

Adjectives as auxiliaries of the noun phrase

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0. Introduction

In many recent proposals, attributive APs are analysed as adjuncts to NP or FP within DP, analogous to the analysis of adverbials as adjuncts to VP or FP within the sentence (cf. Bernstein 1991, Lamarche 1991, Valois 1991). A rather different proposal can be found in Abney (1987): here, adjectives are taken to be 'auxiliary nouns' heading functional projections, comparable to auxiliary verbs within the sentence.

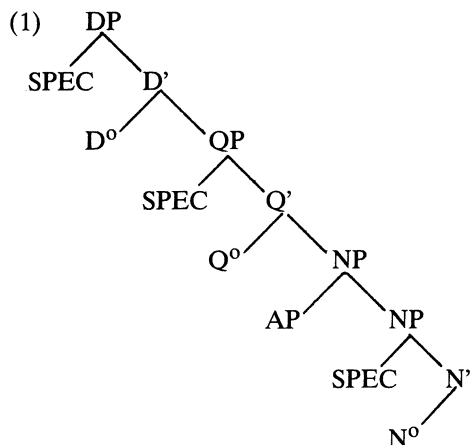
If APs are adjuncts to NP or FP, the occurrence of adjectival agreement on attributive adjectives in Dutch is somewhat surprising. It cannot be treated as a simple case of Head-Specifier Agreement or as agreement by government. I will show this in section 1, taking Valois (1991) as representative for the AP-as-an-adjunct analysis. The agreement phenomena in Dutch nominal projections can be readily explained if we adopt Abney's proposal in connection with Rizzi's (1986) theory of *pro*. This will be shown in section 2.1.

The linear order of the categories D^0 , Q^0 , A^0 and N^0 is not arbitrary in languages like English and Dutch. To account for this, Abney imposes a set of selectional restrictions on these categories. Since selectional restrictions are stipulations, it is highly desirable to remove them from the grammar. Without selectional restrictions, X-bar theory massively overgenerates strings at D-structure. I will show in section 2.2 that the proposed agreement theory, in combination with a condition of coindexing of heads within the noun phrase, correctly rules out 32 of the 38 strings generated at D-structure. The remaining 6 word orders actually do occur in Dutch. Thus, this part of the grammar meets the all and only requirement.

1. Problems for AP-as-an-adjunct analyses

In most recent analyses, noun phrases are given the syntactic structure in (1). The relative order of heads is stipulated implicitly or explicitly. Determiners and possessive agreement are generated in D^0 and the number feature is generated in Q^0 (also called Num^0). For several languages, it has been proposed that head movement applies, from N^0 to Q^0 and/or from Q^0 to D^0 ,

either at S-structure or at LF. As for APs, they are mostly assumed to be adjuncts to NP or adjuncts to a functional projection, e.g. Valois (1991).



(cf. Bernstein 1991, Lamarche 1991, Löbel 1990, Ritter 1990, Tang 1990, Valois 1991)

According to Valois¹, the internal structure of noun phrases is strictly parallel to that of CP in all respects. Adverbial adjuncts in clauses parallel APs in noun phrases. APs are adjuncts to NP. In [SPEC,AP] PRO is generated and PRO receives an external Θ -role from the adjective. What must be explained is how PRO is controlled and how the adjective receives agreement features for gender and number. The crucial assumption is that in French N° obligatorily moves to Q°. The noun has an inherent gender feature and receives the number feature from Q°. In Q°, the noun m-commands everything below.² This is considered to be a special case of control. N° transmits the features to PRO by control, and by Head-Specifier Agreement (henceforth HSAG) the features of PRO in [SPEC,AP] are assigned to A°. The analysis correctly predicts that French has postnominal adjectives.³

¹ Actually, Valois' noun phrase is more complex than the structure in (1), but for the sake of simplicity I will omit structure that is irrelevant for the point to be made.

