

Towards a Typology of Control in DP¹

Ivy Sichel
The Hebrew University of Jerusalem

Abstract

The paper argues that the typology of control in DPs is as rich as it is in clauses, and identifies clear cases of Obligatory Control (OC) and Non-obligatory Control (NOC) in DP. Once implicit arguments in nominalizations are taken into account, the control pattern in nominalizations of subject control clauses turns out to fall, uniformly, on the side of OC. Agentless control nominalizations are claimed to involve local control by an implicit agent, supported by the interpretive OC properties associated with the infinitive subject. NOC is also attested, with nominalizations of predicates which in clauses are associated with NOC. The paper also argues that adjunct control, of the sort familiar from clauses, does not exist, and that NOC is always logophoric control. The existence of both patterns, OC and NOC, provides a new testing ground for the factors determining the typology in clauses and the effect of nominalization on control.

1. Introduction

It is a well known fact that Raising is impossible within the (English) DP and control is possible (Chomsky 1970), as exemplified in (1) and (2).

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- (1) a. John₁ promised / tried / refused [PRO₁ to leave]
b. John₁ appeared / is likely [t₁ to leave]
- (2) a. John₁'s promise / attempt / refusal [PRO₁ to leave]
b. the promise / attempt / refusal [PRO_{ARB} to leave]
c. *John₁'s appearance / likelihood [t₁ to leave]

Beyond the basic observation, however, and despite the centrality of control in linguistic theory, there has been relatively little systematic study of control in DP and much remains unknown. In particular, is control in DP amenable to the obligatory / non-obligatory typology familiar from clauses? If it is, are both patterns attested, or is control in DP more restricted in this respect? If both patterns are attested, is the distribution of obligatory and non-obligatory control in DP the same as in clauses? If not exactly, what might the difference reveal about nominalization, or about the conditions governing obligatory and non-obligatory control, or both?

The goal of the paper is to demonstrate the significance of a finer empirical landscape of control in DP, and in particular, the division into obligatory and non-obligatory control (henceforth, OC and NOC), for our general understanding of both control and nominalization. As an empirically rich and independently well-understood phenomenon, the study of the OC / NOC typology in DP is bound to shed light on DP structure and the process of nominalization. The fact that nominalization affects argument-structure,

combined with the current consensus that in clauses, the division into OC and NOC is related to structural position and argument-structure, provides a new and relatively well-controlled testing ground for the effects of argument-structure and structural position on the division.

The paper argues, in section 2, that control into infinitives in DP of the familiar sort exemplified in (2a) and (2b) is always obligatory control (henceforth, OC). The controller, however, may be implicit, as it is in (2b). Section 3 presents new cases which are argued to exhibit NOC. NOC occurs primarily with nominalizations of predicates which in clauses produce NOC. Section 4 formulates the predictions from clausal control for OC and NOC in DP. Beginning with Manzini (1983), and further developed in more recent studies by Hornstein (1999), Wurmbrand (1999), and Landau (2000), the distribution of OC and NOC is tied to the structural position of the infinitive. Important differences aside, all agree that complements systematically exhibit OC and subjects exhibit NOC. Section 4 considers how the division in clauses is expected to be manifested in DP, and proposes a simple dichotomy: OC in complements and NOC in non-complements. Section 5 addresses some problems and discusses prospects for future research. The conclusions are in section 6.

2. OC in DP

2.1 *Implicit Agents and Apparent NOC*

A well-known difference between English clauses and DPs is that constituents which realize participants in the event denoted by the head noun are freely omitted, with implications for control. While a non-realized controller in a subject-control configuration in IP may sometimes lead to ungrammaticality, as shown in (3b) and (3c), an arbitrary interpretation is always available for the covert subjects of infinitives in DPs which lack overtly expressed agents, as in (3e).

- (3)
- a. Mary₁ promised John₂ [PRO₁ to learn Arabic]
 - b. *John₂ was promised (by Mary₁) [PRO_{1/2} to learn Arabic]
 - c. *It was attempted [PRO_{arb} to learn Arabic]
 - d. Mary's promise/ attempt [PRO₁ to learn Arabic]
 - e. the promise / attempt [PRO_{arb} to learn Arabic]

The requirement for an overt controller has sometimes been taken as a criterion for OC, as in Bresnan (1982). (A full classification of OC and NOC properties in IP is presented immediately below, in (5) and (6)). To the extent that an overt controller is necessary for OC, the examples in (3) would suggest that control in DP is not OC. Hornstein (2001) and Boeckx & Hornstein (2003) argue, accordingly, that in the absence of an overt controller, control in DP consistently exhibits the properties of NOC. In (3e), for example, arbitrary

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interpretation, a hallmark of NOC, is possible, though it isn't in (3b) or (3c).

Similarly, when the agent is not expressed, the overt antecedent can be non-c-commanding and non-local, two more distinctive NOC properties, in (4a) and (4c):²

- (4) a. The attempt [PRO₁ to learn Arabic] frustrated Mary₁
- b. Bob₂'s attempt [PRO_{2/*1} to learn Arabic] frustrated Mary₁
- c. Mary₁ denied the attempt [PRO₁ to learn Arabic]
- d. Mary₁ denied Bob₂'s attempt [PRO_{2/*1} to learn Arabic]

OC / NOC diagnostics based on IP, and representative examples of control into complements (OC) and subjects (NOC), are given in (5) and (6) (from Hornstein (1999)).³

(5) Obligatory Control:

- a. OC PRO requires an antecedent
*It was expected PRO to shave himself
- b. The antecedent must be local
John₁ thinks that he₁ / *it was expected PRO to shave himself₁
- c. The antecedent must c-command the controlled position
John₁'s campaign expects PRO to shave him₁ / *himself₁
- d. Split antecedents are not possible
*John₁ told Mary₂ PRO₁₊₂ to wash themselves
- e. Only sloppy readings are available under ellipsis

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John expects PRO to win, and Bill does too

(Bill expects Bill to win)

- f. The controlled position is only interpreted *de se*. In the context in which *the unfortunate* denotes an amnesiac war veteran watching a ceremony on TV in which he was awarded a medal, the following is odd.

