

Word Formation is Syntactic: Raising in Nominalizations

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Abstract

According to Chomsky (1970), raising to subject and raising to object may not take place inside nominalizations. This claim has been accepted as fact ever since (with the exception of Postal 1974, chapter 10). For instance, Newmeyer (2009) repeats the claim as crucial evidence for the Lexicalist Hypothesis, the view that word formation takes place in a component of the grammar separate from the phrasal syntax. This paper shows with attested examples and survey data that the claim is false: raising to subject and raising to object are grammatical inside nominalizations. This argues for a purely syntactic model of word formation, and against Lexicalist accounts. Additionally, the paper shows that one argument against syntactic accounts of nominalization, that from coordination, does not go through, clearing the way for the most parsimonious type of theory: one with only one combinatorial component, not two distinct ones for phrases versus words.

1 Introduction

The literature includes two broad approaches to word formation. On the *Lexicalist* approach, word formation requires a component of grammar separate from the phrasal syntax. In this type of theory, there are two distinct combinatorial systems in the grammar, the phrasal syntax and some word formation component. According to the other view, there is only one component of grammar, a system of syntax. This system is responsible for putting all complex elements together, whether those things are words or phrases.

This paper argues for the latter—more parsimonious—view and a model of grammar with only one combinatorial system. It does so by contesting the longstanding claim from Chomsky (1970) that raising to subject and raising to object do not take place in nominalizations. They actually do, as attested examples and an acceptability survey show. This, I argue, requires a syntactic account of nominalization. Lexical analyses of nominalization cannot account for the attested patterns without additional stipulations. Additionally, some of the Lexicalist literature has argued against purely syntactic accounts of nominalization on the basis of coordination. I also address this argument, and show that it is without force. There is no issue from coordination for any syntactic account of nominalization, and the syntactic analysis is best at accounting for raising in nominalizations.

Section 2 begins by presenting new data regarding raising inside nominalizations. Section 3 proposes a syntactic account of nominalization and argues that Lexicalist accounts are inadequate. Finally, section 4 shows that the argument against syntactic accounts from coordination does not go through.

2 Raising is Grammatical inside Nominalizations

As stated above, Chomsky (1970) claimed that nominalizations may not include raising to subject or raising to object:

- (1) a. John was certain/likely to win the prize.

- b. * John's certainty/likelihood to win the prize (Chomsky 1970, 189, (8b))
- (2) a. We believe God to be omnipotent.
- b. * our belief of/in God to be omnipotent (based on Chomsky 1970, 201, (32b))

This claim was contested by Postal (1974, chapter 10), but Chomsky (1977, note 47) and Kayne (1984, 142–143) dismissed Postal's counterexamples.¹ The claim seems to have been accepted since. For instance, Jacobson (1990) uses the putative ungrammaticality of raising in nominalizations as an argument for her analysis of raising. Newmeyer (2009) cites such examples as crucial evidence for the Lexicalist Hypothesis, the hypothesis that (at least some) word formation is accomplished in a lexical component of grammar separate from the phrasal syntax.

According to Chomsky and Newmeyer, the Lexicalist Hypothesis rules out raising to subject and raising to object in the input to nominalization, because they are rules of the phrasal syntax. The output of lexical rules like nominalization feeds the phrasal syntax, and not vice versa. (See section 3 for discussion of Lexicalist models where raising is lexical rather than syntactic.)

In this section, I contest the claim that examples like (1b) and ones similar to (2b) are ungrammatical. I for one as a native speaker of English have always found (1b) perfectly acceptable. This is borne out by attested examples from corpora and an acceptability survey using Amazon Mechanical Turk. As for raising to object as in (2b), many speakers do not accept it with this particular word (*belief*), but examples of raising to object with nominalizations of other verbs are attested and accepted.

2.1 Attested Examples

Numerous examples of raising to subject can be found with *likelihood* and *certainty*. I have found numerous examples on the web which I and others polled informally find perfectly acceptable:

- (3) *Raising to Subject: Certainty*
 - a. If that is an accepted premise, the same concept should apply to the net neutrality debate and **its certainty to increase consumer bills.**
(<http://www.foxnews.com/politics/2014/11/17/fcc-official-warns-obama-backed-net-neutrality-plan-will-bring-backdoor-tax-on/>)
 - b. ...that the Black Panthers were eager to start a civil war despite **its certainty to cause a bloodbath.**
(blackpanthercivilrights.blogspot.com/)
 - c. ...refused to consider the underlying patent litigation, and **its certainty to be a bitter and prolonged process.**
(https://www.wsgr.com/WSGR/Display.aspx?SectionName=publications/PDFSearch/AntitrustWire_0405.htm)
- (4) *Raising to Subject: Likelihood*
 - a. Sadly a species' name affects **its likelihood to survive.**
(<https://twitter.com/meeurotaru/status/552744000651001856>)
 - b. Interesting his psychiatrist believes **his likelihood to re-offend** is low. (<https://twitter.com/BigBluto63/status/570248776113201153>)

¹Actually, Chomsky and Kayne only addressed *one* of Postal's counterexamples, examples like *John's tendency to leave*. Postal produced several other counterexamples. These include *Nixon's likelihood of being reelected is minimal* (328, (23b)), which Postal judged marginal, *Nationalist China's continuation as a Security Council member* (330, (31)), *cancer's persistence as a frightening killer* (328, (32–33)), *the bomb's failure to go off* (354, (84)) on the raising to subject side, and *your estimate of Bob's weight to be/as being 200 pounds* (348, (71)), *your recognition of him as (being) the outstanding living malingerer* (352, (77b)) on the raising to object side. I believe Postal to be correct that these are genuine examples of raising within nominalizations.

