Antisymmetry and the Lexicon*

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Introduction.

In this paper, I will try to show that what we think of as the noun-verb distinction can be understood as a consequence of antisymmetry, in the sense of Kayne (1994). (I will also make some remarks (in the first two sections) concerning counterparts of the human language faculty in other species.[1]) Properties of nouns will, from this perspective, lead me to suggest that sentential complements (and derived nominals) involve relative clause structures.

1. Recursion.

Hauser, Chomsky and Fitch (2002, 1578) consider the "hypothesis that recursion evolved to solve other computational problems such as navigation, number quantification" and consider that it is "possible that other animals have such abilities".

Assume, then, that recursion is not unique to humans but that FLN (faculty of language narrowly understood) in their sense is. We can ask what other more specific property or properties of FLN might keep it from appearing in other species. Or put the other way round, what is it about non-human species that makes FLN unavailable to them? Some possible properties more specfic than recursion that might be conjectured to characterize non-human species (as opposed to humans) are as follows.

First, it might be that in non-human species recursion is available with spellout to PF, but there is no compositional interpretation available, i.e. no mapping to LF (and correspondingly no notion of idiom).

Second, it might be that external merge is available, but no internal merge.

Third, counterparts of language in non-human species might allow branching of arbitrary degree, rather than just binary branching.

Fourth, recursion might be available, but without any notion of phase, in which case, if Kayne (2006) is on the right track, non-human species might lack the possibility of having pronounceable elements be unpronounced in certain contexts.

Fifth, counterparts of human language in non-human species might more generally have no silent elements. (For example, there might be no contentful pauses in birdsong.)

Sixth, it might be that parametric differences are absent within any given non-human species (assuming a sufficiently clear way to individuate species). For example, there might be no parametric differences in birdsong (within a given species) comparable to the parametric differences present in human language. (Related to this is the question why parametric variation exists in humans (and why only certain kinds).[2])

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[1]   This paper (with a different title) originated as a talk given in June 2007 at the conference "Biolinguistics: Language Evolution and Variation" (University of Venice).
[2]   For some discussion, cf. Baker (2001, chap. 7).

2. Antisymmetry.

The antisymmetry property that Kayne (1994) attributed to the human language faculty might or might not have counterparts in other species.

Informally speaking, a relatively weaker interpretation of antisymmetry has it that no two human languages can be mirror images of one another, i.e. no pair of languages can have the property that one is the exact mirror image of the other (in the sense that each grammatical sentence of one has a grammatical counterpart in the other that is its mirror image, counting by morphemes, say). Put another way, take some human language, e.g. English, and construct mirror-image English by taking the mirror image of each grammatical English sentence and 'putting it into' mirror-image English. Though perfectly easy to imagine, such a mirror image of English is not a possible human language (if antisymmetry is correct).

Correspondingly (in part), one could ask whether a given species of bird could have two songs that are mirror images of one another.

Again informally speaking, a stronger interpretation of antisymmetry has it that if some subtree (with both hierarchical structure and precedence relations specified) is well-formed in some human language, then its mirror image is well-formed in no human language.

The similar question for birdsong would be: Can two subparts of songs (in a given species) be mirror images of one another, with hierarchy preserved?

These questions can also be asked in a cross-species fashion. Again taking birdsong as an example, could a whole song from one species be the mirror image of a whole song from another species? Taking hierarchical structure specifically into account, could a well-formed subpart of a song from one species have its mirror image be well-formed in some other species?

A conjecture would be that antisymmetry holds both within and, in the above sense, across species. (Whatever the exact extent to which it holds, we would need to further ask why it holds.)[3]

Assuming antisymmetry to be related to sequence in time, one can ask to what extent sequence in time is a PF interface property, as opposed to holding more fundamentally of internal 'thought'.

3. Antisymmetry and antioptionality.

In the early years of generative syntax, transformations were commonly taken to divide into optional transformations and obligatory ones.[4] Starting in the 1980s, Chomsky, for example in his 'last resort' proposal,[5] began to move away from the idea that transformations/movement operations were free to vary between optional and obligatory, and toward the idea that derivations do not countenance (a certain kind of)

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[3] Asking a cross-species question of the sort mentioned amounts to asking a question concerning what the brains of different species might have in common, and what the limitations might be on what such brains can do.

[4] Cf. for example Kayne (1975); on clitic movement, cf. also Kayne (2000, chap. 9).

[5] Cf. Chomsky (1986; 1995).

optionality. Antisymmetry can itself be (informally) thought of as reflecting a particular dimension along which the human language faculty rejects optionality - in the case of (temporal) order (for a given hierarchical arrangement).

Important to the present paper is a question involving the optionality of projection, thinking of Chomsky (2005, 14), who emphasized the (widely-agreed-upon) fact that when a head is merged with a phrase it is the head that projects - there is no choice/option. In agreement with Chomsky, I take this lack of optionality to be desirable.

Chomsky's discussion left open the question of initial derivational steps in which one head is merged with another. Contrary to the case of head-phrase merger, where the identity of the projecting element is plausibly fixed by general principle, it seems at first glance that in head-head merger the language faculty must countenance optionality, allowing either of the two heads to project.

This problem with respect to projection recalls the one that seemed to arise for antisymmetry if one tried to reconcile antisymmetry (in particular the LCA-based formulation of it from Kayne (1994)) with Chomsky's (1995, chap. 4) bare phrase structure proposal. The LCA approach, while deriving various other properties of X-bar theory, took over intact from X-bar theory the idea that one could have non-branching projections, something that bare phrase structure prohibits.[6] Non-branching projections were necessary for the LCA to work properly precisely in the case of what bare phrase structure would now call the merger of two heads, insofar as two sister nodes both of which are pure heads would involve no asymmetric c-command and would therefore, according to the LCA, not be properly linearized.