#The unfortunate expects PRO to get a medal

- g. The controlled position is interpreted as a bound variable. To the extent that the following is true, it is trivially true, since only Churchill could have this particular self-memory.

Only Churchill remembers PRO giving the BST speech

(6) Non-obligatory Control:

- a. An antecedent is not required

It was believed that [[PRO shaving] was important]

- b. The antecedent can be non-local

John₁ thinks that it was believed that [[PRO₁ shaving himself₁] was important]

- c. The antecedent can be non c-commanding

[Clinton's₁ campaign]₂ believes that [PRO_{1/2} keeping his sex life under control] is necessary for electoral success

- d. Split antecedents are possible

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John₁ told Mary₂ that [PRO₁₊₂ washing themselves₁₊₂] would be fun

- e. A strict reading under VP ellipsis is available

John thinks that [[PRO getting his resume in order] is crucial], and Bill does too

- f. The interpretation of the controlled position is not necessarily *de se*. In the context given for (5f), the following is not odd.

The unfortunate believes that [PRO getting a medal] would be boring

- g. The controlled position may receive a coreference interpretation.

The following may be false, since other people may well remember that Churchill giving the speech was momentous.

Only Churchill remembers [that [PRO giving the BST speech] was momentous]

Given the contrast between (3c) and (3e), together with the possibility of a non-local or non-c-commanding antecedent, in (4a) and (4c), control in DP may appear to pattern with NOC. The problem, however, as observed in Hornstein (2001), is that an overt controller produces strict OC effects. In the presence of an overt agent, in (4b) and (4d), non-local and non-c-commanding DPs can no longer control the infinitive subject position.

Rigidity with respect to choice of controller is characteristic of OC. NOC, in contrast, typically allows ambiguity between multiple potential controllers. This is observed in (6c), where one controller is c-commanding and one is not, and in (7), where one controller is closer than the other.

- (7) John knows that Mary believes that it is important PRO to love
himself / herself

Instead of taking agent omission to signal NOC, I propose, instead, that agent-less nominalizations feature OC, albeit by an implicit agent. This entails that the optionality of the controller is not a reliable criterion for NOC and should be omitted from the set of OC / NOC diagnostics. DP control would hardly set a precedent in this, as the criterion is independently challenged by indirect object control infinitives with the dative suppressed, as in (8a).⁴ When the dative argument is missing, arbitrary interpretation or a non-local antecedent are possible, but when the dative is overtly realized, it is the single possible controller, in (8b). This is the situation just observed in DP. The rigidity induced by overt agents and the overt argument of 'fun' contrasts with the optionality and ambiguity observed with 'help', which does allow an overt dative to be skipped. (8c) is an instance of 'true' NOC (from Landau (2000)).

- (8) a. Mary₁ said [it was fun [PRO_{1/arb} to misbehave in public]]
b. Mary₁ said [it was fun for Bill₂ [PRO_{2/*1} to misbehave in public]]

- c. Mary₁ knew [it wouldn't help Bill₂ [PRO_{2/1} to misbehave in public]]

Beginning with Kimball (1971), and further developed in Manzini (1983) and Koster (1984), a common approach to (8a) has been to posit an implicit argument in the dative position which controls into the infinitive. The neutralization of arbitrary interpretation and long distance control produced by an overt DP shows that control in (8a) is necessarily local, by the dative, whether overt or covert. In (8c) a local antecedent can truly be skipped, as expected in NOC. An NOC approach to control in DP would be hard-pressed, therefore, to explain why the pattern in (8c) doesn't arise. It is straightforward, however, if control is OC, possibly by a null argument. On this approach, NOC effects such as relaxing of c-command and locality requirements reduce to the pronominal nature of the implicit controller, and do not reflect the nature of control. In (4a) and (4c), for example, the implicit agent of 'attempt' may, but need not, be identified as 'Mary', and as such it locally controls the infinitive.

Crucially, the interpretation of the subject of the infinitive always depends on the interpretation of the agent of refusal, overt or covert, consistent with the blocking effect an overt agent has over the non-c-commanding antecedents in (4b) and (4d). The following, where a DP embedded within the overt agent cannot function as a potential antecedent, emphasizes again the significance of the local agent and the c-command relation for control:

- (9) I supported [John₁'s mother₂'s refusal [PRO_{2/*1} to jeopardize herself₂ / *himself₁ / *her₂]]

This example brings out the significance of the local agent, and suggests that a single OC mechanism is at work in nominalizations with overt and covert agents. The ambiguity of (10) then reduces to the referential flexibility of the implicit agent of refusal:

- (10) John₁'s mother₂ was committed to [the refusal [PRO_{1/2} to jeopardize herself₂ / himself₁ / her₂]]

The relaxing of c-command in (4) and (10) is actually more liberal than the flexibility in c-command observed in non-controversial cases of NOC such as infinitive subjects. Williams (1992) shows that while the requirement for a c-commanding antecedent may indeed be violated in NOC configurations, the antecedent must nevertheless be understood to denote the individual whose mental state is being reported, in other words, the logophoric center. Neither *John* nor *John's aunt* in (11b) c-command into the subject infinitive, yet only the latter is a potential controller, hence the ungrammaticality with the masculine reflexive. In (12b) *John* is the logophoric center, hence a possible antecedent:

- (11) a. To find himself alone in Times Square became one of John's most abiding fears
b. *To find himself alone in Times Square became one of

John's aunt's most abiding fears

- (12) a. *John's aunt knew that [[PRO shaving himself] was crucial
for success]
- b. John's campaign knew that [[PRO shaving himself] was
crucial for success]

A non-c-commanding overt antecedent in DP control, as in (10), however, need not be singled out as the logophoric center. This makes sense if the infinitive in (10) is not an NOC infinitive, and the referential properties associated with the implicit agent are distinct from those associated with NOC subjects: pronominal in the former, logophoric in the latter.

