Overview of Binding Theory 1973-1986

A. "Conditions on Transformations" (1973)

(1) *The dog is believed [ ____ is hungry] (cf. The dog is believed [ ____ to be hungry])

(2) Tensed Sentence Condition (1st version)

No rule can involve X, Y in the structure

...X...-[e...Y...-]

where e is a tensed sentence

(3a) The candidates each hated the other(s) (cf. The candidates are hated ___)

b The candidates each expected [the other(s) to win] (cf. The candidates are expected [ ___ to win])

c The candidates each expected [that the other(s) would win]

A POSSIBLE ALTERNATIVE:

(4) Passive (i.e., NP preposing) and each-movement obey (2). "...one rule that obviously does not satisfy the condition is Coreference Assignment..." as in (6).

(5) John said that he would leave

(6) The candidates expected to defeat each other

(7a) *The men expected the soldier to shoot each other

b *The men expected [the other(s) to win]

c *The men expected [that the other(s) would win]

A POSSIBLE ALTERNATIVE:

(8) Specified Subject Condition (1st version)

No rule can involve X, Y in the structure

...X...-[e...Z...-WYV...-]

where Z is the specified subject of WYV in α

'Specified subject': See (18) below.

(9a) The men saw [s pictures of each other]

b *The men saw [John's pictures of each other]

c *J. is expected [M. to visit ___] [[Remember, 1973 is well before Case Theory was added.]]

(10a) *I saw me

b *I saw us

c *We saw me

d He saw him

e The soldiers shot the officers (among them)

(11) RI: *a rule of interpretation applying to the structure NP-V-NP (among other) [that] seeks to interpret the two NPs as nonintersecting in reference, and where this is impossible...it assigns 'strangeness'. cf. Postal's "Unlike Person Constraint". <The ancestor of LGB's Condition B.>

(12a) We expect [them to visit me]

b *We expect [me to visit them]

c We believe [I may still win]

(13) In (12a), c, RI is blocked by SSC and TSC, respectively

(14) No rule can involve X, Y in the structure

...X...-[e...Z...-WYV...-]

where (a) Z is the specified subject of WYV

or (b) Y is in COMP and X is not in COMP

or (c) Y is not in COMP and α is a tensed S

(15) "...under the analysis proposed here there is no necessity for a rule raising the subject of an embedded sentence to the object position of the matrix sentence..."

(16a) *We persuaded Bill [PRO to kill each other]

b We promised Bill [PRO to kill each other]

(17)a I (we) persuaded Bill [PRO to kill us]

RI X Z Y

b *I (we) promised Bill [PRO to kill us]

X Z Y

(18) Z is a specified subject with respect to X if it is not 'controlled' by (a category containing) X. (If Z is lexically specified, it is not controlled at all. PRO is controlled in the standard sense. Trace is controlled by its antecedent.)

(19a) *They appealed to John [PRO to like each other]

X Z Y

b They appeared to John [ to like each other]

X Z Y

(20a) We appealed to John [PRO to like us]

RI X Z Y

b *We appeared to John [ to like us]

X Z Y

A POSSIBLE ALTERNATIVE:

(21) Specified Subject Condition (Simplified version)

No rule can involve X, Y in the structure

...X...-[e...Z...-WYV...-]

where Z is the subject of WYV in α

AND NOW make the previously non-specified Zs (what I sometimes call transparent subjects) be Xs). Then there never need to be relations across a subject.

AND there is independent evidence that traces must, in fact, sometimes be Xs:

(22) Which men does Mary think [ Susan said [ t

(23a) The men like each other

b *The men want [John to like each other]

(24) Reciprocal interpretation assigns an appropriate sense to sentences of the form NP...each other

as nonintersecting in reference, and where this is impossible...it assigns 'strangeness'. cf. Postal's "Unlike Person Constraint". <The ancestor of LGB's Condition B.>

(25a) The men like them

b The men want [John to like them]

(26) Disjoint reference (DR) assigns disjoint reference to a pair (NP, pronoun) (and is constrained by the conditions).

(27a) John seems [t to like Bill]

b *John seems [Bill to like j]

(28) "...the relation between NP and the trace that it controls [is] a special case of bound anaphora..." That relation is constrained by the conditions. The conditions thus are conditions on surface structure applying to anaphora. (I have illustrated SSC. TSC is the same.) For examples like (21)-(22) above, Chomsky continued to assume the (1973) definition of 'specified subject'. In retrospect, it is clear that such a complication was unnecessary. Rather, instead of the transparent subjects not counting as Z, they would count as X.

(29) The rules of anaphora relate surface structures (enriched to include traces) to LF. Perhaps more generally, surface structure determines LF.