² M-command (Chomsky 1986:8): α m-commands β iff α does not dominate β and every τ , τ a maximal projection, that dominates α dominates β .

³ Note that if controllers must be referential expressions, Valois' analysis is problematic, since the controller is not a referential expression but a part of it, namely a head.

Since Dutch has no postnominal adjectives, there seems to be little evidence that Dutch has N^0 -to- Q^0 movement. If there is no such movement, PRO cannot be controlled and the adjective will not be marked with agreement features. More seriously, PRO would have an arbitrary interpretation.

Now suppose that PRO is controlled by N^0 . This could be achieved if we assume that Q^0 in Dutch takes its complement to the left and that Dutch has N^0 -to- Q^0 movement as well. Then there is still a problem: PRO must have two different controllers since not only must the features for gender and number be assigned, but also the feature for definiteness, as the minimal pairs in (2) show.

- | | | | | |
|-------|---------------|-----------|-----------|-------------|
| (2) a | koud water | [+neuter] | [-plural] | [-definite] |
| | cold water | | | |
| | oude kaas | [-neuter] | [-plural] | [-definite] |
| | old cheese | | | |
| b | een oud huis | [+neuter] | [-plural] | [-definite] |
| | an old house | | | |
| | oude huizen | [+neuter] | [+plural] | [-definite] |
| | old houses | | | |
| c | een oud huis | [+neuter] | [-plural] | [-definite] |
| | an old house | | | |
| | het oude huis | [+neuter] | [-plural] | [+definite] |
| | the old house | | | |

Absence or presence of adjectival inflection in (2) is obligatory. It is not possible that there is also movement from Q^0 to D^0 in Dutch, since this would wrongly predict that adjectives in Dutch are always postnominal. So we are left with two controllers, contrary to the general requirement that control is a unique relation between a controller and a controlee.

Another problem is that under the given analysis, the absence of agreement on adjectival adjuncts in Dutch clauses is completely accidental. The sentences in (3) give the relevant facts.

- (3) a De man_i kwam [PRO_i rood van woede] de kamer in
 the man came red of anger the room into
 The man entered the room red with anger
- b *De man kwam rode van woede de kamer binnen

In (3a) we find a perfect control structure, but the example in (3b) shows that it is not possible to have agreement on the adjective. If adjectival agreement

is assigned via PRO control and HSAG, why would that be impossible in (3b)?

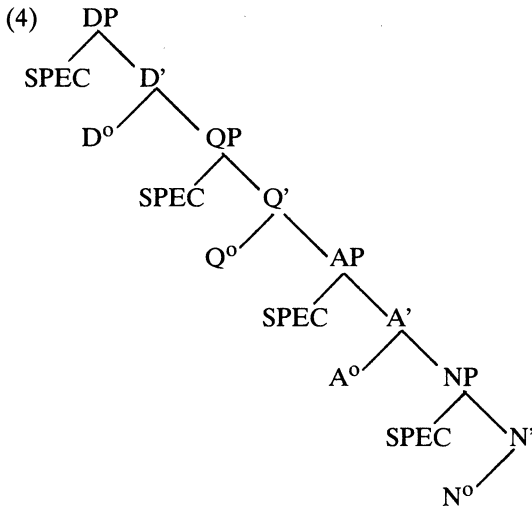
The fact that adjectival agreement is obligatorily absent on clause adjunct APs and obligatorily present on APs in noun phrases suggests that we have PRO in the first case and *pro* in the second. In this respect, adjectival agreement in Dutch would parallel verbal agreement in *pro* drop languages, for which holds that if there is agreement on the verb, then there is *pro*, and if there is no agreement on the verb, then there is PRO. We might assume a *pro* in [SPEC,AP], but that does not provide an answer to the question as to how the adjective, which does not bear Φ -features inherently (cf. 3a), receives these features. We could stipulate that the features are assigned by government, but then we would have to give a revised definition of government, since normally adjuncts are not governed by the head of the projection which they are adjoined to.

