

θ -Features and Projection

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Thematic roles (or θ -roles) were originally introduced by Gruber and Jackendoff in the **semantic description** of predicates. θ -roles identify recurring parts that individuals play in the actions/states that predicates describe; e.g., agent, theme, instrument, etc.

- (1) a. John opened the lock using that key
 b. Mary surprised Bill with a new idea
Agent: John, Mary
Theme: the lock, Bill
Instrument: that key, a new idea

Chomsky (1981) promotes θ -roles from semantic description to a central place in **syntactic composition**. LF becomes sensitive to their presence:

“Let us assume that LF must be so designed that such expressions as *the man, John, he* are assigned θ -roles, that is, are assigned the status of terms in a thematic relation. Let us call such expressions ‘arguments’.” (p. 35)

Special grammatical principles regulate interaction between θ -roles and structure, e.g., the θ -Criterion:

“Each argument bears one and only one θ -role, and each θ -role is assigned to one and only one argument.” (p. 36)

This importance persists in the Minimalist Program (Chomsky 1995). The core structure-building operation of External Merge is conditioned by θ -role assignment.

Questions: What are θ -roles? What does it mean to assign a θ -role? Where does this device fit in C_{HL} ?

Developing ideas by Hornstein (1999), I pursue the following views,

- θ -roles should be understood as syntactic features - **θ -features**
- θ -role assignment should be understood as **θ -feature agreement**
- θ -features show the properties of features generally: they exhibit interpretable/non-interpretable, valued/nonvalued instances, and show concord.

Follow-up Reaction/Question: Well, yes, but in the MP, what else could they be?

Executing θ -roles as features is not obvious. It requires (I believe) the right semantic conception to accompany it. I begin by considering some simple issues of the syntax-semantic mapping.

1.0 What Contributes θ -relations?

On traditional semantic views, predicates denote n-ary relations and 0 nominals denote the individuals related. The analysis of (2) is (3a) (ignoring tense) and the mapping of sentence parts to semantic contributions is (3b). The same holds in Davidson’s original (1967) event analysis (4); addition of *e* is “inert” in this respect.

(2) Mary gave John Fido

- (3) a. **give'**(*m,j,f*)
 b. *gave* \rightarrow $\lambda z\lambda y\lambda x[\text{give}'(x,y,z)]$
Mary \rightarrow **m**
John \rightarrow **j**
Fido \rightarrow **f**

- (4) a. $\exists e[\text{give}'(m,j,f,e)]$
 b. *gave* \rightarrow $\lambda z\lambda y\lambda x\exists e[\text{give}'(x,y,z,e)]$
Mary \rightarrow **m**
John \rightarrow **j**
Fido \rightarrow **f**

Consider now (5a), the neo-Davidsonian event analysis. One possible mapping is (5b), paralleling (3b) and (4b): nominals denote bare individuals; the V-meaning folds in the relations they participate in. But another potential mapping is (5c), where V denotes a bare event predicate, and nominals contribute individuals together with their thematic relations:

- (5) a. $\exists e[\text{give}'(e) \ \& \ \text{Ag}(e,m) \ \& \ \text{Gl}(e,j) \ \& \ \text{Th}(e,f)]$
 b. *gave* \rightarrow $\lambda z\lambda y\lambda x\exists e[\text{give}'(e) \ \& \ \text{Ag}(e,x) \ \& \ \text{Gl}(e,y) \ \& \ \text{Th}(e,z)]$
Mary \rightarrow **m**
John \rightarrow **j**
Fido \rightarrow **f**
 c. *gave* \rightarrow **give'(e)**
Mary \rightarrow **Ag(e,m)**
John \rightarrow **Gl(e,j)**
Fido \rightarrow **Th(e,f)**

(5b) is the view of Parsons (1990) wherein events and θ -relations represent a “subatomic” analysis verbal meaning. Call this the “P Analysis”. (5c) is the proposal of Krifka (1989,1992), wherein θ -relations are not part of the verb’s meaning at all. Call this the “K Analysis”.

