Notes on *half, all, both, each* and *of**

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1. *All* vs. *half* and vs. *all of*
    Half and *all* look alike in the following pair of examples:
   (1) Half (of) the students like syntax.
   (2) All (of) the students like syntax.
Yet *half* does not 'float' in the same way that *all* does:[1]
   (3) They should all/*half have paid more attention to semantics.
Nor does *all of* float:[2]
   (4) *The students should all of have paid more attention to semantics.
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[1]As noted by Al Khalaf (2019, 2). Cf. also:
   i) I like them all/*half.
[2]As noted for *each* by Bobaljik (2003, 123).

The following statement would cover (4):

(5) Successful Q-stranding of the sort seen with *all* in (3) cannot strand *of.*

On the other hand, in some English (not exactly mine, but close), adding a resumptive pronoun to sentences like (4) results in acceptability:[3]

(6) They should all of them have paid more attention to semantics.

(7) They've half of them decided to switch to chemistry.

This is in all likelihood related to the well-known fact that resumptive pronouns often neutralize island violations.

2. Preposition-stranding and *all of*

Before addressing the *half* vs. *all* question directly, let me devote this section to (5). Why can Q-stranding not strand *of*? The sharp unacceptability of (4), contrasting with the relative acceptability of (6), might well seem surprising, in part against the background of the fact that English does allow cases of what look like optional resumptive pronouns. For example, my colloquial English allows both of the following:

(8) Those are the guys who we really can't stand them.[4]

(9) Those are the guys who we really can't stand.

Given that (9) can coexist with (8), why can (4) not coexist with (6)?

A second reason why the sharp unacceptability of (4) might seem surprising is that English allows preposition-stranding in quite a wide range of cases, especially with A-bar movement, as in:

(10) What were you thinking of?

(11) That problem we've been thinking about for much too long.

but also with A-movement, in pseudo-passives:[5]

(12) You're being taken advantage of.

What I would like to argue now is that the unacceptability of (4) is, despite (10)-(12), not specific to Q-stranding, insofar as there are other, plausibly related, cases in English in which P-stranding is not available, to one degree or another.

An initial example involves VP-subdeletion/pseudo-gapping, as exemplified in:

(13) I won't show my papers to John, but I definitely will to Mary.

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[3]In a way that may be relevant to Torrego (1996), Shlonsky (1991) and Al Khalaf (2019). Two examples with a stranded *all five of them* are given in Payne and Huddleston (2002, 428). Left for future work is:

i) The students have all of them/*them all/*they all decided to participate.

ii) I consider them to have ?all of them/*them all been loyal to us.

[4]For detailed discussion, see Boeckx (2003), including the idea (p. 28) that *them* and *guys* in this kind of sentence originate within one complex DP and then are separated by movement; on the relevance of resumptive pronouns to (NP-)deletion, see Kayne (2022).

[5]Cf. Ziv and Sheintuch (1981). For the idea that pseudo-passives are sometimes not instances of classical A-movement, see den Dikken and Naess (1993, esp. notes 16, 20).

Going back to Jayaseelan (1990),[6] the idea has been that (13) is derived via 'ordinary' VP-deletion applying to a VP out of which the ultimately stranded phrase, here *to Mary*, has previously been extracted, with the VP in question being, in this example:

   (14) show my papers to Mary

Were P-stranding possible with VP-subdeletion, we would expect to be able, starting from (14), to extract just *Mary*, with subsequent VP-deletion then yielding:

   (15) *I won't show my papers to John, but I definitely will Mary.

which is, however, to my ear not acceptable.[7]

   A second example of illicit P-stranding in English is the well-known case of Heavy-NP-Shift, with an initial discussion in Ross (1967, 226). It's usually said that sentences like the following are not possible:

   (16) ?I spoke to just the other day the person I'd been telling you about last week.

Here the object of *to* is separated from it by the adverbial *just the other day*. As indicated by the '?', I find such sentences less than fully acceptable, but not crashingly bad. Of interest now is the fact that my judgment changes if we take a comparable example with an additional direct object:

   (17) *I showed my paper to just the other day the student I'd been telling you about the day before.

   That the extra DP leads from '?' to a full '*' suggests an intervention effect, which can be made sense of if we adopt den Dikken's (1995) modification of Larson's (1988) reinterpretation of Heavy-NP Shift in terms of leftward movement of a verbal constituent. Den Dikken proposed that in a sentence like (16) the 'heavy NP', in this case *the person I'd been telling you about last week* must be scrambled leftward (yielding in my English an intermediate degree of deviance, attributable to P-stranding) prior to (leftward, higher) movement of the remnant verbal phrase *spoke to*. From Den Dikken's perspective, we can now understand the extra degree of deviance of (17) as reflecting the sensitivity of the scrambling of *the student I'd been telling you about the day before* to the presence of the intervening phrase *my paper*.

   A third example of illegitimate P-stranding in English comes from a kind of sentence that brings together in a certain way VP-subdeletion and Heavy-NP Shift. My English allows both of the following, to a reasonable degree:[8]

   (18) (?)I predicted that he would invite Mary Smith to speak. And invite(d) he has that excellent linguist.

   (19) I thought that he would speak to Mary Smith. And speak/spoken he has to that excellent linguist.

These involve preposing to a high position a remnant VP, either *invite(d)* or *speak/spoken* (the choice between infinitive and participle is orthogonal to the present

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[6]It may be that P-stranding requires a landing site at least as high as subject position - cf. Kayne (1998, sect. 2.3).