As a final drawback of analyses that take APs to be adjuncts, note that the positions where these APs may be adjoined must be stipulated. For Dutch we need two rather specific stipulations: APs may not adjoin to the right of NP (whereas PP adjuncts must adjoin there) and APs may not adjoin to the left of determiners (whereas APs adjoin to the left in general).

2. An alternative analysis

2.1. Adjectival agreement in Dutch. I adopt the noun phrase structure in (4), proposed by Abney (1987). Crucial in this structure is that AP is considered to be a functional projection within the nominal projection. I assume that not only [\pm plural] but also numerals and the indefinite article are generated in Q^0 . Furthermore, every head projects a specifier position, which may be empty at D-structure.⁴

⁴ The Projection Principle requires the Θ -role of the adjective to be structurally present. This poses a problem for the adjectives-as-auxiliaries analysis. We might follow Abney (1987:327) in supposing that adjectives cannot take their usual complements when they appear as auxiliary nouns. Alternatively, we could adopt the Θ -identification theory of Higginbotham (1985).



Taking serious the idea that nouns are predicates, I assume that every noun assigns at least one Θ -role:

- (5) Nouns are predicates (cf. Higginbotham 1985, Abney 1987). Every noun assigns a Θ -role to the entity/mass it is predicating of. This role is assigned to *pro* in [SPEC,NP].

pro must meet two requirements (cf. Rizzi 1986):

- (6) I *pro* must be formally licensed, i.e. *pro* must receive a Θ -role;
 II *pro* must be content licensed, i.e. *pro* must be identified for its Φ -features by a licensing head.

For *pro* in noun phrases, I will interpret these requirements in a very restrictive way:

- (7) I A licensing head is a head that has an inherent, i.e. lexically specified, Φ -feature;⁵
- II Content licensing (identification) of *pro* is possible if and only if *pro* is in a head specifier relation with the licensing head;⁶
- III If *pro* is identified for a Φ -feature α , it may assign α to a head that does not bear α .

Languages differ in the number of syntactic features that are assigned. English for instance has no feature for gender. Dutch has three Φ -features in the nominal paradigm, [\pm neuter], [\pm plural], [\pm definite], as is shown in (2). Hence in Dutch noun phrases there are three licensing heads, N^0 for gender (the gender of Dutch nouns is unpredictable generally, so that it is plausible that nouns are lexically specified for gender), Q^0 for number and D^0 for definiteness. With respect to licensing heads I make the assumption in (8):

- (8) Only licensing heads trigger movement of *pro*.

The idea behind (8) is that *pro* will not move if it is content licensed in its base position, and that it will stop moving once it is content licensed (cf. the "Greedy Principle", Chomsky 1991). Adjectives are no licensing heads since they have no inherent Φ -features and thus they do not trigger movement, though they allow movement via [SPEC,AP]. Movement of *pro* must obey the usual conditions on movement. Content licensing of *pro* is an S-structure condition, as is shown for Italian in Rizzi (1986): Italian has *pro*_{arb} objects; passivization of verbs with a *pro*_{arb} object makes a non-*pro*_{arb} interpretation obligatory, i.e. *pro* is identified by the agreement features in INFL.⁷

I consider D^0 elements to be *pro* like in the following respect: D^0 elements have no lexical specification for the features [gender] and [number].

⁵ In English, Q^0 seems to be the only licensing head. This is not problematic if we assume that the Q projection is obligatory present in referential noun phrases. Alternatively, it might be assumed that the noun assigns a nominal feature to *pro* in English.

⁶ This rather restrictive view seems to exclude identification of Φ -features by government, contrary to what is proposed in Rizzi (1986), where the feature *arb* is assigned by V^0 to *pro* in complement position. We could capture this by stating that Φ -features may be assigned by Head-Spec Agreement or by a lexical governor. V^0 is a lexical governor, D^0 and Q^0 are not lexical governors. Alternatively, we could reduce all instances of agreement to Head-Spec agreement; then we would have to assume that *arb* is assigned to *pro* in [SPEC,AGR^{OP}], like accusative case.

