

A Cartesian dream:
A geometrical account of syntax
In honor of Andrea Moro

RGG Monographs

Series Editors
Guglielmo Cinque
Luigi Rizzi

Vol 17

A CARTESIAN DREAM

A geometrical account of syntax

In honor of Andrea Moro

Edited by

Matteo Greco & Davide Mocci



Lingbuzz
Press

ISBN 978-2-8399-4196-9

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Cover: Lucie Janků

Fonts: TeX Gyre Termes, Utopia

Printed and binded by Lulu

Published by Lingbuzz Press

An imprint of Cercle Šnek / Šnek Circle

<https://šnek.com/>

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To our *Maestro*
(Matteo and Davide)

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Dynamic antisymmetry and type-driven interpretation

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1. The core principle of dynamic antisymmetry (Moro 2001; Moro 2013: p. 149 ff.) is that syntactic movement is not triggered by a ‘probe’ head attracting a constituent (as in standard minimalism) nor by the need to establish a criterial configuration that is readable at the syntax-semantics interface (as in the cartographic approach).¹ Movement is triggered at the external Merge position of a constituent by the requirement to break an initially symmetric configuration, like α in the copular structure (1).

(1) [TP is [α [DP Alex] [DP Bill’s partner] α]]

Movement of one of the two DPs breaks syntactic symmetry. In a canonical copular structure (2a) the subject DP moves out of α ; in an inverse copular structure (2b), the other DP moves.

(2) a. [TP [DP Alex]₁ [is [α t₁ [DP Bill’s partner] α]]]

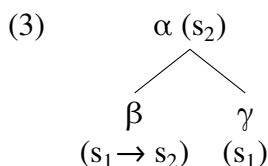
b. [TP [DP Bill’s partner]₂ [is [α [DP Alex] t₂ α]]]

Interestingly, the problematic syntactic symmetry in (1), which disallows linearization, is mirrored by an equally problematic symmetry in the semantic component. I will explore the conjecture that the

1. See Rizzi & Bocci 2017 for a recent overview.

movement chains in (2a) and (2b) can solve the problem in the compositional interpretation as well.

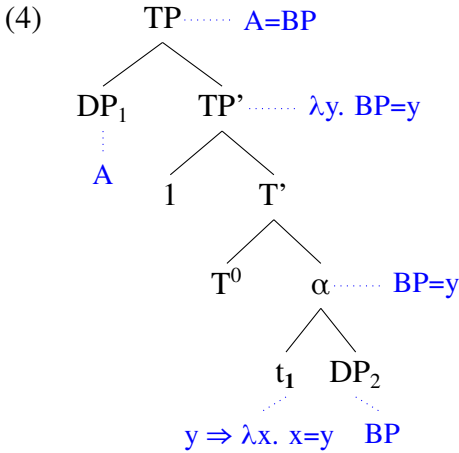
2. In compositional semantics, the denotation of a node is strictly determined by the denotation of its daughter(s); when there is binary branching, a compositional rule must apply. In the typical configuration (3), one of the daughter nodes denotes a function that can take in input the denotation of the other daughter (order irrelevant): the output of function application gives the meaning of the mother node. Thus, there is an inherent asymmetry in the semantic types of the two daughters.



The subtree α in (1) is not interpretable because neither of the two daughters denotes a function. At the extensional level,² both the proper name *Alex* and the DP *Bill's partner* denote an entity; since the entity type is a primitive (non-functional), there is no way to compose the two DPs' meanings *in situ*.

What we need is to turn one of the two DPs into a functional type. Consider the effects of syntactic movement of the DP₁ *Alex* in (2a). Following the notation of Heim & Kratzer 1998, the index binding the trace is represented as a separate node:

2. More accurately, at the intensional level the DP *Alex* denotes the same entity in every possible world, whereas the DP *Bill's partner* denotes different entities in different possible worlds.



