Control Phenomena

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1 Introduction

The phenomenon of control has been at the center of syntactic theorizing since its introduction into the generative literature (e.g., Rosenbaum 1967; 1970; Postal 1970; Bresnan 1972; 1982; Jackendoff 1972; Bach 1979), where it was originally known as Equi-NP Deletion. To first approximation, control is understood as an interpretive dependency between two arguments, one of which is obligatorily unpronounced. The overt argument, known as the *controller*, determines, or "controls," the interpretation of the unpronounced one, the *controllee*. Below, the controllee is represented atheoretically as Ø and the control interpretation is indicated via coindexation. Typical examples are in (1).

(1) a. Jack_i tried [$Ø_i$ to climb the beanstalk]. subject control
    b. I persuaded Jill_i [$Ø_i$ to fetch a pail of water]. object control

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c. Mary_i thinks that [$Ø_{i/j/k}$ to be calm] would benefit John_j. non-obligatory control

d. Bob_i left [without $Ø_i$ saying goodbye]. adjunct control

Control resides at the intersection of syntax, semantics, and the lexicon. As such, any analysis involves several modules of the grammar and has consequences for a range of phenomena: the representation of argument structure, the categorial status of complements, the existence and identity of empty categories, the role of tense and finiteness, the mechanics of case and agreement, and others. Consequently, control serves as an optimal test case for a grammatical theory as a whole since its analysis typically relies on a large set of central assumptions. As Davies and Dubinsky (2007, 3) state, "control continues to provide an excellent window into generative models of syntax, and a useful tool for measuring the validity of their claims."

Although much work continues to focus on English, there is a large literature that has expanded beyond English and other typologically similar languages (see Engh and Kristoffersen 1997; Landau 2001; 2013; Davies and Dubinsky 2004; 2007; Stiebels 2007; Polinsky 2013, among others, for historical perspective, references, relevant data, and theoretical approaches). This chapter summarizes the core of the empirical domain that has typically been treated under the purview of control, states the most important questions in this domain, and outlines the dominant theoretical approaches to answering these questions. The organization is as follows. Section 2 highlights a fundamental division in the domain of control: the distinction between obligatory control (OC) and non-obligatory control (NOC). Section 3 presents the empirical landscape of control phenomena; these include the canonical control into arguments and control into adjuncts, as well as the more unusual backward control and copy control. Section 4 continues to focus on the empirical, exploring in more detail various characteristics of the controller and controllee. The data and discussion in sections 3 and 4 have important implications for current theories of control. These are discussed in section 5, with particular focus on two approaches within the Principles and Parameters framework, namely, PRO-based theories of control and the movement theory of control. Section 6 is a conclusion.

2 The OC/NOC distinction

Before moving into the empirical landscape, we introduce a distinction in control phenomena that has been central since the beginning and which was highlighted in Williams (1980): the *obligatory control* (OC) versus *non-obligatory control* (NOC) distinction.[1] OC is a restrictive control relation in which the controller is limited to arguments local to the clause containing the controllee. (2) is a slightly simplified version of Landau's (2013, 29–30) characterization of OC.

(2) *Characterization of OC*
In a control structure [… X_i … [$_S$ $Ø_i$ …] …], where X controls the Ø subject of the clause S,
   a. the controller X must be a co-dependent of S;
   b. Ø must be interpreted as a bound variable.

(2a) stipulates a local controller for OC, which is typically unique, as exemplified by the data in (3).

(3) a. Bob_i thinks that Thelma_j persuaded Louise_k [$\text{Ø}_{*i/*j/k/*l}$ to go to the store].
b. [Mary's_i sister]$_j$ saw John_k [after $\text{Ø}_{*i/j/*k/*l}$ crossing the room].

NOC, also called *free control*, in contrast to OC, places few restrictions on the antecedent of the missing subject. (4) is Landau's (2013, 232) characterization of NOC, with representative data in (5). The antecedent of Ø in such examples may variously be a noun phrase in the sentence, a discourse entity, or a logophoric center.[2] It may also receive a generic interpretation, indicated with the subscript arb(itrary) on Ø.

(4) *Characterization of NOC*
In a control structure [… [$_S$ Ø …] …],
a. the controller need not be a grammatical element or a co-dependent of S;
b. Ø need not be interpreted as a bound variable;
c. Ø must be [+human].

(5) a. Trevor_i knew that [$\text{Ø}_{i/j/k/arb}$ expressing her/his/my/your/one's opinion in public] offends Tanya_j.
b. [Ø_k Having traveled all day], the hotel was a vision indeed.
(Williams 1994, 87, ex. 32)
c. [Ø_i Having just arrived in town], the main hotel seemed to Bill_i to be the best place to stay.
(Williams 1994, 85, ex. 27a)

These minimal characterizations derive from a longer list of criteria that are typically offered to differentiate OC and NOC, given in (6–12). In the data we give each criterion followed by an OC example in (a) and an NOC example in (b) (see Williams 1980; Hornstein 1999, 73; 2003, 12–14; Landau 2000, 31; and Polinsky 2013 for further illustration, and Landau 2013 for critical discussion.)

(6) Only OC requires a linguistic controller
a. *It was expected Ø to behave herself in public.
b. It was suggested that Ø behaving herself in public was the right thing to do.

(7) Only OC requires a local controller
a. *Sue_i assumed that it was expected Ø_i to behave herself in public.
b. Sue_i assumed that Ø_i behaving herself in public was the right thing to do.

(8) Only OC has a unique controller
a. Mary_i persuaded Sue_k $\text{Ø}_{*i/k}$ to behave herself in public.
b. Mary_i persuaded Sue_k that $\text{Ø}_{i/k}$ behaving herself in public was the right thing to do.

(9) Only OC requires a c-commanding controller
a. *Sue_i's boss expects Ø_i to behave herself in public.
b. Sue_i's boss assumed that Ø_i behaving herself in public was the right thing to do.

(10) Only OC prohibits a strict reading under ellipsis
  a. Sue expects Ø to behave in public and Tom does too.
     = Tom expects to behave in public (sloppy reading)
     ≠ Tom expects Sue to behave in public (strict reading)
  b. Sue_i assumed that Ø behaving in public was the right thing to do, and Tom did too.
     = Tom assumed that him behaving in public was the right thing to do (sloppy reading)
     =Tom assumed that Sue behaving in public was the right thing to do (strict reading)

(11) Only OC prohibits a split antecedent for the controller
  a. *Tom_i told Sue_k $Ø_{i+k}$ to behave themselves in public.
  b. Tom_i told Sue_k that $Ø_{i+k}$ behaving themselves in public was the right thing to do.

