Passive *Do So*

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Abstract

The received view is that the VP pro-form *do so* cannot be a verbal passive, although it can be unaccusative. I show that this is incorrect: *do so* can be passive. It can also take a raising to subject verb as its antecedent. This means that *do so* is compatible with all types of A-movement, although it does not permit A-bar movement. I construct an analysis of *do so* where it is simply an intransitive verb plus an adverb. The verb combines with a Voice head, which can be unaccusative, passive, or active transitive. The subject of *do so* is base-generated in Spec-VoiceP, and does not move in unaccusatives or passives. Instead, *do so* must copy a function from its antecedent in the semantics. The proposal that lambda abstraction in A-movement is accomplished by the head that triggers the A-movement (here, Voice) results in the subject of *do so* being interpreted as an internal argument if Voice is passive or unaccusative. This reconciles the evidence against movement in *do so* itself with arguments for A-movement in its antecedent. The copy mechanism explains voice and category mismatches, as well as split antecedents and ellipsis-containing antecedents.

1 Introduction

It has long been observed that VP ellipsis is compatible with A-bar extraction from the ellipsis site (Lappin 1984, 282, Fiengo and May 1994, 229):

(1) VP Ellipsis
   a. I know which cases the Supreme Court will hear, and which cases they won't.
   b. The director rejected every proposal that the deputy director did.
   c. Bubble tea, I'll drink, but green tea, I won't.
   d. The junior lawyers try more cases than the senior partners do.

In contrast, the VP anaphor *do so* (Lakoff and Ross 1966, 1976) is not compatible with A-bar extraction, as first noted by Bouton (1969, 237):

(2) *Do So*
   a. * I know which cases the Supreme Court will hear, and which cases they won't do so.
   b. * The director rejected every proposal that the deputy director did so.
   c. * Bubble tea, I'll drink, but green tea, I won't do so.
   d. * The junior lawyers try more cases than the senior partners do so.

A typical account of this contrast is that VP ellipsis involves a full (silent) syntactic structure, but *do so* is a pro-form with no structure that could support a gap (e.g., Fiengo and May 1994).

The VP anaphor *do so* is also apparently incompatible with the passive (Bouton 1969, 237–238, Hallman 2004, Houser 2010):

(3) a. * The boy who we regularly annoyed had no idea why he was being done so. (Bouton 1969, 237, (21))
   b. * The game that was done so by the midget team was won on raw courage. (Bouton 1969, 237, (22))

c. * The vase was broken by the children, and the jar was done so, too. (Houser 2010, 22, (44))

d. * These books were left in the classroom, and this cell phone was done so, too. (Hallman 2013, 77, (5d))

This appears to point to the same conclusion: the passive involves movement of an object from within the VP, but again the VP anaphor *do so* does not have the structure that would be necessary to support this movement.

However, Hallman (2013) points out data that seem to be at odds with this conclusion. One fact is that the VP anaphor *do so* is compatible with unaccusatives (Huddleston and Pullum 2002, 1532, Houser 2010):

(4) Unaccusatives (Hallman 2013, 90, (50a–b))

a. The river froze solid, and the pond did so, too.

b. The towels dripped dry, and the socks did so, too.

Unaccusatives are thought to involve movement of an underlying object to subject position, just like passives. (Addition of the resultative secondary predicate ensures that the verbs have not been coerced into unergatives.) Unaccusatives pattern with passives in many ways, for instance in their compatibility with resultatives (e.g., Levin and Rappaport Hovav 1995), and this has led to the hypothesis that the surface subject of an unaccusative, like the surface subject of a passive, starts out as an object (e.g., Perlmutter 1978, Perlmutter and Postal 1984). The fact that *do so* is compatible with unaccusatives but not passives is then unexpected.

Additionally, adjectival passives permit *so*, contrasting minimally with verbal passives with *do so*:

(5) (Hallman 2013, 78, (11a–b))

a. * The ship was damaged, and the dock was done so, too.

b. The ship appears damaged, and the dock appears so, too.

Many lexicalist analyses of adjectival passives do not posit movement from the underlying object position in adjectival passives (following Wasow 1977), but more recent analyses of adjectival passives do (e.g., Embick 2004, Bruening 2014). The apparent ill-formedness of verbal passives with *do so* then could not be due to the incompatibility of *do so* with movement from object to subject. If unaccusatives and adjectival passives involve movement of an underlying object, then it is not possible to claim that *do so* is ungrammatical with verbal passives because *do so* is incompatible with movement.

Note that these data also rule out another possible account. As Lakoff and Ross (1966) and Ross (1972) noted, *do so* is degraded with stative predicates. A possible account might be that *do so* requires an agentive subject, as Culicover and Jackendoff (2005) explicitly claimed (cf. Baltin 2012). Unaccusatives and adjectival passives render this explanation untenable, however: neither has an agentive subject.

Additionally, Hallman (2013) points out that *do so* is still incompatible with A-bar extraction at the same time as it is compatible with unaccusatives and adjectival passives:

(6) Unaccusatives (Hallman 2013, 90, (51a–b))

a. The towels dripped drier than the socks did (*so).

b. The roses grew taller than the sunflowers did (*so).

(7) Adjectival Passives (Hallman 2013, 78, (12a–b))

a. The ship looks more damaged than the dock looks (*so).

b. The violin looks more expertly repaired than the cello looks (*so).

These examples involve comparatives, which require A-bar extraction (Chomsky 1977). We are faced with a challenging puzzle: one form of movement is grammatical, but another form of movement out of the same constituent is not.

Baltin (2012) and Hallman (2013) both propose accounts of *do so* that attempt to explain that anaphor's compatibility with unaccusatives and adjectival passives but its incompatibility with verbal passives and A-bar extraction. However, I show here that any such account is based on the wrong data: in fact, *do so* does occur as a verbal

passive. I present naturally occurring data as well as an acceptability survey that show that verbal passives are compatible with *do so*, given the right syntactic context. Additionally, we also find active-passive mismatches between *do so* and its antecedent, just as we do with VP ellipsis (Sag 1976; for recent discussion see Merchant 2008, 2013). Moreover, *do so* is compatible with raising to subject. This means that *do so* is compatible with all sorts of A-movement, although it is not compatible with A-bar movement. One could conclude from this that A-movement is not movement at all, but I give reasons to think that A-movement in most contexts actually is movement. At the same time, however, there is no A-movement with *do so* itself. What we need is some way to reconcile a base-generated, pro-form analysis of *do so* with A-movement in its antecedent.

I propose such a way here, building on a proposal in Bruening (2015) that A-movement involves abstraction being built into the semantics of the head that triggers the A-movement. As I will show, this proposal coupled with a view of *do so* as an intransitive verb plus adjunct (Bouton 1970) explains why A-movement is compatible with *do so* but A-bar movement is not. Because the *do* of *do so* is intransitive, it does not license an internal argument. However, an NP can be base-generated as the subject of *do so* and be interpreted as though it were in an internal position, because of the way *do so* finds an antecedent. It requires an appropriate function to copy at the level of semantic interpretation, and if this function is of the appropriate form, the subject of *do so* can be interpreted as an internal argument. I show that this analysis successfully accounts for *do so* as an unaccusative or raising verb, adjectival and verbal passive, and all cases of active-passive and syntactic category mismatches, while maintaining that A-movement is always movement. A-bar movement, on the other hand, is not permitted, just because *do so* does not license an internal argument. A subject can always be case-licensed by T(ense), but an object (trace) can only be case-licensed by a transitive verb.

I begin in section 2 by presenting new data involving verbal passives and raising to subject. This section also argues that A-movement really is movement, but the subject of *do so* is base-generated, even when its antecedent is unaccusative or passive. Section 3 presents the proposed analysis and shows how it accounts for all of the facts.

2 New Data

In this section, I present new data showing that verbal passives are compatible with *do so*. Moreover, voice mismatches occur between the voice of *do so* and the voice of its antecedent. I also show that *do so* is compatible with raising to subject, meaning that it is compatible with all varieties of A-movement. At the same time, A-movement really is movement, except with *do so*.

2.1 Attested Examples of Verbal Passives

Using the web as a corpus, I have found many examples of passive *do so*. I present a few of these examples below. All of them are judged by native speakers to be acceptable.

(8) a. For those who do not know Devil Fruits are extremely rare to find and the ones that are found and eaten **are done so** in mere happenstance unless you know what to look for.
(`http://shannaro.wordpress.com/2012/11/30/`)

b. I then take notice and observe when the food is brought to table that the meal is picked apart and what is eaten **is done so** in a controlled and seemingly not pleasurable manner.
(`http://www.psychologytoday.com/blog/when-food-is-family/201208/reflections-the-2012-olympics`)

c. Every photo taken and every update written **is done so** with the adoptive parents in mind.
(`http://godslittlestangelsinhaiti.org/andlifegoeson/2013/07/19/words-of-encouragement-adds-sunshine-to-our-day/`)

d. And I think everyone can agree that some of the most beautiful music ever written **was done so** in the name of God or gods.
(quote attributed to Anand Wilder, `http://en.wikipedia.org/wiki/Yeasayer`)

e. It is thrillingly written, and **done so** with the clarity and poignancy of a man who waited 62 years to reveal the full account of his experience, after first being approached by American prosecutors in 1947.
(http://theboar.org/2013/04/19/denis-avey-believe-or-not-believe/)

f. The first "Rosicrucian" writings, the Fama Fraternitatis, Confessio Fraternitatis and the Chemical Wedding of Christian Rosenkreuz, all when written **were done so** anonymously and then later traced to be the works of Johannes Valentin Andreae,...
(Tobias Churton, http://www.bonisteelml.org/invisible_history_of_rosicrucians.pdf)

g. Therefore, with a book bound in human flesh comes a feeling that something "bad" happened in order for these people's flesh to be used as book binding in the first place, even if it WAS **done so** legally.
(https://roadtrippers.com/stories/harvard-discovers-three-of-its-library-books-are-bound-in-human-flesh?lat=40.80972&lng=-96.67528&z=5)

h. Although coffee was brewed in the shops, it **was done so** only at the request of customers and dispensed as free samples, ...
(http://www.entrepreneur.com/article/197692)

Examples of passive *do so* can also be found in the Corpus Of Contemporary American English (COCA; thanks to an anonymous reviewer for suggesting this corpus):

(9) (examples from COCA, http://corpus.byu.edu/coca/)

a. it is not required that sexual conduct portrayed **be done so** in a patently offensive manner...

b. ...frequently, those things that are leaked to the media **are done so** by people who are not in a position to know, ...

c. Any resources that are checked out **are done so** by students using self-checkout stations in each school.

d. Our release of their information **was done so** in compliance with this law.

e. ...knowing the healthy fruits, vegetables, and nuts grown here **are being done so** with the highest regard for saving our most precious resource: water.

f. The recommendations made by Gersten and colleagues (2007) **were done so** without considering the heterogeneity of ELP levels...

g. And when this one was closed and forgotten in the late 1800s, it **was done so** out of prudence.

h. ...assumed that if an item was completed, it **was done so** by the respondent as intended.

i. ...when it is thought about, it must **be done so** in the context of a supreme, and very Canadian, irony.

We can see that *do so* does occur as a verbal passive in numerous instances in corpora, contrary to all of the syntactic literature. It can even be found in academic and other formal genres, which have presumably been heavily edited.

2.2 Acceptability Survey

I also conducted a survey using Amazon Mechanical Turk. For this purpose I made use of the free tools described in Gibson *et al.* (2011) and available at http://tedlab.mit.edu/software/, modified for the purposes of this experiment. I took some of the corpus examples and created matching pairs by manipulating the passive example to create an active version that was as closely matched as possible. The following are the resulting pairs that were presented to the survey participants, in the order active-passive:

(10) a. For those who do not know Devil Fruits are extremely rare and people who do find and eat them do so in mere happenstance unless they know what to look for.

b. For those who do not know Devil Fruits are extremely rare and the ones that are found and eaten are done so in mere happenstance unless you know what to look for.

(11) a. I then take notice and observe when the food is brought to table that people pick apart the meal and those who eat it do so in a controlled and seemingly not pleasurable manner.

b. I then take notice and observe when the food is brought to table that the meal is picked apart and what is eaten is done so in a controlled and seemingly not pleasurable manner.

(12) a. Every caseworker who takes a photo and every caseworker who writes an update does so with the adoptive parents in mind.

b. Every photo taken and every update written is done so with the adoptive parents in mind.

(13) a. I think everyone can agree that those who composed some of the most beautiful music ever written did so in the name of God or gods.

b. I think everyone can agree that some of the most beautiful music ever written was done so in the name of God or gods.

(14) a. The author of the first Rosicrucian writings, the Fama Fraternitatis, Confessio Fraternitatis and the Chemical Wedding of Christian Rosenkreuz, when he wrote them did so anonymously and only later were they traced to be the works of Johannes Valentin Andreae.

b. The first Rosicrucian writings, the Fama Fraternitatis, Confessio Fraternitatis and the Chemical Wedding of Christian Rosenkreuz, all when written were done so anonymously and then later traced to be the works of Johannes Valentin Andreae.

(15) a. Therefore, with a book bound in human flesh comes a feeling that something bad happened in order for someone to use these people's flesh as book binding in the first place, even if they did do so legally.

b. Therefore, with a book bound in human flesh comes a feeling that something bad happened in order for these people's flesh to be used as book binding in the first place, even if it WAS done so legally.