[7]The result is better in comparatives:

   i) ?I won't show my papers to John as often as I will Mary.

Possibly, there is a parasitic-gap-like effect here, with the extraction of *Mary* facilitated by the wh-movement part of comparatives - cf. Chomsky (1977).

[8]Cf. the German/Dutch remnant topicalization construction studied by den Besten and Webelhuth (1990).

discussion), prior to which the object *that excellent linguist* in (18) or the PP *to that excellent linguist* in (19) must have been scrambled out of the VP.[9] Of direct relevance here is the fact that in the PP case extracting the object of the P by itself is not possible:

   (20) I thought that he would speak to Mary Smith. *And speak/spoken to he has that excellent linguist.

     As a fourth example of ill-formed P-stranding in English, we have, I think:

   (21)*To not John has she spoken, but to Paul.

which contrasts (in a more literary English) with:

   (22) Not to John has she spoken, but to Paul.

Although (21) does not at first glance seem to be an instance of P-stranding, I argued in Kayne (1998, sect. 2.6) that it is, in a way that I won't pursue in this paper.

     As a final example, consider:

   (23) John accidentally collided with Bill yesterday

from the perspective of an analysis of the sort proposed by Lakoff and Peters (1969) and Kayne (1994, sect. 6.3), according to which *John* in (23) has been raised into subject position from within a coordinate-like constituent *John with Bill*. Now if we replace *collide* by the interpretively similar *run into* we get the impossible:

   (24) *John accidentally ran into with Bill yesterday.

the reason arguably being that raising *John* across *into* constitues a P-stranding violation.

     The preceding four examples of English P-stranding violations heighten the plausibility of taking the violation in (4) (P-stranding combined with Q-stranding) not to be a unique property of Q-stranding. Even closer to (4), though, may be the P-stranding violations found in:[10]

   (25) We just read *War and Peace*. The first chapter (*of) is remarkable.

   (26) We just read your papers. All ?(*of) are absolutely remarkable.

in which Q-stranding of the sort seen in (4) is again not itself at issue.[11]

3. OF and *half* vs. *all*
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[9]That some notion of heaviness is involved, at least in the direct object case, is suggested by the impossibility of:

   i) ...*And invite(d) he has her.

[10]Perhaps also relevant is:

   i) Its first chapter (*of) is excellent.

though this doesn't seem specfic to *of*:

   ii) The allusion to you/it was uncalled for.

   iii) *Your/*Its allusion to was uncalled for.

with the fact of (iii), to the effect that P-stranding of this sort is not allowed within derived nominals, constituting an argument against Chomsky's (1970) approach to derived nominals and in favor of the scrambling step involving *to you/it* in (ii) that is a key part of the approach developed in Kayne (2008a).

[11]Note that if there is a silent pronoun-like element in these sentences movement must be involved, if Kayne (2006) is on the right track. Cf. also:

   i) I'm sure that all of those papers are excellent.

   ii) *Those are the papers that I'm sure that all of are excellent.

In Sportiche's (1988) terms, the type of movement that strands *all* in (3) cannot strand *of*, as shown by (4).[12] As discussed in the previous section, this restriction is in all likelihood not specific to Q-stranding. Let us return now to the initial contrast between *half* and *all*, repeated here:

   (27) They should all/*half have paid more attention to semantics.

    The possibility now arises that we can assimilate this property of *half*, i.e. its non-strandability in (27), to the previously discussed restriction against stranding *of*, if, first, we attribute to *half* the requirement that it cooccur with either *of* or a silent counterpart of *of*, to be indicated as OF (using capitals in general to indicate silence), i.e. if we take *half the students* to necessarily be:[13]

   (28) half OF the students

and if, second, we generalize (5) to:

   (29) Q-stranding is incompatible not only with *of*, but also with its silent counterpart OF.[14]

    Taken together, the proposals in (28) and (29) will account for the impossibility of stranding *half* in (27).[15]

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[12]An interesting challenge to Sportiche's stranding approach comes from (marginal) French examples like (cf. Kayne (1975, sect. 2.14)):

   i) ??ces garçons, à qui j'en ai tous offert 'those boys, to whom I of-them have all given'

in which an apparently non-constituent PP *à qui* seems to have moved up stranding *tous*. Possibly, the key lies in the even more marginal:

   ii) ??ces garçons, à qui j'en ai à tous offert

with the P appearing twice, i.e. (i) might be best thought of as:

   iii) ...à qui...A tous...

again with two identical Ps.

    Examples like (ii) are less marginal in Italian. Rizzi (1988, 514) gives:

   iv) ?I tuoi amici, ai quali dirò a tutti la verità,... ('the your friends, to-the which I-will-tell to all the truth...)

   v) Ai tuoi amici, parlerò a tutti di Maria. ('to-the your friends, I-will-speak to all of M')

In both French and Italian this P-doubling appears to be limited to *à/a*.

[13]Cf. Borer (2005, 207) on *of*-deletion; on the distinction between deleted elements and silent elements, see Kayne (2006).

[14]Further generalization to cover the genitive Case of standard Arabic as discussed in Al Khalaf (2019) might be appropriate. Relevant here is Collins's (2007, 5) proposal that "Null prepositions cannot be stranded", with respect to which the following look like a potential problem:

   i) Mary can be relied/depended on.

   ii) Mary is reliable/dependable.

unless the silent ON in (ii) is moved along with *Mary* to subject position in the manner of den Dikken and Naess (1993).