2.0 Semantic Attractions of the K-Analysis

The P Analysis has a simple compositional implementation using familiar function application (6a,b):

3.0 Implications of the K Analysis

The K analysis alters our views of selection and the relation of arguments to other sentence elements.

3.1 Selection is not Semantic

The standard view of selection is that it's rooted in **meaning** - in the semantics of the predicate. On this picture, the incompleteness we sense in (17a,b) is something like "failure to express a complete thought" or "failure to spell all participants that the meaning requires".

- (17) a. Mary hit. (*Hit who?*)
 b. Bill demands. (*Demands what?*)

Frege: Predicates are "incomplete" or "unsaturated" expressions. They have "open positions". They require arguments to complete/saturate/fill them and express a complete thought.

Higginbotham (1985): Predicates have a " θ -grid" represented as a numbered sequence $\langle 1 \rangle$, $\langle 1,2 \rangle$, $\langle 1,2,3 \rangle$. As predicates combine with arguments, positions are "starred" in the grid, representing θ -assignment (18a). This correlates transparently with function-argument application (18b):



The K analysis does not support this view of selection. Verbs denote unary event predicates. No non-event individuals are required to "complete" them. (17a,b) correspond to well-formed event representations with determinate truth-vals (19a,b).

- (19) a. $\exists e$ [hitting(e) & Ag(e,m)]
 b. $\exists e$ [demanding(e) & Ag(e,b)]

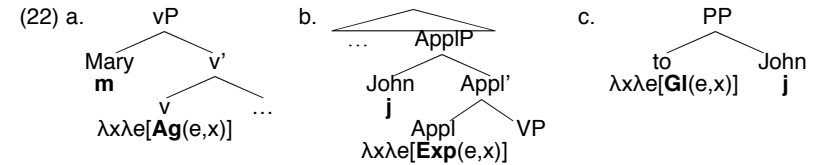
Whatever selection relation exists between verb and object, it's not semantic. This is already suggested by alternations like (20a,b) (from Carlson 1982) and (21a,b):

- (20) The donkey kicked (**Bill**).
 a. $\exists e$ [kicking(e) & Ag(e,d)]
 b. $\exists e$ [kicking(e) & Ag(e,d) & Th(e,b)]
- (21) a. John wrote that letter (**carefully**).
 $\exists e$ [writing(e) & Ag(e,i) & Th(e,l) & careful(e,C)]
 b. John worded that letter *** (carefully)**.
 $\exists e$ [wording(e) & Ag(e,i) & Th(e,l) & careful(e,C)]

Presence/absence of *Bill* in (20) doesn't yield an obvious meaning difference in *kick*. *Carefully* seems to function identically in (21a,b) but is required only in the second.

3.2 Functional Heads do not "Introduce Arguments" Semantically

If predicates don't require nominal "arguments" semantically, then neither can they be semantically responsible for "introducing" them into syntactic representation. This applies equally to lexical and functional heads.



Kratzer (1996) suggests a "little v"/Voice head supplies the θ -relation of the subject/external argument (22a). Pylkkänen (2002, 2008) takes an Appl head to supply the θ -relation of experiencer arguments in applicative constructions (22b). Many assume that Ps like *to* provide a θ -relation for their objects (22c).

On the K analysis, these proposals are wrong. And again, our analysis of focus is incompatible with them. Consider (23a-c). In each case, the relevant nominal must come with its θ -relation. This is not possible with under (22a-c):

- (23) a. MARY kissed John
 $\exists e$ [kissing(e) & Th(e,j)] (**Ag(e,m)**)
 b. Mary gave JOHN Fido
 $\exists e$ [giving(e) & Ag(e,m) & Th(e,f)] (**Exp(e,j)**)
 c. i. It was TO JOHN Mary gave Fido.
 $\exists e$ [giving(e) & Ag(e,m) & Th(e,f)] (**GI(e,j)**)
 ii. It was JOHN Mary gave Fido to.
 $\exists e$ [giving(e) & Ag(e,m) & Th(e,f)] (**GI(e,j)**)

Whatever selection relation exists between v/AppI and their Specs, or Ps and their complements, it's not semantic.