(12) Only OC allows only a *de se* reading
  a. The unfortunate expects Ø to get a medal.
  b. The unfortunate expects that Ø getting a medal would be boring.

One of the first questions regarding a given control construction is whether it is OC or NOC. Although it would seem that such a choice should be clear based on (im)possible interpretations; this is not always the case. The various diagnostics above sometimes yield conflicting results. A well-known case is *wh*-infinitivals, discussed below.

A related issue of current debate is the distribution of OC versus NOC: under what conditions does each obtain? Manzini (1983) and Landau (2013) (see also Chomsky 1980; Williams 1980; and Bresnan 1982) argue that the determination of OC versus NOC is largely syntactic, governed by the position of the controlled clause. To first approximation, OC occurs with complement clauses, NOC occurs with subject clauses and extraposed clauses, and both OC and NOC variously occur with adjunct clauses. In contrast to the syntactic approach, Jackendoff and Culicover (2003, 524) propose that the distribution of OC versus NOC is determined, at least for arguments, by the semantic role assigned to the controlled clause. Wurmbrand (2002) adopts a mixed syntactic and semantic understanding of the distinction.

The remainder of the chapter will have relatively little to say about NOC and focuses mainly on OC, in large part because NOC has received much less attention in the theoretical literature and has not been well investigated beyond English (see Rosenbaum 1967; Grinder 1970; Hornstein 1999; Wurmbrand 2002; Boeckx and Hornstein 2007; Landau 2013, ch. 7, and references therein for development).

3 The empirical landscape

Control is not a narrow phenomenon; it arguably takes a variety of forms both within a single language and across languages, and what should be subsumed under the label "control" is continually under revision. Nonetheless, this section presents what we believe to be the core control phenomena in the literature.

Section 3.1 focuses on control into argument clauses. Section 3.2 describes control with adjunct clauses. Section 3.3 presents less common cases of control that have more recently received some attention in the literature: backward control and copy control.

3.1 Control into argument clauses

Control into complement clauses takes place with predicates that subcategorize for what Stiebels (2007) calls a state-of-affairs argument. This is the canonical case of OC. The embedded predicate in such cases may take a variety of forms (Stiebels 2007), including a non-finite verb phrase (13), an incorporated verb (14), a finite/ subjunctive complement clause (15), or a nominalization (16).

(13) a. Tanya$_i$ tried [Ø$_i$ to embarrass Philip].
b. Italian
Mario$_i$ ritiene [di Ø$_i$ aver finito il suo lavoro].
Mario believes COMP have.INF finish.PTCP the his work
'Mario believes that he has finished his work.'
(Rizzi 1982, 166, ex. 21)

(14) Yaqui
Ne kaa yi'i-bae.
I NEG dance-want.PRS
'I don't want to dance.'
(Guerrero 2004, 13, ex. 11a)

(15) Greek
I Maria$_i$ prospathi [na elegksi Ø$_i$ tin oreksi tis].
Maria try.3SG SBJV control.3SG the appetite her
'Maria tries to control her appetite.'
(Terzi 1997, 336, ex. 1)

(16) Standard Arabic
Ziyaad$_i$ qarrara [l-raħiil-a-Ø$_i$].
Ziyad decided.3MSG the-leaving-ACC
'Ziyad decided to leave.'

Control predicates in some languages select embedded interrogatives. Sentences (17a)–(17c) are examples from English. Of particular interest in the literature are issues regarding cross-linguistic availability of control into embedded questions – possible in English but not German, for example – and the issue of whether such constructions constitute OC or NOC. A complicating factor is the availability of a generic interpretation in (17c). See Landau (2000, 39–42), Jackendoff and Culicover (2003, 524), Barrie (2007), and Stiebels (2007) for discussion.

(17) a. Tanya$_i$ wondered [whether Ø$_i$ to stay a little longer].
b. Trevor$_i$ asked [how Ø$_i$ to prepare for his job interview].
c. Trevor$_i$ asked [how Ø$_{arb}$ to prepare oneself$_{arb}$ for a job interview].

Argument clauses may also be subjects, in which case they typically show NOC:

(18) Sue_i believes that [$Ø_{i/j/k/1/2/arb}$ to speak $\text{her}_i/\text{his}_j/\text{my}_1/\text{your}_2/\text{one}_{arb}$'s mind] would please John_j.

Exceptions to this generalization are discussed in Jackendoff and Culicover (2003, 535) and Landau (2013, 42). An understanding of why subject positioning facilitates NOC interpretations is an observation still to be fully explained.

3.2 Control into adjuncts

Control into adjuncts has received significantly less attention than control into arguments, and the facts are arguably more complex (see Faraci 1974; Bach, 1982; Huettner 1989; Jones 1991; Williams 1992; Landau 2000; 2013, ch. 6; Whelpton 2002; Adler 2006). The complexity results from adjuncts' (i) freedom of syntactic positioning and (ii) diversity of semantic function, both of which influence control behavior.

Regarding semantic function, there are two broad categories: participant-oriented adjunct control and event-oriented adjunct control (see Schultze-Berndt and Himmelmann 2004 for a similar dichotomy). Participant-oriented adjunct control involves an adjunct that modifies an argument of the clause, as is the case with depictives, (19), and resultatives, (20). The former "designate a state of affairs which holds at the same time as the eventuality encoded by the main predicate," while the latter "designate an eventuality which is a consequence, or result, of the eventuality encoded by the main predicate" (Schultze-Berndt and Himmelmann 2004, 65–66).

(19) a. Tanya_i ran to the backyard [$Ø_i$ barefoot].
b. Philip drinks his vodka_i [$Ø_i$ straight].
c. Paula ordered the fish_i [$Ø_i$ grilled].

(20) a. Philip boiled the zucchinis_i [$Ø_i$ soft].
b. The lake_i froze [$Ø_i$ solid].
c. The table_i was wiped [$Ø_i$ clean].