[15]The impossibility of:

   i) *Of them should *all/*half have paid more attention to semantics.

indicates that Q-stranding derivations that would involve moving '*of*/OF them' are not made available by the language faculty, perhaps because '*of*/OF them' is not a

4. The nominal character of *half*

The contrast between *half* and *all* in (27) must then indicate that *all the students* need not contain OF. This contrast between *half* and *all* concerning OF plausibly reflects at least in part the nominal character of *half* (vs. the non-nominal character of *all*) seen in the fact that *half* (but not *all*) can be preceded by typical nominal determiners, as in:

(30) the better/this/that/each/your half of the pie
(31) *the better/this/that/each/your all of the pie

as well as in the fact that *half* (but not *all*) pluralizes (in the fashion of nouns like *shelf, wolf* et al.):

(32) A pie can only have two halves.

5. *Half* accompanied by a silent indefinite article

Although there is no doubt that (30) shows clearly that *half* can have the behavior of a run-of-the-mill noun, there is equally clearly more to be said, if only because singular *half* can do without overt *of* in:

(33) Half the students are switching to chemistry.

To my ear this is also possible to a reasonable extent in:

(34) ?One half the students are switching to chemistry.

but not in:

(35) *A half the students are switching to chemistry.

In contrast, plural *halves* always requires *of*:

(36) Both halves *(of) the pie were eaten by the dog.

As in the discussion of (28), I take (33) and (34) to contain silent OF.[16]

Now, given the generally close relation between *one* and *a*,[17] the contrast between (34) and (35) is a bit surprising. The way I would like to try to make sense of that contrast is as follows. Example (35) is actually possible; it's just that it takes on the guise of (33).

More carefully put, *a half* has the property that when it takes a definite DP (e.g. *the students* in (35)), the indefinite article *a* obligatorily deletes, yielding (33).[18] The

constituent, as in Kayne (2002), with questions then arising as to when exactly remnant movement containing '*of*/OF them' is or is not available.

[16]And similarly for *(a) half a day*, analyzed as:
  i) (a) half OF a day
[17]For discussion, see Kayne (2017a) and references cited there.
[18]It also arguably obligatorily deletes in:
  i) Why did you cut that pie in (*a) half?
but not in:
  ii) They're planning to reduce your salary by (a) half.
with this contrast probably related to the following:
  iii) Why did you cut that pie in thirds?
  iv) They're planning to reduce your salary by a third.
  In some English, the indefinite article obligatorily deletes in:
  v) We'll be there in half an hour.

proposal, then, is that *half the students,* in, say:

   (37) We talked to half the students yesterday.

is necessarily to be understood as in:

   (38) we talked to A half OF the students yesterday

with 'A' representing the silent indefinite article (and with OF the silent counterpart of *of* previously discussed).

6. Other fractions and TIMES

     This property of *half* is not mimicked with other fractional expressions:[19]

   (39) *We talked to third/quarter the students yesterday.

as opposed to the straightforwardly acceptable:

   (40) We talked to a third/quarter of the students yesterday.

which overtly contains both *a* and *of*. With plural fractions, the indefinite article disappears, as expected, while *of* unsurprisingly remains:

   (41) We talked to two thirds/three quarters of the students yesterday.

    As for why silent OF is licensed with *half*, but not with *third, quarter,...*, we can note in passing that there might be a link to the following contrast:

   (42) Both (of) the students like syntax.

   (43) All three *(of) the students like syntax.

Like *half, both* does not require overt *of.* Since *half* and *both* are both related to 2, there might be an indirect link here to the proposal in Kayne (2019a) to the effect that 2 is syntactically simpler than all higher numerals.[20]

    We can also note in passing the following contrast:

   (44) We talked to two thirds *(of) the students yesterday.

   (45) New Haven is two thirds (of) the distance from Boston to NYC.

It seems likely that the possible absence of *of* in (45) stems from the measure phrase character of *two thirds the distance,*[21] in a way that links (45) to:

   (46) New Haven is two thirds as far from Boston as NYC is.

    Again in passing, we can note that related to (46) is:

   (47) We now have three *(times) the number of students we had last year.

which contrasts with:

   (48) We now have three quarters (*times) the number of students...

   (49) We now have half (*times) the number of students...

suggesting that *half/three quarters the number* is to be understood as:

though my English allows both (v) and:

  vi) We'll be there in a half an hour.

On the other hand, it cannot delete in:

  vii) We'll be there in two and *(a) half hours.

[19]As noted by Borer (2005, 116n).

[20]There might also be a link to the fact that some varieties of Basque have 2 being post-nominal, as opposed to pre-nominal 3, 4, 5... - cf. Hualde and Ortiz de Urbina (2003, 127); also Pearce (2011) on Unua (Oceanic).

[21]Which may well not be a constituent; for another particularly interesting such case, see Fraga (2022). The possibility of *of* may bear on Koopman (2012, note 8) and vice versa.