(30) John thought that Bill liked him (cf. (6) above)

(31) (30) is not a problem, as it does not involve a rule of sentence grammar at all. [The problem, of course, is "He thought that Bill liked John". The problem comes home to roost immediately below.]

(32a) Who said Mary kissed him

b Who said he kissed Mary

c Who did he say Mary kissed (Wasow's 'Strong Crossover')
A  An anaphor is (A-)bound in its GC.

b  John said he kissed Mary
c  He said Mary kissed John

(34) for which person x, he said Mary kissed x

(35) Taking a variable to function as a name, (32)c then reduces to (33)c.

C. "On Binding" (1980)

(36) (Certain cases of) SSC and TSC are reformulated as the Opacity Condition:

If \( i \) is an anaphor in the domain of the tense or the subject of \( \beta \), then \( i \) cannot be free in \( \beta \). NP or S'.

The conditions are now strictly on anaphors themselves, not on rules, and "Tense and Subject are 'operators' that make certain domains opaque." [But what about RI?]

(37) Which men did Tom think Bill believed [t saw each other]

(38) In the earlier theories, each other was assumed to take Which men as its antecedent. Aside from the semantic impropriety of that, the conditions would have blocked it. Now each other is coindexed with \( t \) and it is not free in any opaque context. [Question: Could an analogous move have been made before?]

(39) *They told me [what I gave each other]

(40) (39) illustrates a certain 'redundancy' in the Opacity Condition: it is excluded by both the SSC part and the TSC part. Hence, Chomsky broke it apart into two separate conditions, (41)a,b, with (41)b, the Nominative Island Condition, a narrower version of TSC involving only subjects of finite clauses. (41)a, as before, involves only non-subjects, in the simple examples at least.

(41a) If \( i \) is in the domain of the subject of \( \beta \), then \( i \) cannot be free in \( \beta \).

b  A nominative anaphor cannot be free in S containing S.

(42) They expected [that [[pictures of each other] would be on sale]]

(43) (42) violated TSC, evidently incorrectly, but does not violate NIC; each other is not in a nominative position.

(44) Who do they think [\( i \) [look t] Bill will see t]

D. Lectures on Government and Binding (1981)

(45) *Who do you think [that [t left]]

(46) In (45), \( t \) is not "properly governed." The theory of anaphora is not at issue. We are thus free to treat the trace of wh-movement as a name (rather than an anaphor) in accord with the treatment of strong crossover.

(47) The OB system treated PRO as an anaphor. This was too weak in that it didn't entail that PRO occurs only in ungoverned positions, and too strong in that 'long distance control' as in (48) would be incorrectly excluded by SSC.

(48) They thought I said [that [[PRO to feed each other] would be difficult]]

(49) In OB there is a sort of redundancy between the theories of Case and binding. They both pick out the subject of infinitives as special, but by totally different means.

(50) In OB the two configurations relevant to binding theory - subject of a finite clause and c-command domain of a subject - are in no way related.

(51) The OB indexing conventions are complicated. [I didn't give them here, but they are indeed complicated.]

(52) \( \alpha \) is bound by \( \beta \) if and only if \( \alpha \) and \( \beta \) are coindexed and \( \beta \) c-commands \( \alpha \).

\[ X \text{ c-commands } Y \text{ iff every } Z \text{ dominating } X \text{ also dominates } Y \]

\[ \alpha \text{ is } (A-) \text{ bound by } \beta \text{ iff } \beta \text{ binds } \alpha \text{ and } \beta \text{ is in an } A \text{-position} \]

\[ \alpha \text{ is } (A-) \text{ free if and only if it is not } (A-) \text{ bound.} \]

(53a) An anaphor is (A-)bound in its GC.

b  A pronominal is (A-)free in its GC.

c  An R-expression (fully lexical NP, or variable) is (A-) free.

(55) \( \alpha \) is a governing category for \( \beta \) if and only if \( \alpha \) is the minimal category [i.e., XP] containing \( \beta \), a governor of \( \beta \), and a SUBJECT accessible to \( \beta \).

(56) SUBJECT = AGR in a finite clause; NP of S in an infinitival; NP of NP in an NP.

(57a) *John, believes [[that] himself, is clever]

b  *They, believe [[that each other, are clever]

c  *Mary, is believed [[that] he, is clever]

(58) John, believes [[him, to be clever]

(59) *John, believes [[him, to be clever]

(60) John, believes [[that] he, is clever]

(61a) Mary believes [[them, to be clever]

(62) Infinitivals (at least some of them) are not barriers to government, either for Case assignment (61) or for establishment of governing category (57)-(60); cf. (49) above.