A solution to the challenge of reconciling the LCA with bare phrase structure was proposed by Guimarães (2000), who suggested that the language faculty should be taken to allow what he called Self-Merge, where some head x is merged with itself, yielding {x}. Let me follow more closely Chomsky's (2005, 16) formulation (from a different context) of a similar idea. Without saying that x can merge with x (which leads to questions about how to distinguish occurrences of x and what to say about 3 or more x's merging all at once), let us say only that one option for merge, taken to be set-formation, is the direct formation of the singleton set {x}.[7]

From an LCA perspective, this works informally as follows.[8] Whereas having heads y and x as sisters yields a linearization problem (since neither y nor x asymmetrically c-commands the other), having y the sister of {x} does not. In this configuration, y

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[6] Cf. Chomsky (1995, 246).
[7] It seems unlikely that {x} (or Guimarães's (2000) self-merge) could be the source of what is called morphological reduplication. Gulli (2003) has proposed that syntactic reduplication is found only in remnant movement configurations, where neither copy c-commands the other. A plausible conjecture is that exactly the same holds of what we think of as morphological reduplication.

Alongside {x}, there seems to be no need for {{x}}, which would be unavailable in principle if every merge operation must directly involve a head.
[8] Full integration of the LCA with bare phrase structure will require reformulating the LCA without recourse to non-terminals.

asymmetrically c-commands x (and so y will be ordered before x). (I am assuming that c-command has the property that a head c-commands each member of the set it merges with.)

4. Antisymmetry of projection.

Another way to put this Guimarães (2000) type proposal is to say that antisymmetry compels the language faculty to have recourse to singleton set formation in the relevant case.[9] From this perspective, we can now say that antisymmetry, by inducing singleton set formation, has automatically provided a solution to the head-head projection problem,[10] tying it to various other ramifications of antisymmetry (cf. also Kayne (2005, chap. 9)).

The problem, again, was that merging distinct heads y and x seemed to lead to an option with respect to projection - either y could project or x could, with distinct results. But merging y with {x} reduces to the general case of merging a head with a phrase (set), for which there is no ambiguity of projection (it is always the head, here y, that projects).[11] Put another way, a language faculty that respects antisymmetry is not, given Guimarães's (2000) proposal, subject to the optionality of projection problem.

If it should turn out that antisymmetry itself is ultimately derivable from some more general (and precise) notion of antioptionality (one compatible with the presence in the language faculty of certain instances of optionality, such as parameter setting and such as the optionality involved in choosing items to be drawn into the numeration from the lexicon and into the derivation from the numeration (or into the derivation directly from the lexicon)), then the title of this paper would be appropriately changed to "Antioptionality and the Lexicon", without, I think, affecting the core claim to be made beginning with the next section, namely that the existence in the language faculty of a noun-verb distinction is a consequence of antisymmetry (or, then, antioptionality) rather than an intrinsic property of anything called the lexicon.

5. The closed class vs. open class distinction.

From the preceding discussion, we can see that in a given derivation, some lexical items x will appear as part of {x}, others (the 'y's) will not. That is, some lexical items will be involved in singleton set formation, others will not.

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[9] I agree with Guimarães's arguments that neither Chomsky's (1995, 337) nor Moro's (2000) attempt (cf. also Babyonyshev (2004)) to use obligatory movement of one of the two heads in '[y x]' to solve the problem is sufficiently general.
[10] Bare phrase structure alone, without antisymmetry, would not have solved the problem.
[11] If, in merging a head y and a phrase XP, it was the phrase that projected, we would have y as the specifier of the head of XP, which is excluded by antisymmetry - Kayne (1994, sect. 3.7).

Note that just as the solution to the optionality problem for head-head merger is that the merger of two distinct heads is in fact never possible, there is a sense in which two phrases never merge directly with one another, but only via the intermediary of the head of one.

It is a commonplace that some categories are open, in the sense of (having a large number of members and) allowing (further) expansion, while others are not. Why should this be? Why are there closed categories at all?

Let me suggest an answer based in part on Chomsky's (2001, 15) proposal that unvalued (uninterpretable) features have to be valued immediately upon entering the derivation,[12] and in part on the idea that the set of parameters is fixed. Assume that singleton-set formation is part of the derivation; together with Chomsky's proposal, this would yield the conclusion:

   (1) If x participates in singleton-set formation (yielding {x}), then x cannot have an unvalued feature.

This is so, since the initial derivational step that forms {x} will have no way of valuing such a feature, given that that derivational step involves no y distinct from x. Thus Chomsky's requirement can be met only if x has no features in need of valuation.

   Collins (2005, 117) suggests that parametric variation is limited to uninterpretable features, which is very close to:

   (2) Parametric variation is a property of unvalued features only.

If this holds, then combining it with (1) yields:

   (3) If x participates in singleton-set formation, then x is not the locus of parametric variation.

Strengthening (1) would lead to:

   (4) If y remains bare (i.e. does not participate in singleton-set formation), then y must have an unvalued feature.

A parallel strengthening of (2) would give (cf. Kayne (2005, 285)):

   (5) All unvalued features are associated with parametric variation.

Assume further that parameters are hard-wired, i.e.:

   (6) Parameters (though not their values) are fixed by the language faculty, i.e. they constitute a closed set.

Now by (4) + (5), a bare y must be associated with parametric variation. Therefore, by (6), the set of such y must be closed, i.e. the category that y belongs to must constitute a closed class. (This constitutes an answer to the question raised toward the beginning of this section, with the next question being why (6) should hold.)

By standard assumption, the lexicon as a whole is not closed. If so, it follows from the present perspective, which has lexical elements necessarily being either of the y type or of the x type, that the category that x belongs to must constitute an open class.

6. Nouns and verbs.

The antisymmetry-driven picture of the lexicon we have arrived at is that there are lexical items of category x and lexical items of category y, with the following properties:[13]

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[12] An open question is whether the existence of a distinction between valued and unvalued features could itself follow from antisymmetry/antioptionality. (The reverse seems less likely.)