The dependency of the interpretation of the infinitive subject on the interpretation of the implicit agent is further observed when the matrix predicate biases the interpretation of the agent towards either the matrix subject or towards its possessor. The matrix predicate in (10), *was committed to*, is compatible with either John or John's mother as possible agents of refusal, and is therefore essential for the ambiguity of control under *refusal* (and similarly *doubted*, *denied*, *was proud of*, etc.). Other matrix predicates may bias the interpretation of the agent of refusal in either direction. To the extent that they do, the infinitive subject is similarly disambiguated. The predicates in (13), for example, tend to bias towards a disjoint interpretation of the matrix subject and agent of refusal. On this reading, the matrix subject is no longer a possible

antecedent for the embedded reflexive, and the embedded possessor is preferred. Similarly, the predicates in (14) tend to prefer coreference with the matrix subject. On that interpretation, *John* is no longer a possible antecedent for the infinitive object:⁵

- (13) a. John₁'s mother₂ criticized / agreed with [the refusal [PRO₁ to jeopardize himself₁/ her₂ / *herself₂]]
b. John₁'s mother₂ shared / disapproved of [the refusal [PRO₁ to jeopardize himself₁/ her₂ / *herself₂]]
- (14) a. John₁'s mother₂ put off / opted for [the refusal [PRO₂ to jeopardize herself₂/ *himself₁/ *her₂]]
b. John₁'s mother₂ maintained / stuck to [the refusal [PRO₂ to jeopardize herself₂/*himself₁/ *her₂]]

Biases such as these highlight the dependency of the infinitive subject on the interpretation of the implicit agent. The effect of the matrix predicate on the agent suggests that the appearance of NOC is independent of the infinitive, and arises only as the result of the flexibility in interpretation of the covert agent of the nominalization.⁶

The role played by the flexible referential nature of the covert agent is further demonstrated by comparison with the interpretive rigidity of DPs headed by gerunds which allow only the matrix DP as antecedent. Even in the presence of the neutral matrix predicate 'was committed to', control into an

infinitive requires strict c-command by the overt antecedent. Here *himself* and *her* are ungrammatical, in contrast to (10), repeated in (15b), and similarly in (16):

- (15) a. John₁'s mother₂ was committed to [refusing [PRO*_{1/2} to jeopardize herself₂ / *himself₁ / *her₂]]
- b. John₁'s mother₂ was committed to [the refusal [PRO_{1/2} to jeopardize herself₂ / himself₁ / her₂]]
- (16) a. John₁' mother₂ was proud of [deciding [PRO*_{1/2} to educate herself₂ / *himself₁ / *her₂]]
- b. John₁' mother₂ was proud of [the decision [PRO_{1/2} to educate herself₂ / himself₁ / her₂]]

DPs headed by gerunds appear, then, to yield strict OC effects even in the absence of an overt agent. The minimal difference between gerunds and nominalizations supports the conclusion that it is the implicit agent of the nominalization, and not the infinitive, which introduces flexibility in interpretation. This is especially so since the identity of the non-expressed agent in gerunds can be established as PRO independently of control. The empty subject of a simple gerund in complement position must be controlled by a local c-commanding antecedent, and is otherwise realized by an overt pronoun (Abney (1987)):

- (17) a. John₁ hates [PRO₁ working too hard]

- b. [People who know John₁]₂ hate [his / *PRO₁ / PRO₂
working too hard]
- c. Sam₁ thought that Mary discussed [his / *PRO₁ shaving
himself]

The realization of the implicit agent as PRO explains why OC effects are fully transparent. The covert agent is PRO, so OC is enforced throughout the chain, from overt antecedent to infinitive subject. Control of the infinitive subject is itself local, an instance of OC, as depicted in (18). Similar contrasts between agent-less nominalizations and gerunds with non-local antecedents are given in (19). When DP is headed by a gerund, and the implicit agent is PRO, the distant antecedent is impossible. For the distant antecedent to be possible, the agent must be overt. Agent-less nominalizations, as usual, are more flexible, but still the implicit agent and infinitive subject must be identical:

- (18) John₁' mother₂ was proud of [PRO_{2/*1} deciding [PRO_{2/*1} to
educate herself₂]]
- (19) a. John₁ regretted that Mary₂ put down [deciding [PRO_{2/*1}
to love herself₂ / *himself₁ / *her₂]
- b. John₁ regretted that Mary₂ put down [his deciding [PRO₁
to love himself₁ / her₂]
- c. John₁ regretted that Mary₂ put down [the decision
[PRO_{1/2} to love himself₁ / her₂ / herself₂]]

The situation with non-local antecedents, then, is fully parallel to the situation with non-c-commanding antecedents: the apparent ambiguity and flexibility of the infinitive subject reduces to the ambiguity and flexibility of the implicit agent of nominalization, which I take to be pronominal. Like pronouns, it can be identified from afar and need not be bound.⁷ The infinitive subject, however, is subject to obligatory control.