- c. But in this case whether or not a man was in a committed relationship had no influence on **his likelihood to sexually harass**.
(<https://books.google.com/books?isbn=1555536387>)
- d. However, if a peer tells the student his joke is “silly” or “stupid” he will be punished by telling the joke and **his likelihood to tell another joke** is greatly decreased.
(en.wikipedia.org/wiki/Self-control)

Note that at least one of these comes from a published book.

Examples of clear raising to subject with *likelihood* can also be found in the Corpus of Contemporary American English (<http://corpus.byu.edu/coca/>). Here are a few examples:

(5) *Raising to Subject: Likelihood*

- a. ... have shown positive effects on **students’ likelihood to register for subsequent semesters**. . . (COCA)
- b. These numbers don’t necessarily track **people’s likelihood to vote for or against someone**, . . . (COCA)
- c. ... participants viewed physical activity as fun, which reinforces **their likelihood to be active and maintain their healthy weight**. (COCA)
- d. ... it is not sexual guilt per se that is directly connected to **women’s likelihood to engage in force fantasy**. (COCA)

I found no clear examples of raising to subject in COCA with *certainty*, however.

As for raising to object, it too is attested in nominalizations, though at a much lower rate (and speakers judge them to be less acceptable in the survey reported below). I was unable to find any examples in COCA, but the following are some examples from the web:

(6) *Raising to Object*

- a. ... again what you are telling us is **no proof of them to be hackers**.
(<http://www.kongregate.com/forums/291-yu-gi-oh-bam/topics/379107-new-hack>)
- b. ... for true confession consisteth in the general, in a man’s taking to himself his transgressions, with **the acknowledgment of them to be his**, . . .
(*The Pharisee and the Publican* By John Bunyan, accessed by Google Books)
- c. ... and how I may be erroneous in **my demonstration of them to be consistent with my argument**.
(<http://orthodoxbridge.com/is-the-protestant-church-fragmented-a-response-to-pastor-doug-wilson-1-of-2/>)
- d. ... those acts that would be wrong must be wrong by virtue of some means other than **God’s declaration of them to be wrong**.
(<https://quizlet.com/94797180/attacking-faulty-reasoning-ch-256-quiz-flash-cards/>)

Native speakers polled informally find at least some such examples to be acceptable, although they typically report that they are less acceptable than raising to subject. Many people do not accept raising to object with *proof* or *belief* (but numerous examples of *proof* appear on the web), but raising to object does seem to be acceptable with nominalizations of some other verbs (see the acceptability survey below).

These attested examples contradict the judgments reported in the literature by Chomsky (1970), Kayne (1984), Newmeyer (2009), and others.

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.

The experiment used a 2x2 design with factors *raising to subject* (“*Subj*”) versus *raising to object* (“*Obj*”) and *nominalization* (“*Nom*”) versus *clause* (“*Clause*”). Experimental items were constructed in sets of four on the following pattern:

- (7) a. (Subj_Nom) According to historians, that radical group was eager to start a civil war despite its certainty to cause a bloodbath.
- b. (Subj_Clause) According to historians, that radical group was eager to start a civil war despite the fact that it was certain to cause a bloodbath.
- c. (Obj_Nom) According to historians, that radical group was eager to start a civil war despite their acknowledgment of it to be folly.
- d. (Obj_Clause) According to historians, that radical group was eager to start a civil war despite the fact that they acknowledged it to be folly.

Raising to subject predicates were only *be certain* and *be likely* and their corresponding nominalizations *certainty* and *likelihood*. The raising to object verbs used were *acknowledge*, *pronounce*, *recognize*, *estimate*, *calculate*, *observe*, *presume*, and *calculate*. All of these have nominalizations with either *-tion* or *-ment*. The complete list of items appears in the appendix.

Eight sets of four were constructed and divided into four lists, so that each subject saw only one item from each set. Each subject rated two exemplars of each condition. Subjects rated each sentence on a scale of 1 to 5 (1: Extremely unnatural, 2: Somewhat unnatural; 3: Possible, 4: Somewhat natural, 5: Extremely natural). Each sentence was also accompanied by a comprehension question to make sure that the subjects were not just answering randomly without reading the sentence. For the set above, the question was, *Was that radical group eager to start a civil war?* Questions were always answered yes or no and always had a right answer (an obvious one). Subjects were discarded from the analysis if they answered more than 25% of the questions incorrectly.

In addition to the 8 experimental items that each subject judged, each also rated 22 fillers. Six of these were items for an unrelated experiment. Two of these were judged by the experimenters ahead of time to be acceptable, but the other four were unacceptable (but survey participants actually judged 5 of the 6 to be unacceptable). The other 16 were control sentences that 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, or a P and its object. A couple of examples follow (the ungrammatical sentences were not presented with the star):

- (8) 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.
- (9) 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 once again each subject saw only one member of each pair. Subjects therefore rated a total of 30 sentences (8 experimental items + 6 fillers from another experiment + 16 control items). A different list was created for each subject with the presentation order randomized.