[13] If a non-human species lacked antisymmetry, then it should lack the x vs. y distinction - necessarily so if antisymmetry is the only possible source of this bifurcation.

(7) x: open class, singleton-set formation, initially valued features, not locus of parametric variation

(8) y: closed class, no singleton-set formation, initially unvalued features, locus of parametric variation

Part of my proposal is:

(9) An x is what we call a noun.[14]

That is, nouns match the properties listed in (7).

Related to these, we might have:

(10) An element can 'denote' only if it enters the derivation with no unvalued features.

from which it would follow, given (7) and (8) (cf. Baker's (2003, 118) kind-denotation[15]):

(11) The only lexical elements that can denote are nouns.[16]

Paired with (9) is the proposal:

(12) A y is what we call a non-noun.

Falling under 'non-noun' are at least verbs (and aspectual heads), with the apparent paradox that verbs are normally thought to belong to an open class.

That paradox needs to be rethought, however, in light of Hale and Keyser's (1993, 55) proposal concerning *laugh* and similar items. For Hale and Keyser there,[17] English *laugh* is a noun that in some sentences cooccurs with a light verb that is unpronounced, giving the (misleading) impression that *laugh* in English can also be a verb. Strictly speaking, though, *laugh* is invariably a noun, even when it incorporates (in some sense of the term) into a (silent) light verb (for example, by adjoining to the light verb,[18] or perhaps by moving to some Spec position related to the light verb).[19] Put another way, if Hale and Keyser (1993, 55) are right, which I take them to be, *laugh* must be subtracted from the set of English verbs.

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[14] From this perspective there may be no need for a category-creating *n* such as in Marantz (to appear). (The text discussion uses 'noun' where one might want to speak of 'nominal root'.) On gender and on Harris's (1991) notion of word marker, both of which I will be leaving aside (perhaps wrongly), see also Ferrari (2005).

If classifiers are nouns, then parametric variation involving classifiers must be reinterpreted in terms of properties of other heads that are non-nominal, and similarly for measure nouns and for parametric variation with *at the age of five* (cf. Kayne (2005, chap. 10)).

[15] Also, Déprez (2004) and Vergnaud and Zubizarreta (1992).

Parallel to (10) and linked to Baker (2003, 95) would be:

i) An element can have *criteria of identity* only if it enters the derivation with no unvalued features.

[16] One might ask whether it is x or {x} that denotes.

[17] Hale and Keyser (2002, 98) move away from that position.

[18] On incorporation, cf. Baker (1988).

[19] Cf. Kayne (2005, chap. 9, note 5). In bare phrase structure, there is no way for a noun to derivationally 'become' a verb.

Without addressing any of the various challenges that arise for the Hale & Keyser proposal,[20] let me jump to the following claim:

(13) All verbs are light verbs.

This amounts to the conjecture that if we pursue the Hale & Keyser approach consistently, we will see that most of what we call verbs are really like *laugh*, and actually involve a noun and a silent light verb (or more than one silent light verb).[21]

If so, we are led to the conclusion:

(14) The class of verbs is closed.

in which case the paradox under discussion disappears, and we can maintain the conclusion that the antisymmetry-driven distinction between (7) and (8) is what underlies the distinction that we are used to calling the noun-verb distinction. (Put another way, a basic property of (what we think of as) the lexicon is called into being by a property (antisymmetry) of the language faculty that is not intrinsically a property of the lexicon.)

7. Other categories.

Questions arise about other traditional categories. Take adpositions, for example. If there is a core x vs. y (noun vs. non-noun) distinction, then, if an adposition is simplex it must be either of category x or of category y, i.e. either nominal or not. It seems virtually certain that, as many authors have suggested, some adpositions are (simplex and) nominal.[22] Adpositions that are not nominal, i.e. not of the x type, must be of the y type. Determiners might be uniformly of one type, or perhaps some determiners are x and others y, and similarly for other categories. Another possibility is that some categories that look simplex actually are not. For example, Amritavalli and Jayaseelan (2003) have suggested that adjectives might cross-linguistically be analyzed as resulting from the incorporation of a noun to a (silent) Case morpheme.[23]

8. Lexical specialization.

The question arises as to whether lexical items are necessarily specialized relative to the x vs. y distinction, or not. Could there be a lexical item with the property that in some derivations it acts as an x and in other derivations as a y? The

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[20] For a proposal concerning cognate objects that is compatible with a strong form of the Hale & Keyser position, see Real Puigdollers (2007).

[21] In languages like English, 'incorporation' can also involve phrases, as in*:*

i) Don't Monday-morning-quarterback him so much.

Other instances involve adjectives:

ii*)* You need to thin the soup.

If *download* is phrasal (cf. Koopman and Szabolcsi (2000)), then English also has phrasal 'incorporation' into a nominal structure, in:

iii) the downloading of the program

[22] With a reduced amount of functional structure above them, as compared with ordinary nouns - cf. Collins (2006).

[23] As opposed to Baker's (2003) approach to adjectives.

Case morphemes are probably a subtype of adposition.

antisymmetry/antioptionality perspective that I have been taking suggests not. Two more specific considerations that point in the same direction are as follows.

First, given the open vs. closed class distinction that matches x vs. y, it is clear that not all items of type x could alternatively act as type y, otherwise the set y would not be closed. There remains the question whether a closed subset of x could have the property of appearing as y in some derivations. This second question can be made more concrete by thinking of a particular x, say *thing*. Could *thing* act as a y (non-noun) in some derivations? The answer would seem to be a clear no. The most plausible conclusion, then, is that the x's and the y's constitute disjoint sets of lexical items.

Although not found with *thing*, there are of course sentences (in English) such as:

(15) John impersonated Bill.

but these (like many others) will have an incorporation type derivation, including the presence of a (silent) light verb and in this case a prepositional element *im-*, in addition to *person*, which can therefore be taken to be an x here, as in general.

Similarly, there are (in English) even some cases in which light verbs might be thought to act as nouns:[24]

(16) You should give it a go/*be/*have.

