Here lies the handout from the talk presented at Harvard University on May 2, 1994: Carol Neidle, Judy Kegl, and Benjamin Bahan, **The Architecture of Functional Categories in American Sign Language**.

More updated information about the work of the American Sign Language Linguistic Research Project is available at <http://web.bu.edu/ASLLRP>.

The Architecture of Functional Categories in American Sign Language

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Harvard University, May 2, 1994

Aarons, Debra, Bahan, Benjamin, Kegl, Judy & Neidle, Carol (1992). Clausal Structure and a Tier for Grammatical Marking in American Sign Language. *Nordic Journal of Linguistics 15:*103-142.

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——————————————— (in press, b).   Lexical Tense Markers in American Sign Language. In: Emmorey, K. & Reilly, J. (Eds.), *Sign, Gesture and Space.* Hillsdale, NJ: Lawrence Erlbaum.

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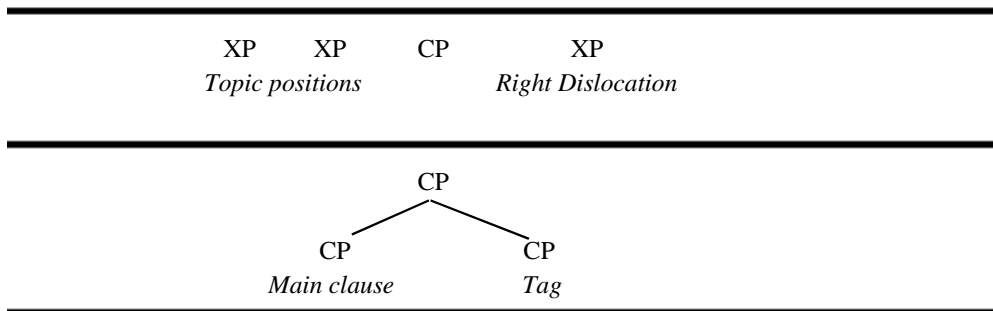
Introduction and Overview

1. Framework for examining the phrasal structure of languages: X-bar theory

2. ASL is a configurational language.

   While many surface word orders are possible (determined by discourse factors such as given and new information), the basic underlying word order and hierarchical relations are recoverable. Prosody and non-manual marking provide important evidence. Certain grammatical markings (wh-question, yes/no-question, negative, etc.) are expressed non-manually and spread over the c-command domain of the manual sign with which they are associated.

3. An ASL sentence may contain positions outside of the main clause.

	XP	XP	CP	XP
	Topic positions			*Right Dislocation*

```
                    CP
                   /  \
                 CP    CP
           Main clause  Tag
```

                            top
                    ─────────────
Topic: 1.   VEGETABLE, JOHN LIKE CORN
                     'As for vegetables, John likes corn.'

Right Dislocation: 2.   Jean est parti, lui.   (French)

                3.   JOHN$_i$ LEFT, IX$_i$
                     'John left, him.'

                                              hn
                                        ───────────
Tag: 4.   JOHN$_i$ WILL EAT CORN,   WILL (IX$_i$)

                                         hn
                                       ──────
                5.   JOHN$_i$ WILL EAT CORN,   IX$_i$
                     'John will eat corn, he will.'

Conclusions of our previous research	Alternative proposals...........	and their source
Tense		
• Not only Aspect, but also Tense, is an essential part of ASL sentence structure.	Grammatical tense does not exist in ASL; time information can only be expressed by adverbials.	General assumption in the literature (Wilbur, 1991; Fischer & Gough, 1972; Friedman, 1975; Cogen, 1977; Perlmutter, 1991) with a few notable exceptions (Jacobowitz & Stokoe, 1988)
• ASL has lexical tense markers, occurring in the canonical position.	[none; not previously recognized]	
• ASL also has non-manual tense marking, which, like other non-manuals, appears to spread over its c-command domain.	[none; not previously recognized]	
• Tense heads the ASL clause, and the position may be lexically filled by modals or tense markers.	[none; not previously recognized]	
Subject-verb Agreement		
• Structural subject-verb Agreement is syntactically present across the board in all main clause sentences. [Null subjects are found in clauses containing all types of verbs.]	The fundamental syntactic structure of a sentence differs, depending on the morphology of the verb; AGR is present syntactically just in case the verb exhibits overt agreement morphology.	Lillo-Martin (1991b), using Padden's morphological classification.
• Subject-verb Agreement systematically licenses null subjects in ASL (as in Italian). [ASL differs in crucial respects from Chinese.]	Licensing of null subjects by AGR occurs only with verbs that exhibit overt agreement morphology; for other verbs, structural licensing is by coindexation with Topic (as proposed by Huang for Chinese).	Lillo-Martin (1991b)