(50) half/three quarters TIMES the number

7. More on nominal *half* vs. adjectival *all*
     The nominal character of *half* seen in (30)-(32) is also seen, if less directly, in the following:
   (51) half-crazy, half-finished, half past two
once one brings into the picture:
   (52) John is at least a quarter crazy.
   (53) The work is three quarters finished.
   (54) It's a quarter past two.
in which *quarter* is transparently nominal. The reason that (51) at first looks different is due to the fact that in each of the subparts of (51) *half* is preceded by a silent indefinite article, just as in (37)/(38).[22]
     The difference in nominal character between *half* and *all* is again illustrated in:
   (55) A pie can only have two halves.
vs.
   (56) *A pie can only have one all.
   (57) *You ate the all of the pie.
     There is, on the other hand, the idiom:
   (58) He gave it his all.
But rather than taking this to be an isolated case of nominal *all*, I think this should be seen as an idiomatic variant of:
   (59) He gave it his whole effort.
which leads to an analysis of (58) as:
   (60) he gave it his all EFFORT
with this then being an isolated case in English of *all* mimicking the adjective-like behavior of *whole*.[23]

8. Silent definite articles
     It is not clear if the distinction in categorial status between *half* and *all* plays a role in:
   (61) We spent half *(the) day on that problem.
   (62) We spend all (%the) day on that problem.
In my English, *(*)all the day* is not possible, though it is in some varieties of English.[24]
With *half the day* in mind, it may well then be that *all day* is:
   (63) all THE day
with a silent definite article.[25]
     Partially similar to (61) vs. (62) is:
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[22]The parallelism between *half* and *quarter* is also found in:
   i) That clock strikes every half/quarter hour.
[23]Also adjectival is *total*, on which see Kayne (2012). On the general question of the categorical status of adjectives, see Amritavalli and Jayaseelan (2003).
[24]Cf. the example given in Payne and Huddleston (2002, 375).
[25]And perhaps similarly for:
   i) All (*the) three (of them) are worth reading.
i.e. *all three* may be 'all THE three'.

(64) *Half linguists work hard.
(65) All linguists work hard.

The Romance counterparts of (65) would have a definite article following *all*, as in French:

(66) Tous les linguistes travaillent dur. ('all the linguists work hard')

Taken together with (63), this fact supports in a familiar way:[26]

(67) all THE linguists

with the silent definite article here possible only in a generic reading, in English.

Nor does my English allow, in place of (64):

(68) *Half of linguists work hard.

as opposed, evidently, to some other varieties of English. Better for me, though, is:[27]

(69) Half of all linguists work hard.

presumably again with the silent generic THE:

(70) half of all THE linguists

(Why (61) and (64) (and for me (68)) do not allow THE needs to be elucidated.)

9. More on the non-nominal status of *all*

Against the background of the nominal character of *half*, the various differences that we have seen between *half* and *all* clearly suggest that *all* is not nominal,[28] i.e. that it does not correspond to any subtype of N. From the perspective of Kayne (2008a), this means that *all* must be either verbal or complex. It seems unlikely that English *all* is verbal.[29] More likely is that *all* is adjectival (thinking in part of Italian *tutto* ('all') showing

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[26]Silent articles go back at least as far as Chomsky (1965, 107). For detailed discussion, see Longobardi (1994).

The existence of silent articles in some languages in some cases (cf. also Kayne (2008b), Cheng and Sybesma (2012), Jiang (2020)) increases the plausibility of the claim that all languages have articles (vs. Bošković (2009)); note that that claim is independent of the question whether articles project). For recent discussion, see Crisma and Longobardi (in press) and references cited there; also Köylü (2021).

[27]The following may be due to the silent indefinite article associated with *half*:
i) *Linguists half of all work hard.
ii) *Linguists are half of all smart.
Independently of stranding, dropping *of* is very difficult in:
iii) *Half all linguists work hard.
but can be improved:
iv) ?Just about half all linguists work hard.

[28]To these differences can be added:
i) All eight of them passed the exam.
ii) *Half eight of them passed the exam.

[29]For a reasoned and cautious approach to questions concerning counterparts to *all* in other languages, see Matthewson (2003).

adjective-like agreement).[30] If so, then it has something important in common with *whole* (cf. (60)), despite the positional difference (and other differences).

The categorial difference between nominal *half* and non-nominal *all* must underlie the Q-stranding difference between them, as discussed earlier at (3), repeated here:

(71) *They should half have paid more attention to semantics.
(72) They should all have paid more attention to semantics.

The proposal has been that *half* requires either *of* or OF, both of which block the kind of stranding seen in (71). (Whereas *all* is not subject to that requirement, despite allowing *of*.[31]) In effect, then, it is the nominal character of *half* that, by forcing the presence of *of*/OF, accounts for the deviance of (71).

10. The relevance to Q-stranding of the indefinite article and numerals

An approach to (71) in terms of the blocking effect of *of*/OF would seem to have a competitor (though the two competitors might turn out to both be necessary), if we think back to (37)/(38), i.e. to the idea that apparently bare *half* necessarily cooccurs in such cases with a silent indefinite article. What comes to mind is the possibility that what blocks stranding with *half* in (71) is not (only) *of*/OF, but rather (or in addition) the presence of that silent indefinite article.

This possibility would become particularly interesting if the blocking effect generalized from the indefinite article to *one*, and from there to all numerals. In which case, we might account for a fact about my English:[32]

(73) Those books are all very interesting.
(74) ??Those books are all three very interesting.

which does not readily allow Q-stranding with *all*+numeral, despite *all* and *all*+numeral being equally possible in:

(75) All (three) of those books are interesting.

The idea, then, would be that it is the presence of *three* in (74) that in my English interferes with the raising of *those books*.