Both depictives and resultatives instantiate OC. While depictives can be controlled by at least subjects or objects (Stowell 1981; Bowers 2001, but see Marušič, Marvin, and Žaucer 2003 for additional controller options), resultatives are traditionally thought to be subject to the direct object restriction (Simpson 1983; Levin and Rappaport-Hovav 1995, 34), allowing control only by logical objects, as seen above. The exact source of this restriction, and even its correctness, is of some debate in the literature on resultatives (see, for example, Wechsler 1997; Rappaport-Hovav and Levin 2001; Rothstein 2004; Mateu 2005; and Secondary Predication in this volume).

Event-oriented adjunct control, on the other hand, involves an adjunct that modifies the matrix predicate. The sentences in (21) illustrate temporal adjuncts. The sentences in (22) illustrate VP-level purpose, result, goal, exchange, and stimulus infinitival clauses classified in Huettner (1989). These are adjuncts that are internal to the verb phrase according to standard constituency tests. In contrast, the examples

in (23) illustrate Huettner's (1989) S-level rationale and outcome clauses, which, according to Huettner, are outside the verb phrase.

(21) a. Trevor$_i$ left [before Ø$_i$ paying the bill].
b. Tanya$_i$ appreciated Philip better [after Ø$_i$ working closely with him on a project].

(22) a. Sue built the extra room$_i$ [Ø$_i$ to hold her sewing supplies].
b. John$_i$ awoke [Ø$_i$ to find the fire had gone out].
c. Sam$_i$ came along [Ø$_i$ to look after the children].
d. They gave Sue$_i$ ten dollars [Ø$_i$ to pose with a cobra].
e. Mary$_i$ blushed [Ø$_i$ to recall Tom's importunities].

(23) a. I$_i$ gave Scruffy a biscuit [(in order) Ø$_i$ to keep him quiet].
b. Mary$_i$ escaped [only Ø$_i$ to be recaptured].

The control properties of these adjuncts are quite intricate and even basic generalizations as to whether controller choice is structural or semantic are of some debate. Temporal adjuncts in their default position clause-finally show subject OC according to the diagnostics in (6–12). For example, they require a unique, local controller (24a); strict identity under ellipsis is ruled out (24b); and a non-human controller is allowed, which is only possible with OC, (24c).

(24) a. The boss$_i$ thinks that Tanya$_j$ will appreciate Phil$_k$ better [after Ø$_{*i/j/*k/*arb}$ finishing the project].
b. John$_i$ fell asleep [while Ø$_i$ watching the movie] and Bill did too.
(Adler 2006, 66, ex. 41)
= Bill fell asleep while watching the movie (sloppy reading)
≠ Bill fell asleep while John was watching the movie (strict reading)
c. The cake$_i$ looked delicious [before Ø$_i$ falling on the floor].
(Adler 2006, 67, ex. 42a)

When temporal adverbs are fronted, however, NOC is allowed:

(25) a. Mary$_i$ was baffled. [Even after Ø$_i$ revealing her innermost feelings], John remained untouched.
(Landau 2003, 481, ex. 21b)
b. [While Ø$_i$ in a coma], it seemed to me$_i$ that the world was on fire.
(Williams 1994, 87, ex. 34b)

Controller choice with other VP-level adjuncts is less clear. Huettner (1989, 92–96) suggests that they prefer internal argument controllers, but when none is available subject control becomes possible. However, there are different types of VP-level adjuncts and it is not obvious that they all have the same control characteristics.

S-level rationale clause adjuncts allow control by either "the matrix subject or the intentional causer of the matrix event/state" (Landau 2013, 225), (26). See Williams (1985), Roeper (1987), Huettner (1989). Various authors (Williams 1980; Huettner 1989, 129; Landau 2013, 225) have suggested that this is NOC but the behavior is not exactly the same.

(26) a. John$_i$ called Mary$_j$ [in order Ø$_{i/*j}$ to reassure himself/*herself].
b. The boat was sunk [in order Ø to collect the insurance].
c. The house was emptied [in order Ø to be demolished].

S-level outcome clause adjuncts, in contrast, show obligatory subject control (Huettner 1989, 120):

(27) a. John$_i$ bought a camera [only Ø$_i$ to break it].
b. *John bought a camera$_i$ [only Ø$_i$ to break].

Control into adjuncts thus shows a range of patterns that are a function of the attachment site of the adjunct and its semantic contribution, and work remains to be done in English and certainly other languages to determine the generalizations and appropriate theoretical mechanisms. Williams (1992) and Landau (2013), for example, argue that at least some cases of adjunct control – specifically participant-oriented control – involve structural predication (contra Chomsky 1981; Stowell 1981). Other cases, such as the preposed event-oriented adjuncts, seem to implicate NOC.

3.3 Additional control phenomena

All the control structures presented in the previous sections illustrate a canonical control configuration in which the overt controller c-commands the non-overt controllee, which cannot be phonologically realized. Relatively recently, further control phenomena have been documented which depart from this configuration. This section presents two: backward control and copy control. Such phenomena have been characterized as control because of the obligatory interpretational dependency between the two arguments and the interpretive characteristics of the dependent argument.

Backward or *inverse control* is the label given to control structures in which the control relation is hierarchically reversed: the null element c-commands the overt controller that determines the interpretation. A schematization using English word order is given in (28). (29) illustrates an example of backward subject control in Greek and backward object control in Malagasy. (30) is backward adjunct control in Telugu.

(28) Ø$_i$ tried [Bill$_i$ to finish the race]

(29) a. Greek
Ø$_i$ emathe [na pezi o Janis$_i$ kithara].
learned.3SG SBJV play.3SG John.NOM guitar
'John learned to play the guitar.'
(Alexiadou et al. 2010, 96, ex. 18)

b. Malagasy
inona no naneren' i Paoly Ø$_i$ [ho atao-ny$_i$]?
what FOC force Paul IRR do-3SG
'What did Paul force him to do?'
(Potsdam 2009, 772, ex. 43)

(30) Telugu
Ø$_i$ [Kumaar-ki$_i$ aakali wees-i] sandwich tinnaa-Du.
Ø.NOM [Kumar-DAT hunger fall-PTCP] sandwich ate-3MSG
'Having gotten hungry, Kumar ate a sandwich.'
(Haddad 2009, 82, ex. 30a)

Backward control, originally claimed for Japanese in Kuroda (1965) and Harada (1973), was first systematically documented and analyzed in Polinsky and Potsdam (2002) for the Nakh-Daghestanian language Tsez. The phenomenon is surveyed in Fukuda (2008). It has since been claimed for several languages, including Japanese (Fujii 2006), Malagasy (Potsdam 2009), Romanian and Greek (Alboiu 2007; Alexiadou et al. 2010), Mizo (Sino-Tibetan) (Subbarao 2004), Telugu (Dravidian) (Haddad 2009), and Assamese (Haddad 2011). Some of these languages license alternating control structures in which the overt element in a control relation may be pronounced either in the embedded clause or in the matrix clause (Haddad and Potsdam 2013).