Like
 modals —but unlike time adverbials—   In contrast,
                  lexical tense markers   **time adverbials**

[53]	[54]	• necessarily occur to the right of s-structure subject.	[69, 70, 70', 70'']	• may occur in several positions in the sentence, but not in the position occupied by modals and tense markers.
[55]	[56]	• necessarily occur to the left of negation.		
[57]	[58]	• may contract with negation.		
[59]	[60]	• necessarily occur to the left of lexical aspect markers.		
[53, 57]	[54, 58]	• necessarily occur to the left of VP (unless the VP has moved).	[70']	• don't appear immediately preceeding NEG.
[61]	[62]	• occur frequently as the head constituent in the Tag.		• may not contract with negation.
[65]	[66]	• may not occur in complement clauses of verbs that subcategorize for tenseless complements.	[63]	• do not occur as the head of the Tag.
[67,68]	[68]	• occur in complementary distribution with other tense markers & modals	[64]	• may occur in the complement clause of verbs that subcategorize for tenseless complements.

53.   j-o-h-n   [MUST]   EAT   CORN
       'John must eat corn.'

54.   j-o-h-n   [FUTURE-TNS]   EAT   CORN
       'John will eat corn.'

                                      _____ neg
55.   j-o-h-n   SHOULD   NEVER EAT   CORN
       'John does not eat corn.'

                                      _____ neg
56.   j-o-h-n   FUTURE-TNS   NOT   BUY   HOUSE
       'John will not buy a house.'

                            _____ neg
                   _____ have-to
57.   j-o-h-n   MUST^NOT   EAT   CORN
       'John doesn't have to eat corn.'

                                      _____ neg
58.   j-o-h-n   FUTURE-TNS^NOT   BUY   HOUSE
       'John will not buy a house.'

                              _____ have-to
59.   TOMORROW j-o-h-n$_i$ MUST   TAKE-UP EXAM
       (IX$_i$)   MUST   FINISH/PERF-ASP READ BOOK
       'John has to take an exam tomorrow.
        He must read the book (to completion).'

60.   IX FUTURE-TNS FINISH/PERF-ASP READ PAPER
       'He will have read-through (to completion) the paper.'

                                      _____ hn
61.   j-o-h-n$_i$ CAN GO,   **CAN (IX$_i$)**
       'John can go, he can.'

                                      _____ hn
62.   j-o-h-n$_i$ FUTURE-TNS GO,   **FUTURE-TNS (IX$_i$)**
       'John will go, he will.'

                                      _____ hn
63. * FUTURE-ADV j-o-h-n$_i$ GO, **FUTURE-ADV (IX$_i$)**
       'In the future John will go, he in the future.'

64.   j-o-h-n   PREFER GO-TO STORE TOMORROW
       'John prefers to go to the store tomorrow.'

65. * j-o-h-n   PREFER CAN LEAVE
       'John prefers can leave (to be able to leave).'

66. * j-o-h-n   PREFER FUTURE-TNS GO-TO STORE
       'John prefers will go to the store.'

Note: we argue that the variability of the path length (see (69, 70, 70')) distinguishes the adverbial from the tense marker morphologically. Tense markers (as in (70'')) have a single, frozen, path length.

67. * j-o-h-n   MUST CAN PASS TEST.
       'John must can pass the test.'

68. * j-o-h-n   FUTURE-TNS CAN PASS TEST.
       'John will can pass the test.'

69.   [FUTURE-ADV]$_{Variable\ path\ length}$ j-o-h-n   BUY   CAR
       'In the future John will buy a car.'

70.   j-o-h-n   BUY   CAR   [FUTURE-ADV]$_{Variable\ path\ length}$
       'John will buy a car in the future.'

                                                                            _____ neg
70'. *   j-o-h-n [FUTURE-ADV]$_{Variable\ path\ length}$ NOT BUY CAR
       'John will not buy a car in the future.'