⁷ In the present analysis a trace of *pro* may be in the specifier position of a licensing head and thus partially licensed. In this respect, the analysis differs from Rizzi (1986), where only the head of the *pro*_{arb}-chain is in the specifier position of a licensing head.

These features must be assigned to them, i.e. D^0 elements must be content licensed for gender and number.⁸

Let us now see how this system explains the agreement phenomena in ordinary Dutch noun phrases like (9):

- (9) die twee kleine huizen
 those two small houses

If we analyse (9) as in (4), *pro* is assigned a Θ -role and the gender feature in [SPEC,NP]. Upward movement of *pro* is triggered by the need of content licensing. The first triggering head is Q^0 *twee*. Movement proceeds via [SPEC,AP]. In [SPEC,QP], *pro* receives the number feature. Next, *pro* moves to [SPEC,DP] and receives the definiteness feature. Now, *pro* is content licensed. By HSAG with D^0 , *pro* content licenses the determiner for gender and number. Via the chain that is the result of moving *pro*, N^0 and A^0 agree with *pro*.⁹

2.2. *Possible word orders in Dutch noun phrases.* Of the logically possible word orders in Dutch noun phrases only a few do actually occur. For instance, the permutation of the elements D^0 , Q^0 , A^0 and N^0 is 24. Only three of these orders are grammatical Dutch strings. About the same is true for English. To account for this, Abney (1987:341) proposes the following selectional restrictions:

- (10) Selectional restrictions
 D^0 selects NP, AP, NP_e , QP
 Q^0 selects NP, AP, NP_e
 A^0 selects NP, AP

I will show that it is not necessary to stipulate selectional restrictions in this paradigm: they can be derived on the base of the theory sketched in section 2.1. The assumptions in (11) are crucial for the analysis to be given:

- (11) I The lexical head and all functional heads of a constituent must bear the same Φ -features (henceforth: must be Φ -coindexed).

⁸ Dutch definite articles and demonstratives show overt agreement for number and gender.

⁹ Though N^0 does not show agreement for definiteness. This fact is not explained by the presented analysis.

If a head receives a Φ -feature by HSAG with *pro*, this feature is not necessarily expressed by an overt agreement affix at S-structure (i.e. agreement may be abstract).

- II Percolation of Φ -features from one head to another, both upward and downward, is impossible.

As a consequence of these assumptions, lexical heads in a noun phrase can only be Φ -coindexed by movement of *pro* via the respective SPEC positions. The features that *pro* receives are transmitted through the chain that results from movement of *pro*. Let us start with the simplest cases:

- (12) a *auto's twee
cars two
b twee auto's
- (13) a twee oude auto's
two old cars
b *oude twee auto's
c *twee auto's oude
d *oude auto's twee
e *auto's twee oude
f *auto's oude twee

Note that the ungrammatical phrases in (12) en (13) are not ungrammatical because of uninterpretability. There is no *a priori* reason why the word orders in (12) and (13) should be excluded.

The phrase in (12a) is excluded because *pro* cannot be content licensed and the heads cannot be Φ -coindexed.¹⁰ *pro* is generated in [SPEC,NP]. It cannot lower to [SPEC,QP] since the trace of *pro* would then c-command *pro*. Thus the feature for number is not assigned to *pro* and Q^0 does not receive the gender feature. Without examining the other word orders we can already derive the following generalization:

- (14) If N^0 c-commands one or more of the other heads, the noun phrase is ungrammatical.

¹⁰ It is assumed that Dutch noun phrases are uniformly right branching (head first). Furthermore, it is assumed that Q^0 and N^0 are the only obligatorily present heads in a nominal projection. Therefore, the occurrence of a string only consisting of D^0 and N^0 is excluded.

