Adjective Ordering Restrictions Revisited

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1. Introduction

Adjective ordering restrictions (AOR) have been widely discussed, but they are still not very well understood. For example, in languages like English prenominal adjectives are strictly ordered. While (1a) is perceived as grammatical and natural, (1b) is considered awkward by most speakers.

(1) a. vegetarian Russian lawyer
    b. # Russian vegetarian lawyer

In spite of such observations, questions like (i) what adjectives are ordered? (ii) how are they ordered? and (iii) why are they ordered the way they are? are still very much a matter of debate. In this paper I will focus on cases where AOR do *not* apply, thus adressing some of these questions indirectly. Specifically, I will argue that:

(2) Ordering restrictions do not choose between structures that are truth-conditionally distinct.

The paper is organized as follows: I start with some background on AOR (section 2) and then present Cinque(1994)'s syntactic analysis of the phenomenon (section 3). Next, I discuss a class of exceptions that hasn't received much attention in the literature on ordering restrictions, namely intensional operator adjectives like *former* and *alleged* (section 4). These adjectives prove to raise challenges to the syntactic account of AOR, and section 5 shows how it can be modified so as to accommodate them. The modification, however, is not the best solution as suggested by a new set of data coming from so-called non-definite superlatives. Section 6 shows that sequences of adjectives that normally obey ordering constraints, are freely ordered when they contain a superlative and are preceded by the indefinite determiner. Taken together these two exception classes suggest that AOR are subject to the semantic constraint in (2). A discussion on how to implement this constraint and the consequences of the proposal follows (section 7). Section 8 discusses definite superlatives and section 9 concludes.

2. What we know about AOR
2.1. Adjective Hierarchies

It has long been observed that certain adjectives occur in an unmarked order cross-linguistically. For instance, in the absence of any special intonation the order in (3) is perceived by English speakers to be the only option. All the other combinations in (4) are rather awkward.

(3) a beautiful small black purse

(4) a. # a beautiful black small purse
    b. # a small beautiful black purse
    c. # a small black beautiful purse etc.
       (modelled after Morzycki(2005))

This has led to the conclusion that there are semantic classes of adjectives that pattern together with respect to ordering restrictions, and various adjective hierarchies have been introduced (cf. (5) and (6)).

For example, adjectives that denote quality have been argued to precede adjectives conveying size, which in turn precede adjectives conveying shape, and so on, in all languages (5). Similar claims have been made for other adjective types, and the respective ordering restrictions are given in (6).

(5)   Quality >Size >Shape >Color >Provenance (Sproat and Shih(1991))

(6)   a.   Possesive >Speaker-oriented >Subject-oriented >Manner/Thematic (Cinque(1994))

     b.   Value >Dimension >Pysical property >Speed >Human Propensity >Age >Color (Dixon(1982))

2.2. *AOR lifted*

While hierarchies like those in (5) and (6) represent a widespread phenomenon, not all adjectives are subject to ordering restrictions, and three such exceptions have already been noted. First, adjectives that are homophonous with reduced relatives are freely ordered, and this is illustrated below with data from Mandarin Chinese (Sproat and Shih(1991)). In (7a) the order of the adjectives is what we would expect given the hierarchy in (5). However, the order in (7b), which departs from (5), is also fine. In both examples the adjectives are marked by the particle *de*, in the same way that full-fledged relative clauses are (8)[1].

(7)   a.   hao-de   yaun-de   panzi (QUALITY >SHAPE)
         good-DE *round*-DE *plate*

     b.   yuan-de   hao-de   panzi (SHAPE >QUALITY)
         round-DE *good*-DE *plate*

         'nice round plate' (Sproat and Shih(1991):565)

(8)   lai-de   chezi
     come-DE *car*

     'the car that is coming' (Sproat and Shih(1991):573)

Adjectives that bear 'comma intonation' represent another exception to AOR since they, too, are freely ordered (Sproat and Shih(1991)). For instance, in the absence of any special intonation the adjectives *wonderful*, *orange* and *Oriental* can only be arranged as in (9), which conforms with the hierarchy in (5). However, once they are treated as separate intonational phrases the word order becomes free (10).