Proceeding from bottom to top, I hypothesize the following compositional steps: ³

- i) The trace created by movement is an entity-type variable, standing for an arbitrary individual y . I assume that a type-shifting rule turns the arbitrary individual y to the property of being identical to y ($\lambda x. x=y$: the symbol λ introduces a property denotation.) This shift is parallel to the first part of Fox's (2002, 2003) Trace Conversion rule.
- ii) This property is applied to DP_2 (*Bill's partner*), resulting in the formula whereby an arbitrary individual y is identical to Bill's partner ($BP=y$).
- iii) At level T' the variable y is bound by the binding index 1 (à la Heim & Kratzer 1998). Binding, via functional abstraction, creates the property of being identical to Bill's partner. ($\lambda y. BP=y$)
- iv) At level TP, this identity property is applied to the entity denoted by DP_1 *Alex* (A), yielding the truth-conditions whereby Alex is identical to Bill's partner (in the circumstance of evaluation).

The interpretation of the inverse copular structure (2b) proceeds through the same steps: in both cases, movement of one DP creates the identity predicate that can be applied to the other DP.

3. For simplicity, here I limit the discussion to extensional semantics and I ignore the tense contribution of the head T^0 .

3. The Italian example (5) is apparently an instance of the symmetric configuration in (1):

- (5) E' ANNA la presidente.
 is A. the

Crucially, the sentence is only acceptable if the first DP following the copula bears narrow focus; if the sentence is pronounced with an unmarked intonation, corresponding to broad focus, it is unacceptable (Moro 2013, pp. 200-201).

Following Belletti 2004, the focussed constituent moves to a position in the low periphery of α (the predicative nucleus) as shown in (6). Spec,TP is filled by a null expletive pronoun.

- (6) [_{TP} *pro* [è [ANNA₁ [_{α} t₁ [_{DP} la presidente]]]]]

Here too, movement rescues the structure: the focused DP₁ leaves a coindexed trace, which undergoes type shifting and yields a predicate of identity connecting the two DPs, as discussed in (i)-(iv) above.

4. Consider now a copular structure containing a non-specific indefinite phrase (which does not refer to a specific individual). In this case, contrary to (2), the inverse copular structure is ungrammatical:

- (7) a. Alex is a teacher.
 b. *A teacher is Alex.

This contrast is unexpected from the syntactic viewpoint, but it finds an explanation in the semantic component. In the time-honored approach going back to Heim 1982, the indefinite is a free variable that must be bound by Existential Closure. Following Diesing 1992, the latter takes scope immediately above the VP (below T⁰, in current terms). If the indefinite moved to Spec,TP, as in (7b), it would fall outside the scope of Existential Closure: such a derivation is ruled out as uninterpretable at the interface.

5. Movement to the subject position has another semantic correlate. This can be seen at the intensional level, by embedding the copular structure in the scope of an epistemic modal:

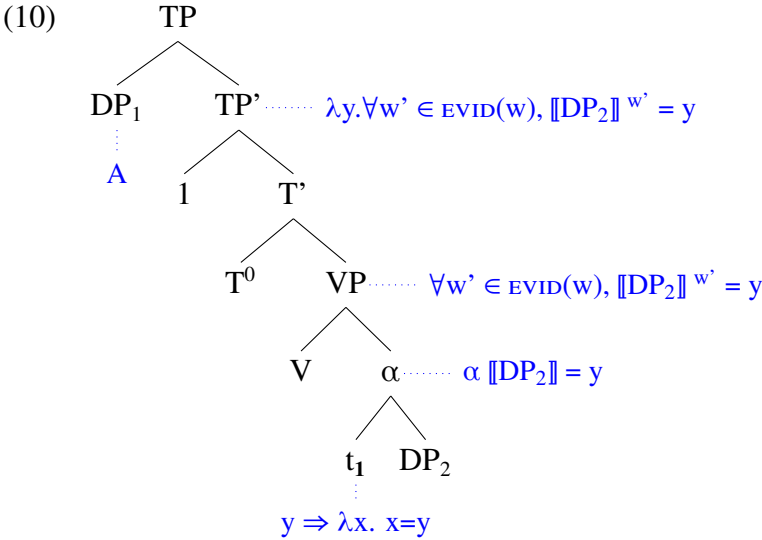
- (8) a. Bill potrebbe essere il compagno di Alex. (canonical)
 Bill might be the partner of Alex
 ‘Bill might be Alex’s partner.’
- b. Il compagno di Alex potrebbe essere Bill. (inverse)
 the partner of Alex might be Bill
 ‘Alex’s partner might be Bill.’