Copy control is a control construction in which both arguments in a control relation are pronounced. The phenomenon is rather rare; it has been attested in Tongan (Chung 1978) and San Lucas Quiaviní Zapotec (Lee 2003; Boeckx, Hornstein, and Nunes 2007), as well as in a number of South Asian languages, including Dakkhini and Karnataka Konkani (Arora and Subbarao 2004), Telugu (Haddad 2009), and Assamese (Haddad 2011). (31) illustrates copy complement control in San Lucas Quiaviní Zapotec, while (32) shows copy adjunct control in Assamese.

(31) San Lucas Quiaviní Zapotec
R-càà'z Gye'eihlly g-auh (Gye'eihlly) bxaady
HAB-want Mike IRR-eat (Mike) grasshopper
'Mike wants to eat grasshopper.'
(Lee 2003, 102, ex. 83)

(32) Assamese
[kukur-to-r bʃiɲe lag-i] kukur-to/xi polai gɔl
[dog-CLF-GEN fear feel-PTCP] dog-CLF.ABS/he.ABS escape went
'Having got scared, the dog ran away.'
(Haddad 2011, 58, ex. 90)

These phenomena – backward control and copy control – challenge traditional theoretical approaches to control, which were largely built upon English facts and generalizations.

4 Refinements

This section refines the empirical observations from the previous section. Sections 4.1 and 4.2 discuss specific issues surrounding the controller and controllee, respectively.

4.1 Controller characteristics

Perhaps the core issue in the analysis of OC is the identification of the controller of the missing subject. The initial generalization in this domain was Rosenbaum's (1967; 1970) Principle of Minimal Distance (see also Martin 1996; Hornstein 1999; 2003; Manzini and Roussou 2000; Davies and Dubinsky 2004). (33) presents the formulation from Larson (1991). To first approximation, the controller for the missing subject is the "closest" c-commanding DP:

(33) *Principle of Minimal Distance* (MDP)
An infinitive complement of a predicate P selects as its controller the minimal c-commanding noun phrase in the functional complex of P.
(Larson 1991, 115)

We begin with this claim, not because it is necessarily the most successful, but because it is historically prior and most subsequent work is a reaction to it in some way. The generalization correctly accounts for a number of the core cases above. For complement control with predicates having only one DP argument, that DP is the controller. With predicates taking two arguments, typically a subject and an object, the object is the controller.

Digging a little deeper, however, things get more complicated and a number of phenomena, known since the 1970s, challenge the MDP, (34). They are discussed in turn below.

(34) a. subject control in the presence of an object (e.g., *promise*)
b. control shift
c. variable control
d. implicit control

One of the perennial challenges to the MDP involves commissive verbs like *promise* (Rosenbaum 1967; Postal 1970; Larson 1991; Landau 2001; 2004, and others). In many languages, these verbs can take an object yet still show subject control:

(35) a. Trevor$_i$ promised (Tanya$_j$) [Ø$_{i/*j}$ to be available].
b. I$_i$ vowed (to Zeus$_j$) [Ø$_{i/*j}$ to find the thief].
(Landau 2013, 3, ex. 10b)

c. Brazilian Portuguese
O João$_i$ prometeu à Maria$_j$ [que Ø$_{i/*j}$ iria embora].
the João promised to.the Maria that would.go away
'João promised Maria that he would leave.'
(Holmberg and Sheehan 2010, 143, ex. 51)

Similar cases involve *control shift*, where the controller shifts from the expected subject/object to the other argument as a consequence of some syntactic change in the embedded clause (Bresnan 1982; Comrie 1984; Farkas 1988; Sag and Pollard 1991; Panther and Kopcke 1993; Petter 1998; Landau 2013, 136–148, and others). (36) illustrates control shift from object control to subject control with *ask*, normally an

object control verb, while (37) illustrates control shift from subject to object control with the exceptional subject-control verb *promise*. In both cases, the shift is triggered by passivization in the complement clause. The acceptability of such examples is highly variable both within and across languages (Landau 2013, 136–138).

(36) a. Philip$_i$ asked Tanya$_j$ [Ø$_{*i/j}$ to behave herself].
b. Philip$_i$ asked Tanya$_j$ [Ø$_{i/*j}$ to be allowed to do the job himself].

(37) a. Trevor$_i$ promised Tanya$_j$ [Ø$_{i/*j}$ to leave].
b. Trevor$_i$ promised Tanya$_j$ [Ø$_{*i/j}$ to be allowed to leave].

In some cases, *variable control* exists, in which either the subject or the object may be the controller, with context determining a preference:

(38) a. Trevor$_i$ suggested to Steve$_j$ [Ø$_{i/j}$ to build a fence].
b. Tommy$_i$ begged his mother$_j$ [Ø$_{i/j}$ to stand next to her$_j$/him$_i$].
(Landau 2013, 35, ex. 89c)
c. German
Ich$_i$ habe ihm$_j$ angeboten [Ø$_{i/j}$ mich zu erschießen]
I have him.DAT offered me/myself to shoot
'I offered him to shoot myself.'
'I offered him to shoot me.'
(Wurmbrand 2002, 3, ex. 2a)
d. Chinese
Dahua$_i$ anshi Xiaomei$_j$ [Ø$_{i,j}$ keyi he yi-bei-bailandi].
Dahua signal Xiaomei can drink one-CL-brandy
'Dahua signaled Xiamei that he/she can drink a glass of brandy.'
(Stiebels 2007, 4, ex. 3)

Finally, there are cases where control is by an implicit argument, so-called *implicit control*. In implicit control, there is an unpronounced argument of the main predicate and it obligatorily controls the missing subject. Such control may be by a dative addressee, (39a), or a beneficiary (39b), among other roles.