120 participants (“workers,” in Amazon Mechanical Turk parlance) were recruited from within the USA. Ten subjects were excluded for reporting a language other than English as their first language, for getting less than 75% correct on the comprehension questions, or for leaving more than 20% of the questions unanswered. This left 110 subjects whose data entered into the analysis.

Median ratings and 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):

(10)	Obj_Clause	Obj_Nom	Subj_Clause	Subj_Nom
median	4	4	4	4
mean	4.168182	3.727273	4.190909	4.245455
SD	1.0040495	1.1259423	1.0022391	0.9478297

For comparison, median and mean ratings on the grammatical and ungrammatical controls are shown below:

(11)	grammatical	ungrammatical
median	5	2
mean	4.364773	2.361143
SD	0.9407401	1.2353854

Various statistical tests indicate that there are significant differences between the four conditions. For instance, a two-way ANOVA shows a main effect of subject versus object ($F(1,876)=15.4038$, $p<0.0001$) and a main effect of clause versus nominalization ($F(1,876)=7.8591$, $p=0.0052$), as well as an interaction ($F(1,876)=12.9237$, $p=0.0003$).² Post-hoc pairwise t-tests show that Subj_Clause and Subj_Nom do not differ from each other ($p=0.9439$), but Obj_Clause and Obj_Nom do ($p=<0.0001$). Subj_Nom and Obj_Nom also differ ($p<0.0001$), but Obj_Clause and Subj_Clause do not ($p=0.9955$), nor do Obj_Clause and Subj_Nom ($p=0.8577$). In other words, Obj_Nom differs from the other three conditions, which do not differ from each other.

These results indicate that native speakers of English do not consider raising to subject in nominalizations degraded in any way compared to raising to subject in clauses. In fact, the mean rating was actually *higher* for nominalizations than it was for clauses, although this difference is not significant. I conclude that Chomsky (1970) was simply wrong to claim that raising to subject does not take place in nominalizations. It does.

As for raising to object, it is rated lower in nominalizations relative to the other three conditions, which do not differ from each other. This indicates that it is not as acceptable as raising in clauses or raising to subject in nominalizations. On the other hand, the mean (and median) rating for the Obj_Nom condition is still quite high, much higher than the ungrammatical control sentences. It should also be noted that there is little evidence of a dialect split: only seven out of 110 subjects rated both Obj_Nom sentences that they saw 2 or 1. All eight of the Obj_Nom items were also rated quite high (a similar range for each), so it is not the case that one or two items were responsible for the slightly lower mean rating. It appears that overall, raising to object is simply slightly less acceptable in nominalizations than raising in clauses or raising to subject in nominalizations.

The question is what we are to make of this result. It is not possible to decide that below a given mean rating (say, 2.5) sentences are ungrammatical, and above that they are grammatical. For one thing,

²Mixed models that include subjects and items as random effects lead to different results depending on how they are set up. The one thing they all agree on is that the interaction between the two factors is significant. They differ on whether there are any main effects.

the judgments reported by subjects are judgments of acceptability, not grammaticality, and judgments of acceptability are affected by numerous non-grammatical factors (such as length, complexity, and familiarity). Such factors can both lower subjects' ratings for sentences that we must consider grammatical, and raise subjects' ratings for sentences that we must view as ungrammatical within a well-motivated model of grammar.

This means that we have two options. The first option is that we can decide that raising to object is not grammatical in nominalizations, but other factors lead subjects to rate such examples surprisingly high in acceptability. The second option is that we can decide that raising to object *is* grammatical in nominalizations, but other factors lead subjects to assign examples of it somewhat lower ratings of acceptability.

I believe that several considerations favor the second view. First, the median and mean ratings of the Obj_Nom condition are quite high, close to 4 on a 5-point scale (the median rating *is* 4). This is much higher than we would expect for truly ungrammatical sentences (without some kind of "illusion" of the type discussed in Phillips *et al.* 2011, but no such seems to be operative here). Second, we have now concluded that raising to subject is grammatical in nominalizations. Given that, we should have every reason to expect that raising of all kinds would be possible, since in most models of grammar raising to subject and raising to object are very similar, parallel operations. That is, within a motivated model of grammar, there is no reason to expect that raising to object would be ungrammatical in nominalizations, if we accept that raising to subject is. Third, there may be an independent reason that raising to object is judged slightly less acceptable than raising to subject. Consider first that Chomsky (1970) contrasted raising to subject in nominalizations, which he judged to be ungrammatical, with raising to subject in gerunds, which is acceptable:

- (12) John's being certain/likely to win the prize. (Chomsky 1970, 188, (7b))

According to Chomsky (1970), (at least some types of) gerunds are formed syntactically and can include any relation or operation that is part of the phrasal syntax. However, gerunds are not very acceptable with raising to object when the object is marked with *of*:

- (13) a. * their believing of him to be a genius
b. * their considering of him to be a genius