                                                                            _____ neg
70''.   j-o-h-n [FUTURE-TNS]$_{Fixed\ path\ length}$ NOT BUY CAR
       'John will not buy a car in the future.'

See fuller explanations and complete data in ABKN, in press, b.

Spread of Non-manual Grammatical Marking

Conclusions of our previous research	Alternative proposals	and their source
• Non-manual markers are associated with heads of functional projections.	Non-manual markers are linked only to C.	Petronio (1993).
• Non-manual marking spreads *optionally* over its c-command domain.	Non-manual wh-marking spreads *obligatorily* over the whole clause.	Lillo-Martin (1994), counter to Lillo-Martin & Fischer (1992).
• Non-manual marking is obligatorily realized over manual material.	Non-manual wh-marking is obligatorily realized over manual material. In the case of "covert" questions, the wh-marking must show the wh scope.	Lillo-Martin & Fischer (1992).
- The otherwise optional spread of non-manual marking over its c-command domain therefore becomes obligatory if required to ensure the realization of non-manual marking over manual material.		
- With *in situ* wh-words, wh-marking is obligatory over the entire IP (in order for the non-manual wh-marking associated with C to be realized).	With *in situ* wh-words, wh-marking optionally spreads over the entire IP.	Lillo-Martin & Fischer (1992), counter to Lillo-Martin (1994).

Wh-movement

Conclusions of our previous research	Alternative proposals	and their source
• Wh-words optionally move *rightward* to Spec of CP.	Wh-words optionally move *leftward* to Spec of CP.	Lillo-Martin, 1990. (Also assumed in Fischer, 1990; Romano, 1991; and Petronio, 1992, who claims that final wh-words are in a distinct Focus position; the existence of P's Focus position (but not of leftward wh-movement) is also assumed by Wilbur, in press.) Petronio (1993) assumes leftward movement of a "twin" wh-element and analyzes sentence-final wh-words as base-generated "doubles" occurring in C.
• Extraction of wh-words from an embedded clause to the Spec of the matrix CP occurs regularly, in main clause questions. Wh-marking optionally spreads over the c-command domain of the +wh C.	It does not occur.	Lillo-Martin (1990), who explains it in terms of "parameterization" of the binding theory.
	Extraction occurs, but with leftward wh-movement.	Petronio (1993); Lillo-Martin (1994).
	The wh-word from the embedded sentence may remain in the Spec of the lower clause.	Petronio (1993:122).
• Extraction of wh-words from an embedded clause to the Spec of the lower CP regularly occurs with verbs that subcategorize for wh-complements. Wh-marking optionally spreads over the c-command domain ofthe +wh C.	It does not occur.	Lillo-Martin (1990).
	Extraction *must* occur from such clauses, leftward to the Spec of the lower CP. The wh-word may not remain *in situ.* There is no non-manual wh-marking in such constructions.	Petronio (1993:117-118).

Wh-Movement

Wh-words move to the right, or they may remain *in situ.*

How to decide between rightward and leftward wh-movement? The labelled columns contain the sentences predicted to be grammatical assuming leftward/rightward movement. Those that are ~~struck through~~ represent data that are equally consistent with the alternative hypothesis, and thus not decisive.

Leftward movement ?	*In situ*	Rightward movement ?
	1. $\overline{\qquad\qquad\text{wh}}$ j-o-h-n LOVE WHO 2. $\overline{\qquad\qquad\text{wh}}$ WHO LOVE j-o-h-n	
3. *? $\overline{\qquad\qquad\text{wh}}$ WHO j-o-h-n LOVE 4'. $\overline{\qquad\qquad\text{wh}}$ ~~WHO t LOVE j-o-h-n~~		5. $\overline{\qquad\qquad\text{wh}}$ LOVE j-o-h-n WHO 6'. $\overline{\qquad\qquad\text{wh}}$ ~~j-o-h-n LOVE t WHO~~

How to distinguish *in situ* wh-words in object position (e.g., (1)) from object wh-words in Spec of CP (e.g., (8'))?
 • Position with respect to IP-final adverb.