To be noted in passing is that adding a resumptive pronoun to (74), as in:[33]
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[30]Partee (1995, 582) notes that cross-linguistically *all* "sometimes seems adjectival". Recall that 'adjective' is not a simplex category, according to see Amritavalli and Jayaseelan (2003). Of supporting note, too, is the dialect of Tunis, with a post-N 'all' (preceded by the definite article) that is "clearly adjectival", in Gil's (1996, 166) words.
[31]*All* thereby contrasts with run-of-the-mill adjectives, in English:
  i) They are proud *(of) their children.
Future work will need to dive further into the syntax of *of*/OF.
[32]Ross (2012) accepts:
  i) The owls all three were asleep.
and Ross (2004, 361) has:
  ii) They all three/?nine/729 hate Spam.
as well as:
  iii) *The children all three hate Spam.
[33]As opposed to:
  i) *Those books are all the three of them interesting.
for reasons that need to be brought to light.

(76) Those books are all three of them interesting.

has the effect for me of increasing acceptability. (See the discussion of (6) and (7) earlier.)

11. *Both* is similar to *all three*

   Let us now turn to the contrast between (74) and its perfectly acceptable counterpart with *both*:

(77)   Those books are both very interesting.

thinking especially of Pesetsky's (2013, 137) taking *both* to be 'all two'.[34] Pesetsky's proposal would seem to be supported by the fact that *both* is unlike *all*, but like *all three* in various ways. One obvious way has to do with mass nouns:

(78) You've drunk all/*all three/*both of the water.

which are compatible with *all (of)*, but incompatible with a numeral.

   A second way in which *both* patterns with *all three*, but not with *all*, can be seen in:[35]

(79) Not all of our students like chemistry.
(80) *?Not all three of our students like chemistry.
(81) *?Not both of our students like chemisty.

The contrast between (79) and (80) appears to be due to the presence of a low numeral in (80).[36] If *both* = 'all two', then (81) is unsurprisingly parallel to (80).

   Another way in which *both* patterns with *all three* rather than with *all* is seen in:

(82) I think I'll invite both.
(83) I think I'll invite all three.
(84) *?I think I'll invite all.

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[34]Although *all two* is generally not very possible in English (as opposed to French):

   i) *?All two of my front tires are flat.

I accept:

   ii) John is bringing his friends to the party. Yeah, all two of 'em!

in a way that recalls:

   iii) All I did was touch it and it broke.

on which, see Tellings (2020).

[35]For recent discussion of *not all*, cf. Collins (2020).

[36]With a higher numeral, acceptability improves:

   i) (?)Not all twenty-five of our students like chemistry.

Both and *all three* readily occur in such sentences in English together with a silent third person pronoun. *All* does not, especially not in object position.[37]

12. *Both* is different from *all three*

Yet if *both* is 'all two', why, in contrast to the facts of (78)-(84), does it act differently from *all three* (in my English) with respect to Q-stranding, as we saw in (74) vs. (77)?

We can note immediately that *both* and *all three* in fact display differential behavior elsewhere than just with Q-stranding. For example, we have:

(85) I know the both of them.
(86) *I know the all three of them.

While (85) is possible in some English (not mine), (86) is, as far as I know, possible in no English.[38] Similarly, I once heard, from an older native speaker of American English, something like the (much) rarer:

(87) The both boys were there.

But it seems unlikely that one would ever find:

(88) *The all three boys were there.

In addition, there is a sharp discrepancy between *both* and *all three* when it comes to the need for *of*, in cases like:

(89) Both (of) the students are working hard.
(90) All three *(of) the students are working hard.

The question now is whether we can find a way to reconcile Pesetsky's proposal with all the facts of (73)-(90), and especially with the challenges posed by (74) vs. (77) and by (85)-(90).

13. *Both* is accompanied by ALL

Let me execute Pesetsky's idea somewhat differently from the way he put it. Let me in particular take English *both* to invariably be accompanied by a silent counterpart of *all*. This understanding of *both* finds indirect support in the fact that German overtly allows:[39]

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[37]On the limitation to third person, see Kayne (2001). On the subject/object asymmetry, note the following:
  i) ?All has been fixed.
  ii) *They've fixed all.
in the sense of 'all THING', i.e. of *everything*, showing that rather different kinds of silent elements can be subject to similar, if not identical, restrictions.
  A similar point can be made with *every* itself, which cannot be Q-stranded:
  iii) *Person at the party was every drinking.
and neither is it possible in:
  iv) *Every is good.
which must also involve movement, according to Kayne (2006).
[38]As opposed to:
  i) the whole three of them
which is found on the internet (though not really possible for me).
[39]Example from Durrell (2002, sect. 5.5.3) - at least with no pronounced N. Cf. Dutch *allebei* as discussed by Broekhuis and den Dikken (2012, sect. 7.1.2.2.1). Why English

(91) Alle beide sind gekommen. ('all both are come')
with *beide* plausibly taken to be a close counterpart of *both*.

   The question remains, though, as to why the combination of ALL and *both* would behave differently from the combination of *all* and a numeral, as in (74) vs. (77) and as in (85)-(90). Let me focus initally on (85) vs. (86). If in (85) we had, following (91), '...the ALL both of them', it is hard to see why its status would be so different from that of '*...the all three of them' in (86).