But a plausible alternative is that *go* here is a y embedded in a structure much of which is silent, perhaps partially parallel to what is seen overtly in:

(17) We gave them the go-ahead.

which is in turn similar to the control sentence with obviously verbal *go*:

(18) We gave them permission to go ahead.

Similar considerations hold for cases like:

(19) Neither the haves nor the have-nots will be happy about this.

alongside:

(20) Neither those who have nor those who do not have...

The conclusion that the x's and the y's must be disjoint in a given language leads to the question of cross-linguistic consistency. If some lexical item is an x is one language, must its counterpart in the next language also be an x?[25] The Hale and Keyser (1993, 55) discussion of English *laugh* and its Basque counterpart lends itself to thinking that the answer is yes, that lexical items do distribute consistently across languages as far as the noun-verb distinction goes.[26] I agree with a strong version of this (but will not pursue the question).

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[24] Beyond the scope of this paper is the question (which cuts across the silent vs. pronounced dimension) how best to distinguish one light verb from the next, one consideration being that light verbs themselves are not (all) simplex.

[25] The identification of lexical counterparts across languages (with silent elements playing an important role) is central to comparative syntax. For relevant discussion, see Cinque (1999) and Kayne (2005, chap. 12).

[26] In the present framework, it is clear that every language must have a distinction between y and x (between non-noun and noun). This agrees with Baker's (2003, 169) argument that all languages have nouns.

How best to express the difference between English and Basque with respect to *laugh* is left an open question.

9. Nouns do not project.

The complement of a head is that phrase that the head initially merges with. When y merges with {x}, {x} is the complement of y. However, elements of type x cannot themselves have a complement, since when they enter the derivation they invariably undergo singleton-set formation, rather than merging with a phrase/set. (As in the previous section, x's and y's have disjoint properties.) In more familiar terms, this yields the conclusion that nouns must not have complements.

Can x ever have a specifier? This amounts to asking whether {x} can merge with some phrase in such a way that x projects (is the label of the resulting larger phrase). Relevant here (and perhaps also to the question of complements) is our earlier conclusion in (1) that x cannot have any unvalued feature. If an unvalued feature is necessary to the derivational coming into being of a specifier, then x can have no specifier. I will take this to be valid.[27]

Let me therefore add this difference concerning projection to the set of differences between x and y given earlier in (7) and (8), which yields:

(21) x: open class, singleton-set formation, initially valued features, not locus of parametric variation, no complement or specifier

(22) y: closed class, no singleton-set formation, initially unvalued features, locus of parametric variation, complement and specifier possible[28]

10. A consequence of nouns not projecting: *the fact that...*

If nouns never project,[29] then in:

(23) the fact that they're here

that they're here cannot be a complement (or specifier) of *fact* if *fact* is a noun (an x).[30]

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[27] This agrees with Baker (2003, 23) on verbs vs. nouns.
[28] And perhaps obligatory, though I will not pursue that here, and similarly for the question whether {x} can itself be the specifier of another head.
[29] Ghomeshi (1996, 63) takes this position for Persian.
[30] Little would change in the text discussion if *fact* turned out to be phrasal, as suggested perhaps by its German counterpart *Tatsache* ('deed thing'), though that might perhaps help with the potential gender problem (depending on one's analysis of complementizer *that/dass*) of *die Tatsache, dass/*die sie intelligent ist* ('the fact that she intelligent is') brought to my attention by Luka Szucsich, which recalls French *quelque chose de beau/*belle* ('some thing of beautiful').

It is unlikely that Stowell's (1981, chap. 3, sect. 7) appositive proposal for finite clauses in derived nominals could (if correct) be generalized to *fact*, given:
 i) The (very/mere) fact that they lied is scandalous.
 ii) *?The (*very/*mere) fact, (namely) that they lied, is scandalous.
Also:
 iii) His claim to the effect that he's innocent is hard to believe.
 iv) The fact (*to the effect) that he is innocent is well-known.
as well as:
 v) ?That man we deplore the fact that she's in love with.
 vi) *That man the fact is (that) she's in love with.

Since it is unlikely that *fact* is a verb (a y), there appears at first glance to be a problem. The solution, I think, involves taking (23) to be a relative clause structure.

There are, needless to say, differences as compared with more familiar relative clauses:

(24) *the fact which they're here
(25) the fact which they mentioned

If (23) contains a relative clause, why is *which* not possible?

An answer is to be found in the realm of *way*, which occurs in ordinary relative clauses like:

(26) the way in which they solved the problem

Way also appears in:

(27) the way (that) they solved it

which is uncontroversially a relative clause structure with the preposition *in* unpronounced, as it can (optionally) be elsewhere:

(28) They solved it (in) this way.

What is notable is that when *in* is unpronounced, *which* is impossible:[31]

(29) *the way which they solved it

despite being possible in (26).

The suggestion, now, is that (24) is impossible for the same reason as (29). If so, then (24) is not incompatible with a relative clause analysis of (23), since (29) shows that *which* is not automatically available in English, even when the head of the relative is inanimate.

Linking (23) vs. (24) to (27) vs. (29) rests in part on the proposal that the former pair has in common with the latter the presence of silent *in*, i.e. that (23)/(24) is to:

(30) They're here, in fact.

as (27)/(29) is to (28). In other words, (23) contains a relative clause in which what has been relativized is the object of the (silent) *in* of (30).[32] That *which* is not possible in (24) reflects a broader incompatibility between *which* and silent *in*, as shown by (29).

A further apparent problem lies with the unacceptability of:

(31) *the fact in which they're here

and the contrast between it and (26). A possible solution would involve relating this contrast to others having nothing to do with relatives, e.g.:

(32) In what/?which way did they solve it this time?

(v) recalls the extraction out of relatives discussed by Taraldsen (1981) and Chung and McCloskey (1983).