3.3 Features & Agreement

The K analysis suggests a more strictly syntactic view of selection.

Hornstein (1999): Represent θ -roles as syntactic features - θ -features. Analyze selection/ θ -assignment as θ -feature agreement.

Pesetsky and Torrego (2004) take features to come in four varieties, according to whether they are **interpretable/uninterpretable** or **valued/unvalued** (24).

(24)

	INTERPRETABLE	UNINTERPRETABLE
VALUED	iF <i>val</i>	uF <i>val</i>
UNVALUED	iF	uF

Two occurrences of a feature can undergo agreement, producing two instances of what becomes a single feature:

(25) **Agree (Feature sharing version)**

- (i) An unvalued feature F (a probe) on a head H at syntactic location α (F_α) scans its c-command domain for another instance of F (a goal) at location β (F_β) with which to agree.
- (ii) Replace F_α with F_β , so that the same feature is present in both locations.

(26) ... uF[] ... uF[] ... \Rightarrow **AGREE** \Rightarrow ... uF[3] ... uF[3] ...

Only features **both** interpretable & valued will be legible to the interfaces. Thus for P&T, features like (27a-d) will be legible, but (28a-e) will not:

- (27) a. iFval[] b. iF[n] ... uFval[n]
 c. iF[n] ... uF[n] ... uFval[n] d. iF[n] ... uF[n] ... uF[n] ... uFval[n]

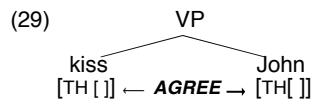
- (28) a. uFval[] b. uF[n] ... uFval[n]
 c. iF[] d. iF[n] ... uF[n]
 e. iF[] ... uFval[]

Summarizing:

- an interpretable occurrence of F will need to agree with a valued occurrence of F,
- a valued occurrence of F will need to agree with an interpretable occurrence of F,
- an uninterpretable, unvalued occurrence of F will need to agree with both.

3.4 θ -Features and θ -Agreement: predicate - object

Putting aside features that are iFval[] - both interpretable and valued, consider θ -features in P&T's terms. Suppose we have [AG], [TH], [GL], etc. Assume the selection relation between a predicate and an object is θ -feature agreement (29).



Questions:

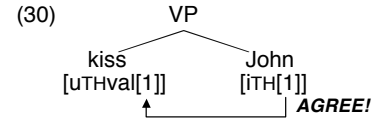
- Which elements of structure carry interpretable θ -features?
- Which elements of structure carry valued θ -features?
- Which elements of structure carry uninterpretable/unvalued θ -features?

K analysis implies:

θ -features are interpretable on argument nominals (not on predicates!).

Thus *John* in (29) should bear [iTH[]], which is interpreted at the interface as $\lambda e[\text{Th}(e,i)]$.

If [TH] is interpretable on *John* in (29), it's natural to assume [TH] is valued on V. Thus [iTH[]] probes [uTHval[]] on *kiss* and they agree (30):

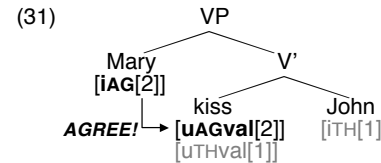


The result is an LF-legible feature.

Define **External Merge** as Merge accompanied by θ -feature agreement. (30) thus instantiates External Merge.

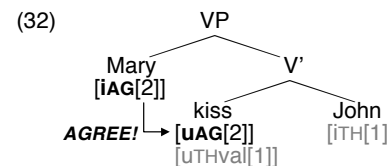
3.5 θ -Features and θ -Agreement: subject - predicate

Suppose we wish to merge a nominal *Mary* with structure (30) as subject. *Mary* should bear the interpretable θ -feature, here [AG]. If *kiss* bears a valued [AG] feature, things go as above. *Mary* combines by External Merge (31).