(9)   She loves all those wonderful orange Oriental ivories. (QUALITY >COLOR >PROVENANCE)

(10)   a.   She loves all those wonderful, orange, Oriental ivories.

     b.   She loves all those Oriental, orange, wonderful ivories. etc.

Finally, the third exception to AOR consists of adjectives that bear focus (Cinque(2005b), Cinque(2005a)). The order in (11a), for example, is the only one allowed when the two adjectives are pronounced with unmarked intonation. This is as predicted by (5). However, if the adjective *black* is focused it can escape ordering restrictions, and the reverse word order becomes possible (11b).

(11)   a.   small black purse (SIZE >COLOR)

     b.   BLACK small purse (COLOR >SIZE)

To summarize, the current view in the literature is that modifying adjectives that are homophonous with reduced relatives, or exhibit a special intonation pattern (such as 'comma' or focus intonation) are allowed to escape ordering restrictions. All the other adjectives, which I will call from now on *plain adjectives*, are subject to AOR.

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1.   This class of exceptions has recently come under debate: on the one hand, additional data from Mandarin Chinese argues against equating adjectives marked by *de* with reduced relatives (Paul(2005)). On the other hand, data from Greek shows that adjectives homophonous with reduced relatives can be subject to ordering restrictions (Alexiadou and Wilder(1998)).

3. A syntactic account for AOR

As apparent from the previous section adjective orderings have been extensively documented, yet the data has proved rather challenging to account for. In what follows I will present a popular view on how hierarchies like (5-6) arise, namely Cinque(1994)'s syntactic proposal[2], and use it as a starting point in my discussion of exceptions to AOR.

According to this view, plain adjectives are generated in the specifier position of dedicated functional heads, and the order of these with respect to each other is a principle of universal grammar. For example, if an adjective conveys color, it will occupy the Specifier position of a ColorP; if it conveys size, it will occupy the specifier of a SizeP; and the grammar imposes the restriction that SizeP dominates ColorP. In other words, there is a putative correlation between the lexical semantics of a given adjective and its syntactic representation, which guarantees that plain adjectives will always be strictly ordered.

This analysis accounts for adjectives that obey hierarchies like (5) and (6), and also allows for the exceptions I mentioned because the adjectives not subject to AOR are outside its scope. Their syntax is different from that of plain adjectives, so they fall into a distinct category.

Adjectives belonging to the first set differ from plain adjectives in that they are not adjectival modification cases. These adjectives are reduced relatives, which means that they have more structure than plain adjectives, and belong to the set of clausal modifiers. Since the grammar contains no principle for ordering relative clauses with respect to each other their word order is predicted to be free.

Adjectives that are treated as separate intonational phrases are instances of adjectival modification, but they don't have the syntax of stacked bare adjectives. Multiple adjectives with 'comma' intonation are represented syntactically as coordination structures, and thus they too, are expected to be freely ordered.

Finally, adjectives that bear focus have been claimed to constitute a particular case. They are generated in the same way as plain adjectives but then move to a special syntactic position, which is associated with focus and is situated leftmost inside the DP (Cinque(2005b), Cinque(2005a)). This produces word orders that are not expected under hierarchies like (5).

4. Another systematic exception to AOR

In this paper I will show that there are other systematic exceptions to AOR, which don't belong to any of the exception classes discussed in sections 2 and 3. Specifically, I will discuss two other types of adjectives that are not subject to ordering restrictions, and evaluate their implications for a theory of AOR.

First, let us look at operator adjectives like *former* and *alleged*, which haven't been discussed much in the AOR arena. These adjectives cannot be analyzed as reduced relatives since they cannot occur predicatively. Neither do they bare any special intonation in examples like (12-14), which means that, at least descriptively, we can put them in the same group with plain adjectives. However, this leads to the expectation that operator adjectives should also be subject to ordering constraints.