One could claim that all nominals with *of*, including gerunds, are lexically derived and so do not permit syntactic operations. However, gerunds with *of* do permit particles and they do not permit the logical object to appear as a prenominal possessor, in contrast with other nominalizations (Abney 1987). These sorts of facts led Abney (1987) and others to propose syntactic accounts of gerunds with *of*. An alternative explanation is that there are restrictions on what can appear with *of* in a nominalized form of a verb. The first object of a double object construction never can, for instance (Kayne 1984, Pesetsky 1995), see (14), and various verbs that take direct objects also do not allow those with *of* (15):

- (14) a. * the gift of Mary (of) a necklace / *his giving of Mary (of) a necklace
b. * the sale of us (of) a defective car / *their selling of us (of) a defective car
- (15) a. * this tent's sleeping of twenty people
b. * his weighing of 200 pounds
c. * his resembling of his wife
d. * the trees' surrounding of the house
e. * Martin's entering of the navy

It appears that there are some (poorly understood) restrictions on what can appear with *of*,³ and this is what leads subjects to view raising to object with nominalizations as less than fully acceptable, since the raised object in a nominalization must appear with *of*. This is not about the grammaticality of combining raising to object and nominalization, however, it is something about the acceptability of different kinds of objects with *of*. It is probably not the case that this is a hard grammatical constraint, since subjects do rate NPs raised to object and marked with *of* as fairly acceptable in context (see the examples in the appendix). Postal (1974) also presented examples like the following, which also seem to involve raising to object:

- (16) (Postal 1974, 348 (71c), 352 (77b))
- a. your estimate of Bob's weight as (being) 200 pounds
 - b. the/my recognition of him as (being) the outstanding living malingerer

It is therefore possible in principle for a non-thematic object of a verb to appear marked with *of* in a nominalization derived from that verb. However, there seem to be some restrictions which make this less acceptable than raising to subject, although I cannot at this point say exactly what those restrictions are.

To sum up, several considerations favor the view that raising to object is grammatical but somewhat degraded in acceptability in a nominalization. I know of no considerations that would favor the opposite view according to which raising to object is ungrammatical in nominalizations, but something leads subjects to rate examples surprisingly high in acceptability. I conclude that both raising to subject and raising to object are fully grammatical within nominalizations. Raising to subject is not any less acceptable in nominalizations than it is in clauses. Raising to object is slightly degraded in nominalizations as compared to clauses, but this seems to be due to poorly understood factors governing the acceptability of NPs marked with *of* in nominalized forms of verbs. In principle, raising to object is fully grammatical in nominalizations, and any model of grammar should be able to capture this.

3 Discussion and Analysis

Attested examples and the acceptability survey described in the previous section indicate that both raising to subject and raising to object do take place nominalizations. In this section, I discuss the consequences of this finding and propose a purely syntactic account of nominalizations, adopting existing proposals from the literature.

3.1 Discussion: Lexical versus Syntactic Models

The first important point is that the facts of raising cannot be taken as an argument in favor of the Lexicalist Hypothesis, as Chomsky (1970) and Newmeyer (2009) presented them. Contrary to their assertions, raising to subject and raising to object do feed nominalization. In the kind of feed-forward view advocated by Chomsky (1970), nominalization could not be a lexical process if raising is syntactic. In this view, lexical processes strictly precede the syntax, and it is not possible for a syntactic process to feed a lexical one.

Can we then use the existence of raising in nominalizations to argue against the Lexicalist model, and for a purely syntactic theory with no separate lexical component? Not yet, because there are theories where raising is also accomplished lexically, for instance LFG and HPSG (e.g., Bresnan 1982, Pollard and Sag 1994, Müller 2006, Müller and Wechsler 2014). In this type of account, lexical rules relate different forms of verb stems. For instance, in English there is a stem *declare*₁ that takes a finite CP complement (e.g.,

³One might think from some of these examples that acceptability with *of* correlates with acceptability of the passive. For instance, most of the corresponding verbs in (15) cannot passivize. However, *the house was surrounded by trees* is acceptable (as an adjectival passive, at least). Conversely, NPs raised to object are fine as passivized subjects in clauses, although they are degraded with *of* to different degrees.

declare that those acts are wrong). The raising to object rule relates *declare*₁ to another stem *declare*₂ that takes a syntactic NP object and a non-finite complement clause. The NP object of *declare*₂ is interpreted as the semantic subject of the complement clause. It is not a semantic object of *declare*₂ at all. So, in *declare those acts to be wrong*, *those acts* is syntactically but not semantically the object of the verb *declare*; it receives its semantic interpretation solely from the lower clause. In this analysis, there is no syntactic raising, although we get the semantic effect of the object NP functioning as the logical subject of the non-finite clause. It receives no interpretation qua object. The analysis of control is almost identical, except that the object (or subject, in the case of subject control) is assigned two semantic roles, one as the missing subject of the infinitive and one as the object of the higher verb.

The raising to object stem, *declare*₂ in our example, as a verb stem can undergo other lexical rules that can affect verb stems. For instance, it can undergo a lexical rule of nominalization, just like *declare*₁ can. The output of both will be pronounced *declaration*, but the two forms of it will inherit different argument structures from the stem that they were formed from. The *declaration* formed from *declare*₂ will take an NP object and a non-finite clause, and the NP object will be interpreted as the semantic subject of the non-finite clause. This will be the raising to object *declaration*.