2.2 *The OC nature of the infinitive subject*

We have seen so far that some NOC effects may reduce to the presence of a local implicit controller whose pronominal nature produces the appearance of NOC. The second part of the argument for OC addresses the referential properties of the infinitive subject directly, and shows that it is of the anaphoric sort associated with clausal OC. The subjects of clausal OC can only be interpreted *de se* (Higginbotham, 1992). When the subject of (20a) refers to an amnesiac war veteran watching a medal awarding ceremony on TV in which he gets a medal but has no memory of the ceremony and does not realize that the person on TV is himself, (20a) will be odd or false, since the subject of the infinitive must be interpreted *de se*. (20b), with NOC, could still be true in this context:

- (20) a. The unfortunate expects to get a medal
b. The unfortunate believes that [[PRO getting a medal] would

be fun]

Another direct diagnostic is VP ellipsis. OC infinitives under VP ellipsis allow only sloppy readings, reflecting the anaphoric dependency of the infinitive subject, in (21b), in contrast to the strict readings allowed in NOC, in (21c).⁸

- (21) a. John hoped that he would win and so did Bill
(strict and sloppy)
- b. John hoped to win and so did Bill
(sloppy only)
- c. John thinks that [[PRO getting his resume in order] is crucial], and Bill does too
(strict and sloppy)

Therefore, to the extent that control in apparently agentless nominalizations is OC by an implicit agent, it should be possible to detect the OC properties of the infinitive subject directly. The interpretation of the infinitive subject should be restricted to *de se* and ellipsis should produce only sloppy readings.

Starting first with the restriction to *de se*, an effect similar to (20) is observed in nominalizations. A description in terms of self-expectation, as in (22a), is odd in the context of our amnesiac medal winner who doesn't realize he is watching himself. The oddness persists in (22b) and (22c), suggesting that here too the infinitive subject can only be interpreted *de se*:

- (22) a. The unfortunate's expectation to get a medal amused us

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- b. The expectation to get a medal made the unfortunate happy
- c. The unfortunate had an expectation to get a medal

Consider now ellipsis. In the context of N-bar deletion, only nominalizations with overt agents can be tested. As seen in (23), N-bar deletion allows only a sloppy reading of the elided constituent, on a par with (21b), implying OC when the agent is overt.⁹

- (23)
- a. John's attempt to sneak into the party was not as clever as Bill's
(sloppy only: Bill's attempt for Bill to sneak in)
 - b. John's promise to sign the petition was just as trustworthy as Bill's
(sloppy only: Bill's promise that Bill would sign)
 - c. John's claim to have signed the petition was just as reliable as Bill's
(sloppy only: Bill's claim that Bill signed the petition)

Since N-bar deletion requires overt material in the pre-nominal genitive position, it is not directly relevant for probing into nominalizations in which the agent is not expressed. Under VP-deletion strict readings become available (from Hornstein 2001):

- (24) John approved the plan to leave early and Bill did too
(strict and sloppy)

(24) has a reading in which Bill approved the plan for John to leave early, the strict reading. Note however that the subject of the elided infinitive can be interpreted as *John* only if the planner is similarly construed. The strict reading of (24) may very well follow, therefore, from the strict reading associated with the implicit planner, previously established to be pronominal. That this is the most likely analysis of the strict reading in (24) is suggested by the fact that gerunds under VP-ellipsis produce only sloppy readings, reducible to the difference in the nature of its implicit agent, PRO:

- (25) John was proud of [PRO deciding to leave early] and Bill was too (sloppy only)

Interpretation under VP-ellipsis, then, doesn't provide a direct probe into the properties of the infinitive subject in agentless nominalizations since an independent pronominal with flexible reference is included in the elided material. The comparison with gerunds, however, shows that the infinitive subject is restricted to sloppy identity, and given the independently established difference in the referential properties of these implicit agents, it strongly suggests that the source of ambiguity in (24) is the implicit agent, not the infinitive subject. Combined with the restriction to sloppy readings with expressed agents, and the restriction to *de se* in (22), it seems safe to conclude that the referential properties of the infinitive subject, when tested directly,

place control on the side of OC.¹⁰ The conclusion that nominalizations of verbs which exhibit OC also exhibit OC, possibly by an implicit controller, is further strengthened when we turn to consider true cases of NOC in DP.

3. NOC in DP

Having established that the nominal counterparts of OC verbs systematically fall on the side of OC, we now turn to NOC. The existence, in DP, of NOC alongside OC provides a new testing ground for the factors underlying the typology of control. We turn to the distribution of OC and NOC after introducing clear-cut cases of NOC in DP.

Nominalizations such as 'necessity', 'significance', 'importance', 'possibility', in (26), quite clearly exhibit NOC. They pattern in this respect with their clausal counterparts, in (27), which have the non-finite constituent as a subject, in either intraposition or extraposition.

- (26) a. [the significance / importance / possibility of [PRO finding new evidence]] was clear to us
- b. [the necessity [PRO to speak another language]] was clear to us
- (27) a. To know Arabic well is important / possible / necessary
- b. Knowing Arabic well is important / possible / necessary
- c. It is important / possible / necessary to know Arabic well

The sentences in (27) exhibit NOC, whether the subject is realized in the canonical pre-copular position or in extraposition, argued by Landau (2000) to be adjunction to VP. The infinitive subject may be controlled by the overt antecedent or it may take an arbitrary interpretation, and the closest controller can be skipped, as in (28c):¹¹

- (28) a. Mary₁ knows [that [PRO_{arb/1} to speak another language] is important]
- b. Mary₁ knows [that it is important [PRO_{arb/1} to speak another language]]
- c. Mary₁ knows that John₂ believes [that it is important [PRO_{arb/1/2} to speak another language]]

This is the pattern that we find for the nominalizations in (26). As in (27), the nominalizations are clearly not associated with an additional agent, though there may be an optional benefactive. (29) shows that control is optional and that the controller may be remote. Although the order in (29a) may be preferred over (29c), it is still possible to have the benefactive preceding the gerund, with no effect on the pattern of control. The local benefactive can also be skipped, on a par with long-distance control in (28c):

- (29) a. Mary₁ realizes [the importance / necessity of [PRO_{arb/1/2} behaving himself / herself / oneself]] (for John₂)]

- b. Mary₁ realizes [the significance of [PRO_{arb/1/2} finding new evidence]] for the development of the field / John₂'s career]
- c. Mary₁ realizes [the importance / necessity for John₂ of [PRO_{arb/1/2} behaving himself / herself / oneself]]

The cases of NOC in DP further substantiate the claim that the kind of control encountered in the previous section is indeed OC. The differences are robust, since in OC the subject of the infinitive must always be interpreted as controlled by the local agent, overt or covert. In (29) we find the ambiguity typical of NOC.