Evidence that (10) involves rightward movement	7. [j-o-h-n LIPREAD m-a-r-y YESTERDAY]$_{IP}$ 9. $\overline{\qquad\qquad\text{wh}}$ [j-o-h-n LIPREAD WHO YESTERDAY]$_{IP}$	12.*[j-o-h-n LIPREAD YESTERDAY]$_{IP}$ m-a-r-y 10. $\overline{\qquad\qquad\text{wh}}$ [j-o-h-n LIPREAD t YESTERDAY]$_{IP}$ WHO

How to distinguish *in situ* wh-words in subject position ((2)) from a subject that has moved left to Spec of CP ((7'))?
 • Non-manual spread distinguishes *in situ* and moved cases.

Evidence that (2) does not involve leftward movement:	Spread over entire clause is obligatory with *in situ* wh-words: 9'.* [j-o-h-n LIPREAD $\overline{\text{WHO}}^{\text{wh}}$ YESTERDAY]$_{IP}$ 2'.* [$\overline{\text{WHO}}^{\text{wh}}$ LOVE j-o-h-n]$_{IP}$	10'. [j-o-h-n LIPREAD t YESTERDAY]$_{IP}$ $\overline{\text{WHO}}^{\text{wh}}$ 6'. [t LOVE j-o-h-n] $\overline{\text{WHO}}^{\text{wh}}$

Optional spread of non-manuals over c-command domain

11. JOHN $\overline{\text{NOT}}^{\text{neg}}$ [BUY HOUSE]$_{VP}$
 'John did *not* buy a house.'

12. JOHN $\overline{\text{NOT}\qquad\text{[BUY HOUSE]}}^{\text{neg}}$$_{VP}$
 'John did not buy a house.'

13. $\overline{\qquad\qquad\text{wh}}$
 [JOHN BUY t$_i$ YESTERDAY]$_{IP}$ WHAT$_i$
 'What did John buy yesterday?'

14. $\overline{\qquad\qquad\qquad\text{wh}}$
 [JOHN BUY t$_i$ YESTERDAY]$_{IP}$ WHAT$_i$
 'What did John buy yesterday?'

Obligatory spread as required for realization of non-manual marking with manual material

15-a. * JOHN [   ]$_{Neg}$ BUY HOUSE
 'John did not buy a house.'

15-b. JOHN $\overline{\text{[   ]}_{Neg}\text{ BUY HOUSE}}^{\text{neg}}$
 'John did not buy a house.'

16-a. * [[JOHN BUY WHAT YESTERDAY]$_{IP}$ [   ]$_{C\,[+wh]}$]

16-b. * [[JOHN BUY $\overline{\text{WHAT}}^{\text{wh}}$ YESTERDAY]$_{IP}$ [   ]$_{C\,[+wh]}$]

16-c. [$\overline{\text{[JOHN BUY WHAT   YESTERDAY]}_{IP}\text{ [   ]}_{C\,[+wh]}}^{\text{wh}}$]
 'What did John buy yesterday?'

Extraction to [Spec, CP] of embedded clause vs. matrix clause, with optional spread of non-manual over c-command domains

$\overline{\quad\text{wh}\quad}$

1. $[_{CP_1}$ $[_{IP_1}$ JOHN WONDER $[_{CP_2}$ $[_{IP_2}$ MARY BUY t_i $]_{IP_2}$ $\overline{\text{WHAT}_i}$ $]_{CP_2}$ $]_{IP_1}$ $]_{CP_1}$

$\overline{\qquad\qquad\qquad\text{wh}\qquad}$

2. $[_{CP_1}$ $[_{IP_1}$ JOHN WONDER $[_{CP_2}$ $[_{IP_2}$ MARY BUY t_i $]_{IP_2}$ WHAT$_i$ $]_{CP_2}$ $]_{IP_1}$ $]_{CP_1}$

$\overline{\qquad\qquad\qquad\qquad\qquad\text{wh}\qquad}$

3. * $[_{CP_1}$ $[_{IP_1}$ JOHN WONDER $[_{CP_2}$ $[_{IP_2}$ MARY BUY t_i $]_{IP_2}$ WHAT$_i$ $]_{CP_2}$ $]_{IP_1}$ $]_{CP_1}$

'John wonders what Mary bought.'

