

### 1. Introduction

- We demonstrate how a derivation based account of traditional Binding facts accounts for coreference relations in a variety of multi-object constructions.
- Why is (1) well-formed, but (2) ill-formed (Condition A effects)?
- Why is (3) well-formed (why isn't there a Condition A effect)?

- (1) (a) I showed John<sub>i</sub> himself<sub>i</sub> in the mirror.  
(b) I showed John<sub>i</sub> to himself<sub>i</sub> in the mirror. (Pesetsky 1995:125-126)
- (2) (a) \*I showed himself<sub>i</sub> to John<sub>j</sub> in the mirror.  
(b) \*I showed himself<sub>i</sub> John<sub>j</sub> in the mirror. (Pesetsky 1995:125-126)
- (3) Pictures of himself<sub>i</sub> worry John<sub>j</sub>. (Belletti & Rizzi:317)

- We account for these constructions without recourse to representational-level Conditions A-C (Chomsky 1981).
- Our account has been implemented using a computer model.
- A computer model aids theory development and verification.

### 2. Background

**Keyne 2002**

- A pronominal element and an antecedent originate within a doubling constituent of the form [Spec Head] where the Spec is the antecedent and the head is the pronominal.

- (4) [John him]

- A Spec can move out of a doubling constituent, but a head cannot.
- The Spec can only move out of a doubling constituent if the doubling constituent has moved.
- A reflexive DP (e.g., *himself*) contains a position for the doubling constituent to move to.

- (5) [[John him], [John him]<sub>i</sub>'s self]

- Problem: It is not clear why a doubling constituent must move in order for the Spec to be extracted.

**Phase Theory (Chomsky 2000, 2001, etc.):**

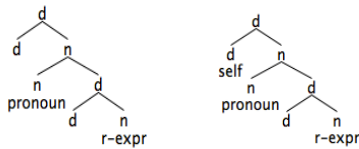
- A derivation proceeds in phases. The complement of a phase head is sent to Spell-Out separately from a phase edge.
- Phase-Impenetrability Condition: In phase  $\alpha$  with head H, the domain of H is not accessible to operations outside  $\alpha$ , only H and its edge are accessible to such operations. (Chomsky 2000:108)

### 3. Proposals

**Proposal 1: Doubling Constituent**

- We assume a modified version of Keyne's doubling constituent proposal.
- Proposed doubling constituent structures:

- (7) (a) pronoun and r-expression (non-phase)      (b) anaphor and r-expression (phase)



- A pronoun takes a DP r-expression complement.
- An anaphor (7b) contains a D phase head 'self'.
  - Morphological affixation between 'self' and a pronoun results in an anaphor
- (7a) lacks the phase head 'self' and is not a phase.

**Proposal 2: Last Resort**

- (8) Last Resort (LR)  
A Lexical Item (LI) with an uninterpretable feature that is in imminent danger of falling outside of a probe-goal scope relation will, if possible undergo internal merge into an available theta-position.

- The LR process enables us to assume a modified view of the Phase Impenetrability Condition: when a phase head is Merged, a lower phase, including the edge, is closed off.
- The LR process enables a syntactic object to escape from a phase.
- LR, at least with respect to certain constructions, does away with the need for the edge of a phase to be available to higher operations.

- (9) Last Resort:  $[_{XP} Z_{uFeat}] X^* \dots [_{YP} Y^* \dots Z_{uFeat}] \dots$

- $X^*$  and  $Y^*$  are phase heads. When  $X^*$  is Merged,  $Y^*P$  will be closed off.
- $Z$ , a DP with an uninterpretable feature, is subject to LR and undergoes internal merge into theta-position in the higher  $X^*P$ .
- These proposals predict (1-3).

### 4. Model

- We tested our theory with a computer model:
  - Basic probe-goal search of Phase Theory
  - Possibility of LR theta-Merge when a phase is closed off
  - Doubling constituent structure (7a-b)
- We assume multi-object PP structures, following Pesetsky (1995).

- (1) (a) I showed John<sub>i</sub> himself<sub>i</sub> in the mirror.  
•  $[_{VP} V [_{PP} Goal [_{P} G] Theme]]$   
• G is a null pronoun that assigns Case to a theme (Pesetsky 1995).

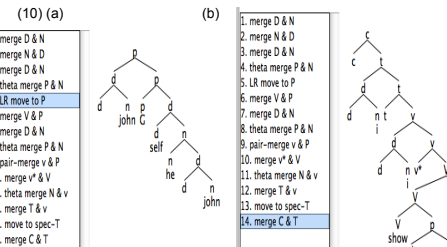
- (1) (b) I showed John<sub>i</sub> to himself<sub>i</sub> in the mirror.  
•  $[_{VP} V [_{PP} Theme to Goal]]$

- (3) Pictures of himself<sub>i</sub> worry John<sub>j</sub>.  
•  $[_{VP} CAUSv [_{PP} Goal [_{CAUSp} Theme]]$   
• CAUSp is a null P that assigns a causer theta-role but no Case.  
• CAUSv is a causative v that occurs in experienter constructions.