This is not true. Operator adjectives are freely ordered. The examples below show that sequences with multiple adjectives are not subject to ordering constraints if they contain one or more operator adjectives. In example (12) the operator adjective *former* is present and the word order is free. The same effect obtains in (13) where *former* is replaced with *alleged*. Substitute *famous* with any other non-operator adjective, and the results stay the same.

(12)   a. a famous former actor

         b. a former famous actor

(13)   a. a famous alleged actor

         b. an alleged famous actor

Example (14) shows that if two operator adjectives are present the ordering constraints are again lifted. No matter how we arrange the two adjectives with respect to each other the sequences that obtain are grammatical.

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2.   See however Matushansky(2002) and Morzycki(2005) for problems with this approach.

(14) a. an alleged former thief

   b. a former alleged thief

Importantly, the different orderings also correspond to different things: (12a) does not allow the consistent continuation *who is now forgotten*, and it refers to someone famous who is no longer an actor. In contrast, (12b) can be consistently continued with *who is now forgotten*, and it refers to someone who is no longer famous or no longer an actor. Similarly, (14a) can be used to describe someone who is alleged to have formerly been a thief, while (14b) means something else: it characterizes a person who is no longer alleged to be a thief.

From a semantic point of view, this pattern is not surprising: adjectives like *former* and *alleged* are intensional operators (Montague(1970), Partee(2003) and references therein); namely they map the intensional property of the noun they combine with onto another property which is the semantic value of the adjective + noun combination. Their type is $<<i, <e,t>>,<e,t>>$ or $<<s, <e,t>>,<e,t>>$ and they compose with the denotation of the noun via functional application[3].

(15) *Former*

   a. $[former]^{now} = \lambda f.[\lambda x.f(now)(x) = 0$ but $f(t)(x) = 1$ for some time t before now]

   b. $[[president]] = \lambda t.\lambda x.$ x is a president at t

   c. $[former\ president]^{now} = \lambda x.$ x is not a president now but x was a president at some time before now

(16) *Alleged*

   a. $[alleged]^{w_0} = \lambda f.[\lambda x.f(w)(x) = 1$ for every possible world w where the relevant allegation in w_0 is true]

   b. $[[thief]]] = \lambda w.\lambda x.$ x is a thief in w

   c. $[alleged\ thief]^{w_0} = \lambda x.$ x is a thief in every possible world w where the relevant allegation in w_0 is true

The problem now is how to account for this class of exceptions. A possible solution is to keep the Cinquean analysis for plain adjectives and modify it so as to accommodate for operator adjectives as well. The next section shows how this can be done.

5. Ammending the syntactic account for AOR

Under the Cinquean approach plain adjectives are generated as specifiers of dedicated functional projections. Since the order of functional heads is established by the universal grammar and therefore is unique, plain adjectives are predicted to always be strictly ordered. However, we have seen above that this class of adjectives is not homogenous. Plain adjectives actually come in two flavors: operator adjectives and non-operator ones. The first class of adjectives shows free orderings, while the second shows fixed orderings. The second category is exemplified again in (17), where both *vegetarian* and *Russian* are non-operator adjectives and the only possible ordering is the one in (a).

(17) a. vegetarian Russian lawyer

   b. # Russian vegetarian lawyer

Besides word order effects, the two sets of plain adjectives also differ in terms of their semantics. Unlike intensional adjectives, whose semantics was given in section (4), non-operator ones are much simpler; they denote first order properties (18).

(18) a. [vegetarian] = $\lambda x.$ x is a vegetarian

   b. [Russian] = $\lambda x.$ x is Russian

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3. Note that *i* ranges over times, and *s* over worlds. The single bracket notation is used for extensions, and the double brackets for intensions.

Thus, if we keep the basic insight of the Cinquean analysis according to which semantic distinctions are reflected by syntactic distinctions, we arrive at the following revised account. Plain non-operator adjectives are marked in the lexicon as [- operator] and are generated in the specifier position of dedicated functional categories. Plain operator adjectives, on the other hand, are marked as [+ operator] and enter the syntactic derivation as adjuncts, which ensures that they are freely ordered.