(16) a. Although the shops brewed coffee, they did so only at the request of customers and dispensed it as free samples.

b. Although coffee was brewed in the shops, it was done so only at the request of customers and dispensed as free samples.

(17) a. The Iranians did delay the release, but they did so unilaterally for their own motives.

b. The release was in fact delayed, but it was done so unilaterally by the Iranians for their own motives.

As can be seen, there were eight pairs. Each subject saw only one member of each pair. Subjects answered a comprehension question about every sentence and also rated every sentence on a scale of one to five (1: Extremely unnatural, 2: Somewhat unnatural; 3: Possible, 4: Somewhat natural, 5: Extremely natural). The survey also included 16 filler or control sentences that were intended to be matched for register and style. These were created by modifying examples taken from the web, typically on-line newspaper articles. Each of the sixteen was manipulated to create an ungrammatical match, where the manipulation was changing the word order of S, O, or V. A couple of examples follow (the ungrammatical sentences were not presented with the star):

(18) a. South Africa became the second African country to announce that it would leave the International Criminal Court.

b. * South Africa became the second African country to announce that it would the International Criminal Court leave.

(19) a. One child lives in a second-floor apartment overlooking the Grand Concourse, the Bronx's main thoroughfare.

b. * Lives one child in a second-floor apartment overlooking the Grand Concourse, the Bronx's main thoroughfare.

As stated, there were 16 pairs of controls, and again each subject saw only one member of each pair. Subjects rated a total of 24 sentences (8 experimental items + 16 control items). A different list was created for each subject with the presentation order randomized.

40 workers were recruited from within the USA. All 40 identified themselves as being from the USA and having English as their native language. Three subjects were discarded from the analysis, two for getting less than 75% of the comprehension questions correct, and one for failing to rate most of the sentences. That left 37 whose results entered into the analysis.

Mean ratings and standard deviations are shown below (again, the scale is 1–5, 1: Extremely unnatural, 2: Somewhat unnatural; 3: Possible, 4: Somewhat natural, 5: Extremely natural):

(20)

Condition:	Active	Passive	control gramm	control ungramm
Mean:	3.493243	3.442177	4.320946	2.068027
Standard Deviation:	1.2426471	1.2338227	0.9646465	1.1634940

Both active and passive *do so* are rated slightly lower than the grammatical controls. This could be an effect of including the verbal anaphor *do so*, or it could be just because the sentences with *do so* were on average slightly longer. Because they needed to have an antecedent and *do so*, they were also necessarily syntactically complex, with more than one clause. The important comparison here is that between active and passive *do so*. As can be seen from the above table, active and passive *do so* do not differ from each other (one-way analysis of variance, F(1,293)=0.1254, p=0.7235).

The results are shown below by the rating that subjects assigned:

(21)

	Condition			
Answer.Rating	Active	Passive	control gramm	control ungramm
1	9	8	4	113
2	32	31	18	106
3	20	34	27	35
4	51	36	77	22
5	36	38	170	18

As can be seen, the only difference between active and passive *do so* is that passive *do so* is more equally distributed among the ratings 2 and above. Active *do so* has more 4 ratings than 3 ratings compared to passive *do so*. Overall, active and passive do not differ (Pearson's χ^2 test, χ^2=6.3413, df=4, p=0.1751).

An anonymous reviewer has suggested that there might be a dialect difference based on age. Specifically, the reviewer suggests that people over 55 find passive *do so* unacceptable. To test this possiblity, I asked subjects to report their age. Here are the mean ratings by age:

(22)

	20–30 (n=16)	30–45 (n=15)	45–55 (n=2)	over 55 (n=4)
Active	3.562500	3.516667	3.3750	3.187500
Passive	3.609375	3.316667	2.7500	3.600000
control gramm	4.343750	4.200000	4.5000	4.593750
control ungramm	2.218750	2.109244	1.8125	1.419355

This sample is small, and subjects are not equally distributed across the age groups, but I find no support for the reviewer's contention that people over 55 do not allow passive *do so* (analysis of variance with condition and age as factors finds no main effect of age, F(3,287)=1.0720 p=0.3613, and no interaction, F(3,287)=0.8589 p=0.4628).

Miller (2013) speculated that judgments on *do so* might differ by education level. Specifically, according to him, *do so* is part of a more educated register. Since, according to him, Amazon Mechanical Turk workers tend not to have a college education, they tend to rate sentences with *do so* higher simply because they recognize it as being part of a higher register. To address this possibility, I also asked subjects to report their education level. The results are given below:

(23)

	High School (n=5)	2yr College (n=8)	4yr College (n=21)	Graduate School (n=3)
Active	3.950000	3.375000	3.464286	3.250000
Passive	3.947368	3.531250	3.285714	3.500000
control gramm	4.575000	4.453125	4.220238	4.250000
control ungramm	2.150000	1.920635	2.130952	1.869565

As can be seen, the majority (86%) of my respondents reported at least two years of college. There is very little difference in ratings by level of education, although those with only a high school education did rate both active and passive *do so* sentences slightly higher than the other education groups did. However, they also rated the grammatical controls slightly higher, as well. All subjects also rated all sentences with *do so* lower than the grammatical controls (but again, this is probably due to length and complexity). (An analysis of variance with condition and education as factors reveals that a main effect of education approaches significance, F(3,287)=2.3363 p=0.07394. The interaction of condition and education is not significant, F(3,287)=0.4243 p=0.73576.)

To sum up, multiple sources of data reveal that *do so* is actually acceptable as a passive, contrary to all the published literature. Examples of passive *do so* occur frequently on the web and in available controlled corpora like COCA. They are not rated differently from their active counterparts by speakers in an Amazon Mechanical Turk survey. This survey also found no support for a reviewer's suggestion of an age difference in acceptability. It also found little support for a difference in acceptability based on education level (Miller 2013). This does not mean that no such differences exist, only that the Amazon Mechanical Turk survey that was conducted did not find any such differences.

2.3 Why the Literature Judged Passives Ungrammatical

All of the above data indicate that the literature has been incorrect in its assertion that *do so* cannot be passive. Now, the question arises of why previous researchers concluded that *do so* cannot be passive. Every speaker that I have consulted accepts the attested examples but rejects the examples given in the literature, like those in (3). Why is there a discrepancy in these judgments?

One thing to notice is that many of the attested examples have the antecedent of *do so* inside a relative clause that modifies the subject of *do so* (8a–d, 9a–f). Houser (2010) noticed that counterexamples to the requirement that *do so* be eventive are attested in the same environment. For instance, he presents the following contrast with a stative antecedent for *do so*:

(24) (Houser 2010, 3–4, (7b), (8b))

a. * Felix knows French from school, and Sammie does so, too.

b. The students who know French best do so because they lived in France for a year.

I will turn to Houser's explanation for this effect momentarily, as well as my own. First, it is important that we start to carefully distinguish *acceptability* from *grammaticality* (Chomsky 1957). When speakers report judgments, they are reporting a judgment of acceptability. It is up to the linguist to decide *why* a sentence might be judged unacceptable. It could be that it violates rules or constraints of the grammar and so is ungrammatical, but it is also possible that it does not, and is judged to be unacceptable for extra-grammatical reasons. These reasons could include difficulty of processing (as in the famous case of multiple center embeddings), discourse incoherence, or other possible reasons.

This is exactly what Miller (2013) suggests regarding Houser's example in (24a): it is actually grammatical, but unacceptable for extragrammatical reasons. Given this possibility, we need a way to mark that a sentence is judged unacceptable by most (if not all) speakers, but without pre-judging the account of this unacceptability. I propose to use the diacritic "‡" to indicate that a sentence is unacceptable. When I report a judgment from the literature, I will report whatever marking that publication assigned it, but when I report judgments that I have collected, I will use "‡" rather than "*" to indicate unacceptability.[1]

[1] I also propose that researchers start indicating numerical scores where they are available. For instance, a sentence could be marked "1/7‡" to indicate that the mean acceptability assigned to the sentence by speakers was one on a scale of one to seven.

To continue, Houser's account of the improvement in stative antecedents for *do so* when the antecedent is in a relative clause that modifies the subject of *do so* relies on the fact that VP ellipsis is unavailable in this context. For instance, the above contrast reverses when we use VP ellipsis instead of *do so* (now using the marking of unacceptability):

(25) a. Felix knows French from school, and Sammie does [—], too.
b. ‡ The students who know French best do [—] because they lived in France for a year.

All of the passive examples collected above also do not permit VP ellipsis in place of *do so*. I illustrate with a selection of four examples from the web and four examples from COCA. Two of each have the antecedent inside a relative clause modifying the subject of *do so*, and the other two do not:

(26) (examples modified from the web examples)
a. ‡ The Devil Fruits that are found and eaten are [—] in mere happenstance unless you know what to look for.
b. ‡ When the food is brought to table the meal is picked apart and what is eaten is [—] in a controlled and seemingly not pleasurable manner.
c. ‡ The first "Rosicrucian" writings, all when written were [—] anonymously and then later traced to be the works of Johannes Valentin Andreae,. . .
d. ‡ Therefore, with a book bound in human flesh comes a feeling that something "bad" happened in order for these people's flesh to be used as book binding in the first place, even if it WAS [—] legally.

(27) (examples modified from the COCA examples)
a. ‡ . . . frequently, those things that are leaked to the media are [—] by people who are not in a position to know, . . .
b. ‡ Any resources that are checked out are [—] by students using self-checkout stations in each school.
c. ‡ And when this one was closed and forgotten in the late 1800s, it was [—] out of prudence.
d. ‡ . . . assumed that if an item was completed, it was [—] by the respondent as intended.

The examples that do not have the antecedent for *do so* inside the subject of *do so* all have a non-contrastive adjunct modifying *do so*. Huddleston and Pullum (2002, 1531) note that VP ellipsis is degraded compared to *do so* in the presence of a non-contrastive adjunct (it is also important that the anaphoric VP and its antecedent have the same subject in such cases, although Huddleston and Pullum do not note this):

(28) (Huddleston and Pullum 2002, 1531, (44))
a. She agreed to help, but she {did so / *did} reluctantly.
b. Those who take part {do so / *do} at their own peril.

All of the attested examples of passive *do so* have non-contrastive adjuncts, even the ones where the antecedent is inside the subject of *do so*. (They also have the same subject as their antecedent.) In fact, searching for "were/was done so with" turns up many more relevant examples than just searching for "were/was done so." Consider the effect of the adjunct on the following:

(29) a. Although coffee was brewed in the shops, it was **done so** only at the request of customers and dispensed as free samples, . . .
(`http://www.entrepreneur.com/article/197692`)
b. ‡ Although coffee was brewed in the shops, it was [—] only at the request of customers . . .
c. A: Was coffee brewed in the shops? B: It was [—]. / ‡It was done so.

VP ellipsis is unacceptable with the adjunct, but the acceptability of *do so* and VP ellipsis reverses when the adjunct is removed.

As can be seen, the acceptability of passive *do so* seems to be inversely correlated with the acceptability of VP ellipsis. In most of the cases from the literature where passive *do so* has been judged to be unacceptable, VP ellipsis is acceptable:

(30) a. * The vase was broken by the children, and the jar was done so, too. (Houser 2010, 22, (44))
b. The vase was broken by the children, and the jar was [—], too.

(31) a. * These books were left in the classroom, and this cell phone was done so, too. (Hallman 2013, 77, (5d))
b. These books were left in the classroom, and this cell phone was [—], too.

Bouton's examples in (3a–b) are not acceptable with VP ellipsis or *do so*:

(32) a. * The boy who we regularly annoyed had no idea why he was being done so. (Bouton 1969, 237, (21))
b. ‡ The boy who we regularly annoyed had no idea why he was (being) [—].

(33) a. * The game that was done so by the midget team was won on raw courage. (Bouton 1969, 237, (22))
b. ‡ The game that was [—] by the midget team was won on raw courage.

I am not entirely sure why these examples do not work with either type of VP anaphor. It might be that the voice mismatch and the cataphoric reference push both of them beyond the bounds of acceptability.[2] In any case, modifications to these examples show that passive *do so* and VP ellipsis are again in complementary distribution:

(34) a. A: That boy is being picked on. B: Smaller kids like him often are (‡done so).
b. A: The game will be won on raw courage. B: Yes, it will be (‡done so).

Thus, we see that the acceptability of passive *do so* is negatively correlated with the acceptability of VP ellipsis in the same environment. Passive *do so* is acceptable just when VP ellipsis is not.

Houser's (2010) account of this effect is that there are grammatical constraints on *do so*, for instance a constraint against it being stative, but these constraints can be overcome by the need to use some kind of VP anaphora. If VP ellipsis is unavailable, then *do so* must be used. Houser refers to the suspension of constraints on *do so* as *subtractive coercion*: a constraint is removed by some other need. In Houser's account, these constraints seem to be constraints on the grammar, so that when *do so* is unacceptable it truly is ungrammatical.

I will not adopt this account, but will instead pursue the line of analysis suggested by Miller (2011, 2013). According to Miller, unacceptable sentences with *do so* of the type under discussion here are actually grammatical, but they are unacceptable for reasons external to the grammar. According to Miller, there are three extragrammatical factors that influence the acceptability of (finite) *do so*:

(35) (Miller 2013, 124, (3))
a. Finite *do so* very strongly prefers to occur with non-stative antecedents.
b. Finite *do so* very strongly prefers to occur referring to the same state of affairs as its antecedent and hence with the same subject as its antecedent.
c. Finite *do so* prefers to occur with a non-contrastive adjunct.