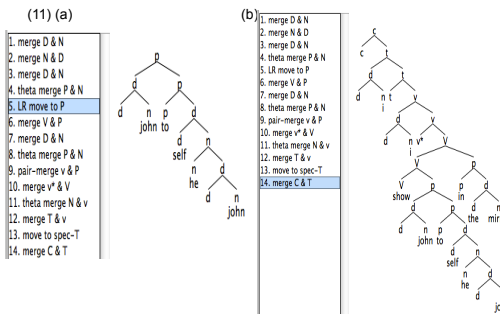
- P (in these double object constructions) is a phase head – it has full argument structure with a specifier and a complement (Chomsky 2000, 2001).

### 5. Derivations

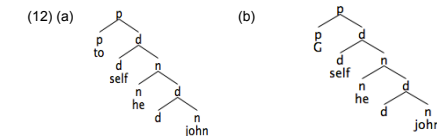
- (1) (a) I showed John<sub>i</sub> himself<sub>i</sub> in the mirror.  
• Doubling constituent is complement to the null pronoun G.  
• G is a phase head. When G is Merged, LR applies and 'John' is remerged in theta-position in [Spec, PP] (10a).  
• LR applies because 'John' lacks Case and a theta-role.



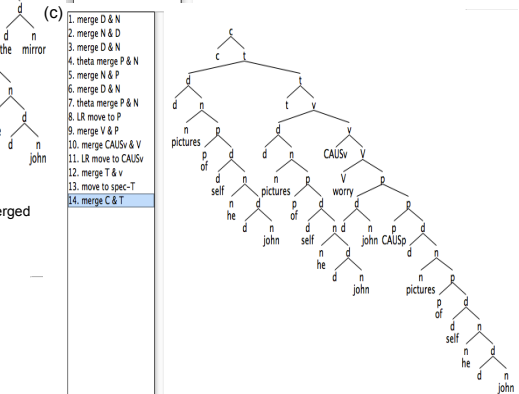
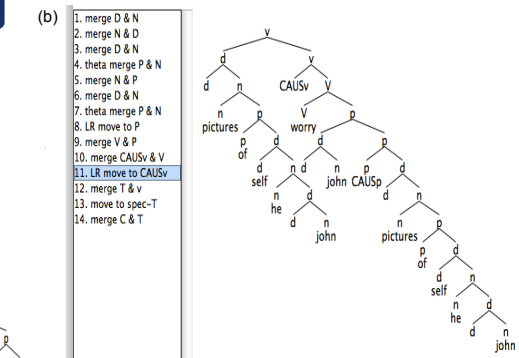
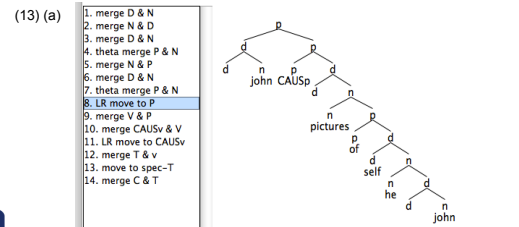
- (1) (b) I showed John<sub>i</sub> to himself<sub>i</sub> in the mirror.  
• When the P 'to' (a phase head) is Merged, LR applies and 'John' is Merged into theta-position (11a).  
• LR applies because 'John' lacks Case and a theta-role.



- (2) (a) \*I showed himself<sub>i</sub> to John<sub>j</sub> in the mirror.  
(b) \*I showed himself<sub>i</sub> John<sub>j</sub> in the mirror.  
• Assume the doubling constituent structure in (7b). In (2a-b), when P is Merged (12a-b), 'John' is subject to LR.  
• The anaphor is licensed in its base position and has no reason to move. (2a-b) cannot be derived.



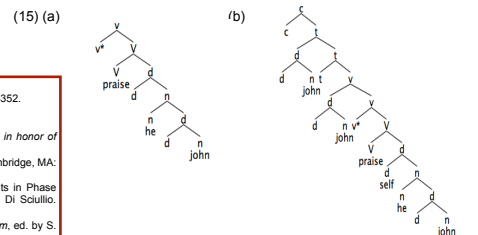
- (3) Pictures of himself<sub>i</sub> worry John<sub>j</sub>.  
• Doubling Constituent is base generated within a picture DP.  
• Picture DP Merges with CAUSp (null P that assigns a causer theta-role but no Case).  
• CAUSp is a phase head: 'John' undergoes LR to theta-position (13a).  
• LR applies because 'John' lacks Case and a theta-role.  
• Merge CAUSv (causative v that occurs in experienter constructions).  
• CAUSv is a phase head: 'pictures of himself' undergoes LR to theta-position (13b).  
• LR applies because 'pictures of himself' lacks Case.  
• Picture-DP gets causer theta-role twice (once from CAUSp and once from CAUSv).  
• A DP can be assigned the same theta-role multiple times (Pesetsky 1995).



### 6. Conclusion

- This work demonstrates how a derivation based analysis, motivated by the needs to achieve computational efficiency, accounts for a variety of coreference facts involving constructions that underlying have multiple objects.
- This work demonstrates how a computer model can be used to verify how well a theory works.
- We can also account for a variety of other data (see Fong and Ginsburg (To Appear)).

- (14) (a) \*John<sub>i</sub> praises him<sub>i</sub>.  
(b) John<sub>i</sub> praises himself<sub>i</sub>.
- In (14a), when  $v^*$  is Merged, 'John' is not contained within a phase that is about to be closed off and so LR cannot apply. See (15a).
  - In (14b), when  $v^*$  is Merged, 'John' is contained within a DP phase (due to the phase head 'self'). LR applies and 'John' moves to subject theta-position. See (15b)



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