   On the other hand, I proposed a while back that silent elements and their overt counterparts never occupy by the end of the derivation the same position.[40] The silent element, as the result of movement/internal merge, always ends up in a distinct position. In that spirit, the following proposal for (85) becomes available:

(92) ...know ALL the both of them
in which ALL and *both* do not form a constituent (at least not derivation-finally). The idea would be that English never allows a (derivation-final) post-*the* highest occurrence of *all*/ALL, that that is what excludes (86) (and (88)), and that (85) (and very marginally (87)) escape this prohibition by having ALL end up preceding *the*.

14. The external merge position of *all/ALL*

   The proposal illustrated in (92) rested on the idea that silent elements always move to a postion distinct from that of their pronounced counterparts. The question then arises as to where ALL in (92) originated, i.e. from what lower position would it have moved. A possibility (that I will not pursue in this paper as far as it deserves) is that, despite the impossibility in English of (86) and (88), ALL in (92) starts out below *the*.

   Within English this is indirectly supported by the earlier discussion of (58), repeated here:[41]

(93) He gave it his all.
Cross-linguistically, its plausibility is increased by French allowing:[42]

(94) le tout ('the all')
with *tout* almost certainly accompanied by silent THING,[43] recalling English *the whole thing*, and by Spanish having:[44]

(95) Lo bebiste todo. ('it you-drank all')
with (clitic-moved) *lo* in (95) arguably corresponding to *le* in (94). In addition, there is Brattico's (2008) Finnish example:

does not allow:
   i) *All both have arrived.
remains to be elucidated.

[40]Cf. Kayne (2006). For a proposal that PRO is not in the exact position of its non-silent counterpart, see Baltin (1995).
[41]Cf. also Kayne (2017b) on *wherewithal*. For detailed discussion of the Dutch counterparts of *all* and *whole*, see Broekhuis and den Dikken (2012, chapter 7). If *all* originates lower than *the*, then *all day* might be 'THE all day'.
[42]As noted by Martinon (1927, 179); cf. Obenauer (1994).
[43]On other instances of THING, cf. Kayne and Pollock (2010).
[44]Example from Martínez (1999, 2754); as I read Butt and Benjamin (1988, 133), having *todo* accompanied by clitic *lo* is common, where English would just have *everything*.

(96) ne kaikki kolme... ('those all three...')
in which the Finnish counterpart of *all* follows a demonstrative, as well as the Bangla example from Dasgupta (1980, chap. 4, (49)):
   (97) ...e-SOb... ('...this all...' = 'all this')
and the one from Bhattacharya (1999, 235):
   (98) ei SOb gulo chele ('this all Classifer boy' = 'all these boys')

15. A glance at Dutch
     Let us now ask how the proposal in (92) in favor of '...ALL the both...' might or might not bear on the contrast mentioned in (89)-(90) between *both (of) the students* and *all three *(of) the students*. If *all three* requires *of*, why does *both* not require it? In fact, I don't immediately see how to use (92) to resolve this question about *of*.
     If (92) is not relevant to *of* here, then, since (92) is relevant to (85) vs. (86), i.e. to *the both/*all three of them*, we seem to reach the conclusion that the following English pair:
   (99) *the all three of them
   (100) *all three the students
does not form a natural class, in which case we would expect (99) and (100) not to pattern together consistently cross-linguistically. This expectation seems to be borne out by Dutch, which allows a counterpart of (100):[45]
   (101) alle drie de boeken ('all three the books')
but yet appears to have no exact counterpart of (99).[46]

16. *Both* and *twice*
     Let us now return to Q-stranding and to the contrast in my English between (74) and (77), both repeated here:
   (102) ??Those books are all three very interesting.
   (103) Those books are both very interesting.
The question is whether the deviance (in some English) of (102) is to be unified with that of (99) and/or (100). The sharper ill-formedness of (99) and (100) suggests not. To understand (102) vs. (103), then, let us look in a new direction.
     A core property of *both* is that there is no X such that X is to 3 as *both* is to 2:
   (104) Those books are both/*throth very interesting.
This recalls the fact that (my) non-archaicizing English has *once* and *twice*, but not *thrice*, and makes one wonder if *both* and *twice* should not be taken to have something important in common.
     The analysis of *twice* proposed in Kayne (2014) was as in:
   (105) TIME twi- -ce
with silent TIME and with *-ce* a postposition. *Twi-* itself is possibly monomorphemic, or possibly (in a way that is not central to what follows) bimorphemic, with *tw-* what is also
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[45]Example from Broekhuis and den Dikken (2012, 962).
[46]An interesting complication here is that Dutch also lacks an exact *all*-less counterpart of *the three of them* (Jenny Doetjes, p.c.); in the same vein Sjef Barbiers (p.c.) has told me that Dutch lacks the equivalent of *all of DP*, with *of*.

found in *twin, twenty, twelve, two, between*. TIME, which is singular in a classifier-like way,[47] has probably reached the position indicated, preceding *twi-,* via movement.

Sentences with *twice* are clearly extremely close to sentences with *two times*, e.g.:

(106) We've only been there twice.

(107) We've only been there two times.

Yet there is a positional difference:

(108) (?)They twice criticized us yesterday.

(109) *?They two times criticized us yesterday.

that recalls Belletti and Rizzi's (2012) discussion of comparable Italian facts:

(110) Gianni ha risolto il problema rapidamente/con rapidità. ('G has solved the problem rapidly/with rapidity')

(111) Gianni ha rapidamente/?con rapidità risolto il problema.

their idea being that the nominal part *rapidità* of the phrasal adverb *con rapidità*, when in a position between auxiliary and past participle, creates an intervention effect leading to marginal acceptability.