This type of lexical account is compatible with the facts as we have seen them here. However, there is an argument against this type of analysis, and for a purely syntactic account. This argument comes from Williams (2015, 312). In the opposing syntactic account, a verb stem takes a non-finite complement clause, out of which the subject raises to become the object of the verb stem. This entire syntactic construct forms the input to nominalization in an example like the following:

- (17) a. ... those acts that would be wrong must be wrong by virtue of some means other than **God's declaration of them to be wrong**. (<https://quizlet.com/94797180/attacking-faulty-reasoning-ch-256-quiz-flash-cards/>)
- b. input to nominalization: [declare them [~~them~~ to be wrong]]

That is, the nominalization *God's declaration of them to be wrong* can only be formed from the full phrase [*declare them to be wrong*], where the NP has undergone raising (see below for an analysis).

The difference between the two accounts is that in the lexical analysis, the nominalization is only a nominalization of a verb stem, not a phrase. The nominalization simply inherits the arguments of the stem it is formed from. In contrast, in the syntactic account, raising to object is purely syntactic, and there can be no such thing as raising to object in the absence of a full phrase structure to support it.

The argument against the lexical account comes from the fact that arguments of nominalizations are never obligatory. For instance, we can talk about a *declaration*, with no syntactic realization of the finite complement clause or NP, although the content of some proposition is implied. We should then expect that we could do the same with the nominalization formed from raising-to-object *declare*₂, and drop the complement clause while keeping the NP, preserving the raising to object interpretation. This is not possible, however. A raising to object interpretation is only ever possible in the presence of the complete phrase structure for it. *God's declaration (to him)* is grammatical by itself but implies a proposition, but *God's declaration of those acts* is nonsensical, and certainly does not imply a predicate that takes *those acts* as its subject. The same is true of all such examples: any NP after *of* can only be taken as the thematic direct object of the verb used as a simple transitive, and never as the subject of an implied predicate (e.g., *their acknowledgment of it*, *their pronouncement of them*, *their recognition of it*, *their presumption of it*, *their calculation of it*). The generalization is that nominalizations may only have a raising interpretation when they actually occur with overt raising of a phrase out of a phrase. This in turn means that the nominalization must be a nominalization of phrasal syntax. Treating raising as a lexical rule that may feed a lexical rule of nominalization makes the wrong predictions. Compare control verbs, which can nominalize and drop the non-finite clause argument, as in *her persuasion of him doubles as an act of seduction* (<https://newrepublic.com>).

com/article/126835/age-power-couple). In the lexical account, control verbs and raising verbs are treated in an almost identical fashion, as mentioned above (and see more below).

Of course, the lexical account could stipulate that when stem₁ is turned into stem₂ by the raising to object rule, the arguments of stem₂ are obligatory and must remain so even when stem₂ is nominalized. This would be nothing but a stipulation, however, and would contradict the general pattern where arguments of nominalizations are not obligatory (as we just saw with control verbs, for instance). In contrast, the syntactic view *predicts* that raising could never be possible in the absence of the phrase structure that is necessary for its existence.

This argument can be extended from the nominal to the clausal domain. In the lexical account, there is no literal raising to object or raising to subject, even in clauses. As described above, a lexical rule says that stem₂ takes an NP and a non-finite clause as arguments, and specifies that the NP is interpreted as the subject of the non-finite clause. There is no syntactic relation between the NP and the non-finite clause it is the semantic subject of. Raising in this account is treated exactly like control, with the only difference being that a control verb also assigns a thematic interpretation to the NP (so the NP plays two thematic roles; see Pollard and Sag 1994 for extensive discussion). However, observe that control verbs often permit their clausal argument to drop, while the NP argument remains:

(18) *Subject Control*

- a. I tried. (“Did you fix the car?”)
- b. I dare. (“Who dares to enter the domain of Smaug the Magnificent?”)
- c. I promise. (“Do you promise to tell the truth?”)

(19) *Object Control*

- a. I convinced them. (“Who convinced them to come with us?”)
- b. I told them. (“Who told them to take the money?”)
- c. I asked them. (“Who asked them to come?”)

This is never possible with raising (Jacobson 1990). A raising to subject or raising to object interpretation is simply not available in the absence of the clause the NP raised out of. The only possibility is VP ellipsis within the clause, not dropping the entire clause:

(20) *Raising to Subject*

- a. I began *(to). (“Did you fix the car?”)
- b. There began *(to be). (“Were there rumblings of dissent?”)
- c. He appears *(to be). (“Is Jerome talking right now?”)
- d. She is likely *(to). (“Will Abby get the job?”)
- e. Hillary is thought *(to be). (“Who is a real animal lover?”)

(21) *Raising to Object*

- a. I believe them. (bad as answer to “Who believes them to be the culprits?”)
- b. Many people believe there *(to be). (“Is there a liberal bias in the media?”)
- c. I consider them. (bad as answer to “Who considers them to be viable candidates?”)
- d. I estimate them. (bad as answer to “Who estimates them to number in the thousands?”)

If raising were really a verb taking two syntactically independent arguments, an NP and a clause of some type, we would not expect this dependency between them. We do not observe it in control. A purely syntactic theory of raising, in contrast, does expect this dependency: raising requires the presence of a clause for the NP to raise out of. If there is no clause, there can be no raising.

Pollard and Sag (1994) claim that the above facts follow in the lexical theory from a principle that they call the Raising Principle:

(22) Raising Principle:

Let E be a lexical entry whose SUBCAT list L contains an element X not specified as expletive.