Thought experiment: Suppose predicates cannot bear more than a single valued θ -feature. I.e., suppose bundled features are treated like a single feature: only one value is allowed. Suppose that [TH] is the valued feature in the default case - a special status for themes.

If *kiss* bears an unvalued occurrence of [AG], *Mary* can still externally merge; θ -feature agreement can still occur (32):

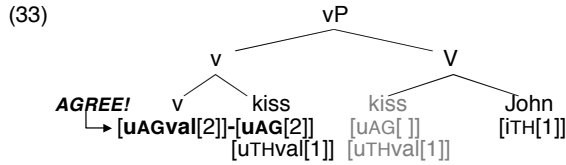


BUT [AG] is now unvalued. Unvalued features are interface illegible!

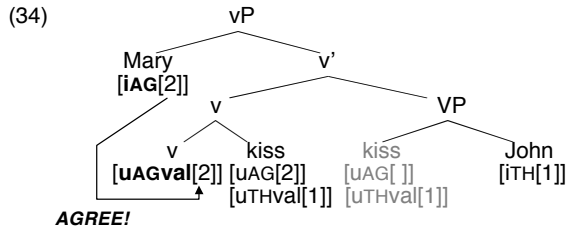
Suppose that when we select a Numeration containing a V, we're allowed to include a "light v" whose properties are the following:

- Light v:** Bears a strong V feature. Bears an EPP feature. May bear one valued occurrence of a θ -feature unvalued on a V with which it was selected.

This permits a Numeration that includes a light *v* carrying $[uAGval[]]$. Merge this with (30); *V* raises and *v-V* agree (33).



Mary can now merge with this structure, satisfying *v*'s EPP feature. Unvalued $[iAG[]]$ on *Mary* probes valued $[uAGval[2]]$ on *v* and Agrees. The result is LF-legible (34):



This reconstructs “little *v*,” but does so in a **purely formal role** – i.e., not as an empty causative, nor any sort of semantically contentful head, but rather as the bearer of a valued (uninterpretable) θ -feature.

Question: How do we know to merge in the order shown? I assume a version of the Thematic Hierarchy, and a constraint on order of agreement in sets of θ -features.

Thematic Hierarchy: $[AG] > [TH] > [GL] > [LOC] > \dots$

Constraint: a feature in a set can undergo agreement only if there are no lower-ranked, unagreed features in that set.

In (33), agreement with $[AG]$ in the set $\{[AG],[TH]\}$ for *kiss* occurs only after $[TH]$ undergoes agreement. Hence the constraint is satisfied.

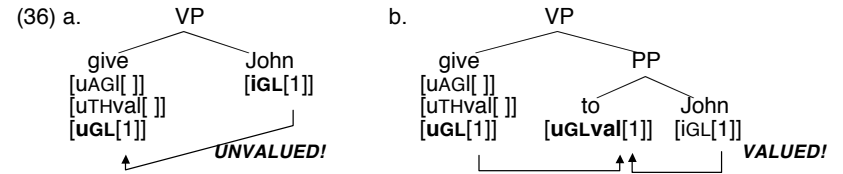
3.6 θ -Features and θ -Agreement: predicate – oblique argument

Consider ditransitive *give*. Suppose it has θ -features as in (35):

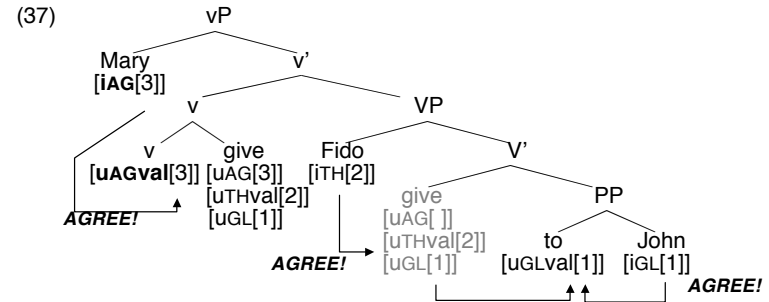
(35) *give* $\{[uAG[]], [uTHval[]], [uGL[]]\}$

This looks traditional: *give* selects an agent, a theme and a goal. But again, none of these θ -features is interpretable. And only one is valued!