Since it is beyond the scope of this paper to look into how AOR arise, I will for now adopt the analysis for non-operator adjectives as is and in the rest of the paper focus on the proposal for operator adjectives. Specifically, I will argue that the modification above is not the best solution. Evidence supporting this position comes from a new set of data involving so-called non-definite superlatives.

6. AOR and non-definite superlatives

The term 'non-definite superlatives' refers to superlative noun phrases that are headed by an indefinite determiner (Herdan and Sharvit(2006)). For example, the sentence in (19), which contains a non-definite superlative, is used to mean that there is a unique student in this class who is shorter than all the other students in the class.

(19)   This class has [a shortest student]. (Herdan and Sharvit(2006):2)

Remarkably, in non-definite superlative constructions the presence of the degree morphology has an effect on AOR. In the absence of the superlative morpheme structures with multiple non-operator adjectives like *short* and *Italian* are subject to ordering restrictions. This is shown in (20).

(20)   a. My class has [a short Italian student].
       b. # My class has [an Italian short student].

Consider now example (21), where the superlative phrase is ambiguous. It can either refer to an Italian student who is shorter than any other Italian student in my class, or it can be taken to mean that the shortest student in my class happens to be Italian.

(21)   My class has [a shortest student from Italy].

Interestingly, if we change the prepositional phrase *from Italy* to the adjective *Italian* the two interpretations are disambiguated by word order. Example (22) corresponds to the first interpretation, while example (22) is associated with the second.

(22)   a. My class has [a shortest Italian student].
       b. My class has [an Italian shortest student].

Examples like (22) prove that once the degree operator is present, adjectives which are otherwise subject to AOR become freely ordered. Structures with multiple adjectives and a degree operator are then another exception to AOR, and they pattern together with operator adjectives in that here too different linear orders mean different things.

However, in contrast to operator adjectives, the free word order effect is not due to the lexical properties of the adjectives involved, but rather to the presence of the degree morphology. The adjectives *short* and *Italian* are ordered in (20) but not in (22), where *-est* is present. This suggests that the modification proposed in the previous section is too simplistic and cannot account for both sets of exceptions.

7. A semantic constraint on AOR

We have now distinguished three types of cases involving modification by plain adjectives:

(23)   a. Plain non-operator adjectives
       b. Plain operator adjectives
       c. Plain adjectives with superlative morphology

The last two classes form a group to the exclusion of the first. On the one hand, we have non-operator adjectives, which are subject to AOR, and on the other hand we have operator adjectives and adjectives with superlative morphology, both of which are freely ordered and the different orders mean different things. Since there is no syntactic generalization that can capture this grouping, I suggest to look more closely at the interaction between linear order and the semantics of these three types of plain adjectives.

First, plain non-operator adjectives: they denote denote functions of type <e,t>, and they compose with the noun they modify via predicate modification (Heim and Kratzer(1998)). Since the operation of intersection is commutative, the linear order of non-operator adjectives will have no effect on the interpretation of these sequences. Both *vegetarian Russian lawyer* and *Russian vegetarian lawyer* are predicted to denote (25).In other words, reversing the order of these adjectives preserves the meaning. Different linear orders do not yield different semantic interpretations in the case of non-operator adjectives.

(24)   a. [vegetarian] = λx. x is a vegetarian

        b. [Russian] = λx. x is Russian

        c. [lawyer] = λx. x is a lawyer

(25) λx. x is vegetarian and x is Russian and x is a lawyer

In contrast, plain operator adjectives have a non-intersective semantics (cf. discussion in section 5), and therefore we always expect scope effects. The surface position of these adjectives determines the amount of material that they scope over. For example, in (26a) *former* operates on the noun meaning, while in (26b) it operates on the noun + adjective meaning. Consequently, different linear orders correspond to different interpretations.

(26)   a. a famous former [actor]

        b. a former [famous actor]

Superlative modifiers too, depart from plain non-operator adjectives in that they also have non-intersective interpretations. A phrase like *shortest student* does not characterize the set of students who are shorter than anyone else but the set of students who are shorter than all other students, which means that *-est* needs to takes scope over the modified noun (Heim(1999), Schwarz(2005)). This is shown in (27).

