

### Subject movement and the problem of Determinacy

**Issue:** Chomsky (2019) and Chomsky et al. (2019) argue that syntax is deterministic in the sense that no ambiguous situation is allowed for subsequent rule application. Given Determinacy, a derivation will be ruled out when (1) is produced. In (1), two occurrences of XP (boxed for convenience) are created by movement as an intermediate step, to which a movement rule or Internal MERGE (IM) will ambiguously refer in the following derivation:

(1) [  $\overline{\text{XP}}$  [ ... [ ...  $\overline{\text{XP}}$  ... ] ] ]  $\rightarrow$  Determinacy violation

A Determinacy violation at (1) prevents the XP from moving further to a higher position.

However, Determinacy, though it may be considered a property following from efficiency principles, faces theoretical and empirical problems. Theoretically, as pointed out in Goto & Ishii (2019), it involves look-ahead: how does syntax know that (1) is indeterminate at the output of MERGE, that is, at the point when (1) is yielded? Empirically, Determinacy will rule out subject A'-movement. Consider this with subject *wh*-movement in (2):

(2) Who will give a talk at the conference?

In the derivation, as shown in (3), two occurrences of *who* are yielded via its movement to Spec,TP, to which IM will ambiguously apply in the following derivation; Determinacy will be violated when (3) is generated and *who* will not be able to move to Spec,CP, which is wrong:

(3) [  $\overline{\text{TP}}$   $\overline{\text{who}}$  [  $\overline{\text{T}}$  [  $\overline{\text{vP}}$   $\overline{\text{who}}$  [  $\overline{\text{v}}$  [ ... ] ] ] ] ]

Notice that the empirical problem persists under the revised notion of Determinacy proposed by Goto & Ishii (2019), who argue that a Determinacy violation occurs at the input of MERGE, that is, at the time when a rule actually applies in the subsequent derivation. Under this proposal, the creation of (3) itself is not a problem. However, IM will ambiguously refer to the occurrences of the *wh*-phrase at (4) when it applies, and a Determinacy violation occurs:

(4) [  $\overline{\text{CP}}$  [  $\overline{\text{C}}$  [  $\overline{\text{TP}}$   $\overline{\text{who}}$  [  $\overline{\text{T}}$  [  $\overline{\text{vP}}$   $\overline{\text{who}}$  [  $\overline{\text{v}}$  [ ... ] ] ] ] ] ] ]

**Proposal:** Given the assumption that an indeterministic situation or ambiguity is not allowed for computational efficiency, in this paper I claim that syntax is deterministic by nature: that is, *syntax is designed in such a way as to avoid indeterminacy from the beginning* and ambiguity or indeterministic situations like (1) and (3) will never arise. The key ingredient of this proposal is the notion “phase,” which is independently motivated for efficient computation. I argue that operations are strictly phase-based, with all operations except External Merge (including transforming operations like IM and valuation) applying at the phase level (Chomsky 2007, 2008, 2013). Given this strictly phase-based derivation, when TP is created in (2), *who* does not move and consequently, when CP is generated, there is only one occurrence of *who* in the CP phase (=5): that is, *who* in the Spec of vP:

(5) a. [  $\overline{\text{TP}}$   $\overline{\text{T}}$  [  $\overline{\text{vP}}$   $\overline{\text{who}}$  [  $\overline{\text{v}}$  [ ... ] ] ] ]      b. [  $\overline{\text{CP}}$  [  $\overline{\text{C}}$  [  $\overline{\text{TP}}$   $\overline{\text{T}}$  [  $\overline{\text{vP}}$   $\overline{\text{who}}$  [  $\overline{\text{v}}$  [ ... ] ] ] ] ] ]

Subject *wh*-movement can be generated in a deterministic manner.

The proposed phase-based Determinacy, however, may pose a problem. In (5), the Spec requirement, which is described as (6), fails to be satisfied since Spec,TP is skipped:

#### (6) The Spec Requirement

Finite T must have a Spec (EPP – Chomsky 1982; label weakness – Chomsky 2015; externalization – Mizuguchi 2019; contiguity – Richards 2016).

Notice that *who* cannot counter-cyclically move to Spec,TP to satisfy (6) as it tampers with the existing structure, violating the No-Tampering Condition (NTC). The relevant problem can be solved by MERGE. Mizuguchi (2019) claims that a head Y can be head-adjoined to another head X when it is pair-merged (Chomsky 2004, 2015), which produces a composite head with the properties of X since Y is asymmetric to X due to adjunction to X:

(7)  $X, Y \rightarrow \langle X, Y \rangle$

With this analysis in place, along with (5), (8) can be generated, where T becomes part of C for being externally pair-merged to C. In (8), T does not stand as an independent head and there is no empty Spec,TP:

(8) a. [  $\overline{\text{C}}$  [  $\overline{\langle \text{C}, \text{T} \rangle}$  [  $\overline{\text{vP}}$   $\overline{\text{who}}$  [  $\overline{\text{v}}$  [ ... ] ] ] ] ]      b. [  $\overline{\text{who}}$  [  $\overline{\langle \text{C}, \text{T} \rangle}$  [  $\overline{\text{vP}}$   $\overline{\text{t}}$  [  $\overline{\text{v}}$  [ ... ] ] ] ] ]

Head adjunction by pair-MERGE solves the Spec requirement problem and warrants deterministic rule application at the phase level;  $\langle \text{C}, \text{T} \rangle$  is a phase head as it bears the properties of C.