Goal must merge first. But merging goal directly yields the problem encountered above: we get an interpretable but unvalued feature (36a). Suppose *P*, like *v*, can bear uninterpretable, valued θ -features. Then *P* can supply the missing value (36b):



The rest goes as before. The theme merges directly and unproblematically since $[TH]$ is valued on *give*. The agent is valued by little *v* (37):



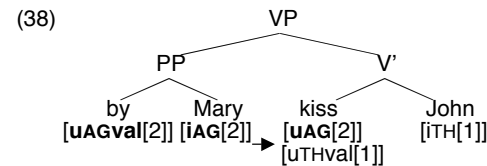
This reconstructs the function of *P* in a **purely formal role** – i.e., not as a θ -relation-contributing head, but again as the bearer of a valued (uninterpretable) θ -feature.

4.0 Voice Alternations

Here *v* and *P* can execute a similar function – valuing θ -features. This suggests an approach to voice alternations, where oblique and non-oblique forms alternate.

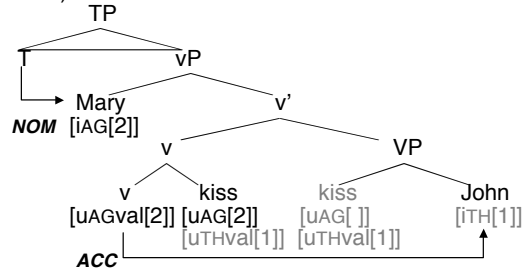
4.1 Passives & Unaccusatives

Thought experiment: If goal θ -features can be valued by *P*, as in (36) and (37), what about agent θ -features? *By* is associated with agency. In place of (34) above why can't we have (38)? (We must assume $[iAG[]]$ can c-command out of PP but this seems independently plausible; cf. *a letter by John to himself*):



Proposal: (38) is out for case reasons. Assume (following Chomsky 1995) that higher *T* bears a NOM feature and little *v* bears an ACC feature. In (34) *Mary* will be local to *T* and *John* local to *v*:

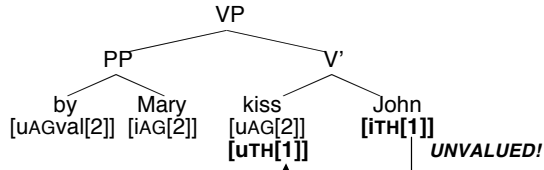
(34) (expanded)



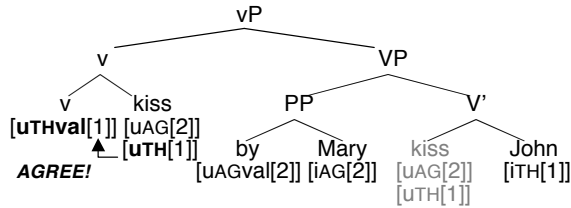
In the equivalent for (38), T will have nothing to agree with since PP intervenes between T and *John*. *John* itself will have no other local case probe. Fail!

Alternative: Suppose [TH] on *kiss* were “de-valued”. Merge with *John* now yields an interpretable but unvalued feature (39a). Since [TH] is unvalued on *kiss*, we may chose little v bearing a valued [TH] feature, merge it with VP, and raise V (39b).

(39) a.

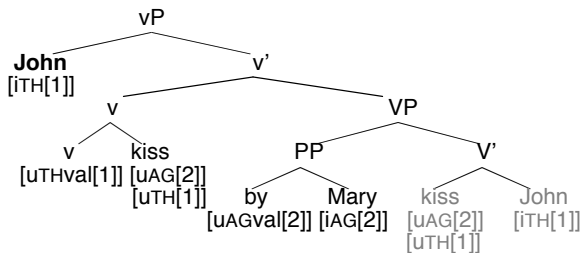


b.



Little v bears an EPP feature and agrees (through *kiss*) with *John*. Hence v can activate its EPP feature, raising the object to its Spec (40).