In (8a), the DP *Alex’s partner* is in the scope of the epistemic modal: thus, there is no entailment that Alex has a partner in the evaluation world (such a partner exists in some worlds accessible from the evaluation world). In (8b), instead, the DP moves to the subject position and falls outside the scope of the epistemic modal: thus, it is anchored to the evaluation world, giving rise to the so-called ‘existential presupposition’.

Although an in-depth analysis requires the apparatus of situation semantics (Bianchi & Chesi submitted), this asymmetry is relevant to an interesting issue raised by a reviewer: some non-copular structures allow for raising of either DP to the subject position:

- (9) a. Il mio capo sembra / ricorda il
 the my boss resembles/is reminiscent of the
 protagonista di ‘The office’.
 protagonist of ‘The office’
 ‘My boss resembles/is reminiscent of the main character in *The office*’.
- b. Il protagonista di ‘The office’ sembra / ricorda
 the protagonist of ‘The office’ resembles / is
 il mio capo.
 reminiscent of the
 ‘The main character in *The office* resembles/ is reminiscent of my boss.’

In the analysis proposed in (4) above, the small clause constituent α denotes a tenseless proposition consisting of an identity function between the postcopular DP and the variable left by movement of the raised DP. In (9), the small clause is selected by a lexical verb:



Simplifying considerably, I take the lexical verbs in (9) to be quasi-evidential modals, which convey that the complement proposition denoted by α is true in all the accessible worlds that are compatible with a given *body of evidence* concerning people’s looks in the evaluation world. (The verb *ricordare* ‘being reminiscent of’ carries the additional presupposition that identity does not hold in the evaluation world.)

(11) $\llbracket \text{sembrare} \rrbracket^w = \lambda p_{st}. \forall w' \in \text{EVID}(w), p(w') = 1$

The nuclear proposition $\llbracket \text{DP}_2 \rrbracket^w = y$ is then true in all these accessible worlds (still ignoring Tense for simplicity); at T’, by abstraction over the variable y we obtain the property of being identical to the person denoted by the post-copular DP_2 in the accessible worlds, and this property is predicated of the raised DP_1 . Notice that the evidential basis relates to people’s looks in the evaluation world; since this is a realistic modal base, the post-copular DP_2 denotes the unique entity that satisfies the description in the evaluation world.

The embedding of the identity relation in the scope of an evidential modal is admittedly crude, but it might hold some water: notice that in (12), the continuation which denies identity in the evaluation world is coherent:

- (12) Quella donna laggiù sembra il mio capo, ma non
 that woman over-there resembles the my boss, but not
 lo è.
 it is
 ‘That woman over there resembles my boss, but she is not.’

Note also that the Italian verb *sembrare* is ambiguous. When it embeds an infinitival copular structure, it is interpreted as a quasi-epistemic modal ‘*it seems that*’ (Davide Mocci, p.c.)

- (13) Quella donna laggiù sembra essere il mio capo.
 that woman over-there seems to-be the my boss
 ‘It seems that that woman over there is my boss.’

6. The analyses sketched above are tentative, but suggestive: in copular structures, the symmetry-breaking movement triggered in the syntactic component has the effect of ‘repairing’ a configuration that does not allow for compositional interpretation.

Pushing the idea further, one could even envisage a very strong hypothesis: every structure that is problematic at the syntax-phonology interface (because syntactic symmetry does not allow for linearization) is also problematic at the syntax-semantics interface (because type mismatch blocks direct type-driven composition), and syntactic movement triggered at the External Merge position yields a derived structure that is adequate for both interfaces.

One case that immediately comes to mind is Quantifier Raising: a covert movement operation that, in its strongest formulation, invariably applies to solve type mismatch in the External Merge position of a QP. The strong hypothesis would then entail that the QP creates a symmetric configuration, which seems very far-fetched. This issue, and a host of others, remains for further speculation.

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