4. The predictions for the distribution of OC and NOC in DP

The existence of NOC alongside OC in DP provides a new testing ground for the factors which determine the division, and potentially a new window onto the processes underlying nominalization. Recent work on control has converged on the idea, due originally to Manzini (1983), that the division into OC and NOC is determined by the structural position of the infinitive. For Hornstein (1999), complements and adjuncts exhibit OC, while subject non-finite clauses exhibit NOC. In Landau (2000), complements are also claimed to exhibit OC, and subjects NOC, while VP-adjoined extraposition structures exhibit NOC. In what follows, I adopt the view that clausal complements fall on the side of OC

and that subjects fall on the side of NOC. Adjunct control, as in Williams (1992), is considered a heterogeneous class, with some adjuncts exhibiting a variety of OC and others NOC.

The immediate question which arises is whether the division in DP is conditioned by similar or related factors. Any finding is bound to shed new light on the factors underlying the typology in clauses, and also on the processes underlying nominalization and their effect on the thematic or structural properties of embedded clauses. There are, however, two complications which must be addressed before the predictions for the typology of control in DP can be formulated. One is related to the relative obscurity surrounding the status of clauses embedded within DP. First, it is unclear a priori whether any given infinitive is a complement, a subject, or an adjunct, and how to decide among these options. It is also unclear whether, independently of the division into OC and NOC above, a tri-partite division for clauses even exists in DP. This raises a difficulty for testing predictions regarding OC and NOC based on the independently determined status of the infinitive. While the division into OC and NOC suggests, in itself, that some such distinction might be represented in DP, it is still far from clear what other, independent, diagnostics might be used to support a structural or thematic generalization in DP.¹² Another difficulty has to do with the unclear status of control into adjuncts, as OC or as NOC. The goal of this section is to flesh out

these challenges and formulate the predictions for the typology of control in DP.

We begin with the challenge posed by adjunct control since it can be resolved empirically, and with the added benefit of reducing the number of clause types that need to be considered to two, complements vs. non-complements. Some of the recent literature on control into adjuncts is divided, with Hornstein (1999) focusing on OC and Landau (2000) on NOC. If adjuncts are conceived of as a general class, and if nothing further is said, we end up with the correlations expressed in (30):

- (30) a. If complement \rightarrow OC; If subject \rightarrow NOC; If adjunct \rightarrow
OC or NOC
- b. If OC \rightarrow complement or adjunct; If NOC \rightarrow subject or
adjunct

Since we do not know a priori whether a given infinitive is a complement, a subject, or an adjunct, we are left with (30b). The problem is that (30b) is confirmed too easily to bear on the typology of control or on the typology of clauses in DP. We need not find a structural difference at all between OC and NOC infinitives in DP; they could both be adjuncts. But then we are back to where we started: what determines whether the adjunct is OC or NOC?

Following Williams (1992) I distinguish among varieties of adjuncts along the

OC / NOC divide and argue that OC in DP cannot be adjunct control. This will allow us to dispense with the adjunct possibility on the side of OC.

Williams (1992) argues that controlled adjuncts do not behave uniformly, and that adjunct control divides into at least two types subject to distinct conditions. In Predicative Control, possible with non-verbal predicates such as the PP in (31), the controller must be the syntactic subject. (31b) is therefore possible only on the unlikely reading in which John was in the possession of the mafia. In logophoric control, available in pre-IP adjuncts, a non-c-commanding antecedent is possible but it must count as the logophoric center, in (32).¹³

- (31) a. The car was repaired several times [while in the possession
of the Mafia]
- b. *John repaired the car several times [while in the possession
of the Mafia]
- (32) a. Having just arrived in town, the main hotel seemed to Bill
the best place to stay
- b. *Having just arrived in town, the main hotel collapsed on
Bill

The possibility that OC in DP is adjunct control of the logophoric variety can be immediately eliminated. As discussed in section 2, cases with an overt agent require that agent to be the controller. When the agent is covert, and the overt

antecedent appears to be non-c-commanding or distant, it is not required to be the logophoric center. In (33a), repeated from above, *John* is not a logophoric center, but it can function as the remote identifier of the local implicit controller. In true logophoric control, in (33b), a possessor antecedent which is not a logophoric center, such as *Bill*, clearly won't do.

- (33) a. John₁'s mother₂ was committed to [the refusal [PRO_{1/2} to jeopardize herself₂ / himself₁ / her₂]]
- b. Having just arrived in town, the main hotel seemed to Bill's mother a good place to stay

Logophoric control is observed, on the other hand, in NOC. Compare (33a) which has OC by an implicit controller, to the DP configurations which exhibit NOC in (34). In the presence of a closer benefactive, the controller can be remote and the infinitive subject can be arbitrary, a sign of NOC, repeated in (34a). While a controller embedded within the benefactive is possible, in (34b), it has to be the logophoric center, as seen by the contrast with (34c), where the logophoric center is *John's sister* and the possessor is not a possible controller.