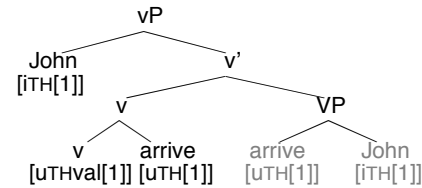
(40)



John is now accessible to higher T and can raise further to TP Spec, etc. This would derive Active-Passive alternation based on whether we value [AG] via little v or P.

Unaccusatives like *arrive* might then be seen as verbs with no agent feature and a lexically devalued theme.

(41)



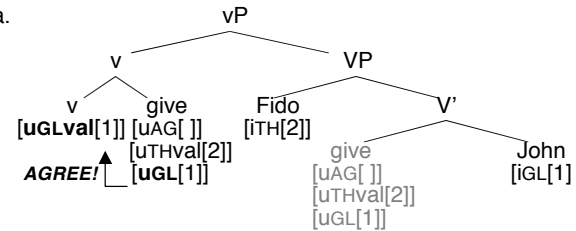
Aside: These proposals entail that passive and unaccusative subjects pass through vP Spec on their way to TP Spec. This seems right given preverbal position as a potential site for Q-stranding in both constructions:

- (42) a. The boys (both) will (both) have (both) been (**both**) fired by now.
- b. The boys (both) will (both) have (**both**) arrived by now.

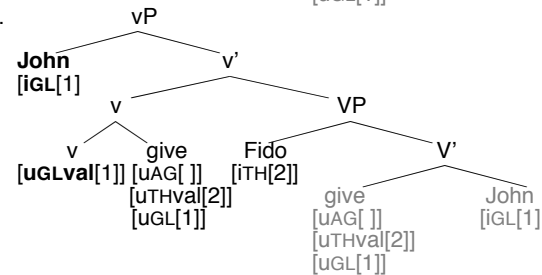
4.2 Applicative Shift (“A-Shift”)

In (37), we valued the low goal by means of P (*to*). Suppose instead we merge *John* directly, merge *Fido*, and then select little v bearing valued [GL]. V raises and v-V agree (43a). Little v bears an EPP feature and agrees (through *give*) with *John*. Hence v can activate its EPP feature, raising the object to its Spec (43b):

(43) a.



b.



5.0 Summary

- θ -roles and θ -assignment have had an odd status in syntactic theory since Chomsky (1981). They are both central and formally undefined. In my view, correct understanding requires the right semantics, and the right mapping of that semantics.
- Neo-Davidsonian semantics allows for a radical revision of our views about the mapping between θ -relations and structural elements: **K analysis**.
- K analysis: θ -relations come with nominals. They are contributed neither by lexical predicates nor by functional heads.
- K analysis underwrites a simple and attractive theory of focus.
- K analysis also implies selection has no semantic basis. It must be a purely syntactic matter. (Sorry Frege!)
- This paves the way for a view of θ -roles as **Hornsteinian θ -features** and θ -assignment as θ -feature agreement.
- Under the feature theory of Pesetsky & Torrego (2004), K analysis also yields a radical picture of θ -feature agreement: θ -features are valued on arguments but purely formal and uninterpretable elsewhere in the clause. In effect, syntactic computation strives to construct derivations in which arguments are valued, distributing effort among lexical and functional heads.
- Voice alternations may be seen to reflect a basic formal option for valuing θ -features:
 - (i) within the V system via little v (active transitives, applicatives)
 - (ii) independently of the V system via P (passives, obliques)
- This theory is not neo-Generative Semantics. Little v's are not the syntactic body-parts of dismembered, decomposing lexical items. [AG]-v is not CAUSE. [GL]-v is not HAVE. Both are uninterpretable formal objects, and *give* is just **give(e)** – a **Pietroskian event monad**. Neo-Davidsonian semantics encourages us to focus on thematic articulation of the syntactic skeleton, not on lexical forensics.

In my view, that's exactly where we should be looking.

Thank you!

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