_F$ senmwul-ul cwuesse]$_F$
Mary-DAT present-ACC read-give
'(I) gave a present to MARY.'

b. [Mary-eykey [SENMWUL-UL]$_F$ cwuesse]$_F$
Mary-DAT present-ACC gave
'(I) gave a PRESENT to Mary.'

(35)a cannot be a felicitous reply to a VP-focus question like *What did you do?*. Even in locally scrambled examples like those in (36), this condition holds: it is only when the object *Mary* is focused that the VP can receive a wide focus reading.

(36) a.*[senmwul-ul [MARY-EYKEY]$_F$ cwuesse]$_F$

b. [[SENMWUL-ul]$_F$ Mary-eykey cwuesse]$_F$

This is rather unexpected, considering the generally free constituent order properties of the language. However, the present theory requires only a minor revision to the English Information Instantiation Principle in (14), as in (37):

(37) INFO-ST Instantiation Principle in Korean (IIP-K):

(i) If a DAUGHTER's INFO-ST is instantiated, then the mother inherits this instantiation (for narrow foci and topics), OR

(ii) the non-agentive **highest** ranking argument's FOC is instantiated, then the FOC of the mother is the sign itself (for wide focus).

The only difference from English is that it is the highest, not the lowest, nonagentive ranking argument that allows wide focus projection. For example, the ARG-ST of the verb *cwuesse* 'gave' will look like the following:

(38) ARG-ST <NP[agent], NP[theme], PP[goal]>

Though the first NP is the highest ranking argument, it cannot allow wide focus projection since it is an agentive argument. The nonagentive highest ranking argument is the theme NP, thus allowing wide focus in accordance with (37). However, the goal PP cannot induce wide focus since it is the lowest ranking argument regardless of its syntactic positions.

Further support for this approach can be found in examples like (39) with a locative complement. The focus value on the PP does not project focus to the VP; only when the NP is focused does the VP obtain a wide focus.

(39) a.*[[SANGCA-EY]$_F$ chayk-ul nehesse]$_F$
box-LOC book-ACC put
'(I) put BOOKS in the box.'

b. [sangca-ey [CHAYK-UL]$_F$ nehesse]$_F$
box-LOC book-ACC put
'(I) put books in the BOX.'

The ARG-ST of the verb *nehesse* is as follows:

(40) ARG-ST <NP[agent], NP[theme], PP[loc]>

As shown in (39)a, a focus value on the oblique PP argument does not allow the whole VP to be focused. VP focus is induced only when the lowest ranking object NP is focused, as in (39)b.[7]

We also could observe that an A-accented experiencer subject can project a wide focus reading too:

(41) A: What happened?

B: [[HALAPECI-KA]$_F$ kamki-ka tu-si-ess-e]$_F$
grandpa-NOM flu-NOM enter(HON)
'Grandpa caught a cold.'

Unlike a pure agent-theme transitive case, the FOC value on the subject can induce wide focus reading just like unaccusative verbs. This is an expected result since the experiencer is the highest ranking nonagentive argument of the predicate *tu-si-ess-e* 'enter'.

Although it is not fully articulated here, the lowest/highest sensitivity in the IIPs of English and Korean is not arbitrary: as a VO language, English orders its non-subject

[7]When the A-accented object NP is located in front of the nominative subject, it does not induce wide scope reading: instead the preference for most of the speakers is assigning a topic reading to the NP. (Some speakers we have consulted, however, still can obtain a wide focus reading in such cases.)

(i) KU SAKWA-LUL John-i mek-ess-e
the apple-ACC John-NOM ate
'John ate the apple.'

To account for the topic reading on the object NP, we take the view that the subject position is fixed external to VP and that internal arguments normally appear inside VP (as argued e.g., by Bratt 1996). The pre-subject accusative NP is thus generated to the left of the subject (a topic position in this case) and is not in VP. To capture the sensitivity to position, we need to add a condition to the principle (37) that the non-agentive argument be instantiated in a 'local position'. The local positions in the language can be summarized as following:

(ii) a. Non-subjects are locally positioned (somewhere) in VP.
b. Subjects are locally positioned in S.
c. Non-subjects can be generated under S (but are then not in their local position).
d. Any constituent that is topicalized is not in its local position.