[2] I have only come across one attested example of cataphoric *do so*:

(i) Having failed to do so because of a space crunch last issue, I must review the ground rules this time. (*MIT Technology Review*, Nov/Dec 2016, Puzzle Corner)

This example seems perfectly acceptable, so there must be others.

Miller refers to these factors as *usage preferences*. Usage preferences are statistically significant preferences in usage which can concern any aspect of linguistics (syntax, compositional semantics, lexical semantics, discourse pragmatics, register, etc.). They are identified by examination of large corpora (that is how Miller identified the above three usage preferences). According to Miller, violating a single usage preference is generally acceptable, but when multiple preferences are violated, the result can be complete unacceptability. It is also important that some preferences are weighted more heavily than others. For instance, according to Miller (2013, 125), the usage preferences in (35a–b) are strong while that in (35c) is weak. A violation of a strong and a weak usage preference is tolerable, but a violation of two strong usage preferences is not. Violating all three is also unacceptable.

Interestingly, the survey Miller (2013) performed to evaluate his analysis did not bear out this specific constellation of usage preferences. In particular, subjects did not seem to mind *do so* having a different subject from its antecedent. This is my judgment as well: there really is no requirement that the subject be the same, even if almost all attested examples have that property (this means that one cannot always identify factors influencing acceptability solely by investigating corpora).

I will follow Miller in taking passive and stative *do so* to be grammatical (that is, they conform to constraints of the grammar). Where they are judged to be unacceptable this is for reasons external to the grammar.[3] I will modify Miller's account such that there are factors that weigh into the choice between *do so* and VP ellipsis. These are not factors that influence the absolute acceptability of *do so*. Rather, they influence the choice of VP anaphor. (Note that this account is very simplified, since there are other VP anaphors that I will not discuss here, like *do it*. A complete account would have more than a two-way ranking of preference). If VP ellipsis is strongly preferred relative to *do so*, then speakers will judge *do so* to be unacceptable. If VP ellipsis is strongly dispreferred, then *do so* will be acceptable. If neither is preferred, then both will be acceptable (perhaps to varying degrees).

For the data under discussion here, we only need two factors that influence the choice of *do so* versus VP ellipsis. The second factor, the Contrast Factor, is based on Rooth (1992a):[4]

(36) a. Choice Factor 1 (the Action Factor): VP ellipsis is strongly preferred and *do so* strongly dispreferred when the antecedent is non-actional (where actional = eventive and active, non-actional = stative or passive).

b. Choice Factor 2 (the Contrast Factor): VP ellipsis is strongly dispreferred and *do so* strongly preferred where there is no contrast between the anaphoric VP and its antecedent; where there is a contrast, VP ellipsis is (weakly) preferred.

(There is also a role for finiteness, which I will not discuss here since it is not relevant for the examples under consideration.)

The Action Factor (Choice Factor 1) tips the scales in favor of VP ellipsis if available, to such an extent that *do so* is judged to be unacceptable. The Contrast Factor (Choice Factor 2) tips the scales in favor of *do so*, but *do so* is not precluded by the Contrast Factor from contrasting with its antecedent. Importantly, the Contrast Factor renders VP ellipsis completely unacceptable and *do so* completely acceptable when there is no contrast. This overrides the Action Factor.

The Contrast Factor subsumes the two cases that render passive and stative *do so* acceptable. In the case where the antecedent is contained within the subject of the anaphoric VP, as in (37), the two VPs have the same subject and do not contrast in any of their arguments. In all the attested cases, there is also a non-contrastive adjunct, which, since it is non-contrastive, does not provide any contrast, either. In (37), for instance, the anaphoric VP includes the antecedent VP as a proper sub-part, and so there is no contrast. This makes VP ellipsis unacceptable and *do so* acceptable.

(37) a. . . . frequently, those things that are leaked to the media are done so by people who are not in a position to know, . . .

[3] A logical alternative would be that passive and stative *do so* are ungrammatical, but can be judged acceptable due to extragrammatical factors. Arregui *et al.* (2006) suggest such an account of certain patterns of VP ellipsis. I will not address this possibility further here. For some criticism of this account of VP ellipsis, see Kertz (2013).

[4] See also Heim (1996), Johnson (2001). These works all assume that the contrast condition is a matter of grammaticality. I take it to be a matter of acceptability, instead. See the works cited for a formalization of the condition in terms of Rooth's (1992b) theory of focus.

b. ‡ . . . frequently, those things that are leaked to the media are [—] by people who are not in a position to know, . . .

(38) a. Although coffee was brewed in the shops, it {‡was [—] / was done so} only at the request of customers . . .

b. A: Was coffee brewed in the shops? B: It was [—]. / ‡It was done so.

The same is true in (38a). The anaphoric VP does not contrast with the antecedent VP in any way, and so VP ellipsis is unacceptable and *do so* acceptable. In contrast, in (38b), there is a contrast, in verum focus. The truth value of the clause is in focus. This leads to either no preference, or a weak preference for VP ellipsis. However, the Action Factor so strongly disprefers *do so* that only VP ellipsis can be used in this example, and *do so* is unacceptable.

We now have an account for why unaccusative *do so* enjoys a wider distribution than passive *do so*. Passives violate the actional requirement of the Action Factor, but unaccusatives do not. The following examples exhibit no preference either way according to the two Choice Factors, and indeed either *do so* or VP ellipsis is acceptable:

(39) Unaccusatives (Hallman 2013, 90, (50a–b))

a. The river froze solid, and the pond did so, too.

b. The towels dripped dry, and the socks did so, too.

(40) a. The river froze solid, and the pond did [—], too.

b. The towels dripped dry, and the socks did [—], too.

In all of these examples, there is a contrast, in the subject of the VPs. Additionally, unaccusative predicates are actional predicates.

In contrast, examples of the passive from the literature all strongly prefer VP ellipsis over *do so*:

(41) a. * The vase was broken by the children, and the jar was done so, too. (Houser 2010, 22, (44))

b. The vase was broken by the children, and the jar was [—], too.

(42) a. * These books were left in the classroom, and this cell phone was done so, too. (Hallman 2013, 77, (5d))

b. These books were left in the classroom, and this cell phone was [—], too.

(43) a. * The ship was damaged, and the dock was done so, too. (Hallman 2013, 78, (11a–b))

b. The ship was damaged, and the dock was [—], too.

The Action Factor strongly prefers VP ellipsis in all these cases, and the Contrast Factor does not prefer *do so* instead, since the subjects of the VPs contrast. In such conditions, *do so* is judged to be unacceptable, by the Action Factor.[5]

It is important to point out that in this account, where VP ellipsis is unacceptable because of a non-contrastive adjunct or because its antecedent is in a subject-modifying relative clause, it is still grammatical. Consider Huddleston and Pullum's example again:

(44) She agreed to help, but she {did so / *did} reluctantly. (Huddleston and Pullum 2002, 1531, (44))

Just like double center embeddings, there is no reason that VP ellipsis would be ungrammatical in this context. I believe that there is nothing grammatically wrong with VP ellipsis here, and the fact that it is unacceptable has to do with the extragrammatical factors outlined above. That the problem is not the adjunct but contrast is shown by the fact that adding verum focus makes VP ellipsis acceptable:

[5]The reviewer who suggested a dialect difference based on age reports that he or she finds all cases of passive *do so* unacceptable, but unaccusative *do so* is acceptable. I have not encountered any other speakers who have this judgment. At present, I have no good explanation for any speaker with this pattern of judgments. One possibility is that, for speakers with this pattern of judgments, the Action Factor needs to be split into two different factors, one referring to eventive versus stative, and the other referring to active versus passive. The latter would not be overridden by the Contrast Factor.

(45) A: Did she agree to help? B: She did [—], reluctantly.

Similarly, if the antecedent is embedded within the subject of the anaphoric VP but the two VPs contrast in some way, then VP ellipsis is acceptable (see Johnson 2001, Kennedy 2008):

(46) a. Those who criticize others {do so / ‡do [—]} because they are insecure.
b. Those who try not to criticize others sometimes {do so / do [—]} anyway because they are insecure.

This means that there is nothing grammatically wrong with the antecedent being embedded within the subject of an elided VP.

To summarize, I have proposed two factors governing the choice of VP anaphor. The two factors push in opposite directions. One prefers VP ellipsis over *do so*, the other does the opposite. The one preferring *do so* (the Contrast Factor) can override the one preferring VP ellipsis. This is a rather sketchy account, since it does not take into account the role of finiteness or the existence of other VP anaphors like *do it*, but it suffices to explain the contrast between examples from the literature and the attested examples that have been presented here. Importantly, passive *do so* is generally grammatical, it is just that in some cases it is so dispreferred as to be unacceptable.

2.4 Active-Passive Mismatches

We have now seen that *do so* can appear as a passive, at least under certain conditions. In addition, *do so* also tolerates mismatches between it and its antecedent in voice. Active-passive mismatches between *do so* and its antecedent were noticed as long ago as Bouton (1969):

(47) (Bouton 1969, 232–233, (7), (9))
a. Mary was contacted by the same man in Boston who had done so in New York.
b. Because the issue had been discussed so thoroughly in our committee that afternoon, we were asked not to waste time doing so again that night.

A broader range of examples are provided by Dalrymple, Shieber, and Pereira (1991), Kehler and Ward (1999), and Merchant (2013, 81, note 9); I also include an example from Huddleston and Pullum (2002):

(48) a. It is possible that this result can be derived from some independent principle, but I know of no theory that does so. (Mohanan 1983, 664, cited by Dalrymple, Shieber, and Pereira 1991, 440, (60b))
b. Section 1 provides the examples to be derived by Gapping, and a formulation of Gapping capable of doing so. (text of Neijt 1981, cited by Kehler and Ward 1999, 246, (35))
c. As an imperial statute the British North America Act could be amended only by the British Parliament, which did so on several occasions. (*Groliers Encyclopedia*, cited by Kehler and Ward 1999, 247, (36))
d. To the extent that victory can be achieved with a minimum of personal sacrifice, the Bush administration will try to do so. (Ted Koppel, "The long, cost-free war." *New York Times*, 6 November 2006, p. A23, cited by Merchant 2013, 81)
e. Apple's lawyers sent Gizmodo a letter asking that the phone be returned, and the Web site did so. (Brian Stelter and Nick Bilton, "Computers seized from home of blogger in iPhone inquiry." *New York Times*, 27 April 2010, p. B7, cited by Merchant 2013, 81)
f. The intention behind the legislation was to ensure the money should be used for reinstatement where it was possible and economic to do so. (Huddleston and Pullum 2002, 1531, (46i))

All of the above cases have a passive antecedent while *do so* is active. The previous literature has not cited examples of an active antecedent with passive *do so*, because passive *do so* was always viewed as impossible. However, I have been able to find a number of attested examples:

(49) a. Some of the sites that we have located were done so with the help of people we met while in the process of trying to locate the site.
(http://www.check-six.com/lib/origin.htm)

b. Each of the 444 ACME oysters Sonya consumed were done so with a fork, as required by MLE.
(http://www.majorleagueeating.com/contests.php?action=detail&eventID=437)

c. LaValle has said all of the funds that he withdrew for Friendship Ridge were done so with the permission of County Commissioners.
(https://beavercountian.com/content/daily/bank-slips-show-3-4-million-unilaterally-withdrawn-by-financial-administrator-lavalle-treasurer-javens)

d. While the D-Backs will have a new face at shortstop in Jean Segura, the majority of other moves that the team made this offseason were done so with the pitching rotation in mind.
(http://isportsweb.com/2016/02/07/arizona-diamondbacks-projected-batting-lineup/)

e. The practice they carried on underground was done so with a limited understanding of their newfound faith.
(*Japan at War: An Encyclopedia*, p170, accessed by Google Books)

All of the examples of this pattern that I have found have the antecedent of *do so* embedded in the subject of *do so*. This was one of the contexts that favored *do so* over VP ellipsis. Now we see that *do so* has its own voice, distinct from that of its antecedent, and it does not have to match its antecedent in voice. It can be active while its antecedent is passive, and it can be passive while its antecedent is active.

Note that there is no way to accommodate these mismatches within previous syntactic accounts of *do so* like those of Baltin (2012) and Hallman (2013), since passive *do so* cannot even be formed in those analyses.

2.5 Raising to Subject

We have now seen that passive A-movement and unaccusative A-movement are compatible with *do so*. According to Houser (2010), another form of A-movement, raising to subject, is not grammatical with *do so*, but as he points out, his examples involve stative raising verbs, and statives are not generally acceptable with *do so*. They are acceptable in the syntactic contexts identified above, however. If we put a raising to subject verb in one of those contexts, such as embedded in the subject of *do so*, raising to subject is acceptable:

(50) a. . . . we can see how two objects that appear to be close together do so only because they lie along the same line of sight.
(http://www.redchairblogs.com/starstruck/2015/04/24/a-cosmic-dance/)

b. The horse which appears to be grey does so because it received the greying agent from the parent.
(http://www.hitechbloodstock.com/coat%20colour.htm)

There are also raising verbs that are eventive, and these are compatible with *do so* even outside of this one syntactic context (although they might be better in this context):

(51) a. The rooster that began to crow right outside my window this morning always seems to do so at the first crack of dawn. (possible interpretation: 'begin to crow')

b. A rooster began to crow right outside my window. It did so because the sun came up, I assume.