(27)   a. shortest student: [-est 1 [[t_1 short] student]]

        b. [shortest student] = λx. x is the student shorter than all other students

Thus whenever the superlative morpheme is present different linear orders mean different things, just like with operator adjectives, and this is illustrated in (28). In (28a), *-est* takes scope over 'short Italian student', while in (28) it only takes scope over 'short student', producing the meaning differences mentioned in section (6).

(28)   a. shortest Italian student: [-est 1 [[t_1 short] [Italian student]]]

        b. Italian shortest student: [Italian [-est 1 [[t_1 short] student]]]

The full picture on how plain adjectives behave is summarized in (29).

(29)   a. Plain non-operator adjectives - fixed orderings and same meaning

        b. Plain operator adjectives - free orderings and different meanings

        c. Plain adjectives and *-est* - free orderings and different meanings

This pattern suggests that there is a general semantic constraint on AOR according to which ordering restrictions do not choose between structures that are truth-conditionally distinct. Following this generalization I would like to propose a model of grammar where the syntactic component imposes ordering restrictions only on semantically equivalent structures. It may be that not all such structures are subject to ordering restrictions but it is only these that can be. Under this view, if two sequences of adjectives

have different denotations, the syntax will allow both orders. This is schematically illustrated in (30a). Reversely, if only one ordering is possible the prediction is that the two sequences are semantically equivalent and that the ordering attested is the one imposed by the syntax (30b).

(30) a. if [A_1 A_2 N] $\neq$ [A_2 A_1 N] $\rightarrow$ AOR do not apply

   b. if [A_1 A_2 N] = [A_2 A_1 N] $\rightarrow$ AOR can apply

The question that arises at this point is how to derive the proposal in (30). A tentative account is to adopt Cinque's syntactic analysis of AOR and find a way to explain the free word order cases. The advantage of this approach is that we have an analysis of how AOR arise. All we need is a mechanism for sorting out structures that are semantically equivalent from those that aren't so that the unexpected word order applies.

One possibility is to introduce a semantically-conditioned adjective movement. Under this view, all plain adjectives are generated as specifiers of functional projections, and then they're allowed to move around iff the resulting structure is semantically distinct from the structure where no movement applies. The trace left behind by this adjective movement would have to be semantically vacuous. Adjective ordering can then be seen as another domain where semantics restricts the application of syntactic operations (Fox(2000)). The downside of this approach though, is that the adjective movement that we need to resort to is not independently motivated.

Instead of using movement, we could lift the ordering constraint by making the truth-condition distinctiveness part of AOR itself. Under Cinque's original analysis, the grammar contains a principle according to which SizeP always dominates ProvenanceP. We can replace it with another one that would allow us to generate both SizeP >ProvenanceP and ProvenanceP >SizeP if the two structures are truth-conditionally distinct. This proposal, however, entails that c-selection is sensitive to semantic interpretation, which seems unlikely.

An alternative to the line of reasoning presented above is to look upon the free word order cases as the norm and try to derive those that are subject to ordering constraints. Let us assume for example, that all plain adjectives are adjuncts. This would cover all the cases in (31) except the one in (b). While at first sight this view might seem attractive - we only need to account for one example that shows unexpected word order rather than three - it leaves us with no explanation for where AOR comes from.

(31)

SIZE >PROVENANCE	PROVENANCE >SIZE
a) a short Italian student	b) # an Italian short student
c) a shortest Italian student	d) an Italian shortest student
e) an alleged former thief	f) a former alleged thief

8. What about definite superlatives?

Before concluding, let me make some remarks on adjective ordering and definite superlatives. Unlike non-definite superlative constructions, definite ones do not allow free word order:

(32) a.   The dean praised [the shortest Italian student].

   b.   # The dean praised [the Italian shortest student].