- (34) a. Mary₁ realizes [the importance / significance for John₂ of [PRO_{arb/1/2} behaving himself / herself / oneself]]
- b. Mary₁ realizes [the importance / significance of [PRO_{arb/1/2} behaving herself / himself]] for John₂'s career]

Towards a Typology of Control in DP

- c. Mary₁ realizes [the importance / significance of
[PRO_{arb/1/2} behaving herself_{1/3} / *himself]] for [John₂'s
sister]₃]

This suggests that NOC in DP is logophoric control, consistent with the claim in Williams (1992) and Landau (2000) that NOC is logophoric control, and providing new support for a necessary relation between NOC and sensitivity to logphoricity. Since in clauses logophoric control is restricted to adjuncts and subjects, we expect to find it in non-complements in DP.

Turning to OC and adjunct control, the question whether OC in DP applies to adjuncts can be addressed by considering a central property of what Williams calls Predicate Control. Predicate Control is limited to control by a subject (in (31) above). Since OC in DP is not limited to subject control, it cannot be adjunct control. While nominalizations do exclude direct object control (Abney (1987)), as shown in (35), indirect object control is possible, as in (36), from Pesetsky (1991).¹⁴

- (35) a. John persuaded Mary to leave
b. *John's persuasion of Mary to leave
c. John pushed Mary to leave
d. *John's push of Mary to leave
- (36) a. Bill's advice to Sally to get out of town
b. Kennedy's challenge to NASA to put a man on the moon by

1970

- c. God's commandment to the Jews to worship no idols
- d. Sue's order to Harry to get out of the room

Furthermore, indirect object control is OC. (37) shows that c-command is obligatory, and that arbitrary interpretation and a remote antecedent are excluded in the presence of an overt indirect object. Although it is possible, in principle, to accept, or act on, advice given indirectly via a third party, it is impossible to express this in a control configuration, showing that the local indirect object cannot be skipped, in (38a).¹⁵ (38b) shows how this would be expressed in a non-control configuration.

- (37) a. Bill's advice to Mary₁'s best students₂ [PRO_{2/*1/*ARB} to study a lot of calculus]
- b. Kennedy's challenge to McNamara₁'s advisors₂ [PRO_{2/*1/*ARB} to do something]
- c. God's commandments to the Jews'₁ allies₂ [PRO_{2/*1/*ARB} to worship no idols]
- (38) a. John₁ acted on Bill's advice to Mary₂ [PRO_{2/*1} to perjure herself/ *himself]
- b. John₁ acted on Bill's advice to Mary₂ [that he₁ perjure himself₁]

The immediate conclusion from (37)-(38) is that indirect object control is OC. Therefore, OC in nominalizations is not limited to control by the subject, and cannot be considered Predicative Control. Since it is not akin to either of the varieties of adjunct control observed in clauses, neither to Logophoric Control nor to Predicative Control, OC in DP does not subsume adjunct control. Therefore, OC should be observed exclusively with complements. The elimination of adjunct control of the predicative variety gives rise to a coherent and simple prediction:

- (39) If OC \rightarrow the infinitive is a complement
If NOC \rightarrow the infinitive is not a complement

5. Problems and Prospects

The prediction is clear, but it is difficult to evaluate given the state of our knowledge about clauses embedded in DP. The remainder of the paper is devoted to discussing some obstacles on the way to firm conclusions and to eliminating some possibilities. On a purely syntactic understanding, a complement is any constituent directly merged with a head. This doesn't seem to distinguish, however, between OC and NOC infinitives. While OC infinitives are complements, NOC non-finite constituents also seem to be complements in this sense. From a Bare Phrase Structure perspective (Chomsky 1994, 2001), all single constituents associated with a head must be syntactic complements,

regardless of their thematic standing. Since Pair-Merge applies to constituents formed by Set-Merge, it follows that a single XP is always merged as complement and adjunction is excluded. There is no other option but to merge the of-phrase (or its complement, see Kayne (2000)) directly with the head noun in the NOC configurations in (40).

- (40) the importance / significance / utility / advantage of solving the
problem

An alternative to a pure syntactic interpretation of (39) might be a thematic one: OC with internal or direct arguments, and NOC otherwise. Here too we come up against an immediate problem. Interestingly, and in contrast to the more familiar event nominalizations derived from verbs, the of-phrase appears to be obligatory. It need not include a missing subject or, for that matter, a gerund. Any DP will do:¹⁶

- (41) a. Mary realized [the significance / importance *(of
speaking another language)]
b. *Mary realized that importance / significance
c. Mary realized the significance / importance of that
speech

The obligatory nature of the DP following *of* suggests, given standard assumptions, that this DP must be a direct or internal argument. Nouns such as *significance*, *importance*, and the like appear to be relational nouns, in other

words nouns which denote a function and take arguments (Dowty & Barker (1992), Hornstein *et al.* (1995), Borschev & Partee (2003), Dobrovie-Sorin (2005), Guéron (2006)). It appears therefore that a simple thematic characterization in terms of internal argument vs. non-internal argument does not distinguish between OC and NOC in DP either.