The proposed analysis also takes care of the *that*-trace effect (9), which Goto & Ishii (2019) argue is ruled out by Determinacy:

- (9) a. Which student does the professor think [will come to the conference]?  
 b. \*Which student does the professor think [that will come to the conference]?

I argue that in the embedded clause of (9a), just as in (2), the derivation goes as shown in (8), and Determinacy (as well as (6)) is not violated in the derivational process. On the other hand, in (9b), pair-MERGE cannot occur due to the overt complementizer. I argue, following Mizuguchi (2019), that *that* is a realization of C while  $\emptyset$  is a realization of  $\langle C, T \rangle$ . One argument for this comes from (10), where T-to-C movement is blocked when *that* appears:

- (10) a. Who did John claim [did he see]? Belfast English  
 b. \*Who did John claim [**that** did he see]? (Henry 1995)

Given that T-to-C movement is nothing other than internal pair-MERGE of T to C (Chomsky 2015), it follows from Mizuguchi (2019) that T-to-C movement and *that* are in complementary distribution. In the embedded clause of (9b), the overt complementizer shows that (11) is generated; however, Spec,TP is not created for movement to Spec,CP at the phase level:

- (11) a.  $[_{CP} \_\_ [C_{that} [_{TP} T [_{vP} \text{which student } [v [ \dots ]]]]]]$   
 b.  $[_{CP} \text{which student } [C_{that} [_{TP} T [_{vP} t [v [ \dots ]]]]]] \rightarrow *(6)$

(9b) is ill-formed in violation of (6). The proposed Determinacy can explain not only (2) but also (9), especially (9a), which, along with (9b), will be ruled out for indeterminacy under Chomsky's proposal (see (3)).

**Consequences:** The proposal has two consequences. The first consequence is that the subject skips Spec,TP on its way to Spec,CP. The proposed Determinacy requires IM to occur at the phase level; consequently, the subject can move directly from Spec,vP to Spec,CP (i.e., the Spec of  $\langle C, T \rangle$  under the proposed analysis) and does not move to Spec,TP on its way. This consequence is supported, for instance, by Bošković (2016) and Erlewine (2016), who argue, based on anti-agreement in Kinande and Agent Focus in Kaqchikel, that movement from Spec,TP to Spec,CP is banned, with the subject moving directly to Spec,CP:

- (12)  $*[_{CP} \text{subject } [C [_{TP} \_\_ [T \dots [_{vP} \_\_ \dots ]]]]]]$

The second consequence is that superfluous successive cyclic movement is prohibited; that is, it occurs only when phase impenetrability appears. Recall that movement applies at the phase level for syntax to be deterministic; otherwise, derivations like (1) and (3) would be generated and an ambiguous situation or indeterminacy would result. Given this, the deterministic syntax predicts that in the absence of phase, movement will be one fell swoop to the target position. This prediction is borne out by examples like (13):

- (13) a. \*[Which picture of himself] did Mary seem to John [to like t]?  
 b. [Which picture of himself] did it seem to John [that Mary liked t]? (Abels 2003:30)

Given that the raising infinitive is TP (Chomsky 1986), which is considered non-phasal, phase impenetrability via cyclic Transfer does not arise, with the *wh*-phrase moving in a single leap to Spec,CP in (13a), unlike in (13b), where it moves successive cyclically for the embedded CP phase and *himself* can be bound in the Spec. Notice that the proposed Determinacy explains the argument by Bošković (2019) and Dadan (2019) that head-phrase (X-YP) is preferred over phrase-phrase (XP-YP) and maximized in syntax: XP-YP is structured only when necessary. Successive-cyclic movement, which generates XP-YP, occurs only when necessitated by phase impenetrability or when Determinacy is warranted by cyclic Transfer at the phase level.

**Conclusion:** The present paper claims that Determinacy follows as a consequence of phase: with phase-based syntax in place, indeterministic situations like (1) and (3) will never arise in the derivation from the beginning. The discussion in this paper argues that phase contributes to computational efficiency by wiping out ambiguous situations for subsequent rule application, thereby endorsing the hypothesis that the faculty of language is optimally designed.

**Selected references:** Bošković 2019, Generalized asymmetry. | Chomsky 2013, Problems of projection. | Chomsky 2019, Some puzzling foundational issues. | Erlewine 2016, Anti-locality and optimality in Kaqchikel Agent Focus. | Goto & Ishii 2019, The principle of Determinacy. | Mizuguchi 2019, Ways of solving (counter-)cyclic A-movement in phase theory.