(39) a. Trevor said/signaled [Ø$_{dat}$ to look at him].
'Trevor signaled to X for X to look at him.'
b. It is exciting [Ø$_{ben}$ to see the Pope].
'It is exciting for X for X to see the Pope.'

A related claim is that control by an implicit agent is impossible. This is Visser's Generalization (Chomsky 1965; Bresnan 1982), also sometimes formulated as: subject control verbs cannot be passivized:

(40) a. *It was tried (by Louise) to rob a bank.
b. *Frank was promised (by Mary) to leave.

Numerous attempts to explain this generalization exist (Chomsky 1977; Bach 1979; Williams 1980; Bresnan 1982; Chierchia 1984; Farkas 1988; Larson 1991; Sag and

Pollard 1991, and others), but consensus is building that the generalization is not correct. Either the data that it is supposed to explain have independent explanations, or it makes incorrect predictions (see Landau 2000, 169–179; 2013, 178–183; and Van Urk 2013 for discussion and reformulations). A clear counterexample is impersonal passives, (41), which are inconsistently allowed in English but widely allowed in other Germanic languages.

(41) a. It was decided to move forward.

(Landau 2013, 181, ex. 350a)

b. Dutch

Er	werd	geprobeerd	om	eekhoorns	te	vangen.
there	was	tried	COMP	squirrels	to	catch.INF

lit. 'There was tried to catch squirrels.'

(Van Urk 2013, 170, ex. 6a)

This range of phenomena has been used in the literature to argue against the MDP – or its derivatives – as the only principle that determines controller choice (but see Larson 1991; Martin 1996; Hornstein 1999; 2003; Manzini and Roussou 2000; Boeckx and Hornstein 2004; Hornstein and Polinsky 2010b). Most researchers conclude that controller choice is at least partially determined on semantic grounds (e.g., Postal 1970; Jackendoff 1972; Růžička 1983; Chierchia 1984; Farkas 1988; Sag and Pollard 1991; Rooryck 2000; 2007; Jackendoff and Culicover 2003; Landau 2013, among others), depending upon both the lexical semantics of the control predicate and the meaning of the controlled complement clause.

4.2 Controllee interpretation

The previous section focused on the controller. This section focuses on the controllee and its interpretation. Three types of controllee interpretation have been identified within the context of OC (Landau 2000 and others):

(42) a. exhaustive control
b. partial control
c. split control

In *exhaustive control* (EC), the referent of the controllee fully coincides with that of the controller. Landau (2000; 2013) indicates that EC structures obtain with implicative predicates (e.g., *manage*, *try*, *remember*) and evaluative adjectives (e.g., *rude*, *smart*, *kind*), as well as with some modal predicates (e.g., *be able to*, *should*) and some aspectual predicates (e.g., *begin*, *continue*, *stop*).[3] Representative examples are in (43). Note that a collective predicate, such as a verb modified by *together*, in the embedded clause is not possible if the matrix subject is singular because the embedded predicate requires a plural subject, which would then not be referentially identical to the singular matrix subject. Tense mismatch between the matrix and embedded predicates is not possible with EC.

(43) a. Yesterday Trevor$_i$ remembered [Ø$_i$ to work (*together) on the project (*tomorrow)].
b. Yesterday Trevor$_i$ was able [Ø$_i$ to leave/*gather before dinner (*tomorrow)].

Partial control (PC) involves overlapping reference between the controller and the missing subject. The referent of the controllee is a superset of the controller and need only contain the controller's referent. Landau (2013) discusses partial control in detail and credits Wilkinson (1971) with identifying the construction. The partial control reading is indicated using the index i+ on the controllee. Partial control is possible with factive predicates (e.g., *regret*, *hate*), desiderative predicates (e.g., *want*, *offer*), propositional predicates (e.g., *claim*, *deny*), and interrogative predicates (e.g., *wonder*, *know*) (Landau 2000, 2013). Unlike EC structures, PC constructions may contain collective predicates or *together* in the embedded clause even with a singular matrix subject because the subject need only be included in the referent of the missing subject. Partial control predicates also allow tense mismatch between the matrix and embedded clauses:

(44) a. Yesterday Tanya$_i$ hated [Ø$_{i+}$ to meet next week].
b. Yesterday Tanya$_i$ wanted [Ø$_{i+}$ to walk together to work tomorrow].
c. Trevor$_i$ wondered [whether Ø$_{i+}$ to gather in front of the entrance before the demonstration next Saturday].

PC judgments are rather subtle for many speakers and not all readily acknowledge the relevant contrasts between EC and PC (see Boeckx and Hornstein 2004; Rodrigues 2007; Bowers 2008). PC is not found in all languages (Słodowicz 2007 [Turkish]; Alboiu 2007 [Romanian]; Smouse 2010 [Sesotho]). Its theoretical basis is still a subject of some debate (see Landau 2000; Barrie 2004; Grano 2012; Pearson 2013; and Landau 2015, among others).

In *split control*, the referent of the controllee coincides with the joint referent of the matrix subject and object:

(45) a. Tanya$_i$ asked Trevor$_k$ [Ø$_{i+k}$ to work together].
b. German

Peter$_i$	vereinbarte	mit	Maria$_j$	[Ø$_{i+j}$	am	Abend	(gemeinsam)
Peter	agreed	with	Mary		at.the	evening	together
ins	Kino	zu	gehen.				
in.the	cinema	to	go.INF				

'Peter and Mary agreed on going to the cinema together.'

(Stiebels 2007, 5, ex. 6)

Split control generally is possible with verbs indicating a cooperative behavior but also verbs of communication, commitment, or request such as *propose* and *ask*. Split control is a type of OC (Madigan 2008; Fujii 2010). The question arises as to whether split control is a phenomenon distinct from PC. Landau (2000) and Fujii (2010) argue, contra Barrie and Pittman (2004), that the two are indeed different.

To summarize, the factors that determine the identification of the controller in control structures are still a matter of some debate. Syntactic, semantic, and lexical factors may all come into play. In addition, the complete identity of controller and controllee seen in canonical instances of control breaks down in a number of cases, requiring a more complex theory.

5 Theories of control

This section surveys a number of theories of control. These theories differ in substantive ways and in how they answer the following questions:

(46) a. Is there a syntactic element in the controllee position?
b. If there is a syntactic controllee, what is its identity?
c. Why is the controllee null?
d. What restricts the distribution of this null element to the subject position of certain subordinate clauses?
e. How is/are the control interpretation(s) determined?