Further support for the idea that these nominalizations involve a shift in argument-structure relative to the adjectives they are derived from is provided by their distribution in copular sentences. The non-finite clause may be predicated of the adjective, but it may not be predicated of the nominalized form:¹⁷

- (42) a. Arriving early is significant / important / useful
b. It is significant / important / utility to arrive early
c. *Arriving early is the significance / importance / utility
d. *The significance / importance / utility is arriving early

The problem with (42c-d) is not that these nominal predicates cannot occur in a copular sentence, but rather, that the argument that the nominal is predicated of is distinct from the one that the adjective is. A copular sentence is fine as long as the obligatory argument remains within the DP and is not separated from the head noun by a copula. A distinct argument may occur in the post-copular position, as shown in the specificational clause in (43a). (43b), with the non-finite portions flipped, shows that the argument which is predicated in the

adjectival form (in (42a-b)), cannot be predicated of in the nominal form even in the presence of another non-finite DP as complement of the nominalization. This suggests, again, that it does not bear the same thematic relation to the nominal as it does to the adjective.¹⁸

- (43) a. The significance / importance of arriving early is
that we can get coffee before the session begins
- b. #The significance / importance of us getting coffee is
arriving early

These examples show that the argument structure of the nominalized form is not the same as the argument structure of the adjective it is derived from.

Assuming with Williams (1981) and Higginbotham (1985) (among others) that the external argument in nominals is the argument which instantiates or reifies its denotation, the external argument would be the post-copular clause in (43a).

This is consistent with the previous conclusion, based on (41), that the argument which is external in the adjective form is an internal or direct argument in the nominal form. The shift in argument structure characteristic of these nominalizations is schematized in (44). The underlined argument is the external argument.

- (44) Adjective < Arg₁ >
- Nominalization < Arg₂, Arg₁ >

Despite the shift in the argument status of the non-finite portion, from external to internal, the pattern of control is persistently NOC. That the shift in thematic status has no effect on the pattern of control suggests, at least preliminarily, that the thematic characterization of the infinitive relative to the nominal might not interact directly with control.¹⁹

That is not to suggest that the pattern of control in DP resists any clear analogy with clausal control. On the contrary, the distribution of OC and NOC seems to mimic the typology of control in the verbs and the adjectives which serve as input to nominalization. The most direct account of the parallelism would have the pattern of control determined once and for all within the input to nominalization, and would have that input fully transparent in nominalization. If the ingredients behind the typology of control are indeed fully syntactic, this will involve syntactic transparency and the syntactic derivation of nominalization from a structurally present VP or AP source (Hazout (1991), Borer (1993), Alexiadou (2001)). On a lexical account of nominalization and control, transparency might involve preservation of lexical-conceptual structure (though not of argument-structure per se). The observation that the pattern of control appears to be preserved despite possible shifts in argument-structure and / or the output of Merge suggests that some properties of derived nominals may be irrelevant for the typology of control. It doesn't seem to favor, in and of itself, one of these approaches over the other, and since

the choice between these possibilities depends on external factors, I leave it as an open question which properties of the derived nominal, thematic or syntactic, are irrelevant for the typology of control.

Alternatively, to the extent that shifts in argument-structure of the sort suggested for NOC nominalizations are further supported and better understood, it might be feasible to seek a relativized alternative to the standard typology of control, along the lines of the relativized Binding Theory introduced in Chomsky (1986). To recall, anaphors contained within DPs can take antecedents outside the immediate DP if that DP does not include an appropriate antecedent ('Mary heard rumors about herself' / *'Mary heard John's rumors about herself'). This approach might capitalize on the fact that both adjectival and nominal NOC predicates lack a higher agentive argument which could serve as controller and in this sense the nominal predicates are similar to their non-derived counterparts. If correct, NOC in clauses is likewise related to the unavailability of a proper clausemate antecedent, and only indirectly to the structural position or argument-status of the non-finite clause.

6. Conclusions

Once implicit arguments in nominalizations are taken into account, the control pattern in subject control nominalizations turns out to fall, uniformly, on the side of OC. Consideration of agentless control nominalizations has shown that

they are best analyzed as involving local control by an implicit agent. This is further supported by the interpretive properties associated with the infinitive subject which are characteristic of OC. Nevertheless, NOC does appear to exist in DP, observed with nominalizations of predicates which in clauses are associated with NOC. Furthermore, NOC in DP is sensitive to logophoricity in the same way that the clausal counterparts are. The existence of both patterns provides a new testing ground for the factors determining the typology in clauses, but whether or not these expectations are confirmed remains an open question and requires a clearer understanding of the effect of nominalization on the thematic standing of the embedded clause. Hopefully, the formulation of the prediction and the elimination of some options will provide a useful basis for future work.

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Notes

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² It is possible that (4a) and (4c) are slightly degraded on the intended reading when compared with nominals with a pronominal possessor:

- (i) a. Her attempt to learn Arabic frustrated Mary
b. Mary denied her attempt to learn Arabic

As pointed out by a reviewer, (4a) and (4c) raise the expectation that the attempter is distinct from 'Mary'. While this may indeed be correct, it does not bear directly on control, which involves the relation between the covert agent of the nominalization, however construed, and the infinitive subject. A similar point could be made regarding (i), since the pronoun could also be disjoint from 'Mary'. See below for discussion.

³ See Hornstein (1999) for discussion of these diagnostics.

⁴ Historically, the omissibility criterion introduced in Bresnan (1982) belongs to the earlier typology, which distinguishes OC and NOC based on whether the infinitive subject may also be overtly expressed (Rosenbaum (1967)).

⁵ The indexation of PRO and the grammaticality judgements for the embedded object reflect only these preferred readings. The fact that indexation and grammaticality of the object anaphor may vary with the interpretation of the agent leads to similar conclusions.

⁶ The biases for disjoint and coreferent interpretations illustrated in (13)-(14) are mere preferences which arise from the combination of the lexical meaning of the matrix predicate and the lexical meaning of the nominalization, and should not be conflated with the relation of control, neither NOC nor lexical control (Williams (1987), Culicover and Jackendoff (2001)). First, they are easily overridden depending on context. The predicate 'disapprove', for example, will usually be taken to refer to other people's actions, but one may of course disapprove of one's own, in which case the pattern of anaphora is affected accordingly; similarly 'repress', in the reverse direction. Second, the symmetry between coreference and disjointness implies that identification of the unexpressed agent is not akin to control, since there seem to be no control predicates of the sort in (13), which impose or prefer disjointness with a matrix argument. A non-c-commanding antecedent is allowed in NOC, but it is never singled out.