Setting aside various details, let me adapt their idea to (108) vs. (109) as follows. The nominal element *times* in (109) is what is responsible for its deviance. This may be due to an intervention effect of the sort that Belletti and Rizzi discuss, or perhaps to an FOFC-like effect of the sort discussed in Sheehan et al. (2017). The absence of either type of effect in (108) is in part due to the absence of pronounced *times*. The presence in (108) of silent TIME, as shown in (105), does not trigger any comparable deviance; the reason may be the positional difference (TIME precedes *twi-*, while *times* follows *two*), and/or it may have to do with the classifier-like status of TIME vs. the non-classifier-like status of plural *times*,[48] and/or it may be due to the silence itself of TIME (or rather to the special status of the position in which silent elements end up).

17. *Both* decomposed

Returning to the Q-stranding difference between *both* and *all three* illustrated in (102) vs. (103), we can now envision the following possibility. The *three* of *all three* creates in (102), in some English,[49] an intervention effect or an FOFC effect of the sort found with *times* in (109). That effect is absent with *both* in (103) in a way that is partially parallel to its absence with *twice* in (108).

The specific reason might be positional, if stranded *both* in (103) is not immediately preceded by ALL, so that there is no 'ALL both' exactly like *all three*. Alternatively (or in

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[47]Cf. perhaps the singularity of *manner* in phrases like *all manner of things*, as well as that of *kind* in *those kind of books*, recalling Selkirk (1977, 299) on the degree interpretation of *these many fewer people.*

[48]It may be that classifiers are universally not pluralizable; for some apparent exceptions, see Aikhenvald (2000, 249n).

[49]But in no French, as far as I know, i.e. French readily allows stranding of *tous (les) trois* ('all (the) three') - cf. Kayne (1975, chap. 1).

Shlonsky's (1991) proposal that the Modern Hebrew counterpart of *all* is a functional head might carry over to English *all* and to French *tous* (though note Kayne (2016)), but it couldn't readily be right for *tous les trois,* nor for the resumptive cases like *all (three) of them* discussed earlier.

addition), thinking of Leu's (2009, 171; 2015, 98) decomposition of German *beid-* ('both') as *bei+d-*, with *-d-* a definite marker, we might take English *both* to also be decomposable as *bo+th*, with *-th* a definite marker and with *b(o)-* conveying '2'; in which case we might wonder if *b(o)-* is to *two* as TIME is to *times*, with *b(o)-* and TIME being associated with less syntactic structure than *two* and *times.*

18. Successive cyclic stranding

A further way in which *both* patterns with *all three* and against *all* has to do with McCloskey's (2000) work on West Ulster English sentences of the following sort:

(112) Where all did he go for his holidays?
(113) Where did he go all for his holidays?

These are not possible either with *both* or with *all three* being associated with *where* (and similarly with other wh-words), e.g.:[50]

(114) *Where both did he go for his holidays?
(115) *Where did he go all three for his holidays?

McCloskey (2000, 61-62) notes the also possible:

(116) What did he say all (that) he wanted?
(117) Where do you think all they'll want to visit?

as reflecting successive cyclic movement, whereby *all* is stranded in an intermediate specifier of CP position.

Although my English doesn't allow any of (112)-(117), it displays comparable evidence of successive cyclic movement in two cases, with the interesting twist that the intermediate position of successive cyclic stranding is IP-internal. First, I accept pretty well:

(118) These books I've both/all read twice.

in which topicalization-type movement strands *both* or *all* in a position between auxiliary and main verb.

The second case involves a variety of English brought to light by Kimball and Aissen (1971), in which one finds relative clause structures such as:

(119) the people who John think should be invited

which are fairly acceptable for me, and in which *think* agrees with plural *who* rather than with *John.*[51] I note in passing that in one subcase, I actually prefer non-standard agreement:

(120) Which kids do/??does John think should be invited?

The inverted auxiliary in (120) agrees more readily with the wh-phrase *which kids* than with *John*. The relevance of this variety of English to Q-stranding lies, now, in the fact that the following relative clause example has, to my ear, especially with stress on *all/both*, pretty much the acceptability of (119):

(121) these people, who John all/both think should be invited

———————————————

[50]As Jim McCloskey (p.c.). has told me.
[51]For evidence that *think* agrees with *who* rather than with *people*, and for more details in general, see Kayne (2003).

As in (118), successive cyclic stranding takes place in an IP-internal position. Of note, finally, is the fact that such stranding is not available at all if *think* agrees with *John*:[52]

  (122) *these people, who John all/both thinks should be invited

19. OUT *of*

  Q-stranding in English is readily available with pronouns:

  (123) They're all working hard these days.

Unsurprisingly, *of* cannot be stranded:

  (124) *They're all of working hard these days.

Apparently unsurprisingly, *of* is fine if stranding does not take place:

  (125) All of them are working hard these days.

A bit of surprise enters with the fact that phrases of the form 'all of pronoun' as in (125) are relatively specific to English within the union of Germanic and Romance. As are, perhaps even more so, phrases of the form 'all of lexical DP'.[53]

  Also relatively rare in nearby languages are examples with 'all'+numeral+'of' such as:

  (126) all three of them; all three of the students

The same is true, as far as I can see, of:

  (127) the three of them

as well as (in, e.g., a restaurant context):

  (128) There are three of us.