Sections 5.1 and 5.2 present the two dominant approaches: PRO-based theories of control and the movement theory of control. Section 5.3 discusses restructuring approaches to control.

5.1 PRO theories of control

There are numerous theories within the Principles and Parameters tradition in which the silent embedded subject that we have been representing as Ø is identified as the null formative PRO:

(47) Tanya_i tried [PRO_i to succeed].

Each argument in (47) is assigned a separate theta-role. *Tanya* receives its theta-role from *try* while PRO receives its theta-role from *succeed*. In this way, the structure satisfies the Theta Criterion, which states that each argument bears one and only one theta-role, and each theta-role is assigned to one and only one argument (Chomsky 1981, 36). The coreferentiality of the arguments is indicated by coindexation. The PRO theory of control has had a number of instantiations in attempts to answer the questions in (46). The major stages are reviewed below.

In the early Government and Binding framework (Chomsky 1981; 1986), PRO was a nominal element that was simultaneously an anaphor and a pronominal. Given this dual specification, PRO was subject to both Principle A and Principle B of Chomsky's (1981) Binding Theory:

(48) *Binding Theory* (Chomsky 1981, 188)
A. An anaphor is bound in its governing category.
B. A pronominal is free in its governing category.

(49) The governing category for α is the minimal NP or IP containing α, a governor of α, and a SUBJECT accessible to α.

This leads to a contradiction unless PRO is in fact ungoverned and has no governing category, the so-called PRO Theorem:

(50) *PRO Theorem* (Chomsky 1981, 191)
PRO is ungoverned.

The PRO Theorem, in concert with the assumption that Case is assigned under government, accounted for the distribution of PRO and its non-overtness. PRO's lack of phonetic content was a consequence of the Case Filter, which required that phonetically overt elements be assigned Case (Chomsky 1981, 49). Being non-overt, PRO is exempt from the Case Filter. Furthermore, PRO was restricted to appearing only in ungoverned positions – essentially the subject position of certain non-finite clauses.

Chomsky and Lasnik (1993) revise Chomsky's (1981) analysis of PRO, arguing that PRO is in fact assigned Case – albeit a special kind of Case called Null Case – by non-finite T. This brings PRO in line with other NPs in being subject to the Case Filter and in requiring Case in order to be visible for theta-role assignment (Chomsky's (1986) Visibility Condition). Chomsky and Lasnik (1993) offer an empirical argument in favor of Null Case based on the ungrammaticality of (51a). If PRO is simply required to be ungoverned, movement from a Case position to an ungoverned, non-Case position as in (51a) should be licit. (51b) shows that this position is one that PRO can occupy. If PRO is Case-marked, however, the ungrammaticality of (51a) is parallel to that of (51c) with an overt noun phrase.

(51) a. *It is unfair [PRO_i to talk about t_i].
b. It is unfair [PRO to talk about John].
c. *It is unfair for [$John_i$ to talk about t_i].
(Chomsky and Lasnik 1993, ex. 311)

The non-overtness of PRO was stipulated as a characteristic of Null Case and the distribution of PRO was restricted by the fact that only certain non-finite Ts assigned Null Case.

The Null Case analysis was also not without problems, however (Hornstein 1999; Manzini and Roussou 2000; Martin 2001; Wurmbrand 2003; Landau 2013, 85–87). Empirically, both it and the Binding Theoretic approach were based on the claim that the position occupied by PRO was unique in its Case characteristics. This view has since been challenged by data from languages like Icelandic (Sigurðsson 1991), Latin (Cecchetto and Oniga 2004), Romanian, Arabic (San-Martin 2004), and others (see Landau 2006). These languages show that PRO occupies a Case position just like lexical DPs. Observe the Icelandic control structures in (52) (Sigurðsson 1991, 331–332, exs 8c–8d). Each sentence contains a case-marked floating quantifier, dative in (52a) and genitive in (52b). The floating quantifier necessarily agrees with the subject it modifies, indicating that PRO itself is dative or genitive, respectively.

(52) a. Strákarnir vonast til [að PRO leiðast ekki öllum
the.boys.NOM hope for to PRO.DAT be.bored.INF not all.DAT
í skóla].
in school
'The boys hope to not all be bored in school.'

b. Strákarnir vonast til [að PRO verða allra getið
the.boys.NOM hope for to PRO.GEN be.INF all.GEN mentioned
í ræðnnie].
in the.speech
'The boys hope to all be mentioned in the speech.'

Important cross-linguistic data such as these, which are crucially not restricted to the English-centric view of control that drove most of early theorizing, led to the conclusion that Case and finiteness are not the determining factors – or at least not the only determining factors – in the distribution of PRO. Accordingly, in the mid-1990s, not long after the Minimalist Program and its reductionist agenda were put into place, the PRO theory of control was further developed by a number of researchers (e.g., Martin 1996; San-Martin 2004; Landau 2000; 2004). Despite the advances, however, they retained the standard assumption that control structures involve two coreferential arguments or argument chains, one of which is PRO. The remainder of this section provides an overview of one particularly well-developed approach, namely, Landau's (2000; 2004; 2006; 2008) Agree Theory of PRO.

Landau's analysis holds that overt DPs (lexical DPs and *pro*) and PRO are in complementary distribution. The former are licensed in tense-independent clauses – root or embedded – in which I is positively specified for tense and agreement [+T, +Agr]. The latter, PRO, occurs in embedded clauses that contain I heads negatively specified for tense and/or agreement: [+T, −Agr], [−T, +Agr], and [−T, −Agr]. On this view, PRO is the elsewhere condition. Given that embedded clauses of control structures may be bigger than IP, where the features [±T] and [±Agr] reside, the head C of these embedded clauses may also be endowed with these features. The verb selects for the features of C, which then Agree with the features on I (Landau 2004, 839). [±T] is interpretable on I and uninterpretable on C; [±uAgr] is uninterpretable on both I and C. (53) represents the basic idea, although not all combinations of features are possible in Landau's system.