(52) a. The screws that are threatening to pull away from the wood right now have been doing so for years. (= 'threatening to pull away from the wood')

b. One screw is threatening to pull away from the wood. It's doing so because the threads are stripped.

This means that all types of A-movement are grammatical and acceptable with *do so*: passive, unaccusative, raising.

2.6 Revisiting A-Bar Movement

Given what we have seen above, we should make sure that A-bar movement really is ungrammatical with *do so*. That is, we should make sure that all the examples illustrating A-bar movement do not suffer from the same problems that beset the examples of A-movement in the literature. In fact, the examples in (2) do not suffer from those problems. According to what we have seen, they should be acceptable alternatives to VP ellipsis. Just to make sure, I constructed the following examples with a non-contrastive adjunct, which strongly favors *do so* over VP ellipsis. *Do so* is still unacceptable with A-bar extraction, and VP ellipsis is also not very acceptable, since it is not very acceptable with a non-contrastive adjunct.

(53) a. The director rejected every proposal that we wanted him to [—].
b. * The director rejected every proposal that we wanted him to do so on principled grounds.
c. ‡ The director rejected every proposal that we wanted him to [—] on principled grounds.
d. The director rejected every proposal. We wanted him to do so on principled grounds.

(54) a. Black tea, I'll drink, but green tea, I won't [—].
b. * Black tea, I'll drink with milk, but green tea, I won't do so with milk.
c. ‡ Black tea, I'll drink with milk, but green tea, I won't [—] with milk.
d. I will drink black tea, but I won't do so with milk.

(55) a. Our heroes will face more challenges than they should ever have to [—].
b. * Our heroes will face more challenges than they should ever have to do so willingly.
c. ‡ Our heroes will face more challenges than they should ever have to [—] willingly.
d. Our heroes have to face many challenges, but they don't have to do so willingly.

I have marked the above examples with the diacritics that I believe to be appropriate. VP ellipsis is simply dispreferred with a non-contrastive adjunct, and so the (c) examples are merely unacceptable (some perhaps not to a great degree). In contrast, *do so* does not seem to tolerate A-bar extraction at all, even when there is a non-contrastive adjunct that would prefer *do so* over VP ellipsis. As the (d) examples show, *do so* is fine in these contexts without the extraction. I conclude from this that *do so* really does not allow A-bar extraction, and this is a matter of grammar, not acceptability. Accordingly, I use the "*" to indicate that the (b) examples violate principles or constraints of the grammar.

2.7 A-Movement is Not Movement?

Because A-movement is compatible with *do so* but A-bar movement is not, we might conclude that A-movement is not movement at all, as in many lexical analyses of passives, unaccusatives, and raising (e.g., Bresnan 1982, Pollard and Sag 1994, Müller 2006, Müller and Wechsler 2014). Then the generalization would be that *do so* is simply incompatible with movement. However, there are good reasons to believe that A-movement is in fact movement. One reason is the possibility of reconstruction (e.g., May 1977, Fox 1999, Moulton 2013). Another is the argument from expletives and *deliberately*-type adverbs in Bruening and Tran (2015), which I will reproduce here.

Bruening and Tran (2015) show that *deliberately*-type adverbs can associate with an NP with any thematic role. However, they must always associate with the *highest* argument of the predicate they modify. This can be shown with unaccusatives and experiencer constructions. In unaccusatives, *deliberately* adverbs can modify the surface subject, which is a patient or theme (adding the resultative ensures these have not been coerced into unergatives):

(56) (Bruening and Tran 2015, 144, (44))
a. The sentient, talking door opened wide deliberately.
b. The sentient, talking door slammed shut deliberately.
c. The Iceman froze solid deliberately.
d. The robot broke open deliberately.

Adding an external argument to the above unaccusatives results in the underlying object no longer being able to associate with the *deliberately*-type adverb:

(57) (Bruening and Tran 2015, 144, (45))
  a. Johnson opened the sentient, talking door deliberately. (only Johnson can be deliberate)
  b. Mr. Freeze froze the Iceman solid deliberately. (only Mr. Freeze can be deliberate)
  c. Johnson broke the robot open deliberately. (only Johnson can be deliberate)

In experiencer-causative alternations, only the surface subject can associate with the adverb, the association is not based on thematic role:

(58) (Bruening and Tran 2015, 144, (46))
  a. Carolina fears dogs deliberately. (only Carolina is deliberate)
  b. Dogs frighten Carolina deliberately. (only the dogs are deliberate)

(59) (Bruening and Tran 2015, 144, (47))
  a. Melinda is angry at Jack deliberately. (only Melinda is deliberate)
  b. Jack angered Melinda deliberately. (only Jack is deliberate)

These patterns show that there is no thematic restriction on *deliberately*, for instance that it can only associate with agents or experiencers. It can associate with patients/themes, and it fails to associate with an experiencer when there is a higher argument.

Now, in passives with *be*, *deliberately* can only associate with the logical external argument, even if that is not expressed:

(60) a. Gillian was hit by that truck deliberately! (only the truck can be deliberate; Bruening and Tran 2015, 142, (33a))
  b. The Iceman is being frozen solid deliberately! (only the understood causer can be deliberate)

Bruening and Tran (2015) say that this makes sense in a theory where the logical external argument is still the highest argument of the predicate. For instance, in a theory with a Voice head that projects the external argument (Kratzer 1996), passive Voice still has an external argument, it simply quantifies over it existentially rather than projecting it (see Bruening 2013 and section 3.2). The external argument is still the highest argument, and it is therefore the only argument that can be modified by the adverb *deliberately*.

As is well-known, *get* passives contrast with *be* passives in permitting *deliberately* to modify the surface subject (Lakoff 1971, Lasnik and Fiengo 1974):

(61) a. Gillian got hit by that truck deliberately! (Gillian can be deliberate; Bruening and Tran 2015, 142, (33b))
  b. The Iceman got frozen deliberately! (the Iceman can be deliberate)

A common account of this is to say that the surface subject of a *get* passive is a thematic argument of *get*, being interpreted as something like an agent or experiencer. The problem with this is that, just like *be* passives, *get* passives are truth-conditionally equivalent to their active counterparts. It is not possible to assert one while denying the other:

(62) (Bruening and Tran 2015, 142, (31))
  a. # The dog broke the vase, but the vase was not broken by the dog. (contradiction)
  b. # The dog did not break the vase, but the vase was broken by the dog. (contradiction)

(63) a. # A truck ran over Jane, but Jane didn't get run over by a truck. (contradiction; Bruening and Tran 2015, 142, (37))

b. # A truck did not run over Jane, but Jane got run over by a truck. (contradiction)

If *get* passives had an additional thematic role that was not present in the active counterpart, they would not be truth-conditionally equivalent to the active counterpart. For comparison, when two clauses are identical except that one has a thematic role not present in the other, they are not truth-conditionally equivalent:

(64) Jane appears foolish, but Jane doesn't appear foolish to Jim. (not a contradiction; Bruening and Tran 2015, 143, (41))

Bruening and Tran (2015) argue that we can make sense of these data if *be* takes no NP argument at all. It simply combines with a complement VoiceP (a passive one). The NP that is the surface subject moves there from an object position. Then *deliberately* can only modify the VoiceP and cannot modify *be*, since the latter takes no NP argument. Being attached to VoiceP, *deliberately* must associate with the understood external argument, since that is the highest argument within the VoiceP. In contrast, *get* does take an NP argument, which is merged in its specifier. However, it assigns no thematic role to it. Instead, it simply predicates its complement of its subject. Its complement, if passive (*get* can also combine with an active complement), is an open predicate with a variable in object position. This is truth-conditionally equivalent to a *be* passive, but syntactically different. Now there are two predicates each with its own syntactic arguments. If *deliberately* modifies *get*, it will associate with the surface subject of *get* (it can also modify the lower VoiceP, and associate with the logical external argument; see Reed 2011).

Now, if *be* passives were formed lexically and the surface subject of a *be* passive was base-generated externally to the VoiceP, there would be no way to account for this contrast. There is no difference in meaning that can distinguish *be* passives from *get* passives. In particular, there is no way to put a thematic condition on *deliberately*, since that is not correct in general and there is no difference in thematic role assignment between *be* passives and *get* passives. Thus, Bruening and Tran (2015) argue, we need to distinguish two different types of passives, one which involves movement of the surface subject, and one which involves base-generation. Importantly, we have to recognize that one type does involve movement.

Bruening and Tran (2015) also argue that the distribution of the expletive *there* tracks this division. *There* is only possible in a position that is not a base-generation site for an NP but is only a landing site for movement. So, *there* is grammatical with *be* passives but not *get* passives (Huang 2013, note 2 credits this observation to Jeremy Hartman):[6]

(65) (Bruening and Tran 2015, 147, (61))

a. There were three civilians that were passive onlookers killed in that attack.

b. * There got three civilians that were passive onlookers killed in that attack.
(cf. Three civilians that were passive onlookers got killed in that attack.)

In lexical analyses of the control-raising contrast in the distribution of expletives, the distinction is claimed to come from interpretation. Control verbs assign a thematic role to the controlling argument, whereas raising verbs do not. Control verbs are therefore incompatible with expletives, since expletives cannot be assigned a thematic role (e.g., Pollard and Sag 1994, Sag, Wasow, and Bender 2003). This explanation will not work for the contrast between *be* and *get* passives, since, as we have just seen, they do not differ truth-conditionally. In particular, *get* does not assign a thematic role to its subject.

This account and the argument receive further support from raising to subject. Raising to subject does allow the expletive *there* (Rosenbaum 1967), so we would expect it to have a movement derivation and to disallow *deliberately*. This is not correct, however:

(66) Matt Damon deliberately appears to be boring in interviews. (Bruening and Tran 2015, 146, note 10, (ii))

[6] Adding a full relative clause in (65) forces these sentences to be monoclausal expletive passives, and not reduced relative clauses (see Deal 2009, note 28), which would require *be* because they are copular sentences. These are not copular sentences, and so it is significant that *get* is not allowed.

Bruening and Tran (2015) follow Lasnik and Saito (1992) in proposing that raising verbs are actually ambiguous between raising and control. On the control analysis, they permit the adverb *deliberately*, just like *get*; on the raising analysis, they do not, but do permit the expletive *there*. This predicts that *deliberately* and *there* should be unable to co-occur, and this is correct:

(67) (Bruening and Tran 2015, 146, note 10, (iv), (iii))

a. * There deliberately appear to have been three bridges left intact during the war.

b. There were three bridges deliberately left intact during the war.

The example in (67b) shows that there is nothing wrong in principle with *deliberately* co-occurring with the expletive. In the *be* passive in (67b), *deliberately* can associate with the understood external argument. In (67a), in contrast, the word order makes it clear that *deliberately* is modifying the raising verb, but that raising verb has no NP argument that *deliberately* could associate with.

If reconstruction is tied to movement, we might also make the prediction that *deliberately* with a raising verb would block reconstruction, since it would force the control derivation. This is correct:

(68) a. Based on these tracks, a yeti appears to have stolen your whiskey.
(= Based on these tracks, it appears that a yeti stole your whiskey.)

b. # Based on these tracks, a yeti deliberately appears to have stolen your whiskey.
(≠Based on these tracks, it deliberately appears that a yeti stole your whiskey.)

I conclude from this pattern of facts that we need to distinguish movement from non-movement derivations. The two derivations have different properties, even when there is no semantic difference between them. Importantly, raising to subject has a movement derivation available to it, and *be* passives must always involve movement (otherwise *deliberately* would be able to associate with the surface subject). This means that we cannot say that *do so* is compatible with A-movement because A-movement is not movement.[7]

At the same time, expletives are *not* possible with *do so*:

(69) a. * There was believed to be a spy, and there was done so by everyone.

b. * On that site there were built numerous monuments and temples, apparently before there were done so on the adjacent one.

c. * In the eleventh century, there began to be widespread dissatisfaction with the monasteries, and there also did so in the thirteenth century.

No relevant examples turn up in web searches of "there were done so" and "there was done so" (searches performed 6/10/2015). I conclude from this that the subject of *do so* must be base-generated as the subject of *do so*, even when it is passive in form. On the other hand, the subject of the passive in the antecedent of *do so* must be derived by movement.

This means that we need a theory where the subject of *do so* is base-generated as such even when it is passive or unaccusative, but the subject of its antecedent is (or may be) derived by movement. In the next section I will show that a simple proposal for how A-movement works, independently proposed to account for depictive secondary predicates, permits such an apparently contradictory analysis.

One other thing to note is that the facts of expletives are incompatible with an account like that of Baltin (2012), where *do so* actually involves ellipsis. In Baltin's account, A-movement as in unaccusatives truly is movement, even with *do so*. If this were correct, *do so* should allow an expletive subject (VP ellipsis does). The fact that it does not indicates that *do so* really is a pro-form, with no unpronounced structure for an internal argument position.

[7] While I believe this argument for a movement derivation of passives to be solid, I should also note that it would be straightforward to translate the analysis of *do so* proposed in section 3 to a lexical analysis. Passive and unaccusative *do so* would simply take an external argument that maps to a logical internal argument, exactly like passives and unaccusatives generally in lexical analyses.