[31] The absence of a following lexical noun, in combination with the non-pronunciation of *in*, seems at be at issue, to judge by:

  i) (There are many known ways of solving this equation) ??In which did they solve it this time?

  ii) *Which did they solve it this time?

[32] Or possibly that of:

  i) They're in fact here.

or of:

  ii) In fact, they're here.

(33) *In what/which fact are they here this time

i.e. to the substantially greater restrictions on determiners found with *fact*,[33] as also seen in:

(34) We solved it in another way.

(35) *We're here, in another fact.

and arguably in:

(36) In ways, they're right.

(37) In fact(*s), they're right.

which may correlate in turn with:

(38) (?)the ways that they're right

(39) the fact(*s) that she's right and (that) he's wrong

   The contrast between (24) and (25), which I have been arguing to be compatible with the idea that both are relative clause structures, has a counterpart in:[34]

(40) The fact ?(that) they're here is irrelevant.

(41) The fact (that) they mentioned is irrelevant.

Having no relative marker at all is difficult in the first, as opposed to the second. That (40) is marginal may, though, be related to the marginality of the following, which clearly involves a(n extraposed) relative clause:

(42) The very person walked in ?(that) they used to know in high school.

in which case (40), too, is compatible with the idea that *the fact that...* always contains a relative clause.

   The two subtypes of relative clause found with *fact* (one based on adjunct-like *in fact*, the other not) also differ with respect to *one*:

(43) the fact that they're right and the fact/*one that you're wrong

(44) the fact that they mentioned and the fact/one that you mentioned

As earlier, we find that the *in fact*-based relative has a counterpart with (clear cases of) relative clauses based on *way*:

(45) the way that they solved it and the way/*one that you solved it

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[33] Also greater than with nouns like *rumor*:

  i) There's a rumor/*fact that John is ill.

which also differ from *fact* with respect to:

  ii) the rumor/*fact according to which John is ill

  iii) the rumor/*fact to the effect that John is ill

Possibly, (iii) is to be linked to:

  iv) John is ill, in effect.

though one will need to understand:

  v) John is indeed ill.

  vi) *the deed that John is ill

(ii) and the following show (along with relativization based on *in fact*) that there is no general prohibition against relativizing (high) adjuncts:

  vii) the scandal as a result of which they resigned

  viii) the reason why they resigned

[34] Cf. perhaps the *som* ('as') vs. *at(t)* ('that') contrast found in Scandinavian languages, which needs to be elucidated.

The restriction in question depends in part on the preposition not being pronounced (in both (43) and (45)), in a way that recalls (29):

(46) They solved it this way and you solved it that way/*one.
(47) They solved it in this way and you solved it in that way/?one.

Luigi Rizzi (p.c.) points out that what from my perspective are two cases of relative clauses with *fact* differ in Italian in that the one that I take to be related to *in fact* allows subjunctive, while the other does not. Let me give polarity-like examples from (my) English that I think mimic the Italian contrast (cf. perhaps the *ever* of *Why ever did they run away?*):

(48) The fact that they could ever have run away disturbs me.
(49) *The fact that they could ever have mentioned disturbs me.

It may be that 'ordinary' relatives like the one with *mention* always have a (sometimes silent) demonstrative, as opposed to the *in fact*-based relative, which does not, and that the *ever* of (48) (along with subjunctive in Italian) is incompatible with relatives whose head has a demonstrative.

In conclusion of this section, then, a relative clause analysis of (23) is more plausible than it might initially seem to be. If so, then (23) is compatible with the idea that nouns do not have complements.[35]

11. Derived nominals.

If *removal* is a noun, then there might appear to be a problem with:

(50) the removal *(of) the evidence

insofar as *the evidence* looks like the complement of *removal*. One response could be to deny that *the evidence* is a complement, by arguing, for example, that if it were, there shouldn't be any need for *of* (one would then call the inability of nouns to assign (accusative) Case a stipulation). Yet if *the evidence* is not a complement, how does one express the parallelism with?:

(51) They removed the evidence.

A second approach, of a familiar and plausible type, is to factor out *-al* and to say that *the evidence* is indeed a complement in (50), but not of *removal*. Rather it is a complement of *remov-*.[36] Since *remov-* is presumably not a noun, the potential problem disappears. But it comes back in a different form, if one asks about *-al* itself. If *-al* were a y (a non-noun), then there would be no problem, except that if neither *remov-* nor *-al* is nominal, the presence of the initial *the* in (50) becomes hard to understand, along with the presence of *of* and the possibility of having an adjective:

(52) the sudden removal of the evidence

If *-al* in our terms is an x (a noun) (cf. Williams (1981)), the presence of *the sudden* here becomes more straightforward, but the original problem returns as soon as one asks what the relation is between *-al* and *remov- the evidence*. If, as seems plausible, -

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35   Stowell's (1981) appositive idea (or den Dikken's (2006, 244) updated version of it) would, if extended to *fact*, also be compatible with *fact* not taking complements. See however note 30.
36   Cf. Pesetsky (1995, 131).

al is merged directly with *remov- the evidence*, then the (suffixal) noun *-al* has a complement, contrary to present expectations.