$\overline{\quad\text{wh}\quad}$

4. $[_{CP_1}$ $[_{IP_1}$ TEACHER EXPECT $[_{CP_2}$ $[_{IP_2}$ t_i PASS TEST $]_{IP_2}$ $]_{CP_2}$ t_i $]_{IP_1}$ $\overline{\text{WHO}_i}$ $]_{CP_1}$

$\overline{\qquad\qquad\qquad\qquad\qquad\qquad\text{wh}\qquad}$

5. * $[_{CP_1}$ $[_{IP_1}$ TEACHER EXPECT $[_{CP_2}$ $[_{IP_2}$ t_i PASS TEST $]_{IP_2}$ $]_{CP_2}$ t_i $]_{IP_1}$ WHO$_i$ $]_{CP_1}$

$\overline{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\text{wh}\qquad}$

6. $[_{CP_1}$ $[_{IP_1}$ TEACHER EXPECT $[_{CP_2}$ $[_{IP_2}$ t_i PASS TEST $]_{IP_2}$ $]_{CP_2}$ t_i $]_{IP_1}$ WHO$_i$ $]_{CP_1}$

'Who did the teacher expect to pass the test?'

Multiple Occurrences of wh-words in a sentence due to the presence of a wh-topic coreferent with a later wh-word

$\overline{\qquad\qquad\qquad\qquad\qquad\text{wh}}$

7. JOHN BUY YESTERDAY WHAT

'What did John buy yesterday?'

wh/topic

$\overline{\qquad\qquad\qquad\qquad\qquad\text{wh}}$

8. WHAT, JOHN BUY YESTERDAY WHAT

'What, what did John buy yesterday?'

wh/topic

$\overline{\qquad\qquad\qquad\qquad\qquad\text{wh}}$

9. WHAT, JOHN BUY WHAT YESTERDAY

'What, what did John buy yesterday?'

$\overline{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\text{wh}}$

10. * [JOHN BUY WHAT YESTERDAY $]_{IP}$ WHAT

- -

Arguments that the initial wh-word in 8 and 9 is a topic

I. It occurs outside of another topic (cf. Aarons, 1994). Therefore it is a topic and a base-generated topic (since a base-generated topic can have nothing intervening between it and the following CP).

$\overline{\quad\text{wh}}$ topic marking (2) $\overline{\qquad\qquad\qquad\text{wh}}$

11. WHO, VEGETABLE, PREFER CORN WHO

II. It can co-occur with a wh-word *in situ* (cf. 9 and10), which shows that it is base-generated rather than moved. This is a problem for DLM and P,because leftward movement of a wh-word to Spec, CP should leave the original position empty.

III. There are cases with non-manual manifestation of topic marking on the sentence-initial wh-word (cf. also Baker-Shenk).

IV. As with topics, the more specific NP occurs in topic position while a later coreferential NP may be less specific.

$\overline{\text{topic}}$

12. JOHN$_i$, IX$_i$ EAT CORN

13. * IX$_i$, JOHN$_i$, EAT CORN

$\overline{\quad\text{wh}}$ $\overline{\qquad\qquad\qquad\text{wh}}$

14. WHO, LOVE JOHN Wh-word

$\overline{\qquad\text{wh}}$ $\overline{\qquad\qquad\qquad\text{wh}}$

15. * Wh-word, LOVE JOHN WHO

Problem we have identified with our account

The obligtory spread of wh-marking over clauses following wh-topics.

$\overline{\quad\text{wh}}$ $\overline{\qquad\qquad\qquad\qquad\text{wh}}$

16. WHO BUY BOOK YESTERDAY WHO

$\overline{\quad\text{wh}}$ $\overline{\qquad\quad\text{wh}}$

17. * WHO BUY BOOK YESTERDAY WHO

Proposed account of this phenomenon:

Utterance-internally, certain channels engaged once but which will be engaged again remain in position. This is a kind of harmony process that occurs both manually or with facial expressions.

$\overline{\qquad\qquad\qquad\qquad\qquad\qquad\text{wh}}$

18. WHO, VEGETABLE, PREFER CORN WHO

$\overline{\quad\text{wh}}$ - - - - - - - - - - - $\overline{\text{wh}}$

19. nd: WHAT- - - - - - - - - - - - - - - - -WHAT

  d: WHAT, JOHN LIKE WHAT

$\overline{\text{topic}}$ - - - - - - - - - - - - - -

20. * JOHN$_i$, , IX$_i$ EAT CORN.

See similar examples with classifiers described in Kegl (1985) as "theme chaining."

Note: "nd" refers to the non-dominant hand, while "d" indicates the dominant hand.

