

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_i himself_i in the mirror.
(b) I showed John_i to himself_i in the mirror. (Pesetsky 1995:125-126)
- (2) (a) *I showed himself_i to John_j in the mirror.
(b) *I showed himself_i John_j in the mirror. (Pesetsky 1995:125-126)
- (3) Pictures of himself_i worry John_j. (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]_i's self]

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

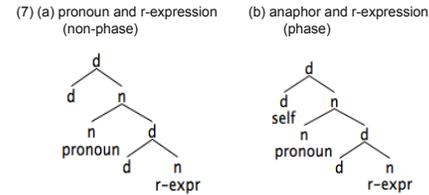
Phase Theory (Chomsky 2000, 2001, etc.):

- 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 α with head H, the domain of H is not accessible to operations outside α , 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:



- 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_i himself_i in the mirror.
• $[_{VP} V [_{PP} Goal [_{P} G] Theme]]$
• G is a null pronoun that assigns Case to a theme (Pesetsky 1995).

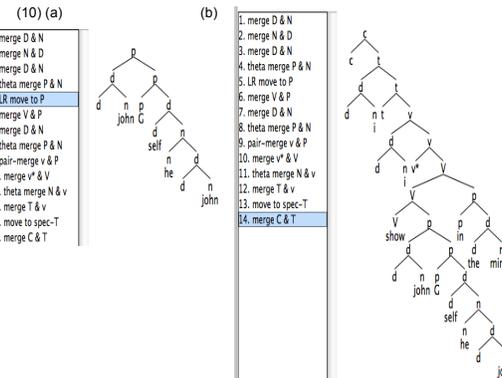
- (1) (b) I showed John_i to himself_i in the mirror.
• $[_{VP} V [_{PP} Theme to Goal]]$

- (3) Pictures of himself_i worry John_j.
• $[_{VP} CAUSv [_{PP} Goal [_{CAUSp} Theme]]$
• CAUSp is a null P that assigns a causer theta-role but no Case.
• CAUSv is a causative v that occurs in experienter constructions.

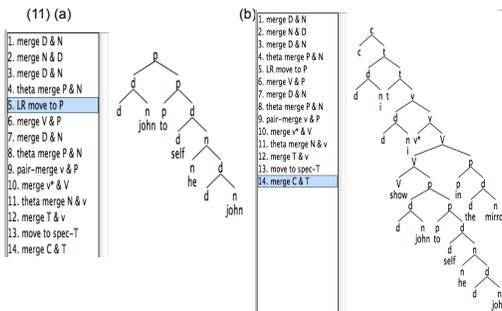
- P (in these double object constructions) is a phase head – it has full argument structure with a specifier and a complement (Chomsky 2000, 2001).

5. Derivations

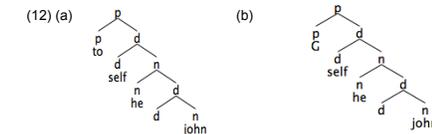
- (1) (a) I showed John_i himself_i in the mirror.
• Doubling constituent is complement to the null pronoun G.
• G is a phase head. When G is Merged, LR applies and 'John' is remerged in theta-position in [Spec, PP] (10a).
• LR applies because 'John' lacks Case and a theta-role.



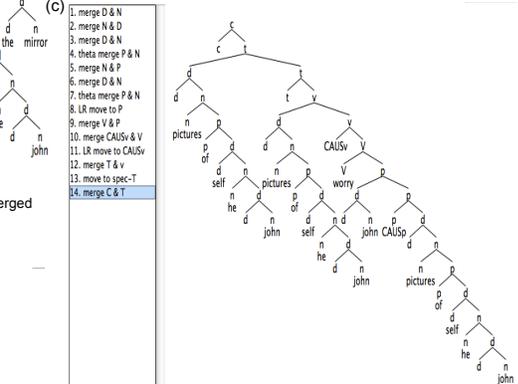
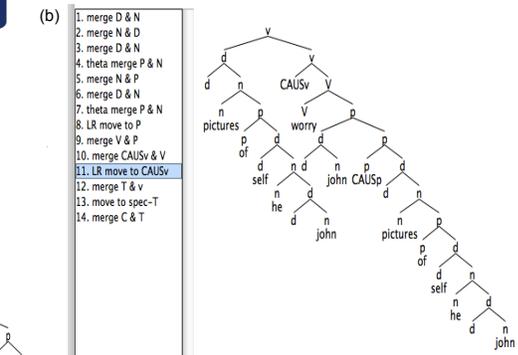
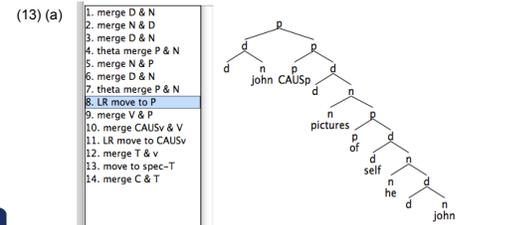
- (1) (b) I showed John_i to himself_i in the mirror.
• When the P 'to' (a phase head) is Merged, LR applies and 'John' is Merged into theta-position (11a).
• LR applies because 'John' lacks Case and a theta-role.



- (2) (a) *I showed myself_i to John_j in the mirror.
(b) *I showed myself_i John_j 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.



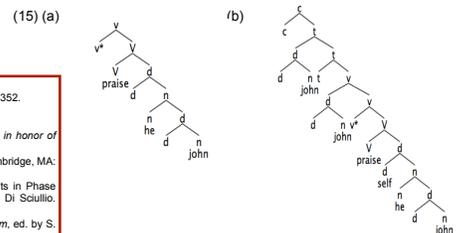
- (3) Pictures of himself_i worry John_j.
• Doubling Constituent is base generated within a picture DP.
• Picture DP Merges with CAUSp (null P that assigns a causer theta-role but no Case).
• CAUSp is a phase head: 'John' undergoes LR to theta-position (13a).
• LR applies because 'John' lacks Case and 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_i praises him_i.
(b) John_i praises himself_i.
- 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)



References
Belletti, A. & Rizzi, L. 1988. Psych-verbs and theta-theory. *Natural Language and Linguistic Theory* 6.291-352.
Chomsky, N. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.
Chomsky, N. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.
Chomsky, N. 2000. Minimalist inquiries: The framework. In *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, ed. by R. Martin, D. Michaels and J. Uriagereka, 89-155. Cambridge, MA: MIT Press.
Chomsky, N. 2001. Derivation by Phase. In *Ken Hale: A life in language*, ed. by M. Kenstowicz, 1-52. Cambridge, MA: MIT press.
Fong, S & J. Ginsburg. To Appear. Computation with doubling constituents: Pronouns and antecedents in Phase Theory. In *Towards a Bilingual understanding of grammar: Essays on interfaces*, ed. by A. M. Di Sciullo. Amsterdam: John Benjamins.
Kayne, R. 2002. Pronouns and their antecedents. In *Derivation and explanation in the Minimalist Program*, ed. by S. D. Epstein & T. D. Seely, 133-166. Malden, MA: Blackwell.
Pesetsky, D. 1995. *Zero syntax: Experiencers and cascades*. Cambridge, MA: MIT Press.