The alternative is to take *-al* (and similar nominalizing elements) to have an analysis partially similar to what was proposed above for *fact*. Suffixal *-al* will be merged as the object of a silent preposition and then relativized.[37] (Thinking of Lees' (1963) discussion of the interpretation of derived nominals, *-al* could (sometimes) be a suffixal counterpart of *fact* or of *way*.) The suffixal character of *-al* will translate into the requirement that the relative be a non-finite small clause of a certain sort and into the need for *remov-* to raise past *-al* (making (50) have something in common with internally-headed relatives). The derivation might (very sketchily) look like this:

(53) remov- the evidence P -al   -->   Case-related movement
the evidence$_i$ remov- t$_i$ P -al   -->   relativization of *-al*, pied-piping P
[P -al]$_j$ the evidence$_i$ remov- t$_i$ t$_j$ -->   remnant movement
[remov- t$_i$ t$_j$]$_k$ [P -al]$_j$ the evidence$_i$ t$_k$

From this perspective, *of* in (50) occurs between the 'head' of the relative, which is *-al* and the relative clause proper, which begins with *the evidence*. (There is no complementizer or relative pronoun is this kind of non-finite relative.) Expanding (53) to include merger of *of* yields:[38]

(54) remov- the evidence P -al   -->   Case-related movement
the evidence$_i$ remov- t$_i$ P -al   -->   merger of *of*
of the evidence$_i$ remov- t$_i$ P -al   -->   relativization
[P -al]$_j$ of the evidence$_i$ remov- t$_i$ t$_j$ -->   remnant movement
[remov- t$_i$ t$_j$]$_k$ [P -al]$_j$ of the evidence$_i$ t$_k$

Having relativization move a phrase to the left of (into the Spec of) *of* also seems called for (in a partially similar case) by the parallelism (cf. (43) and (45)) between:

(55) the way/*one they solved the equation
and:
(56) that way/*one of solving it
(57) the other way/*one of solving it
supporting the idea that the *of* of (56)/(57) introduces a (non-finite) relative. Similar to (56)/(57), with an interesting twist, is:

(58) You have a funny way/*one of wording your letters.
which is missing, in the gerund clause, the manner adverb that *word* normally requires, and which we can take here to have been relativized. That *way* has actually been raised into the pre-*of* position in (58) is supported by:[39]

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[37] In the spirit of the head-raising approach to relatives. Conceivably it is *-al* that is adpositional, in which case its object would be silent FACT or WAY or some other comparable noun.
[38]   Since extraction from relatives is not in general impossible - cf. Taraldsen (1981), Chung & McCloskey (1983) - the existence of:
  i) the evidence that we condemned the removal of
is not entirely surprising, though the extraction in (i) may be facilitated by the application of Case-related movement.
[39]   One will ultimately need to fit in:
  i) You have a funny way about you.

(59) *You have a funny way.

whose unacceptability, compared with the acceptability of (58), can be attributed to *way* in (59) having no source, since there is no relative clause present. Note in addition:

(60) You have a different way of wording each type of letter, don't you?

in which *different* readily scopes under embedded *each*, most straightforwardly as the result of a reconstruction effect keyed to the original position of *(a) different way* within the gerundial relative, much as in the infinitival relative example:

(61) You have a different book to offer each of the students, don't you?

where again *different* readily scopes under the *each* embedded in the relative.

12. Restrictions on derived nominals.

When related to verbs in English that take a direct object plus a prepositional object, derived nominals show divided behavior. There is a broad contrast between cases in which the P is *from* or *to* and cases in which it is *with* or *of*:

(62) the removal of the money from the children
(63) the gift of the money to the children

as opposed to:[40]

(64) *the deprivation of the children of their money
(65) *the provision of the children with money

For me, these different kinds of PPs behave differently under PP-preposing, too, in particular of the non-contrastive (and non-wh) kind:[41]

(66) ?From so many poor children, they've stolen so much money!
(67) ?To so many poor children, they've given so much money!

as opposed to:

(68) *Of so much money, they've deprived so many people!
(69) *With so much money, they've provided so many people!

The hypothesis that derived nominals are derived as in (53)/(54) fits these facts as follows. Transposing (54) to *the removal of the money* (without the *from*-phrase for the time being) gives:

(70) remov- the money P -al   -->   Case-related movement
     the money$_i$ remov- t$_i$ P -al   -->   merger of *of*
     of the money$_i$ remov- t$_i$ -al   -->   relativization
     [P -al]$_j$ of the money$_i$ remov- t$_i$ t$_j$ -->   remnant movement
     [remov- t$_i$ t$_j$]$_k$ [P -al]$_j$ of the money$_i$ t$_k$

To have *from the children* in (62) end up after *the money* in a way compatible with the application of remnant movement as the final step in (70), *from the children* must be scrambled at an early stage:[42]

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[40] Cf. Kayne (1981, sect. 4). I have found one speaker who accepts these, along with the example of note 45. What the parametric difference is remains to be elucidated.
[41] Hinterhölzl (2006) shows that contrastive/stressed scrambling in German is freer than non-contrastive/non-stressed scrambling.
[42] If Kayne (2000, chap. 14; 2005, chaps. 5, 7) is on the right track, the first line of this derivation itself has a non-trivial derivational history that must ultimately be integrated with the present proposal.

(71) remov- the money from the children P -al   -->   scrambling
    [from the children]$_k$ remov- the money t$_k$ P -al   -->   Case-related movement
    [the money]$_i$ [from the children]$_k$ remov- t$_i$ t$_k$ P -al   -->   merger of *of*
    of [the money]$_i$ [from the children]$_k$ remov- t$_i$ t$_k$ P -al   -->   relativization
    [P -al]$_j$ of [the money]$_i$ [from the children]$_k$ remov- t$_i$ t$_k$ t$_j$ -->   remnant
movement
    [remov- t$_i$ t$_k$ t$_j$]$_m$ [P -al]$_j$ of [the money]$_i$ [from the children]$_k$ t$_m$

   If the scrambling in this derivation is of the same type as the movement operative in (66), then that makes it possible to relate the (surprising) deviance of (64)/(65) to that of (68)/(69), by virtue of the movement in question not being applicable to certain types of PP.[43]

   Derived nominals are also impossible with double objects:
  (72) *the gift of the children (of) a book
The indirect object might be incompatible with the Case associated with *of*, and/or the second object might have a problem with Case-licensing. Instead, or in addition, scrambling of the second object might be at issue.[44]

   Assume that the Case-related movement in (71) is limited to DPs. Then in:
  (73) the discussion with the children
with the children must (in order to sidestep the subsequent application of remnant movement that places *discuss-* to the left of *-ion*) have moved past *discuss-* via scrambling (parallel to *from the children* in (71)):
  (74) discuss- with the children P -ion   -->   scrambling
    [with the children]$_i$ discuss- t$_i$ P -ion   -->   relativization
    [P -ion]$_j$ [with the children]$_i$ discuss- t$_i$ t$_j$ -->   remnant movement
    [discuss- t$_i$ t$_j$]$_k$ [P -ion]$_j$ [with the children]$_i$ t$_k$
This point generalizes to all cases of derived nominals followed by a PP other than '*of* + direct object'.