Mulitple occurrences of wh-words due to presence of a wh-word in the tag

```
   _____wh      ____wh
21. WHO   LIKE   JOHN,      WHO
```

Note the distinct articulation of WHO (first observed by Petronio) appearing in the tag, which correlates with the headnod found in the tag portion of affirmative sentences with a non-realized Verb:

```
                         ____hn
22. JOHN  WILL  GO,  WILL
```

Disputed data points

```
                                                          _____wh
   _____wh                        24. WHO   STEPHANIE   LOVE  Wh-sign   [ABKN]
23. WHO   STEPHANIE   LOVE        [DLM / *ABKN]
```

```
   _____wh                        ____wh_ _ _ _ _ _ _ _ _ _ _ _ ____wh
25. WHAT YOU READ BOOK            [DLM]                    28. nd:  WHAT- - - - - - - - - - - - - - - - - -WHAT      [NKB]
                                                              d:   WHAT,    YOU READ BOOK  WHAT
```

[**ABKN on the reading given by DLM:
       'What book did you read?'
but ok as: 'What did you read, a book?']

```
                                                          ____wh_ _ _ _ _ _ _ _ _ _ _ _ _ ____wh
   _____wh                        29. nd:  WHICH- - - - - - - - - - - - - - - -WHICH     [NKB]
26. WHICH YOU LIKE FLAVOR       [DLM]                          d:   WHICH YOU LIKE FLAVOR   WHICH
```

[**ABKN on the reading given by DLM:
       'Which flavor do you like?'
but ok as: 'Which do you like as your favorite?'
since 'favorite' and 'flavor' are in many dialects homophenous]

```
                                                          _____wh_ _ _ _ _ _ _ _ _ _ _ _ _ _____wh
   _____wh                30. nd:  Wh-MANY- - - - - - - - - - - - - - - - - - - Wh-MANY
27. Wh-MANY YOU  HAVE CHILDREN       [DLM]                    d:   Wh-MANY YOUHAVE CHILDREN  Wh-MANY
                                                                                                [NKB]
```

[**ABKN on the reading given by DLM:
       'How many children do you have?'
but ok as: 'How many of you have children?']

```
                                                          _____wh
                                                          31. BUY BOOK WHO                 [ABKN]
```

[*DLM, except on the reading: 'Someone bought a book. Who was it?' or where the wh-word is prosodically separate and may be in a 'tag'. However, see generalization at top of page: wh-tags cooccur only with wh-questions.]

```
   _____wh
32. %WHO TEACHER EXPECT PASS TEST   [% P /*ABKN]
   'Who does the teacher expect to pass the test?'
```

```
                                               _____wh
                                               33. TEACHER  WONDER  PASS TEST  WHO  [A]
```

[*P and *DLM except on the reading where the embedded clause is a direct quote or role shift.]

Potentially problematic data for our analysis

While this appears to involve leftward movement within the embedded clause, we would argue that these are not wh-clauses, that KNOW does not subcategorize for a wh-complement, but rather that WHAT has moved to topic position, as in

```
   _ _ _____hn
34. JOHN  KNOW  WHAT  MARY   BUY  [ABKN]
   ' Joh knows what Mary  bought.'
```

```
                       _ _ _____hn
                       35. JOHN  KNOW  NAME BOOK  MARY   BUY
                          ' Joh knows the name of the book Mary  bought.'
```

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Syntactic structure for the ASL sentence proposed by ABKN

positions for left
dislocations and
topics
(including wh-topics)

XP

XP   Persp-P

"role shift"   Persp   CP

CP   XP

positions for
right dislocation   CP   TAG

position to which
wh-words may
move   CP   XP

C'   Spec

usual s-structure
subject position   TP   C

NP   T'

TENSE
(position for
modals, future
marker, e.g.)   T   Neg P

Neg'

NEGATION
(position for
'NOT', 'NEVER')   Neg   AGR$_S$ P

AGR$_S$ '

AGREEMENT
(subject)   AGR$_S$ AspP

Asp'

ASPECT
(e.g., perfective
'FINISH')   Asp   AGR$_O$ P

AGR$_O$ '

AGR$_O$ VP

V'   NP

Position in which
SUBJECT
originates
(and under certain
circumstances,
where it remains)   (clitic)   V'

TAG consisting of
reduced version of
main clause (CP),
including (potentially)
TENSE, affirmative
or negative marking,
NP subject, wh-word

shares essential
features of
main clause
(tense, polarity,
question-status)

Main clause