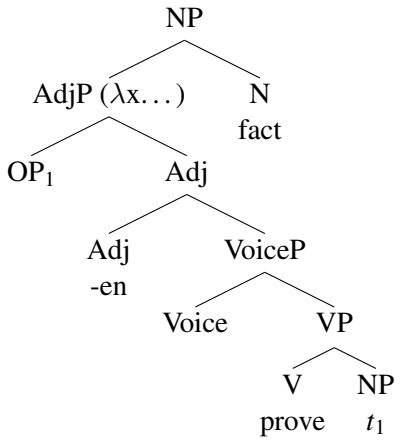
3 An Alternative Analysis

To recap, here are the facts that an analysis should capture: First, A-bar extraction is incompatible with *do so*. Second, A-movement is compatible with *do so*, although there is no actual A-movement with *do so*. A-movement with other predicates is movement, however. Third, *do so* has its own voice (active vs. passive), distinct from that of its antecedent.

3.1 Adjectival Passives

I will begin with adjectival passives, which *so* can be anaphoric to without *do*. I will adopt the analysis of adjectival passives proposed by Bruening (2014). In this analysis, a null operator moves and abstracts over a VoiceP projection that has been rendered passive and stative by an Adj(ective) head (the following tree has been slightly simplified from the source):

(70) a proven fact (Bruening 2014, 386, (63))



Following Kratzer (2005), the denotation of an adjectival passive is that shown in (71), with "λx" coming from abstraction effected by the moved operator. The label "Init" stands for "Initiator," what I take to be the external argument role, introduced by Voice. See below.

(71) $[\![[_{AdjP}\ \text{proven}]\ ]\!] = \lambda x \lambda t.\exists e,y\ [\text{prove}(e,x)\ \&\ \text{Init}(e,y)\ \&\ \tau(e) \leq t]$

The exact analysis is not particularly important here, what is important is that the adjectival passive denotes a predicate of individuals, just like any adjective. It is also important that the surface subject of the adjectival passive (the noun *fact* in the tree above) did not move directly from object position. See Bruening (2014) for more details and supporting evidence (adjectival passives do not permit expletive subjects, for instance).

Turning now to the pro-form *so*, it is able to take any sort of predicate of individuals as its antecedent, including adjectives:

(72) a. Looking back now, I know it wasn't *normal*, but it seemed **so** then. (AP)

b. I still remember the interview because I was *so damn nervous* and probably appeared **so**. (AP)

c. I'm *extremely busy* at the moment, and expect to be **so** for the next two hours at least. (AP; Cornish 1992, 167, (11a))

d. Gabriella Montez was *a good luck charm*. At least, Troy Bolton considered her **so**. (NP)

e. The percentage of working women who considered the behaviors to be *sexual harassment* was greater than the percentage of female students who considered them **so**. (NP)

f. She was not really *on drugs* although she seemed **so** at the time. (PP)

g. The figure was not really *under the tree* although it appeared **so** from a distance. (PP)

I propose that the predicate pro-form *so* simply denotes a function that takes an individual and a state as arguments (cf. Landman 2006):

(73) $[\![\text{so}]\!] = \lambda x \lambda s.f(x,s)$

As the derivation unfolds and the compositional semantics is calculated, the function f must be replaced by an appropriate function from the discourse. For instance, in the following example, f is replaced with the function denoted by the AP *normal*:

(74) It wasn't [normal] but it seemed so then.

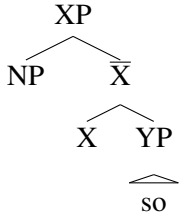
a. $[\![\text{so}]\!] = \lambda x \lambda s.\mathbf{f(x,s)}$

b. Antecedent: $\lambda x \lambda s.\text{normal}(x,s)$

c. Copy: $\lambda x \lambda s.\mathbf{f(x,s)} \rightarrow \lambda x \lambda s.\mathbf{normal(x,s)}$

As for the syntax, it does not matter here what the syntax of non-verbal predication is. One possibility is that all predicates, including *so*, are the complement of some head X in whose specifier the subject of the predicate is projected:

(75)



The head X would simply be vacuous semantically on this analysis. Alternatively, the subject is the specifier of Y, whatever category Y is. Either alternative will work for the purposes of this article, as would other conceivable alternatives (for instance, the denotation of surface *so* could be built up compositionally from YP *so* and X, so that *so* itself would have a uniform semantics in both non-verbal *so* and *do so*, below). What is important is that the syntax of *so* does not change during the course of the derivation; it is not replaced with the structure and content of its antecedent (as in Hallman 2013), nor is any structure deleted (as in Baltin 2012). It is only in the semantics that copying takes place. Note that what I am proposing is literally copying, though. The linguistic discourse must be searched and an appropriate function found that can be copied into the compositional semantics of the phrase that includes *so*. This copying is exactly like the LF copying that has been proposed for VP ellipsis and sluicing (e.g., Chung, Ladusaw, and McCloskey 1995), except that a semantic formula is copied rather than a syntactic structure.

Adjectival passives are just like other adjectives, although they have a more complicated derivational history. This derivational history is irrelevant to *so*, however, which just needs the semantics of a stative predicate to copy. Consider examples of adjectival passives like the following:

(76) a. The ship was not damaged, though it appeared so at the time.

b. Many people are convinced that global warming is a hoax, and they will remain so no matter what evidence is presented.

c. That knowledge was lost, and remained so for centuries.

In (76a), the f of *so* will be replaced with $\lambda x \lambda t.\exists e,y$ [damage(e,x) & Init(e,y) & $\tau(e) \leq t$]. The other examples will be similar. As can be seen, we do not need anything special for adjectival passives, they work just like any other adjective as antecedent for *so*.

This is a very simple analysis of *so*, and as far as I can see, it accounts for all the facts of pro-predicate *so*. Now, we could try to extend this analysis to *do so*, and suppose that *do so* is just $\lambda x \lambda e.f(e,x)$, the eventive version of *so* (Landman 2006 proposes something essentially like this). Then *do so* would just need to find a function to fill in for f. That function could come from an active, passive, or unaccusative antecedent VP.

The problem is that if this analysis were correct, the form of *do so* would always be active *do so*, regardless of the voice of its antecedent. The fact is, however, that *do so* cannot be interpreted as a passive unless it itself is passive in form:

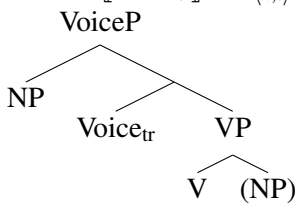
(77) a. Although coffee was brewed in the shops, it was **done so** only at the request of customers.
b. * Although coffee was brewed in the shops, it **did so** only at the request of customers.

If *do so* just needed to find a predicate of individuals to copy, the passive *be brewed in the shops* should be an appropriate replacement for active *do so*. It is not, however; as we saw above, *do so* has its own voice. We therefore need a theory of voice, and how it might combine with *do so*.

3.2 Voice

I propose that there are (at least) three varieties of Voice head: active, unaccusative, and passive. Active Voice (notated "Voice$_{tr}$," for transitive Voice) adds an external argument which is projected in its specifier (Kratzer 1996):

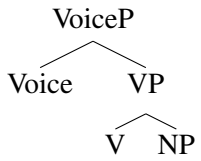
(78) Active: $[\![\text{Voice}_{tr}]\!] = \lambda f_{\langle v,t\rangle}\lambda x\lambda e.f(e)$ & Init(iator)(e,x)



I will refer to the external argument as bearing an "initiator" role (Ramchand 2008, Bruening 2013). This is meant as a cover term for agents, causes, and possibly other external argument roles.

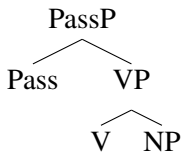
Unaccusative Voice does not add an initiator, and no NP is projected in its specifier. The Voice head is vacuous semantically:

(79) Unaccusative: $[\![\text{Voice}]\!] = \lambda f_{\langle v,t\rangle}\lambda e.f(e)$



Passive Voice (abbreviated Pass here) adds an initiator, but instead of projecting it in its specifier, it existentially quantifies over it (Bruening 2013):[8]

(80) Passive: $[\![\text{Pass}]\!] = \lambda f_{\langle v,t\rangle}\lambda e.\exists x.f(e)$ & Init(e,x)



Furthermore, both passives and unaccusatives require A-movement in English. Even when an expletive occupies the surface subject position, Spec-TP, we can still see short A-movement in the passive and with unaccusatives (this is the "thematization/extraction" process of Chomsky 2001):

(81) a. There was a study done in 1979 which concluded...
b. * There was done a study in 1979 which concluded...

[8] In the analysis in Bruening (2013), and in the analysis of adjectival passives in Bruening (2014), existential quantification is accomplished not by Voice itself, but by an additional head selecting an unsaturated projection of active Voice$_{tr}$ as its complement. This approach would also be compatible with the proposal regarding *do so* here.

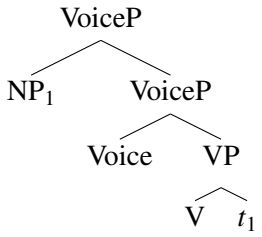
(82) a. For there fell down many slain. . . (1 Chronicles 5:22)

b. * For there fell many slain down. . .

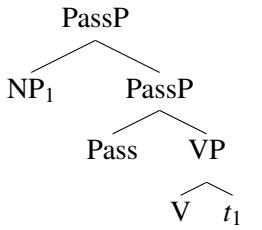
The underlying object cannot stay in object position in the passive (see Akmajian and Wasow 1975, Bowers 2010; it is possible for heavy shift to place it at the end, but this is generally acknowledged to be due to heavy shift). With unaccusatives, there is also necessarily short movement to the right, displacing the underlying object across a particle (Doggett 2004).

I propose that this short movement is triggered by Voice. Unaccusative Voice and Pass require that an NP move to their specifier (this also rules out impersonal passives in English, where there is no NP to move). Additionally, and non-standardly, I will follow Bruening (2015) in proposing that the head triggering the movement also performs lambda abstraction, so that "λx" is part of the denotation of the head, as shown below. Adopting this proposal will permit a base-generation analysis of *do so*, even in the passive and unaccusative.

(83) Unaccusative: $[\![\text{Voice}]\!] = \lambda f \lambda x \lambda e.f(e,x)$



(84) Passive: $[\![\text{Pass}]\!] = \lambda f \lambda x \lambda e.\exists y.f(e,x)$ & Init(e,y)



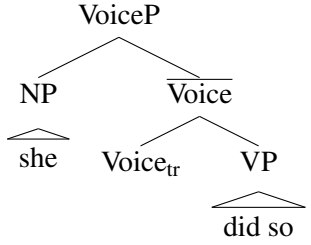
I will represent the moved NP as adjoined to VoiceP/PassP, to distinguish it from a thematic specifier with Voice_{tr}. This is merely for representational convenience, however. (Note also that movement may be to the right instead of to the left, as in 82a.)

Bruening (2015) proposes this as a way of accounting for depictive secondary predicates, and why A-movement opens new possibilities for modification by a depictive secondary predicate (Koizumi 1994, Pylkkänen 2008). See Bruening (2015) for details. The effect of this head-accomplished abstraction in the current context will be that the subject of unaccusative and passive *do so* will be a semantic argument of a function, even though it never occupies the internal argument position (nor is it semantically the external argument). When that function is filled in by an appropriate antecedent, the correct semantics will result.

3.3 Analysis of Do So

I now propose that the too-simplistic account of *do so* from above is essentially correct: *do so* is simply λe.f(e). However, it is also a VP, which necessarily combines with Voice. If this is active Voice_{tr}, an initiator is added:

(85)



a. $[\![[_{\text{VP}}\ \text{do so}]\ ]\!] = \lambda e.f(e)$

b. $[\![\overline{\text{Voice}}]\!] = \lambda x \lambda e.f(e)$ & Init(e,x)

c. $[\![\text{VoiceP}]\!] = \lambda e.f(e)$ & Init(e,she)

Once again, as the compositional semantics is constructed, a function must be found in the discourse to replace f. Voice is outside of f (because *do so* has its own Voice distinct from that of its antecedent); but the semantics of f must be compatible with the rest of [[VoiceP]]. We will go through numerous examples below.

As for the internal structure of *do so*, I follow the line of analysis that treats *do* as intransitive main verb *do* and *so* as an adjunct (Bouton 1970, Ross 1972, Kehler and Ward 1999, Ward and Kehler 2005, Houser 2010). *So* is clearly not the object of *do*. It contrasts with the *it* of *do it* in not being passivizable (as the references just cited have all noted):

(86) a. It will be done.

b. * So will be done.

So, unlike *it*, also cannot appear after *of* in a gerund (Bouton 1970):

(87) The participants launch a short "Play Project" to throw themselves into trying out the new line of work they want. They learn far more in [the doing of {it/*so}] than they ever would by sitting around thinking and researching.

So can also occupy preverbal positions not available to objects (again, see the works cited, especially Kehler and Ward 1999 and Ward and Kehler 2005):

(88) a. Mangroves may salinize the soil and **in so doing** limit their transpiration rate.

b. I can live alone, if self-respect, and circumstances require me **so to do**.