(53) V … [$_{CP}$ C[±uT,±uAgr] [$_{IP}$ I[±iT,±uAgr] …]]

The connection between the feature specifications of I/C and the referentiality of the complement clause subject is achieved using the feature [R(eferential)] from Reinhart and Reuland (1993). Overt DPs are referentially independent and thus specified as [+iR]. PRO, on the other hand, is referentially dependent, [−iR]. The feature [±R] has uninterpretable counterparts on I and C which are determined according to the algorithm in (54).

(54) *Uninterpretable R-assignment rule* (Landau 2013, 67)
  a. [+T, +Agr] → [+T, +Agr, +uR]
  b. [αT, βAgr] → [αT, βAgr, −uR], where α or β is −

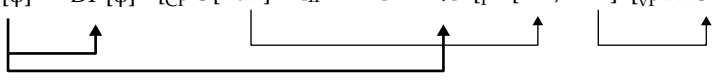
This picture yields I-heads with the feature specifications [+T, +Agr, +uR], [+T, −Agr, −uR], [−T, +Agr, −uR], and [−T, −Agr, −uR]. In the first case, the [+uR] feature on I can only be checked by a lexical DP. In the last three cases, [−uR] will be checked by PRO.

Instantiation of these various features yields the core cases of non-finite control. The different constructions are determined by the selection characteristics of the matrix predicate. We present the derivations for EC and PC to illustrate. See Landau (2004) for full explication, as we cannot do justice to the system here. In a typical example of EC with the implicative verb *forget*, (55a), the verb selects a CP specified as [−uT]. This is an anaphoric tense specification in which the embedded tense must

match the matrix tense. It explains why a tense mismatch between the matrix and embedded clause is not possible. Embedded I is [−iT, −uAgr, −uR].

(55) a. Last night, the manager$_i$ forgot PRO$_i$ to work on the project (*next week).

b. [I [φ] DP [φ] [$_{CP}$ C [−uT] [$_{IP}$ PRO [−iR, φ] [$_{I'}$ I [−iT, −uR] [$_{vP}$ ~~PRO [−iR]~~]]]]]

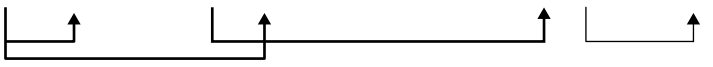


Agree relationships check the uninterpretable features in the structure. [−uT] on C is checked against the interpretable [−iT] feature on I. The uninterpretable [−uR] feature on I is checked by the [−iR] feature on PRO when PRO is in its base, vP-internal position. PRO then moves to Spec,IP. The control interpretation is ensured because the matrix I probe simultaneously Agrees in φ-features with the controller and PRO (shown by the thicker arrows). Control in the EC interpretation is thus direct: a relationship between the matrix clause and PRO.

The partial control reading with a PC verb like *decide* in (56a) arises from a second mechanism where the control relationship is mediated via the intermediate C head. In this case, the verb selects a CP specified as [+uT], which is an independent tense specification; thus, a tense mismatch between the matrix and embedded clauses is allowed. Unlike C[−uT] that lacks an Agr specification, C[+uT] may be specified as [+uAgr]. A positively specified Agr makes C a closer goal to matrix I than PRO. Thus, the matrix I can no longer Agree directly with PRO, as in (55). Instead, C mediates the relationship between I and PRO, ensuring control. At the same time, there can be a mismatch in the feature that determines partial control ([Mer(eology)] for Landau).

(56) a. Last night, the manager$_i$ decided PRO$_{i+}$ to gather next Thursday.

b. [I [φ] DP [φ] [$_{CP}$ C [+uT, +uAgr] [$_{IP}$ PRO [−iR] [$_{I'}$ I [+iT, −uR] [$_{vP}$ ~~PRO [−iR]~~]]]]]



The distribution and interpretation of PRO in (55), (56), and other control constructions depend on a complex interaction between tense and agreement on subordinate I and C, on the one hand, and on the operation Agree between the matrix functional layers v/I and subordinate I and C, on the other hand. Landau manipulates the feature specifications and the Agree relations to account for partial control, finite control, inflected infinitives, and other constructions. These phenomena were unexplained under the traditional PRO theory.

If Agree is not possible at all – for example, Agree cannot cross islands – the result is a logophoric PRO and non-obligatory control. This will arise with extraposed and subject clauses, as well as adjunct clauses, in Landau's system.

A major challenge to Landau's and other versions of the PRO theory of control is how to account for instances of backward and copy control (see section 3.3). These contain an overt DP in the position of PRO. Such phenomena are unexpected in a theory that derives the complementary distribution of lexical DPs and PRO.

Landau's system simply stipulates that PRO is unpronounced, in contrast to earlier Binding Theoretic and Null Case theories, where it was a theorem. This perhaps opens up the possibility that PRO could be lexicalized under certain circumstances.

Landau (2015) raises further challenges for the Agree Theory of PRO. The analysis replaces much of the machinery with more semantically sophisticated elements, accounting for new generalizations at the same time. This updating of the PRO-based analysis will undoubtedly play an important role in future theorizing and empirical investigations.[4]

5.2 The movement theory of control

Despite its success in accounting for a diverse range of phenomena, the machinery in Landau's analysis is considerable, and thus not entirely in line with minimalist desiderata. An alternative approach to control which attempts to reduce the required machinery is the movement theory of control (MTC) (Hornstein 1999; 2001; 2003; Boeckx and Hornstein 2003; 2004; 2006; Hornstein and Polinsky 2010a; see O'Neil 1997; Lidz and Idsardi 1998; and Manzini and Roussou 2000 for similar proposals). The leading idea in the MTC is that the relationship between the controller and the controllee is movement-derived; the controller and controllee do not constitute two distinct argument chains.

Within the Principles and Parameters tradition, one of the main arguments against a movement analysis of control was that such an approach violates the Theta Criterion and the Projection Principle. Minimalism attempts to eliminate such principles if they are not conceptually necessary. Jettisoning the Theta Criterion allows multiple theta-roles to be assigned to a single argument chain. As a result, a DP can move from one theta-position to another, as in (57a). The DP *Tanya* will first be assigned a theta-role by the embedded verb *succeed* before moving into the matrix clause and receiving a theta-role from *try*. The derivation is given in more detail in (57b), which uses the Copy Theory of Movement. The controller checks the embedded external theta-role in Spec,vP. It then moves to the embedded subject position to satisfy the EPP. From there it moves to the matrix Spec,vP to check the external theta-role of the control verb. Finally, it moves to the matrix subject position to check Case and the EPP.