The string in (12b) is grammatical. *pro* is generated in [SPEC,NP] where it receives the gender feature. *pro* moves to [SPEC,QP], receives the number feature and is content licensed. Q^0 receives the gender feature by HSAG and N^0 receives the number feature via the trace of *pro* and HSAG. Thus the heads are Φ -coindexed.

The word order in (13a) is well-formed for the same reasons, the only difference being the intermediate AP. Whereas A^0 is not a licensing head and therefore does not trigger *pro* movement itself, the Q^0 c-commanding A^0 does trigger *pro* movement. This movement proceeds via [SPEC,AP]. Since *pro* visits all SPEC positions Φ -coindexing is achieved and *pro* content licensing as well. The surface order in (13b) is correctly predicted to be ungrammatical. A^0 is not a licensing head and therefore does not trigger *pro* movement. There is *pro* movement from [SPEC,NP] to [SPEC,QP], but then it stops. As a result, A^0 cannot be Φ -coindexed. We now derive another generalization:

- (15) If a head without inherent Φ -features (a non-licensing head) c-commands all other heads, the noun phrase is ungrammatical.

The order in (13c) is out because of (14). The order in (13d) is ruled out by (14) and (15). The strings in (13e-f) are ungrammatical because of (14).

Now what about four heads? There are 24 logically possible strings. With the generalizations in (14) and (15) we are now able to predict which word orders will be ungrammatical, namely all orders with an adjective higher than the other heads and all orders with one or more heads lower than N^0 :

- (16)
- | | | | |
|--------|--------|--------|--------|
| $*A^0$ | X^0 | Y^0 | Z^0 |
| oude | auto's | de | twee |
| old | cars | the | two |
| oude | de | twee | auto's |
| oude | twee | auto's | de |
| oude | auto's | twee | de |
| oude | de | auto's | twee |
| oude | twee | de | auto's |

- (17)
- | | | | |
|--------|-------|-------|-------|
| $*N^0$ | X^0 | Y^0 | Z^0 |
| auto's | de | oude | twee |
| auto's | de | twee | oude |
| auto's | oude | de | twee |
| auto's | oude | twee | de |
| auto's | twee | de | oude |
| auto's | twee | oude | de |

- (18) *X⁰ N⁰ Y⁰ Z⁰
 de auto's twee oude
 de auto's oude twee
 twee auto's de oude
 twee auto's oude de

- (19) *X⁰ Y⁰ N⁰ Z⁰
 de twee auto's oude
 de oude auto's twee
 twee de auto's oude
 twee oude auto's de

Twenty orders are correctly ruled out, four are left. Of these, two are well-formed Dutch surface strings:

- (20) D⁰ Q⁰ A⁰ N⁰
 de twee oude auto's

- (21) D⁰ A⁰ Q⁰ N⁰
 de oude twee auto's

The third one does occur in Dutch, but is not always grammatical. (22) gives the relevant structures.

- (22)
- | | | | | | | | | |
|---|-------------------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|
| | | Q ⁰ | | D ⁰ | | A ⁰ | | N ⁰ |
| a | | twee | pro _i | de | t _i | zelfde | t _i | auto's |
| | | two | | the | | same | | cars |
| b | alle | twee | pro _i | de | t _i | oude | t _i | auto's |
| | all | two | | the | | old | | cars |
| c | *pro _i | twee | t _i | de | t _i | oude | t _i | auto's |

Finally, the fourth is never a grammatical string:

- (23)
- | | | | | | | | | |
|---|-------------------|----------------|------------------|----------------|------------------|----------------|----------------|----------------|
| | | Q ⁰ | | A ⁰ | | D ⁰ | | N ⁰ |
| a | * | twee | pro _i | zelfde | t _i | de | t _i | auto's |
| b | *alle | twee | | oude | pro _i | de | t _i | auto's |
| c | *pro _i | twee | t _i | oude | t _i | de | t _i | auto's |

The orders in (20) en (21) are grammatical since *pro* moves via all intermediate SPEC positions to [SPEC,DP], assembles all relevant features and ends up content licensed. By the chain of *pro* and HSAG all heads are Φ-coindexed.