Not only is this ordering not compatible with *so* being the object of *do*, it also does not fit the line of analysis where *so* represents some verbal XP complement to *do*, analyzed as something like light verb v or the head Pr or similar (Stroik 2001; Hallman 2004, 2013; Haddican 2007; Baltin 2012). The position *so* occupies in the examples above is impossible for a verbal projection in English. I therefore reject that sort of analysis and treat *so* as an adjunct of some kind. Further reasons for treating *so* as an adjunct can be found in the works cited (and summarized in Houser 2010).

As for *do*, if *so* is not its object, then *do* must be an intransitive verb. No NP object is allowed with it:

(89) a. Those who edited the manuscript made lots of mistakes in doing so (*the first chapter).

b. A: I need to hire a secretary. B: Please do so (*my nephew).

c. * Cultures that value personal virtues do so honesty the most.

The relative contributions of V and *so* to the semantics are unclear; I will simply assume that they only have meaning in combination (Huddleston and Pullum 2002, 1532 consider *do so* a non-compositional idiom). Importantly, analyzing *do so* as intransitive *do* plus an adjunct immediately explains the facts of A-bar extraction. The fact is that all forms of A-bar extraction are ungrammatical with *do so*, as we saw above:[9]

[9]Baltin (2012), citing an anonymous reviewer, states that quantifier raising (QR) must be possible with *do so*, because the following example permits inverse scope:

(i) Many men read five books, and many women did so as well. (many > five, five > many; Baltin 2012, 418, (1))

This example does not illustrate the possibility of inverse scope, because bare numerals, like indefinites, can be interpreted specifically (e.g., Szabolcsi 1997). Using true quantifiers in examples like the following, I have received very mixed reactions from native speakers:

(ii) a. A: At least two people should check every calculation.
B: At least two people will do so.

b. A different PI shadowed every suspect, and a different FBI agent did so, too.

(90) a. * I know which cases the Supreme Court will hear, and which cases they won't do so.
b. * The director rejected every proposal that the deputy director did so.
c. * Bubble tea, I'll drink, but green tea, I won't do so.
d. * The junior lawyers try more cases than the senior partners do so.

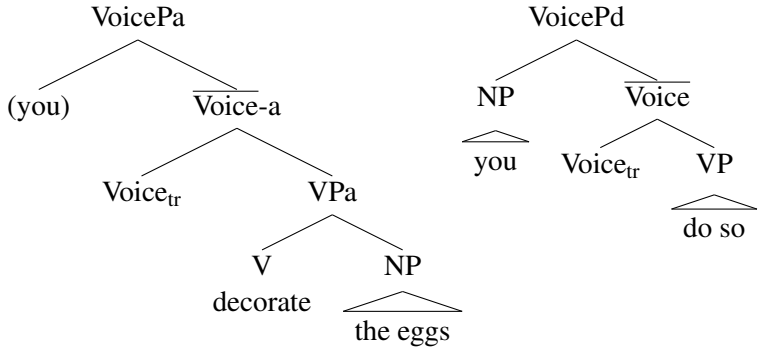
In the proposed analysis, *do so* is simply an intransitive verb and an adjunct. Since the verb is intransitive, there is no place for a trace of an NP. The above examples are ungrammatical for the same reason an object is in (89). I will return to this point once we see how A-movement is possible with unaccusatives and passives (in section 3.10).

Furthermore, the fact that *do so* literally copies a function from the discourse to replace f explains why it requires a linguistic antecedent (Hankamer and Sag 1976). *Do so* has always fit poorly in the division between ellipsis and pro-forms (see especially Kehler and Ward 1999 and Baltin 2012). On the one hand, it does not allow A-bar extraction, making it look like a pro-form, but on the other hand, it requires a linguistic antecedent, making it look like ellipsis (Hankamer and Sag 1976). The proposed analysis explains both facts. It is a pro-form, so no extraction is permitted, but it also has to find a function in the discourse to copy. The discourse therefore has to have included an overt linguistic form to serve as the antecedent for *do so*. Moreover, the antecedent function to replace f has to fit into the semantics imposed by Voice; this puts further limits on possible antecedents (see all the examples below).

3.4 Finding an Antecedent

A simple active transitive as antecedent will work as shown in (91), with the antecedent on the left and *do so* on the right. Throughout, I mark the relevant node of the antecedent as "VPa" (or "VoicePa," and so on). The relevant node in the structure of *do so* will be marked "VPd" or "VoicePd" (and so on).

(91) You need to decorate the eggs, but before you do so,...



a. ⟦VoicePd⟧= λe.**f(e)** & Init(e,you)
b. ⟦VoicePa⟧= λe.**decorate(e, the eggs)** & Init(e,you)
c. ⟦Voice-a⟧= λxλe.**decorate(e, the eggs)** & Init(e,x)
d. ⟦VPa⟧= λe.**decorate(e, the eggs)**
e. Copy: ⟦VoicePd⟧= λe.**decorate(e, the eggs)** & Init(e,you)

The semantic value of the VoiceP of *do so* is shown in (91a). The function f needs to be replaced with an appropriate function from the discourse. Some possibilities from the antecedent VoiceP are shown in (91b–d). In

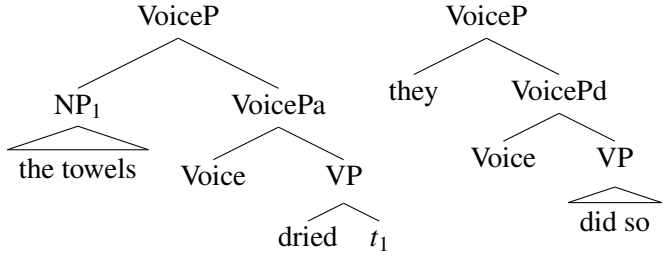
c. If a different police detective shadows every suspect, and a different FBI agent does so as well, then there will be at least sixteen law enforcement officers on the streets at once for this case.
d. John couldn't read many books, and Bill couldn't do so either, but the many books that they could read were classics. (based on Baltin 2012, 387, (15))

Some speakers reject inverse scope in all these examples, while others say they "think they can get it." Since it is not clear to me what the facts are, I will leave scope and quantifier raising aside here.

all three, the function "decorate(e, the eggs)" will work. Copying this function is shown in (91e), which yields exactly the right result.

An unaccusative example is shown below. As stated above, the VP *do so* can combine with any Voice. In addition to active Voice_{tr}, it can also combine with unaccusative Voice. Unaccusative Voice does not project an argument in its specifier, but it does have a specifier to which an NP must normally move. The head itself is an abstractor. In the case of *do so*, I assume that an NP can be merged directly into the non-thematic specifier of unaccusative Voice. In general, I assume that merge is conditioned only by selection and by something like the Principle of Full Interpretation (Chomsky 1993). Briefly, selectional requirements of particular items must be met, and every element needs an interpretation. Otherwise, there is no constraint on what merges with what. This permits an NP to be merged into the non-thematic specifier of unaccusative Voice. If this happens with any VP other than *do so*, the result will be ill-formed, because semantic interpretation will not go through. For instance, if an NP is merged in Spec-VoiceP and an object is merged in object position, there will be no interpretation for one of the NPs. If no object is merged with the unaccusative V, its selectional requirements will not be met (unaccusative Vs require an internal object). In the case of *do so*, though, *do* does not select an object, and if an appropriate function can be found to replace f, then the NP merged in Spec-VoiceP can be interpreted. Consider the following:

(92) The towels dried, but before they did so,...



a. $[\![\text{VoicePd}]\!] = \lambda x \lambda e.\mathbf{f(e,x)}$

b. $[\![\text{VoicePa}]\!] = \lambda x \lambda e.\mathbf{dry(e,x)}$

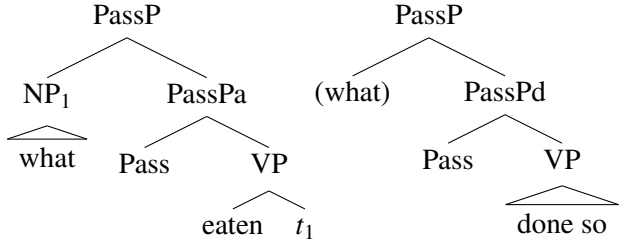
c. Copy: $[\![\text{VoicePd}]\!] = \lambda x \lambda e.\mathbf{dry(e,x)}$

Here and below, the computation will be simplest if f is replaced before VoicePd combines with the NP in the non-thematic specifier. I will therefore assume that that is how it works in general (this would also work in the example of the active transitive above). In this case, the function in VoicePa is appropriate and can be copied directly, again leading to the right result. Once the NP combines, the denotation of the full VoiceP of *do so* will be λe.dry(e,they).

As can be seen, building lambda abstraction into the denotation of unaccusative Voice enables a base-generated subject of *do so* to be interpreted as the logical object, if the antecedent can supply a function of the appropriate form.

An example of the verbal passive is shown below, which will work in the same way. *Do so* can combine with Pass, as it can combine with any Voice. Again, an NP can be merged in the non-thematic specifier of Pass. This would lead to a failure of semantic interpretation with any VP other than *do so*, but again, if an appropriate function can be found to replace f with, then the result will be interpretable.

(93) ...what is eaten is done so in a controlled and seemingly not pleasurable manner.



a. $[\![\text{PassPd}]\!] = \lambda x \lambda e.\exists y.\mathbf{f(e,x)} \,\&\, \text{Init(e,y)}$

b. $[\![\text{PassPa}]\!] = \lambda x \lambda e.\exists y.\mathbf{eat(e,x)} \,\&\, \text{Init(e,y)}$

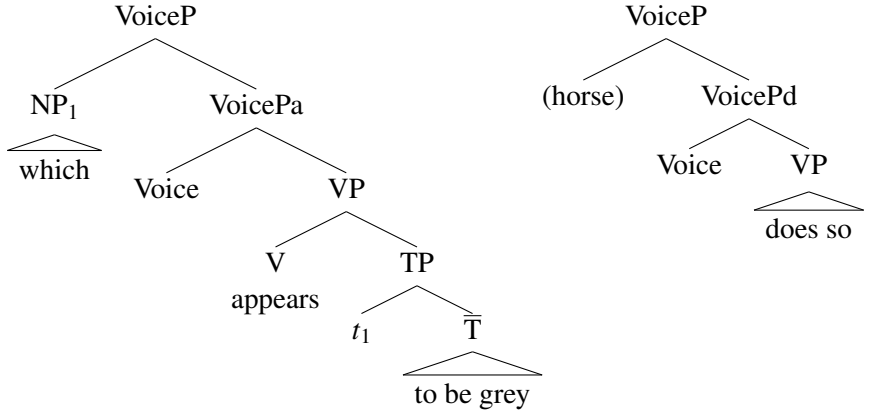
c. Copy: ⟦PassPd⟧= λxλe.∃y.**eat(e,x)** & Init(e,y)

In this case, the function eat(e,x) in the denotation of the antecedent PassPa can be copied. Again, this leads to exactly the right result.

As with unaccusatives, building abstraction into the Voice head enables an NP generated there with *do so* to pick up an internal role from the antecedent, without actually moving. In the antecedent, the NP moves from object to subject position.[10] The function created by abstracting is copied into *do so*, resulting in exactly the same interpretation.

As for raising to subject, I assume that the Voice that occurs with a raising verb is unaccusative Voice, which again triggers movement and abstraction. In this case, what moves will not be the complement of the verb, but the subject of the complement. Simplifying how that complement is treated semantically, we would then have the following analysis for a raising to subject verb as antecedent for *do so*:

(94) The horse which appears to be grey does so because it received the greying agent from the parent.



a. ⟦VoicePd⟧= λxλe.**f(e,x)**

b. ⟦VoicePa⟧= λxλe.**appear(e,[grey(x)])**

c. Copy: ⟦VoicePd⟧= λxλe.**appear(e,[grey(x)]**

Once again, unaccusative Voice can combine with *do so*, so that the function f needs an individual argument. The function from the antecedent is appropriate, with the individual argument further embedded. Copying results in the surface subject of *do so* being interpreted in the same way as the surface subject of its antecedent.[11]

Note that *appears* is actually a stative verb. Other stative verbs are also possible as the antecedent of *do so* under conditions described above (see Houser 2010). For the purposes of the rest of this paper I will simply not distinguish stative eventualities from eventive ones, and will make both of them type e. The denotation given in (94) is then adequate for the purposes of the rest of this paper.

3.5 Voice Mismatches

We now need an account of mismatches between the voice of *do so* and the voice of its antecedent. Let us begin with a passive antecedent and active *do so*. Since *do so* is active, it has active Voice_{tr}, which projects an initiator in its specifier:

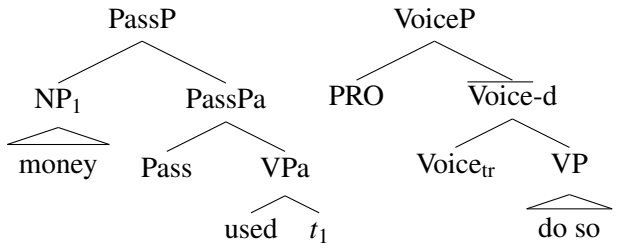
[10] An object of a preposition is also possible, in the pseudopassive or prepositional passive:

(i) What was stepped on was done so in a very deliberate manner.

I assume the head Pass just needs to attract *some* NP, but that NP does not need to be the object of the verb.