   The proposal that scrambling is necessarily involved in derived nominals like (73) leads to the expectation that phrases that do not scramble will be excluded from derived nominals. This may provide an account of:[45]
  (75) *your appearance to have made a mistake
in terms of the non-scramble-ability of raising infinitives in German mentioned by Hinterhölzl (2006, 16), which has a (somewhat faint) reflex in English:[46]
  (76) ?the kind of mistake to avoid which he always tries

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[43]   There is a link here to Kayne and Pollock (2001, section 13).
[44]   Note that some English (not mine) allows (some) DPs like (cf. Jespersen (1970, sect. 8.4$_9$)):
  i) the giving of children books
Cf. also Wik (1973, 136).
[45]   Which would make unnecessary Kayne's (1981) use of government or Pesetsky's (1991; 1995) zero affix approach, neither of which appear to carry over to the scrambling facts.
[46]   As opposed to clefts (to some extent), focalization and topicalization in Italian - see Cinque (2006, 41, 48).

(77) *the kind of mistake to have made which he definitely appears

where preposing a control infinitive is less bad than preposing a raising infinitive.

Like (77) is:

(78) *the kind of mistake to have made which he is definitely believed

despite the well-formedness of:

(79) He is definitely believed to have made that kind of mistake.

Like (75), then, is:[47]

(80) *his belief to have made a mistake

The verb *claim* is unusual in English in allowing both control and raising:

(81) He claims to be a genius.
(82) He is claimed to be a genius.

Preposing/scrambling distinguishes them:

(83) ??the kind of genius to be which he has never claimed
(84) *the kind of genius to be which he has never been claimed

As expected now, there is also a difference in derived nominals:

(85) his claim to be a genius

which can have the control interpretation of (81) but not the raising interpretation of (82).

The parallelism between derived nominals and scrambling/preposing may extend to:

(86) his eagerness to introduce you to people
(87) *his easiness to introduce to people[48]

given the (arguably parallel) contrast:

(88) ?those people, to introduce you to whom he would certainly be eager
(89) *those people, to introduce to whom he would certainly be easy

13. More on the absence of complements to nouns.

One will ultimately need to address, of course, the entire range of examples given by Chomsky (1970, 196) in favor of his idea that nouns take complements just as verbs do. Another type of example that might lend itself to a relative clause analysis would seem to be:

(90) the reason for his departure

insofar as there is a close relation to:

(91) the reason for which he departed

In the case of:

(92) the weather in England

one can think of:

(93) the weather that is found in England

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47   Also:
   i) He is considered intelligent.
   ii) *his consideration intelligent
suggesting that small clauses cannot scramble in the necessary way, with the details to be worked out.
48   Some speakers accept such examples with *-ness* (though not with other suffixes) - cf. Pesetsky (1991, 101).

with the possibility of leaving *found* unpronounced in turn related to the hypothesis that:

   (94) They are in Paris.

is really:

   (95) they are FOUND in Paris

which might give us a handle on:

   (96) *They became in Paris.

via:

   (97) Such things were/*became found in Paris.

combined with the fact that in French a normal way of expressing (94) is with the verb 'find'"

   (98) Ils se trouvent à Paris. ('they refl. find in P')

   In the realm of possessives, Kayne (1993, sect. 1.2; 1994, 86) proposed that:

   (99) a friend of yours

does not have *(of) yours* as a complement of *friend*, but rather that *(a) friend* moves into the specifier position of *of*, starting from a position following *yours*, and similarly for *the sister of that linguist* and other instances involving *of*. Possessives such as *you(r)* in (99) may originate in a (non-adpositional) specifier position above and outside the projection of the noun (*friend*) or as the object of a (silent) adposition;[49] in either case the noun *friend* itself will have no complement.

   In the same vein, there may be a close relation between:

   (100) the way to Paris

and the relative clause structure:

   (101) the way in which to go to Paris

in which case (100) will contain a silent GO of the sort shown to be needed elsewhere by van Riemsdijk (2002).

   There may also be a close relation between:

   (102) He's in the habit of refusing*.*

and:

   (103) He refuses out of habit.

In other words, *the habit of refusing* may involve relativization starting from:

   (104) ...refusing OUT OF habit

with the *of* in (102) akin to that of (56)/(57), as well as to that of:

   (105) the very fact of his refusing

which is itself a relative clause structure based on *in fact* (i.e. on 'IN fact'), essentially parallel to (23) and (56)/(57).

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[49]   See Szabolcsi (1983; 1994) and den Dikken (1997). The presence of a special possessive morpheme in Hungarian (cf. perhaps English *'s*) may reflect the possessor being neither the complement nor the specifier of the possessee, parallel to the idea that the agent is neither the complement nor the specifier of the lexical verb (as opposed to being the specifier of little *v*, as in much recent work).

   I take this parallelism to extend to 'obligatoriness'. Just as agents are sometimes obligatory, e.g. with *destroy* (on passives, see Collins (2005)), so, sometimes, are possessors, e.g. with *for John's sake*, as discussed by Barker (2005), despite *John* not being either complement or specifier (cf. (21)) of *sake*.

Although English readily allows DPs of the form:

(106) the book on the table

these are plausibly reduced relatives, perhaps of the sort discussed by Emonds (1976, 167).