The projection of focus can be then restricted to arguments in their local position (see e.g., (49) below for Greek). Intuitively, arguments not in their local position have been displaced for an information-structural reason, and all such displacements appear to correspond to narrow focus only, for the cases when focus is involved. See also footnote 6.

arguments linearly in terms of increasing obliqueness of the ARG-ST list (see e.g., Pollard and Sag 1987), while Korean orders such arguments in terms of decreasing obliqueness, as it is a VO language (see e.g., Choi 1996).

4 Focus Projection in Greek

VSO languages like Greek (whose argument ordering resembles that of English) exhibit similar behavior to English and support our assumption that the argument structure hierarchy is an important factor in determining focus projection.

Let us first consider a simple Greek example like (42).

(42) a. [edose ta biblia sto [YANI]$_F$]$_F$
gave-3SG the books to-the YANI
'S/he gave the books to YANI.'

b.*[edose ta [BIBLIA]$_F$ sto Yani]$_F$

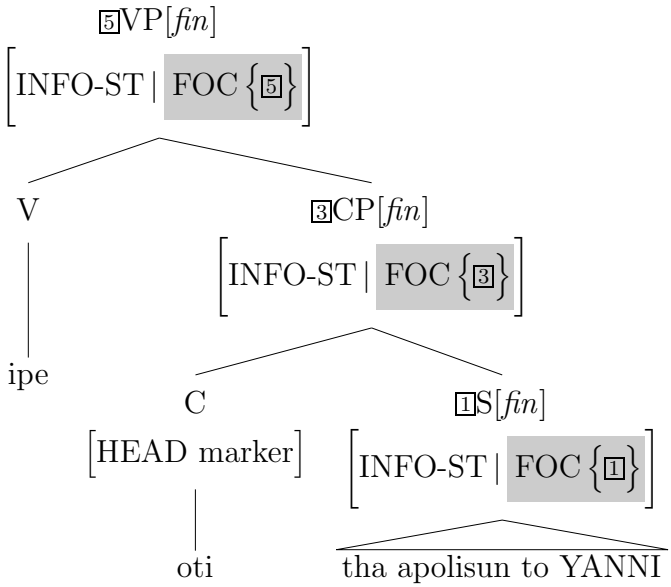
As observed by Alexopoulou (1999), a focus value on the oblique NP 'Yani' can instantiate a FOC value on the sentence. In the present analysis, this is due to the fact that the PP 'Yani' is the lowest ranking argument of the verb *gave*.[8] The second lowest ranking argument, however, does not project its focus value to the relevant mother, as shown in (42)b.

A more complex case can be found in examples like (43)a, with the structure given in (43)b.

(43) a. [ipe oti tha apolisoun to [YANI]$_F$]$_F$
said-3SG that will fire-3SG the YANI-ACC
'S/he said that they'll fire Yani.'

[8]All the Greek data in this section are from Alexopoulou (1999).

b.



The ARG-ST of each head as shown in (44) will again play an important role:

(44) a. apolisoun 'fire': ARG-ST <NP[nom], NP[acc]>

b. oti 'that': ARG-ST <S[fin]>

c. ipe 'said': ARG-ST <NP[pro], CP>

The object of the verb 'apolisoun' *fire* is A-accented and thus gets a FOC value. Since this NP is the lowest argument in (44)a, its focus value can be projected to the mother VP and to the S. This will then lead to the wide focus reading. Meanwhile, the complementizer *oti* selects S as its only argument. Since this is the lowest argument, its focus value can make its mother focused too in accordance with (14). This CP is once again the lowest argument of the verb *ipe* 'said' whose FOC value can be extended to its mother, recursively, to give the widest focus reading.