[11] An anonymous reviewer suggests that this base-generation analysis predicts that VP idioms will be unacceptable with *do so*. Hallman (2013) claims that they are unacceptable. However, it is well-known that idiom chunks can antecede pro-forms and are not limited to movement dependencies (e.g., Nunberg, Sag, and Wasow 1994). This analysis therefore makes no predictions concerning idioms (and idioms are acceptable with *do so*, as in *The shit hits the fan with astonishing regularity around here; how can it do so so frequently?*). Idioms are also compatible with *get* passives (Fox and Grodzinsky 1998), which were shown above to also have a base-generation analysis.

(95) The intention behind the legislation was to ensure the money should be used for reinstatement where it was possible and economic to do so.



a. $[\![\overline{\text{Voice}}\text{-d}]\!] = \lambda x \lambda e.\mathbf{f(e)}$ & Init(e,x)

b. $[\![\text{PassPa}]\!] = \lambda x \lambda e.\exists y.\text{use}(e,x)$ & Init(e,y)

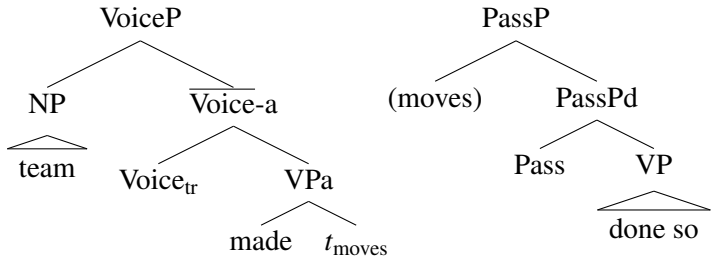
c. $[\![\text{VPa}]\!] = \lambda e.\mathbf{use(e, } \boldsymbol{t}_{\mathbf{money}}\mathbf{)}$

d. Copy: $[\![\overline{\text{Voice}}\text{-d}]\!] = \lambda x \lambda e.\mathbf{use(e, } \boldsymbol{t}_{\mathbf{money}}\mathbf{)}$ & Init(e,x)

Again, we need an appropriate function to replace f with. In this case, f must take only an event argument and not an individual argument. The function "use(e,x)" in PassPa is therefore not appropriate. However, we can copy the function from VPa in (95c). In this case, what will be copied will be the function 'use' applied to the trace of the surface subject of the passive in the antecedent. I will assume that, given the copy theory of movement (Chomsky 1993), we can treat this as *the money* itself. Once PRO is combined, the VoiceP of *do so* will then be "λe.use(e,the money) & Init(e,PRO)." This is the correct interpretation.

Consider now the case of an active antecedent and passive *do so*. In this case, Pass requires a function with an individual argument:

(96) . . . the majority of other moves that the team made this offseason were done so with the pitching rotation in mind.



a. $[\![\text{PassPd}]\!] = \lambda x \lambda e.\exists y.\mathbf{f(e,x)}$ & Init(e,y)

b. $[\![\overline{\text{Voice}}\text{-a}]\!] = \lambda x \lambda e.\mathbf{make(e, } \boldsymbol{t}_{\mathbf{moves}}\mathbf{)}$ & Init(e,x)

c. Copy: $[\![\text{PassPd}]\!] = \lambda x \lambda e.\exists y.\mathbf{make(e, } \boldsymbol{t}_{\mathbf{moves}}\mathbf{)}$ & Init(e,y) $\rightarrow \lambda x \lambda e.\exists y.\mathbf{make(e,x)}$ & Init(e,y)

Because the object of the antecedent has undergone A-bar movement, at $\overline{\text{Voice}}$-a, the function 'make' applies to a trace. Above we saw that a trace could be taken to be a copy of its antecedent. A trace can also be taken to be a variable. This gives the end result in (96c), which enables the subject in Spec-PassPd to be interpreted as the object of *make*.

Note that we independently need traces to be able to be interpreted as variables, for VP ellipsis. Consider a simple case of VP ellipsis in the passive:

(97) The destroyer was sunk, and the aircraft carrier was [—] too.

If traces could not be treated as variables, the missing VP in (97) would have to be [sunk the destroyer], and the elided VP would be uninterpretable, since there would be no interpretation for *the aircraft carrier*. At the same time, traces also need to be able to be interpreted as copies of their antecedents:

(98) The system can be used by anyone who wants to [—]. (Merchant 2008, 169, (1b))

The missing VP here has to be [use the system], which requires treating the trace of *the system* as *the system*. In other words, both treatments of traces are independently necessary for VP ellipsis. If both treatments are possible in the grammar generally, then it is no surprise that they can both be used in resolving anaphora with *do so*.[12]

One question is whether extraction of the object in the active antecedent is necessary for passive *do so*. All of the attested examples of this pattern that I have been able to find do have A-bar extraction of the object. This does not appear to be necessary, however. Speakers I have polled generally find at least some of the constructed examples below relatively acceptable:

(99) a. The team made many moves this offseason. All of them were done so with the pitching rotation in mind.

b. Sonya consumed 444 oysters. None of them were done so with a fork.

c. LaValle withdrew a great many funds for Friendship Ridge. All of these funds were done so with the permission of County Commissioners.

d. They carried on ritual practices underground. However, these rituals were done so with a limited understanding of the new faith.

Merchant (2013, 79, (1c)) cites an example like these but involving VP ellipsis:

(100) A: No one can [hypnotize me].

B: Usually the people who are certain they can't be [–] are the easiest to do it to.

The problem is that the VP [hypnotize me] cannot fill in for the missing VP; instead we need something like [hypnotize *t*], with a trace that can be bound by the subject of the elided VP.

Johnson (2001) points out that these types of examples raise the same issue as pseudogapping, and so should have the same analysis. Consider a case of pseudogapping like the following:

(101) Some had eaten mussels because others had shrimp. (Johnson 2009, 293, (13a))

In most current theories of pseudogapping, the remnant (here, *shrimp*) moves out of the VP prior to it eliding (e.g., Jayaseelan 1990, Lasnik 1995, Johnson 2009). The elided VP is therefore [eaten *t*]. The problem now is the antecedent, which is [eaten mussels]. Johnson (2001) suggests that the object must be able to shift out of the VP in the antecedent, too, so that it also has the form [eaten *t*]. Back in the example of an active VP anteceding a passive elided VP, the antecedent VP must also permit the object to move out of it:

(102) me_1 [hypnotize t_1]

The trace can then be interpreted as a variable, so that it can be bound by *they* in $\textit{they}_x$ *can't be [hypnotized x]*. Something similar would have to take place in the examples of active antecedent/passive *do so* in (99). Since we need such a mechanism anyway for pseudogapping and active-passive mismatches in VP ellipsis, then again it is not surprising that it can be used to interpret *do so*.

To sum up, both patterns of voice mismatches can be captured by the current account. *Do so* has its own voice, distinct from that of its antecedent. So long as traces can be taken to be either a variable or identical to their antecedent, both of which are independently necessary for VP ellipsis, an appropriate function can be found to replace f with in the denotation of *do so*.[13]

[12] Another possibility is that traces can be treated as pronouns, as in Fiengo and May (1994). The pronoun can then be either bound like a variable as in (97), or be referential, as in (98). It could also be an e-type pronoun, which might be necessary for certain cases of quantificational objects. For instance:

(i) A: Some types of evidence should not be used at trial. B: Even when it's legal to do so?

In (i), the interpretation of *do so* must be 'use them', where 'them' refers to the types of evidence introduced in the previous sentence.

[13] A reviewer suggests that this approach to *do so* might predict that Relativized Minimality could be circumvented in passives of double object constructions in a case of a voice mismatch. The following examples were provided by the reviewer. In (ia), the second object of a

3.6 Causative-Inchoative Mismatches

According to Bouton (1969), some speakers also accept mismatches between causative and inchoative, with the antecedent a causative and *do so* the corresponding inchoative. Houser (2010) presents additional examples. Speakers I have polled accept these to varying degrees, with some examples being better than others.[14]

(103) (Bouton 1969, 239, (23), (24), (26))

a. The young men we marched into battle sang "Yankee Doodle" as they did so.

b. The needle the current is oscillating at 40mgc has never done so before.

c. The metal the damp weather rusted did so in spite of an extra heavy coating of grease.

(104) (Bouton 1969, 246, (40–42))

a. Charley tried to curve his next pitch across the inside corner, and it did so beautifully—knee high!

b. The water Jane was boiling when we arrived was still doing so when we left twenty minutes later.

c. The stone we rolled down the hill raised a huge cloud of dust as it did so.

(105) I have tried pairing the N800 with other devices, and it does so easily. (Houser 2010, 20, (35))

Interestingly, in this case the opposite pattern is ungrammatical, with the antecedent an inchoative and *do so* a causative:

(106) (Bouton 1969, 240, (29–31))

a. The needle oscillated at 40mgc for the first time when the new current did so. (*oscillated the needle)

b. The young men marched into battle because we did so. (*marched the young men into battle)

c. The metal rusted in spite of a heavy coat of grease because the damp weather did so. (*rusted the metal)

The grammatical pattern follows from the current account without further addition. Consider the following example. The inchoative on the right has unaccusative Voice, while the causative on the left has Voice_{tr} (representation to be revised):

(107) The water Jane was boiling was still doing so…

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double object construction cannot passivize across the first object, for most speakers of English. This might be analyzed as a locality effect on movement specifically, and as such it should not hold if the subject of passive *do so* is base-generated rather than moved. In (ib), the second object is the subject of passive *do so*, with an active antecedent, and the example seems much improved:

(i) a. * The money was given the children of the orphanage.

b. The money that we gave the children of the orphanage was done so with help from a foundation.

I will leave a full exploration of this to future work.

[14] Houser's example in (105) is presented as an example of a middle. However, it appears to be an example of a causative-inchoative verb instead. Houser also presents the opposite order as grammatical:

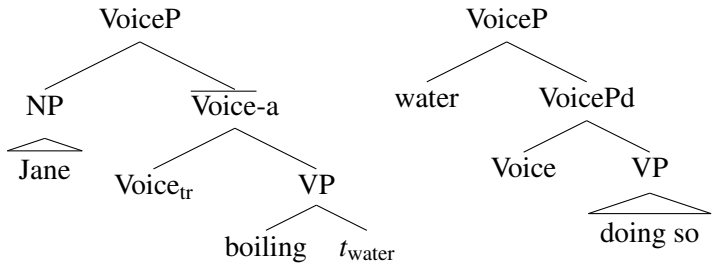
(i) The N800 pairs with other devices easily, and I do so all the time.

This is not my judgment, however. I find this example as unacceptable as Bouton's examples in (106). Judgments on mismatches with true middles are not clear to me:

(ii) a. Politicians bribe easily, so don't fail to do so while you're in Washington.

b. They were able to bribe that politician, because, as everyone knows, politicians do so easily.

I will leave investigation of middles to future work.



a. ⟦VoicePd⟧= λxλe.**f(e,x)**

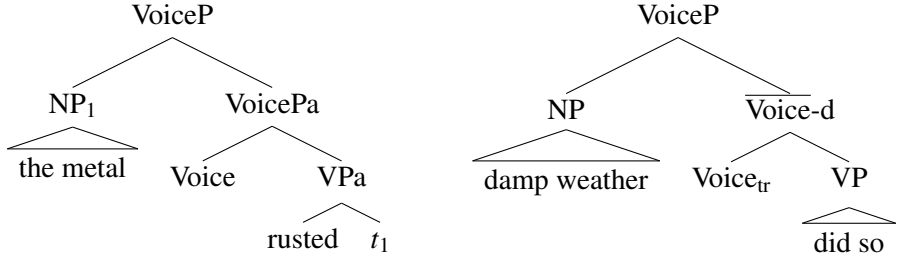
b. ⟦Voice-a⟧= λxλe.**boil(e,t_{water})** & Init(e,x)

c. Copy: ⟦VoicePd⟧= λxλe.**boil(e,x)**

The trace of the object can be considered a variable when the function is copied. Copying then leads to exactly the right interpretation.

If a causative were simply the inchoative VP plus Voice$_{tr}$, as just shown, then we incorrectly predict that the opposite pattern should be acceptable, too. Consider the following:

(108) The metal rusted because the damp weather did so…



a. ⟦Voice-d⟧= λxλe.**f(e)** & Init(e,x)

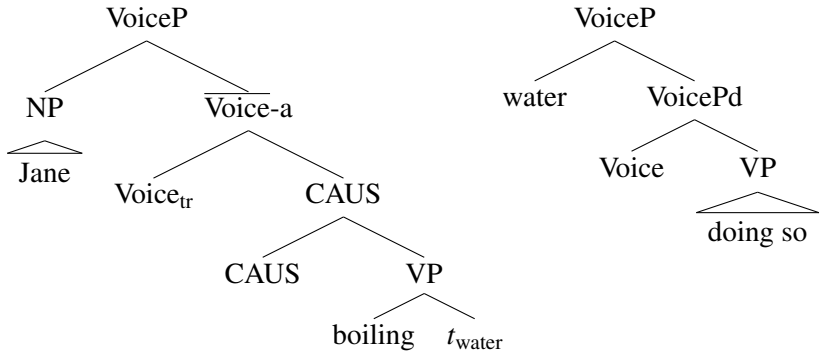
b. ⟦VPa⟧= λe.**rust(e,t_{metal})**

c. Copy: ⟦Voice-d⟧= λxλe.**rust(e,t_{metal})** & Init(e, damp weather)

We should be able to copy the function from VPa, and treat the trace as a copy of its antecedent. The result would be interpretable, in exactly the way that is unavailable.