The proposed theory incorrectly predicts that the strings in (22c) en (23) should be grammatical. The same goes for (24b) (the remaining 4 logically possible word orders with the elements D^0 , Q^0 and N^0 are correctly ruled out by the generalizations in (14) and (15)):

- (24) a de twee auto's
 the two cars
 b *twee de auto's
 two the cars

Let us first ask why (22a) en (22b) are grammatical. I assume that the adjective *zelfde* is an anaphor. In (22a) it is bound by *twee*. As a result these heads are Φ -coindexed, and the feature for number is present on *zelfde* by virtue of this binding relation. Then (22a) is exceptional because *pro* is already licensed for the number feature in [SPEC,AP]. Subsequently *pro* moves to [SPEC,DP] to receive the last feature, [+definite]. As a result *pro* is content licensed. The word order in (22b) is grammatical since here we have a quantifier in [SPEC,QP] (*alle*). This quantifier binds *pro*. Since *alle* is in a HSAG relation with Q^0 , the number feature is transmitted via this binding relation. Movement of *pro* is not required now (and in fact impossible since [SPEC,QP] is filled); *pro* remains in [SPEC,DP].

What (22a) en (22b) have in common is that *pro* is in [SPEC,DP] at S-structure. The ungrammatical cases (22c), (23a,c) and (24b) share the property that *pro* is not in [SPEC,DP] at S-structure. In (23a) there is a binding relation between *twee* and *zelfde*. As a result, the number feature is present on A^0 , and *pro* does not move to [SPEC,QP]. But *pro* must move to [SPEC,AP] to get the number feature, so it cannot remain in [SPEC,DP]. In (22c) and (23c) there is neither a binder in [SPEC,QP], nor an adjectival anaphor. Therefore *pro* must move all the way up to [SPEC,QP] to receive the number feature. The contrast between (22a-b) on the one hand and (22c), (23c) and (24b) on the other now follows from the assumption that D^0 elements in Dutch are *pro*'s with one inherent feature, [definite]. They must be content licensed for number and gender. It seems to be the case that this content licensing differs from assignment of features to an adjective in that it is strictly local, i.e. that it cannot be achieved via the trace of *pro*. Only in the structures where *pro* is in [SPEC,DP] at S-structure is D^0 content licensed.¹¹

¹¹ This analysis wrongly admits strings like *twee de oude zelfde auto's* and *de twee oude zelfde auto's*. Therefore, these strings must be ungrammatical for some independent reason. Possibly, semantic ordering restrictions between adjectives are the relevant factor (cf. Sproat and Shih 1988). The ungrammaticality of *de twee oude zelfde auto's* has the same flavour as the ungrammaticality of *de twee rode mooie auto's*.

We still have to explain the ungrammaticality of (23b). Here *pro* is in [SPEC,DP], so this cannot cause ungrammaticality. Note that *pro* is bound by the quantifier *alle* in [SPEC,QP]. By this binding relation, *pro* obtains the number feature; *pro* already received the gender feature in [SPEC,NP], and in [SPEC,DP] it receives the definiteness feature. Now *pro* is content licensed and there is no trigger for *pro* movement anymore. Since A^0 is not a trigger itself, *pro* remains in [SPEC,DP]. But then A^0 cannot be Φ -coindexed and the structure is out. And thus the all and only requirement is satisfied.

3. Conclusion

The analysis proposed in this paper gives an account for agreement on adjectives and determiners in Dutch DPs. In addition, it correctly rules out ungrammatical Dutch surface noun phrase strings without the use of word order stipulations. It appears that a grammar with so called functional projections (DP, QP) is sufficiently restrictive, contrary to what is believed sometimes. It is likely that the analysis can be extended, not only to other languages but also to other paradigms.

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