In summary of this section and the two before it, the antisymmetry/antioptionality-based approach being pursued here leads to the expectation that nouns, unlike verbs, will not have complements. If so, reanalyses of Chomsky's (1970, 196) examples of the sort just suggested should turn out to be on the right track.[50]

14. More on possessives.

The question of possessives broached at (99) is indirectly relevant to the question of derived nominals broached at (50). Like *removal* is *assassination*, as in:

(107) They were witness to the assassination of the prime minister.

where we can take *-ion* to play the role of *-al*, and attribute to (107) a derivation like that given in (53)/(54). Seemingly very close to (107) is:

(108) They were witness to the murder of the prime minister.

which differs in that there is no visible suffix comparable to *-ion/-al*. Let us, then, take there to be an unpronounced one, as in:

(109) ...murder -ION of...

That an unpronounced derivational suffix of this sort is not automatically available is suggested by the contrast between (108) and:

(110) *They were witness to the punch of the prime minister.

(and similarly if either of the *the*s is replaced by *a* or if *the prime minister* is replaced by *him*). With *punch*, as opposed to *murder*, an object interpretation of the DP following *of* seems impossible. (Irrelevantly to the present discussion, a subject interpretation of a lexical DP following *of* is to some extent possible.) Like *punch*, and unlike *murder*, are *slap, kick, pinch, tug, shove, push, kiss* and *hug*, all of which lack a visible suffix.

Recalling that *-al* plays a key role in the derivation (53)/(54), a natural proposal is that (110) is excluded precisely because *punch* (and similarly for *slap*, etc.) cannot cooccur with a silent counterpart of *-al*. Without any counterpart of *-al*, the relative clause type derivation given in (53)/(54) cannot go through, in the case of (110) . By standard assumption, in the absence of relativization a bare verb phrase cannot be embedded directly under *the*, either. That leaves the option of taking *the prime minister* in (110) to be the complement of nominal *punch*. But that option, too, is excluded, if nouns take no complements.

The availability, in the object interpretation, of:

(111) They were witness to the punching of the prime minister.

suggests that *-ing* can play the role of *-al* or *-ion*.

Similar to (108) vs. (110) is the contrast:

(112) The desire to win is widespread.

(113) *The want to win is widespread.

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[50]   The pervasiveness of relatives from the text viewpoint recalls Koopman (2003: 2005); also Kihm's (2000) revival of the idea that possessives originate in relatives.

The latter can be excluded parallel to (110) if *want*, like *punch*, can have no silent suffix of the *-al/-ion* sort.[51] If it cannot, then no derivation of the relative clause sort is available. Nor can *to win* be the complement (or specifier) of nominal *want*, since by hypothesis nouns take no complements (or specifiers). The admissibility of (112), with *desire*, indicates that *desire* is like *murder* in allowing a silent counterpart of *-al/-ion*. (Like *want* are *love* and *like*.)[52] Although why *murder*, *desire*, etc. allow a silent suffix and the others not remains to be understood, it seems plausible to interpret (110) and (113) as direct reflections of the inability of nouns to take complements.

   A problem may appear to arise if we bring together this discussion of (110) with a version of the Hale and Keyser approach to sentences like:
   (114) Somebody punched the prime minister.
According to that approach, (114) must have a silent light verb to which the noun *punch* has incorporated. Yet (110) shows that nominal *punch* takes no complement. Where, then, does *the prime minister* in (114) come from? A reasonable answer, thinking of:
   (115) Somebody gave the prime minister a punch.
with an overt light verb, is that *the prime minister* originates as the possessor of *punch* (in a way licensed by the presence of *give*, which must have no silent counterpart in (110)), in which case it is not an argument of *punch*, much as in the discussion of (99).

15. Sentential complements.
   Ordinary sentential complements, as in:
   (116) They think (that) everything is fine.
appear not to fall under the present discussion. Recall however Rosenbaum's (1967) hypothesis that all sentential complements (in English, but his hypothesis is readily generalized to all languages) are associated with *it*, which is sometimes deleted (in present terms, is sometimes silent) and sometimes not, as in:
   (117) They'll see to it that everything is in place.
If *it* is a noun, then Rosenbaum's hypothesis brings ordinary sentential complementation close to structures with *the fact that...*, which must be relative clause structures, as in section 10, in which case sentential complementation in general must rest on (partly invisible) relative clauses.

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[51]   As opposed to:
   i) for want of a good idea
 with a (partially) different sense of *want*, here similar to *lack*.
[52]   Cf. Pesetsky (1991, 99). Note also:
   (i) His attempt/*try to solve the problem failed.
   (ii) Their hatred/*hate of losing is well-known.
Pesetsky (1991) contains a great deal of relevant material that will need to be integrated; similarly for Szabolcsi (1994, Part II).

If *it* is a determiner, as in Postal (1966), then this does not follow, unless there is necessarily present, in addition to *it*, a silent noun. If there is, then, again, all sentential complementation must involve relative clauses (in all languages).[53]

16. Conclusion.

The noun-verb distinction may not be a primitive property of the language faculty, but may rather be underlain by antisymmetry/antioptionality. The execution of this idea as developed here leads to the characterization of nouns as having neither complements nor specifiers. That in turn leads to the conclusion that *the fact that...*, derived nominals, and sentential complementation are varieties of relative clause structures.

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[53] Polinsky (2007) provides evidence from Circassian that supports this in a direct way.

Notable here is the colloquial (cf. Legate (2002)):

  i) They were saying (like) as how everything was fine.

with *how* arguably a relative pronoun and *as* arguably close to the *as* found in non-standard relatives like (cf. Herrmann (2005)):

  ii) the man as they were talking to

The status of root clauses will depend (in part) on the status of Ross's (1970) performative hypothesis.

Rosenbaum's hypothesis elicits the question why the language faculty would impose the presence of *it* and/or a silent noun. Kayne (1982) suggested, with verbs, adjectives and prepositions in mind, that arguments must be nominal. If so, that might provide the reason.

Infinitives and gerunds that are arguments seem to lie somewhere between derived nominals and the finite complements illustrated in this section (i.e. they must be subtypes of relative clauses). How exactly to integrate them into the present analysis is left open here.

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