(63) *John, believe [[Mary, to like himself]

(64) John, believe [[Mary, to like him]

(65) *He, believe [[that] John, is clever]

(66) *He, believe [[Mary, to like John]

(67a) *We, heard [their stories about each other]

b  We, heard [some stories about each other]

(68) Does (56) successfully address (50)? Chomsky suggests that it does, in that SUBJECT of \( \alpha \) is the most prominent nominal element of \( \alpha \), taking INFL (which contains AGR) as the head of S. [But notice it cannot be the head of NP that counts as SUBJECT of NP, or (67)b will be ruled out alongside (67)a.]

(69) They, expected [that[[pictures of each other] would be on sale]]

(70) They, expected [that[[pictures of each other], AGR, would be on sale]]

(71) \( \mu \) is accessible to \( \beta \) iff \( \beta \) is in the m-command domain of \( \mu \) (and assignment to \( \beta \) of the index of \( \mu \) would not violate (72).)

\[ X \text{ m-commands } Y \text{ iff every } Z \text{ dominating } X \text{ also dominates } Y \]

\[ *[[\ldots]], \gamma \text{ and } \delta \text{ bear the same index.} \]

\[ (X, \epsilon) = \mu \text{ is accessible to } \beta \text{ iff } \beta \text{ is in the command m-command domain} \]

\[ \text{[and } \mu \text{ is not coindexed with any category properly containing } \beta \]. \]

\[ \text{[and assignment to } \beta \text{ of the index of } \mu \text{ would not violate (72).]} \]

\[ *[[\ldots]], \text{ (\emph{LGB} takes agreement to be instantiated via co-indexation, so a subject and AGR are coindexed.)} \]

(74) *John, thinks [that[[himself, AGR, will win]]

(75) They, think [[t, AGR, is a pity [that pictures of each other, are hanging on the wall]]

(76) *They, think [[t, AGR, bothered each other, [that s]]

(77) They, think [[t, AGR, is a pity [that pictures of them, are hanging on the wall]]

(78) They, expected [that[[pictures of them, AGR, would be on sale]]

(79) Problematically, anaphors and bound pronouns are not in full complementary distribution. (80) is a further illustration.

(80a) They read [each other's books]

b  They read [their books]

(81) John tried [PRO to leave]
*I like PRO
b *Susan spoke to PRO
c *John believes [PRO to be intelligent]
d *John's belief [PRO to be intelligent] e *John believes [PRO is intelligent]

Proposal: PRO is a pronominal anaphor [see (84)], hence, it must obey both (54)A and (54)B. That is, it must be both bound and free in its governing category. If it has a governing category, this is a contradiction, therefore it must have no GC. This (almost) entails that it must be unguoverned, the descriptive generalization covering (82). This deduction is standardly called the PRO theorem. It has the effect of permitting long distance control, by virtue of divorcing control from binding theory. See (47).

"...PRO is like overt pronouns in that it never has an antecedent within its clause or NP. PRO also resembles anaphors in that it has no intrinsic referential content but is either assigned reference by an antecedent or is indefinite in interpretation, lacking specific reference."

*Pictures of each other, \( \text{AGR} \) are on sale

Addendum to (55): A root sentence is a GC for a governed element.

(54)A-C are purely syntactic: they filter out structures based solely on their formal properties. Do we need any associated semantics? (Recall that Chomsky (1973) and Lasnik (1976) had semantic rules of (non-) coreference, or non-overlap in reference. Chomsky, in the 1979 draft of his 1981 "Markedness and Core Grammar" indicates that we no longer need such rules, saying "... we... need introduce no mention of the property of disjoint reference". Well, let's see:

John likes him can't mean that John likes himself.

John, likes him, Out by Cond. B. What prevents it from meaning John likes himself? NOTHING so far.

WE NEED SOME SEMANTIC RULES. A first attempt:

If two NPs have distinct indices then...

They like him

...then they are disjoint in reference.

We, like myself;

We, like myself,

If two NPS have identical indices, then they are coreferential.

We, think [I, will win]

The problem is that NPs have at least three referential relations: disjointness; identity; overlap. But two numerical subscripts are either identical or distinct. See (51). (98) is the cost of addressing (51) in the way that LGB does. Notice that Chomsky (1973) and Lasnik (1976) had no such problem, because they didn't use indices.

An expletive and its associated argument must be conduced to establish the appropriate Case and agreement relation. But such a structure seems to violate Condition C:

There, is a man, in the room

There's a man' in the room

Binding theory cares only about subscripts.

[Which book that John,] read did he, like \( \tau \)

He, liked [every book that John, read]

Who thinks that he, read [which book that John, likes]

...these examples provide prima facie evidence that the binding theory applies at S-structure, a conclusion that I will now adopt.