Given the semantic constraint on AOR that I described, the prediction is that the (a) and (b) cases in (32) are semantically equivalent. The claim however, cannot be tested by appealing to speaker judgments since the second case is ungrammatical. Therefore let us examine what the semantics of superlatives predicts about the meanings of the multiple adjective sequences in (32).

First let us consider the simple case in (33), where only one adjective is present. Here, the superlative noun phrase describes the boy who is taller than any other boys.

(33) a. Florin is the tallest boy.

   b. [tallest boy] = λx. x is the boy taller than all the other boys

By extension we expect to get the following denotations for the multiple adjective sequences in (32):

(34)   a. [shortest Italian student] = λx. x is Italian and x is shortest among the Italian students

          b. [Italian shortest student] = λx. x is Italian and x is shortest among all the students

These denotations are semantically distinct, and this can be illustrated with the following scenario. Suppose that the contextually-relevant set of comparison in these cases is some international school, and that Mihai, Carlo, and several other students of various nationalities study at the school. Mihai is Romanian and Carlo is Italian. Suppose moreover that:

(35)   a. There is no other student in the school shorter than (or of equal height with) Mihai; and

          b. There is no other Italian student in the school shorter than (or of equal height with) Carlo.

In this scenario the sequence *shortest Italian student* characterizes Carlo, while *Italian shortest student* doesn't describe anyone in the school since the shortest student among all is Mihai but he is not Italian. At first sight, this seems to contradict our prediction that the two multiple adjective sequences are semantically equivalent. However, a slight modification of (30) will make it hold again.

First, it is possible that identity is not actually checked at the level of the noun phrase, but rather at the level of the determiner phrase. Secondly, it may be the case that when identity is checked this is done under the assumption that both determiner phrases refer, which implies that the relevant notion is not truth-condition distinctiveness but rather Strawson identity (von Fintel(1999)). With these modifications in place, the two sequences of multiple adjectives in (32) are again predicted to be semantically equivalent. Once the noun phrases *shortest Italian student* and *Italian shortest student* combine with the definite article they become Strawson-identical. Unlike the indefinite determiner, which asserts existence, the definite one presupposes it. Thus whenever both *the shortest Italian student* and *the Italian shortest student* refer, they refer to the same person (in this scenario, Carlo).

With this refinement of the proposal in (30) we can now account for why definite superlatives are subject to ordering restrictions. The exact word order of the adjectives involved however, is admittedly still an open question. Does the observed word order always correspond to that of the universal hierarchies described in section 2? Or is it the case that the superlative adjective needs to be leftmost?[4] I leave the answer to this to the future.

9. Conclusion and prospects

This paper contributes to the debate on AOR by focusing on exceptions to the phenomenon. Adjectives have been shown to fall into several classes, and the resulting typology is given in (36)[5].

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4.   The judgement of examples like the following would have to be examined:

  (1)   The hierarchy
        a.   a small green bottle (SIZE >COLOR)
        b.   # a green small bottle

  (2)   Sequences with a superlative
        a.   the smallest green bottle (SIZE >COLOR)
        b.   the green smallest bottle
        c.   the small greenest bottle (SIZE >COLOR)
        d.   the greenest small bottle

5.   Adjectives bearing focus do not appear in this final classification because they represent a rather complex case and deserve more discussion space.

(36) Adjectives and word order

	Ordering restrictions	Adjective class	
1.	(AOR)	plain	non-operator adjectives
2.	free	plain	operator adjectives
			adjectives with superlative morphology
3.	free	non-plain	adjectives homophonous with reduced relatives
			adjectives that bear comma intonation

Only adjectives that do not bear any special intonation and have the syntax of (stacked) bare adjectives (ie. plain adjectives) have been discussed. Specifically, I argued on the basis of data coming from operator adjectives and superlative constructions that AOR do not apply to sequences where different linear orders yield different truth conditions. Under this view, only non-operator adjectives can be subject to ordering constraints.

This study can be seen as providing further illustration of the fact that principles of syntactic well-formedness are sometimes sensitive to semantic interpretation Fox(2000). Further research needs to be done as to how the proposed semantic constraint on AOR can be implemented.

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