As noted by several scholars (e.g., Kiss 1995 on Hungarian, Hoffman 1995 on Turkish, Vilkuna 1995 on Finnish and Choi 1996 on Korean), languages often employ constructions such as preverbal focus movement, topicalization, and clitic left dislocation. Some examples of these are given in (45)–(46):

- Focus movement: Preverbal focus (always narrow focus)

(45) [tin PARASTASI]$_F$ [skinothetise o Dimitris Potamitis]
the performance-ACC directed-3SG the Dimitris Potamitis-NOM
'Dimitris Potamitis directed the performance.'

- Topicalization of the object: narrow or VP focus (ambiguous)

(46) [tin parastasi] [skinothetise o Dimitris POTAMITIS]$_F$
the performance-ACC directed-3SG the Dimitris Potamitis-NOM
'Dimitris Potamitis directed the performance.' or
'The performance was directed by Dimitris Potamitis.'

In (45), the internal argument is displaced in the preverbal position and A-accented. This induces only a narrow focus reading. Meanwhile, in (46), the object is topicalized with no pitch prominence, allowing two focus projection possibilities as shown in (47) (narrow and wide), which are roughly indicated by the two English translations in (46):

(47) a. The performance [DIMITRIS POTAMITIS]$_F$ directed it.

b. The performance [[DIMITRIS POTAMITIS]$_F$ directed it]$_F$.

It is noted by Alexopoulou (1999) and Alexopoulou and Kolliakou (2002) that these constructions involve long-distance dependencies in Greek, when focus and topic are positionally realized:

(48) a. [to YANI]$_F$ ipe oti apelisan
the Yani-ACC said-3SG that fired-3PL
'S/he said that they fired Yani.'

b. to Yani ipe oti ton [APELISAN]$_F$
the Yani-ACC said-3SG that him fired-3PL
'S/he said that they fired Yani.'

Such examples show that it is not possible to simply adopt Selkirk's (1995) claim that F-marking of the antecedent of a trace left by NP- or *wh*-movement licenses F-marking in the position of the trace. If that were the case, (45)′ would show the focus projecting up from the internal position of the trace:

(45)′ *[tin PARASTASI]$_F$ [[skinothetise [o Dimitris Potamitis] [t]$_F$]$_F$]$_F$

In Selkirk's analysis, if the object trace can be F-marked, its mother VP should also be F-marked, eventually inducing wide focus reading. However, (48) can serve only as narrow scope reading.

In the present analysis, all we need is just a simple modification to the clause (ii) of the IIP, using the notion of 'local position':

(49) INFO-ST Instantiation Principle (IIP) (revised):

Either (i) if a DAUGHTER's INFO-ST is instantiated, then the mother inherits this instantiation (for narrow foci and topics),

or (ii) if the non-agentive lowest ranking argument's FOC is instantiated in its local position (see footnote 7), then the FOC of the mother is the sign itself (for wide focus).

The term 'local position' is roughly the canonical position where the argument is realized, though the Korean data in (35)–(36) show that a precise characterization is not so straightforward. In the examples where a constituent is not in its local position, it cannot project focus to its mother.[9] This local realization requirement prevents a FOC value inherited from a FILLER daughter from giving rise to wide focus as in (50):

(50)*[mas ipe [[tin PARASTASI]$_F$ [oti skinothetise o Petros]]$_F$]$_F$
to-us said-3SG the show-ACC that directed-3SG the Petros-NOM
'S/he said to us that Petros directed the show.'

Although much more remains for us to look into, we observe that the argument-structure approach could play an important role in determining focus projection in Greek, in addition to what we have shown for English and Korean.

5 Conclusion

This comparative study among three typologically different languages supports the view that the argument structure hierarchy is one important determinant of focus projection. While there are cross-linguistic differences in the details of focus projection, these can be related to other properties of the languages in question, such as headedness within VP and how much 'local' reordering of constituents a given language allows.

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[9]Such a condition also applies to cases where focus is designated by constructional constraints as in 'It is John who Mary met.' Even though 'John' is the internal argument, its F-marking value cannot be projected to its mother.

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