Then X is lexically assigned no semantic role in the content of E if and only if L also contains a (nonsubject) Y[SUBCAT (X)]. (Pollard and Sag 1994, 140, (117))

According to Pollard and Sag (1994), this principle ensures that subjects not assigned a semantic role by the predicate they are a syntactic argument of can only appear when an unsaturated phrase is also present (as a co-argument of the predicate). But note that this principle is a pure stipulation, stating by brute force what follows as a consequence from the syntactic theory. The semantic content of missing arguments is clearly recoverable and applicable to pronounced arguments. Consider the ill-formedness of the following question-answer pair:

(23) Q: Who did you persuade to reconcile with each other?

A: # I persuaded Bonnie.

If the semantic content of the missing non-finite clause made no difference to the interpretation of the pronounced controller, the answer would not be ill-formed. It is only ill-formed because the missing non-finite clause includes a reciprocal, which requires a plural controller. Similarly, we already noted that raising is possible in the presence of VP ellipsis, where the lexical item that assigns the raised NP its thematic role is not actually present (24a). Other kinds of elliptical processes are also fine with raising, for instance sluicing (24b), fragment answers (24c), and bare argument ellipsis (24d):

(24) a. A: Does Jerome enjoy milking goats? B: He appears to.

b. A: A certain someone is likely to be asked out tonight. B: Who?

c. A: Who do you consider to be the best living goatherd? B: That guy.

d. A: This screw is threatening to pull away from the wood. B: That screw, too.

There is no general requirement that the predicate that assigns the raised NP its semantic role be present overtly. The Raising Principle, then, cannot follow from anything, and is nothing but a stipulation.⁴

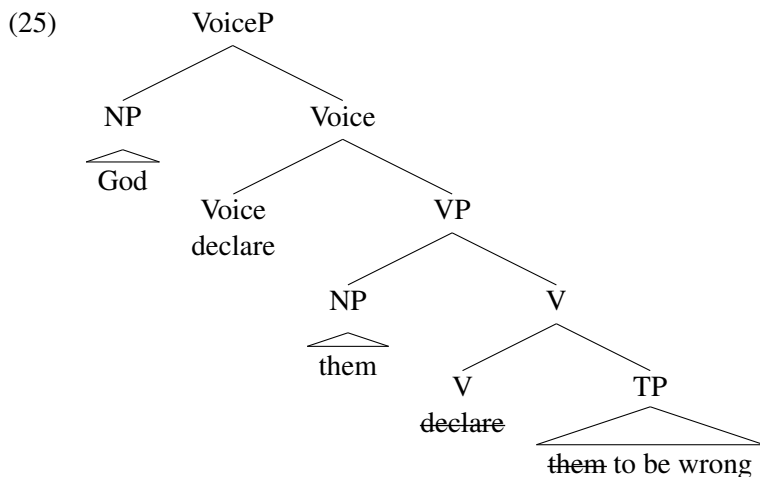
I conclude from these facts that we need a syntactic account of raising, not a lexical one. Raising is only ever possible with the full syntactic structure that the syntactic account requires. This is true in both clauses and nominalizations, and so we need a syntactic account of both.

3.2 A Syntactic Analysis

For the purposes of this paper I will try to make the minimal assumptions necessary for a syntactic account of raising in clauses and in nominalizations. In clauses, I will assume that a verb or adjective takes a non-finite TP as its complement. In raising to object, the subject of this non-finite TP raises to an object position in the main clause, which I will take to be Spec-VP. There is a head Voice above VP which projects the external argument (Kratzer 1996). This external argument typically moves to Spec-TP (not shown in the tree below).

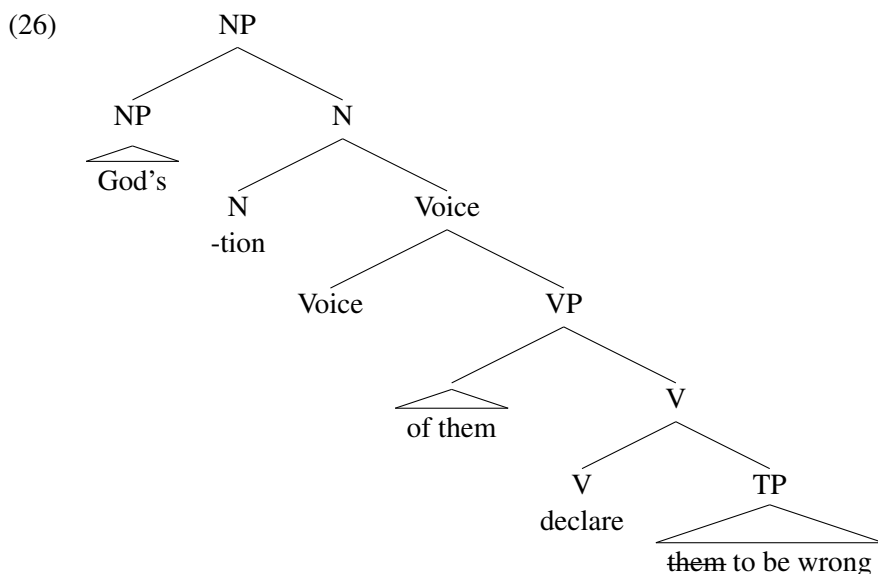
⁴Pollard and Sag (1994, note 43) do state that VP ellipsis has to be treated differently from argument drop (or “null complement anaphora”). However, it is not clear that it is even possible to formulate a process of VP ellipsis in HPSG—which eschews null structure—in such a way that it can avoid violating the Raising Principle. The analysis of VP ellipsis in Sag, Wasow, and Bender (2003, 416–419), for instance, seems to directly violate the Raising Principle. Moreover, Pollard and Sag 1994 go on to treat infinitival *to* as a raising verb exactly like *seems*, on their page 143, example (124). If *to* and other auxiliaries are raising verbs, there is no way their complements can be elided without violating the Raising Principle. Yet, as we see in (24a), the complement of *to* can be null.