I take this to indicate that the causative version of a causative-inchoative pair is more than just Voice$_{tr}$ added to VP. There must be another head in between, call it CAUS(ative). This head adds a causing event but no external argument, as in Pylkkänen (2008). The external argument is still added by Voice$_{tr}$, which attaches on top of CAUS:

(109) The water Jane was boiling was still doing so…



a. ⟦CAUS⟧= λf$_{⟨v,t⟩}$λe.∃e'.f(e') & CAUS(e',e)

b. ⟦Voice-a⟧= λxλe.∃e'.**boil(e',t_{water})** & CAUS(e',e) & Init(e,x)

c. ⟦VoicePd⟧= λxλe.**f(e,x)**

d. Copy: ⟦VoicePd⟧= λxλe.**boil(e,x)**

Within the causative, there is still a function "boil(e',t_{water})" which is appropriate for copying into the denotation of *do so*. Again, the trace can be treated as a variable.

The addition of CAUS makes it impossible to go the other way, and have a causative *do so* with an inchoative antecedent, because *do so* cannot include CAUS. I assume that in English CAUS strictly selects transitive VPs, ones that include a direct object. *Do so* does not. It is therefore not possible to merge CAUS on top of *do so*. Back in (108), then, the structure and interpretation can only be that shown. However, the interpretation in (108c) is the wrong one for a causative. The semantics of a causative is that shown in (109b), with two events, one of which causes the other. This is what is wrong with (108): it does not result in the right semantics.

Thus, the current theory is able to explain another mismatch between *do so* and its antecedent. In this case, however, the mismatch only goes one way, and the missing relation follows from an independently proposed hypothesis about causatives.

3.7 Category Mismatches

Kehler and Ward (1999) and Ward and Kehler (2005) have documented other types of mismatches between *do so* and its antecedent. One type involves syntactic category. The antecedent of *do so* does not have to be a VP:

(110) a. The *defection* of the seven moderates, who knew they were incurring the wrath of many colleagues in doing so,... (Kehler and Ward 1999, 247, (39))

b. Even though an Israeli *response* is justified, I don't think it was in their best interests to do so right now. (Kehler and Ward 1999, 248, (41))

(111) (Ward and Kehler 2005, 375, (35–36))

a. One study suggests that almost half of young female *smokers* do so in order to lose weight.

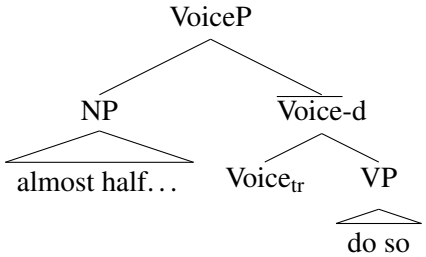
b. The majority of *horse riders* do so purely for leisure and pleasure.

One of the examples from COCA, repeated below, also had this form:

(112) Our *release of their information* **was done so** in compliance with this law. (COCA)

This type of mismatch is expected on the current account. Here, we just need to find a function to replace f with in the denotation of *do so*. There is no reason that function has to come from a verb or verbal projection. For example, suppose that the denotation of an agentive nominalization like *smoker* involves some sort of generic quantification over events, so that it includes something like "GENe.smoke(e)" as part of its denotation. Then the function **smoke(e)** can be copied into the denotation of *do so*, as follows:

(113)



a. $[\![\overline{\text{Voice}}\text{-d}]\!] = \lambda x \lambda e.\mathbf{f(e)}$ & Init(e,x)

b. Copy: $[\![\overline{\text{Voice}}\text{-d}]\!] = \lambda x \lambda e.\mathbf{smoke(e)}$ & Init(e,x)

As Ward and Kehler (2005) point out, not all nominals include a salient function that could replace f in *do so*. For instance, the nouns *computer* and *propeller* do not evoke "compute(e)" and "propel(e)" easily, and so they do not make good antecedents for *do so*:

(114) (Ward and Kehler 2005, 375, (39–40))

a. # My computer does so faster than yours. [=compute]

b. # The boat's propeller failed to do so, and now we're stuck. [=propel]

In contrast, *defection*, *response*, *smoker*, *rider*, and *release* all saliently evoke an event function, and this can be copied into *do so*. Note that in the current analysis where copying is literal copying, the event function must be a part of the semantic denotation of the antecedent. This seems reasonable for all of the attested examples, most of which are deverbal nominals.[15]

3.8 Split Antecedents

Do so also allows split antecedents, just like VP ellipsis (see, e.g., Hardt 1993, 1999; Fiengo and May 1994):

(115) (Kehler and Ward 1999, 248, (42–43))

a. Fortunately, the first person to [die in 1990] and the first couple to [file for divorce in 1990] were allowed to do so anonymously.

b. What I am suggesting is that when we [delay], or when we [fail to act], we do so intentionally.

Split antecedents can be captured quite easily in the current account. As stated above, *do so* is interpreted as f(e) in the active. The function f needs to be replaced with an appropriate function from the discourse. Nothing stops f being replaced by a function constructed from multiple functions in the discourse. In both of these cases, coordination naturally primes constructing a coordinated function:

(116) a. f = [die(e) & file-for(e',divorce)]

b. f = [delay(e) or fail(e',act)]

The plural subject of *do so* can then distribute to the individual conjuncts in (115a).

3.9 Ellipsis-Containing Antecedents

Do so, like VP ellipsis, also allows ellipsis-containing antecedents (Hardt 1999, Schwarz 2000, Elbourne 2008, Tomioka 2008):

(117) When it's Jim's turn to cook, he refuses to, and when it's his turn to clean, he does so too.

In this example, *does so* has to be interpreted as 'refuse to clean', but there is no antecedent with that form. The first *refuse to* is actually *refuse to [cook]*.

I suggest that with *do so*, the elided VP that serves as part of the antecedent for *do so* can be another *do so*:

(118) When it's Jim's turn to cook, he refuses to [do so], and when it's his turn to clean, he does so too.

[15] A reviewer points out that we ought to expect *do so* to be able to take an adjective as antecedent. There are very few attested examples of this, but there are a few. Houser (2010, 49, (33h,i)) cites two naturally occurring examples. One I found on the web is the following:

(i) You do more for your team and for your company if you focus on being instrumental—even when doing so requires an unpopular decision or a bit of radical candor.

A possible antecedent, and perhaps the most salient one in (i), is *being instrumental*. The reviewer provides the example in (iia), which he or she judges unacceptable. I disagree with this judgment. Such examples are even more acceptable if the antecedent is embedded within the subject of *do so*, as in (iib):

(ii) a. John was being very polite. ??He was doing so because he knew how important it was for his future job prospects.

b. The students who are being polite to the substitute are only doing so because they have been bribed.

It appears to me that adjectives can serve as the antecedent for *do so*, but I will leave a full exploration of this to future work.

The elided *do so* is "f(e)," as above. The function f will be replaced with "cook(e)" in the semantic interpretation. However, I suggest that for purposes of the second *do so*, the first can be copied with simply the function f in it. So, the second *do so* can be replaced with [refuse to f], where "f" is the interpretation of the first (elided) *do so*. Within this, f must also be replaced, and it can be replaced with "clean(e)."

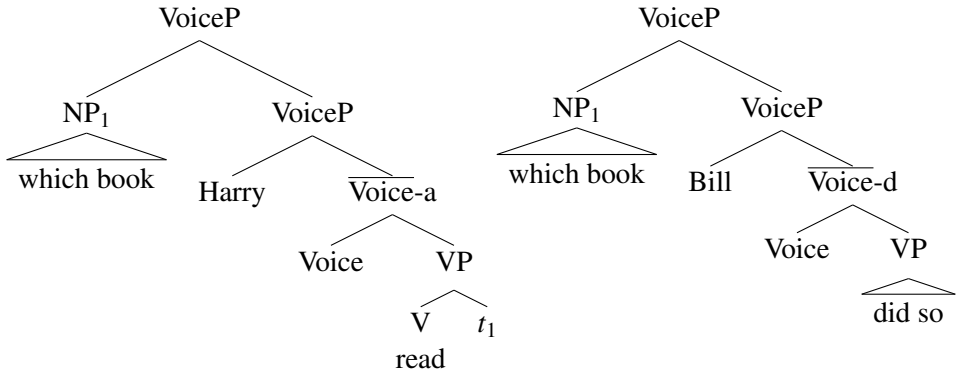
Note that the example in (118) is grammatical with the first *do so* pronounced. So we need this to work anyway, even without ellipsis. Once we have a way of interpreting (118), we just need to permit the first *do so* to elide.

3.10 Back to A-Bar Extraction

Now that we have a complete, worked-out analysis of *do so*, we should check that the account does not inadvertently admit the equivalent of A-bar extraction. In the analysis, A-movement appears to be allowed with *do so*, simply from the way lambda abstraction works in A-movement. The question is whether something similar could happen in A-bar movement, incorrectly permitting A-bar movement with *do so*.

The answer is that, if lambda abstraction for A-bar movement could be built into the denotation of Voice the way A-movement was, it would be permitted. Consider the hypothetical case below:

(119) * I know which book Harry read and which book Bill did so.



If lambda abstraction could be part of the denotation of Voice, we would have the following:

(120) a. $[\![\overline{\text{Voice}}\text{-a}]\!] = \lambda x \lambda y \lambda e.$ **read(e,y)** & Init(e,x)

b. $[\![\overline{\text{Voice}}\text{-d}]\!] = \lambda x \lambda y \lambda e.$ **f(e,y)** & Init(e,x)

c. Copy: $[\![\overline{\text{Voice}}\text{-d}]\!] = \lambda x \lambda y \lambda e.$ **read(e,y)** & Init(e,x)

This would be interpretable, incorrectly.

However, there is an additional problem with A-bar extraction. In the case of A-movement in the antecedent, the subject of *do so* is always the subject, which in standard accounts is licensed by a higher functional head, T(ense). With A-movement, then, the subject of *do so*, although semantically interpreted as an internal argument, is licensed as a subject. In contrast, there is no head that could license *which book* in the example of A-bar movement. T can only license one NP, namely, the subject (*Bill* in the example above). Since *do so* is intransitive, there is no accusative case available to license an internal argument. The NP that appears in an A-bar position (*which book*) will not be licensed, and the derivation will crash.

As noted previously, this reduces the ungrammaticality of A-bar movement with *do so* to the ungrammaticality of an overt object with *do so* (**Bill did so the book*). This is correct, because elements that can be licensed in the VP with *do so* can also undergo A-bar extraction. For instance, various kinds of adjunct phrases are acceptable with *do so*, and all of them can also be extracted:

(121) a. Gary was told not to interrupt, but he nevertheless did so with annoying frequency.

b. Details for Gary's task of not interrupting concerned recording the frequency with which he did so. (Tolson, Reid, and Garvin, *Generalist Practice: A Task Centered Approach*, accessed by Google Books)

(122) a. They lied, and did so recklessly.

b. I know they frequently lie, but it's shocking just how recklessly they do so.

This means that there is no problem with A-bar extraction in general, there is only a problem with selected arguments. *Do so*, as an intransitive, does not license any arguments.

So, in principle it would be possible to build lambda-abstraction for A-bar movement into the denotation of a head, too. This would not incorrectly license A-bar movement with *do so*, because the problem with A-bar movement is syntactic, not semantic.

That being said, we probably do not want A-bar movement to work in the same way as A-movement. As noted above, unaccusative Voice and Pass always require A-movement, and so it makes sense to build abstraction into their denotation. However, they do not always require A-bar movement. We would need two different denotations for each head, one for A-bar movement and one without A-bar movement. I will not go into this in any more detail here, but I will limit the proposal about lambda abstraction being built into the attracting head's denotation to cases of A-movement. A-bar movement, I believe, does not work this way.[16] If this is correct, then A-bar movement of an internal argument is probably also semantically ill-formed with *do so*, although it is sufficient for present purposes to have shown that it is syntactically ill-formed.

4 Conclusion

I have shown here that *do so* is compatible with all kinds of A-movement, contrary to the received wisdom: it is compatible with verbal passives and with raising to subject, in addition to adjectival passives and unaccusatives. At the same time, the distribution of expletives, *deliberately* adverbs, and reconstruction indicates that A-movement is movement, but the subject of *do so* is always base-generated. I showed that these facts receive a natural explanation under a pro-form analysis of *do so*, if we adopt the hypothesis that lambda abstraction in A-movement is built into the denotation of the Voice head that effects the movement. A-bar movement works in a very different way, such that A-bar movement is never compatible with *do so*.

The analysis spelled out how *do so* and pro-predicate *so* work in a compositional semantics. An appropriate function must be copied into their denotation from the discourse. This analysis successfully accounts for all of the facts of these anaphors, including mismatches between *do so* and its antecedent in voice and category, split antecedents, and ellipsis-containing antecedents. Conceiving of the copying as literal copying in the compositional semantics also explains why *do so* requires a linguistic antecedent.

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[16] In Bruening (2015), building lambda abstraction into the denotation of a head was proposed as a way of explaining why A-movement opens new possibilities for depictive secondary predication. A-bar movement does not have this effect. In this proposal, then, it is crucial that A-bar movement *not* work in the same way as A-movement. See Bruening (2015) for more discussion.

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