⁷ As long as the implicit agent can be associated with pronominal properties, its exact representation is not directly relevant to the present discussion. See Roeper (1993, 2004), Longobardi (2001), and Sichel (2009) for arguments in favor of its structural representation and Borer (1999) for the claim that it is *pro*. See also Epstein (1984) for *pro* as the implicit benefactive argument in clauses.

⁸ I set aside split antecedents since it is unclear what exactly to conclude from their behavior in nominalization, and they may not be a reliable criterion for NOC. Split antecedents are argued to be compatible with NOC infinitives, but not with OC, in (5-6) above.

Hornstein (2001) takes the contrast in (i) to imply OC with overt agents and NOC in agent-less nominalizations.

- (i) a. *Bill opposed Mary's intention to leave each other
b. Bill heard that Mary had condemned every plan to leave each other

The situation seems to be more complex. Split antecedents do appear to be possible, but only if both antecedents are locally associated with the nominalization, suggesting perhaps that split antecedents are possible with

overt agents as long as both antecedents are local, in (ii). Similarly, Landau (2000) observes that local split antecedents are possible with some uncontroversial OC predicates, in (iii):

- (ii) a. John's demand/request of Mary [PRO to perjure themselves in the trial]
- b. John's suggestion/proposal to Mary [PRO to perjure themselves in the trial]
- (iii) a. John persuaded Mary [PRO to testify for each other in court]
- b. John promised his son [PRO to go to the movies together]
- c. John proposed to Mary [PRO to meet each other at six]

The problem raised by these locality effects is that the combination of locality and split antecedents as a diagnostic for NOC is incoherent, since distant antecedents are freely available in NOC. If, on the other hand, split antecedents are not a genuine NOC diagnostic, the contrast between (ia) and (ii) reduces to the familiar requirement that the antecedent(s) in OC be local.

⁹ Boeckx & Hornstein (2003) judge N-bar deletion to allow also strict readings and to support the NOC analysis, based on (i):

- (i) John's attempt to sneak himself into the party was not as clever as Bill's
- While the elided portion in (i) certainly has a reading whereby Bill sneaks John into the party, this reading illustrates a strict interpretation of the embedded object, which may refer to John due to 'vehicle change' (see Fiengo & May (1994), Safir (1999)). Crucially, the infinitive subject, even in (i), must be interpreted as 'Bill', and the appearance of a reconstructed reflexive does not entail coreference and a strict reading of the infinitive subject.

¹⁰ OC infinitive subjects are also limited to bound variable readings, and exclude coreference, as in (5g). This diagnostic is set aside since the logic of the argument in (5g) is based on the factive nature of the matrix predicate and factive predicates with infinitives do not nominalize.

¹¹ Coindexation of PRO with one of the arguments in (28) and (29) is taken to indicate co-reference and not binding. As pointed out by a reviewer, it is feasible that the coreference readings in NOC are simply a consequence of the generic reading given by PRO_{ARB}, and this explains why c-command and locality are not observed in NOC. If so, the crucial difference between OC and NOC would be the availability of the arbitrary reading in the latter.

¹² See for example Stowell (1981), Grimshaw (1990), and Pesetsky (1991).

¹³ Recall the discussion in section 2, and the definition of logophoric center as the individual whose mental state is being reported.

¹⁴ The unavailability of direct object control may be related to limitations on the phrase-structure of derived nominals, similar to the unavailability of double objects in nominalization, and not directly to control. Having the embedded clause realized as a finite clause seems to be just as bad (*'the persuasion of John that he should leave').

¹⁵ Failure of c-command cannot be easily salvaged when the antecedent might be construed as a logophoric center, in (i), showing that it doesn't instantiate logophoric control:

- (i) Bill's advice to Hilary₁'s campaign₂ [PRO_{2/*1} to expose her / *herself as little as possible]

¹⁶ It appears that the only configuration in which the complement can be missing is with existential HAVE:

- (i) a. There was (some/little) importance / significance to that book
b. That book had (some/little) importance / significance

This is not surprising. Following Hornstein et al (1995), Partee (1999), Boneh & Sichel (to appear) on existential have, the subject of HAVE is a direct argument of the relational noun.

¹⁷ See Stowell (1981), who applies this test to control infinitives in nominalizations, and the conclusion that the incompatibility with the copular construction suggests that the infinitive is a complement.

¹⁸ A reviewer points out that with 'advantage', both versions are possible:

- (i) a. The advantage of us arriving early is getting coffee before the session begins
b. The advantage of us getting coffee before the session begins is arriving early

Note, however, that the shift from (ia) to (ib) has an effect on meaning. The denotation of *the advantage* changes, from getting coffee in (ia) to arriving early in (ib). These examples further illustrate the point in the text, that these nominalizations appear to involve a shift in argument structure, and that the argument which is predicated of in the adjectival form is internal in the nominal form.

¹⁹ One might also consider a return to an earlier account of the OC / NOC divide, according to which NOC is observed whenever the subject gap is not obligatory (Rosenbaum (1967) and Bresnan (1982)). This may seem appealing

at first glance, because the non-finite portion in DP NOC is a gerund and no gap need be included (in (41)). The problem, as noted already in the context of clausal control (see Landau (2000) for discussion), is that there exist OC infinitives in DP which alternate with for-to infinitives, in (i).

- (i) a. Mary's expectation to kiss Bob
- b. Mary's expectation for Bob to kiss her
- c. Mary's desire to kiss Bob
- d. Mary's desire for Bob to kiss her