The verb V moves to Voice to produce the correct word order (strikethrough indicates the starting positions of moved elements):



Raising to subject will be similar, except that Voice will not project any external argument and the lower subject will move to the higher subject position (Spec-TP), possibly via intermediate landing sites (e.g., Spec-VoiceP).

Turning to nominalizations, numerous syntactic accounts have been proposed for deriving nominalizations from phrases (e.g., VPs). These include, among others, Marantz (1997), Alexiadou (2001), Borer (2003), Roeper (2005), Bruening (2013). The exact account is not of particular importance here. Simply to be concrete, I will adopt the account in Bruening (2013), where a nominalizing head N takes an unsaturated projection of Voice as its complement, and projects an NP in its specifier. This NP may, but does not have to be, interpreted as the unsaturated argument role of Voice. Alternatively, a by-phrase can adjoin to Voice and fulfill the same function (see Bruening 2013 for details). Once again, raising to object moves an NP from a complement clause to Spec-VP:



The V moves to Voice as before, but now it moves on to N, where V-Voice-N are pronounced as *declaration*.

I will tentatively adopt the view that *of* is the spellout of genitive case, assigned to the raised object in a nominal domain. A theory of case is beyond the scope of this paper, although it is important to a complete

account of nominalizations. For the purposes of this paper, treating *of NP* as an NP with genitive case is sufficient.⁵

3.3 Summary

I have argued here that raising requires a syntactic account, not a lexical one, and I have also spelled out a minimal syntactic analysis of nominalization that is compatible with a syntactic account of raising. We can do without lexical processes altogether, and move in the direction of a more parsimonious theory, with only one component of grammar and not two.

4 Defending a Syntactic Account of Nominalizations: Coordination

One argument that has been presented against syntactic accounts of nominalizations like the one outlined above is that nominalizations of verbs can be coordinated with underived nouns and share arguments with them (Wechsler 2008, Müller and Wechsler 2014). However, all the examples that I have been able to find (both in the literature and in corpora) involve coordination of *derived* nouns, like the following:

- (27) (Wechsler 2008, 505, (25b), (22a))
- a. the [hiring and promotion] of faculty members into tenured positions
 - b. ...after the soldier's [destruction and looting] of their home, ...

In fact, coordination of derived nouns and truly underived nouns seems to be ungrammatical (**the resurrection and church of Christ*, **the bundling and pouch of tobacco*, **the occupation and center of the city*). It is possible that this incompatibility is semantic in nature, and so I will not make anything of it.

However, Wechsler (2008) presents examples like those in (27) as problematic for specific accounts of nominalizations which ascribe very different structures to nominalizations like *destruction* and gerunds derived with *-ing*, like *looting* (e.g., Marantz 1997). The first response to this argument is that it is only an argument against accounts that treat *-tion* and *-ing* nominalizations very differently. Other syntactic accounts may not be subject to this criticism. For instance, we could give *-ing* nominalizations the exact same account as *-tion* nominalizations in (26), only with *-ing* in place of *-tion*.

The second, and more important, response to this argument is that there is evidence for an ellipsis account of coordination with argument sharing as in (27). For example, such coordinations can antecede elements that require plurals, as shown in (28):

- (28) a. The hiring and promotion of faculty members into tenured positions are two very different processes.
- b. The soldiers' destruction and looting of their home took place on different days.

The NPs here have the same interpretation as *the hiring of faculty members into tenured positions and the promotion of faculty members into tenured positions*, and *the soldiers' destruction of their home and the soldiers' looting of their home*. This points to an ellipsis account, with deletion of shared material in the first conjunct. See Chaves (2008) on this point with apparent coordination of word parts, and a deletion analysis. If a coordinate ellipsis account is correct, then coordination is not problematic for any syntactic theory of

⁵It should be noted that expletives like *there*, one of the primary diagnostics of raising, are not possible in nominalizations when they are marked with *of* or with genitive *'s* (**acknowledgment of there to be dissent*, **there's likelihood to be protests*). Postal (1974, 325) suggests that this is due to a surface restriction against such NPs being marked with genitive case. Expletives are grammatical in nominalizations (gerunds) when they receive a different case (*there being likely to be* vs. **there's being likely to be*), so it does not appear that there is anything that blocks expletives in nominalizations in general.

nominalizations. It is possible to give *destruction* a very different analysis from that given to a gerund like *looting*, and still have them coordinate, because the analysis will have full phrases in each conjunct (*the [destruction of their home]* and *[looting of their home]*).