English, then, appears to allow an unusual set of cases that look like partitives, yet are not associated with the subset interpretation of familiar partitives such as:

  (129) Three of our students spoke at NELS last year.

  How best to characterize this property of English remains to be determined. Possibly, the locus of variation is *of* itself. The question becomes especially challenging (which is a good thing, in general, insofar as we need to be asking more and more difficult questions) if we bring in considerations of anti-homophony,[54] which tell us that there should be just a single *of* in English, with apparent differences attributable to differences in syntactic environment, including silent elements.

  Take, for example, the *of* of (129), which is associated with a proper subset interpretation not found in (125)-(128), not to mention it not being found with the *of* of:

  (130) the city of Paris

Thus if anti-homophony is correct, *of* itself cannot be providing the proper subset interpretation of (129).[55] Relevant, arguably, are sentences like:

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[52]To my ear, there is a parallel distinction with topicalization:

  i) ?Those two people it'll both bother.

  ii) *Those two people it both bothers.

For relevant discussion, see Kayne (2003).

[53]Suggesting that Barker (1998, 703) puts phrases like:

  i) all of the books

too easily within reach.

[54]Cf. Johns (1992, 84), Embick (2003, 156) and Kayne (2019, 137).

[55]If den Dikken (2006) is on the right track, then *of* itself may be a kind of copula. An interesting challenge to all unifying approached to *of* comes from *should of*, as discussed in Kayne (1997).

(131) Three out of every four students take a course in chemistry.
leading to the proposal that the partitive phrase in (129) contains a silent OUT:
   (132) three OUT of our students...
that is responsible, at least in part, for the proper subset interpretation in question.[56]

20. Q-stranding and pronouns

   The *of* of (125) is not only (notably) possible, it is also, as is well-known, obligatory:[57]
   (133) *All them are working hard these days.
This is relevant to the proposal made earlier in (29), repeated here:
   (134) Q-stranding is incompatible not only with *of*, but also with its silent counterpart OF.
   If so, then (123) must, despite the unacceptability of (133), contain neither *of* nor OF.
A way to make sense of this would be as follows. A structure like:
   (135) ...all them...
is made available by the language faculty, but in a language like English either Q-stranding must apply yielding (123), or else *of* must be introduced ultimately yielding (125). In a language like Italian, *di* ('of') is impossible:
   (136) *tutti di loro ('all of them')
yet Q-stranding needn't apply (though it can), as seen by the well-formednes of
   (137) tutti loro ('all them')
   In this vein, a way to unify the English facts would be to say that given 'all them' some movement of *them* must take place,[58] and that that holds even in the non-obvious case of *all of them*. (Cf. the movement-based analysis of phrases like *a friend of yours* given in Kayne (1993, sect. 1.2).) Possibly this kind of obligatoriness of movement could then be seen in the light of Moro (2000) (and of the use to which that work is put in Chomsky, Gallego and Ott (2019)).
   I leave open the question of how much difference it would make to the preceding if *all of* were necessarily:
   (138) all X of
with X either a silent numeral or a silent noun such as NUMBER or QUANTITY.[59]

21. *Each* ONE

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[56]Cf. the fact that the French counterpart of *three of them* is not:
  i) *trois d'eux ('three of them')
but rather:
  ii) trois d'entre eux ('three of/from among them')
[57]As opposed to:
  i) All us/you/them linguists are working hard these days.
for reasons that will need to be spelled out.
   The impossibility of *all* (and *both*) plus following simple pronoun was noted by Maling (1976, 712). Note that it also holds for *half*:
  ii) half *(of) them/us/you
[58]Why it (apparently) doesn't have to in Italian remains to be understood.
[59]On silent Ns of that sort, see Kayne (2005a) and Zweig (2006).

A partially different kind of challenge to (134) comes from *each*, which, unlike *all* (and *both*) always needs overt *of* in cases like:

(139) Each *(of) the students is working on a different topic.

Yet *each* can be stranded:

(140) The students are each working on a different topic.

though with restrictions not found with *all*:[60]

(141) I called them all/both/*each.

The proper response to pursue, though not here, might, I suspect, be to take (140) not to have a stranding analysis exactly of the sort under discussion, but instead to be more closely related to sentences like:[61]

(142) They've gone/been, the one to Paris, the other to London.

 Indirect evidence supporting the idea that stranded *each* is closer to (142) than to simple cases of stranded *all* or *both* comes from French, whose counterpart of pre-N *each* is *chaque*:

(143) Chaque étudiant travaille bien. ('each student works well')

However, in standard French,[62] if the accompanying N is silent, one generally gets *chacun*:

(144) Chacun travaille bien. ('each-one works well')

where *chacun* is, with virtual certainty, to be understood as *chaque+un* ('each+one'). This in turn leads to the proposal that English (140) is to be analyzed as:

(145) the students are each ONE working on a different topic

with a silent counterpart of the *one* found in:

(146) Each one is working on a different topic.

and in (142). In light of (145), there may in addition be a link between *each*-stranding and movement-based resumptive pronoun examples of the sort mentioned earlier at (76) (see note 4):

(147) The students are all of them working on fascinating topics.

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[60]Example from Maling (1976, 711). Perhaps relevant here is Tunstall's (1998) Differentiation Condition.

[61]On which, cf. Kayne (1975, 60); these seem to be more natural in French than in English. They may involve across-the-board movement.

[62]For discussion, cf. Grevisse and Goosse (2011, sect. 748e).

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