I conclude that coordination is not problematic for any syntactic account of nominalization, contra claims in the Lexicalist literature. This clears the way for a purely syntactic account of word formation.

5 Conclusion

Since Chomsky (1970), it has been accepted that raising is ungrammatical in nominalizations, and some have argued that this points to a Lexicalist conception of grammar, with distinct components for word formation and phrasal syntax. I have shown here that this is not correct: raising to subject and raising to object are both grammatical in nominalizations. I have also argued that raising is better treated syntactically, as a lexical analysis cannot explain the need for a lower clause for a raised NP to have raised out of. This is true in both clauses and nominalizations: a raising to object interpretation is not possible without the full phrasal syntax to support it. This points to a purely syntactic account. We then also need a syntactic account of nominalizations. Recent arguments against such accounts from coordination were shown not to go through, since coordination requires an ellipsis account and so is compatible with fully phrasal analyses.

More generally, the results of this study point to a model of grammar where there is only one combinatorial component, not two. We can do without a lexical component altogether, and analyze everything, including word formation, with the phrasal syntax.

Appendix: Experimental Items for the Acceptability Survey

1. (a) (Subj_Nom) According to historians, that radical group was eager to start a civil war despite its certainty to cause a bloodbath.
(b) (Subj_Clause) According to historians, that radical group was eager to start a civil war despite the fact that it was certain to cause a bloodbath.
(c) (Obj_Nom) According to historians, that radical group was eager to start a civil war despite their acknowledgment of it to be folly.
(d) (Obj_Clause) According to historians, that radical group was eager to start a civil war despite the fact that they acknowledged it to be folly.
2. (a) (Subj_Nom) Studies have found that the name of a species affects its likelihood to become endangered.
(b) (Subj_Clause) Studies have found that the name of a species affects whether it is likely to become endangered.
(c) (Obj_Nom) Studies have found that the name of a species affects conservation groups' pronouncement of them to be endangered.
(d) (Obj_Clause) Studies have found that the name of a species affects whether conservation groups will pronounce them to be endangered.
3. (a) (Subj_Nom) The litigants were determined to go forward with the lawsuit despite its certainty to be a bitter and prolonged process.
(b) (Subj_Clause) The litigants were determined to go forward with the lawsuit despite the fact that it was certain to be a bitter and prolonged process.

- (c) (Obj_Nom) The litigants were determined to go forward with the lawsuit despite their recognition of it to be a bitter and prolonged process.
 - (d) (Obj_Clause) The litigants were determined to go forward with the lawsuit despite the fact that they recognized it to be a bitter and prolonged process.
4.
 - (a) (Subj_Nom) At the hearing, the government-appointed psychiatrist asserted that the defendant's likelihood to re-offend is low.
 - (b) (Subj_Clause) At the hearing, the government-appointed psychiatrist asserted that the defendant is not likely to re-offend.
 - (c) (Obj_Nom) At the hearing, the government-appointed psychiatrist asserted his estimation of the defendant to be unlikely to re-offend.
 - (d) (Obj_Clause) At the hearing, the government-appointed psychiatrist asserted that he estimated the defendant to be unlikely to re-offend.
 5.
 - (a) (Subj_Nom) One state representative argued against the legislation on the basis of its certainty to increase consumer bills.
 - (b) (Subj_Clause) One state representative argued against the legislation on the basis of the fact that it was certain to increase consumer bills.
 - (c) (Obj_Nom) One state representative argued against the legislation on the basis of his calculation of it to be cost prohibitive.
 - (d) (Obj_Clause) One state representative argued against the legislation because he calculated it to be cost prohibitive.
 6.
 - (a) (Subj_Nom) One large-scale study of workplace environments found that whether or not a man was in a committed relationship had no influence on his likelihood to sexually harass.
 - (b) (Subj_Clause) One large-scale study of workplace environments found that whether or not a man was in a committed relationship had no influence on whether he was likely to sexually harass.
 - (c) (Obj_Nom) One large-scale study of workplace environments found that whether or not a man was in a committed relationship had no influence on the observation of him to be a harasser.
 - (d) (Obj_Clause) One large-scale study of workplace environments found that whether or not a man was in a committed relationship had no influence on whether anyone observed him to be a harasser.
 7.
 - (a) (Subj_Nom) Public opinion has shifted in favor of that country, perhaps because of its certainty to lose the war it began without provocation.
 - (b) (Subj_Clause) Public opinion has shifted in favor of that country, perhaps because it is certain to lose the war it began without provocation.
 - (c) (Obj_Nom) Public opinion has shifted in favor of that country, perhaps because of their presumption of it to be about to lose the war it began without provocation.
 - (d) (Obj_Clause) Public opinion has shifted in favor of that country, perhaps because they presume it to be about to lose the war it began without provocation.
 8.
 - (a) (Subj_Nom) Equity investors have revised their assessment of that company on the basis of their estimate of its likelihood to meet its debt obligations.
 - (b) (Subj_Clause) Equity investors have revised their assessment of that company on the basis of their estimate that it is likely to meet its debt obligations.

- (c) (Obj_Nom) Equity investors have revised their assessment of that company on the basis of their calculation of it to be able to meet its debt obligations.
- (d) (Obj-Clause) Equity investors have revised their assessment of that company because they calculate it to be able to meet its debt obligations.

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