(57) a. Tanya tried [~~Tanya~~ to succeed].
b. [$_{TP}$ Tanya T [$_{vP}$ Tanya v [$_{VP}$ tried [$_{TP}$ Tanya to [$_{vP}$ Tanya v [$_{VP}$ succeed]]]]]].

On the assumption that movement must be motivated, the checking of theta-roles must be able to satisfy that requirement (Hornstein 1999), in addition to the more typical motivations due to EPP or Case checking. At PF, all but the highest copy of *Tanya* is deleted for purposes of linearization (Kayne 1994; Nunes 2004).

Under the MTC, NOC arises in configurations out of which movement is impossible, such as subject islands and embedded questions (Hornstein 1999; Boeckx, Hornstein, and Nunes 2010b).[5] Instead, NOC makes use of *pro* as a last resort strategy.

Proponents of the MTC claim that it provides more principled answers to two of the central questions in (46): the identity of the controllee and the non-overtness of the controllee. The controllee is a trace/copy of A-movement, an independently motivated category in minimalist syntax. Its non-overtness follows from whatever accounts for copies/traces normally not being pronounced.

There has been much written on the merits of the MTC. Empirically, the movement approach is capable of accounting for backward and copy control structures (Polinsky and Potsdam 2002; Potsdam 2006; Boeckx, Hornstein, and Nunes 2007; Haddad 2009; 2011; Hornstein and Polinsky 2010b). This success is due to analyzing control as movement coupled with the Copy Theory of Movement and the option of pronouncing non-highest copies (Nunes 2004). Backward control results when the embedded copy of the moving DP is pronounced and the matrix copy is not, (58a). In ordinary (forward) control, the higher copy is pronounced, as is more typical in chain reduction, (58b).

(58) Greek

a.	~~O Janis~~	emathe	[na	pezi	o Janis	kithara].
		learned.3SG	SBJV	play.3SG	John.NOM	guitar
b.	O Janis	emathe	[na	pezi	~~o Janis~~	kithara].
	John.NOM	learned.3SG	SBJV	play.3SG		guitar

'John learned to play the guitar.'

(Alexiadou et al. 2010, 96, ex. 18)

Copy control structures, on the other hand, involve the pronunciation of two copies, and as such they may be considered as instances of multiple copy spell-out, a phenomenon that is not limited to control (see Nunes 2004).

Criticism of the MTC comes from all sides (see Culicover and Jackendoff 2001; 2006; Landau 2003; 2007; Rooryck 2007; Bobaljik and Landau 2009; Modesto 2011; Ndayiragije 2012; Wood 2012, among others). Perhaps foremost is the MTC's theory of controller choice. While most theories acknowledge a prominent place for semantics in determining the controller in OC (see section 4.1), the MTC attributes controller choice in OC to the narrow syntax, dismissing claims that the choice of controller might be determined by semantic and pragmatic factors. In other words, the MTC remains firmly wedded to a syntactic account and the core claim of the MDP, (33). The MDP is a theorem of the MTC, deriving from the locality of A-movement. The controller must be the most immediate c-commanding argument position because A-movement to a less local argument position would violate minimality (Rizzi 1990; 2004; 2011). Thus, cases like *promise*, control shift, and variable control discussed in section 4.1 are potentially problematic (see Boeckx and Hornstein 2004, 439–440; Hornstein and Polinsky 2010b for discussion). Implicit controllers also pose a challenge if they are not syntactically represented (Rizzi 1986), as there would be no syntactic position for the controllee to move to (see Boeckx and Hornstein 2004, 438–439).

Partial control poses a challenge to the MTC because it requires non-identity between the controller and controllee but, under the MTC, these two are (identical) copies. Various researchers have offered analyses of PC within the MTC (Hornstein 2003; Barrie 2004; Rodrigues 2007; Witkoś and Snarska 2009; Boeckx, Hornstein, and Nunes 2010b), which Landau (2013) critically reviews.

Another challenge to the MTC comes from the claim that the controllee position is, in many cases, an ordinary Case-marked position (see the discussion of the Null Case analysis in section 5.1 above). Original formulations of the MTC (e.g., Hornstein 1999) used the lack of Case at the controllee site as a driving force for movement. The DP must move to have its Case-feature checked. If the embedded clause also contains a Case-position, however, the movement chain will check Case multiple times. MTC proponents have offered two responses to this situation. One is to deny that Case is actually checked in the complement clause, despite appearances (Drummond and Hornstein 2014). Alternatively, a number of researchers simply acknowledge that multiple Case checking in a single chain exists (Bejar and Massam 1999; Merchant 2006; Haddad and Potsdam 2013, and others). A particularly celebrated case informing these issues is control in Icelandic (Thráinsson 1979; Sigurðsson 1991; 2008; Boeckx and Hornstein 2006; Bobaljik and Landau 2009; Boeckx, Hornstein, and Nunes 2010a; Wood 2012; Drummond and Hornstein 2014).

Finally, numerous arguments against the MTC have been proposed based on the derivational similarity between control and raising under the MTC. While proponents of the MTC take great pains to point out that the MTC is a *movement* theory of control not a *raising* theory of control, the naïve expectation is that raising and control will behave similarly in areas where the difference in the number of theta-roles involved seems irrelevant. Several of the first arguments against the MTC in Landau (2003) are of this form.

In summary, the two dominant syntactic approaches to control, the PRO theory and the MTC, differ in substantive ways. Simplifying greatly, there is a contrast between empirical coverage and theoretical parsimony. The two theories have generated substantive discoveries, the sign of a productive theoretical exchange.

5.3 Restructuring analyses

The PRO theory of control and the MTC are alike in taking control constructions to be fully biclausal. Both the control verb and the embedded verb constitute their own clausal domain:

(59) $[_{CP}$ … control-verb $[_{CP/TP}$ … embedded-verb]]

There is a long-standing tradition of analyzing the controlled clause as a TP or CP (formerly S′) (Chomsky and Lasnik 1977; Chomsky 1981; Koster and May 1982; Manzini 1983; Bouchard 1984; Boškovic 1997, and others). Given standard Principles and Parameters assumptions, this necessitates a subject in the matrix clause and one in the embedded clause, occupied by either PRO or a trace of movement. An alternative approach, which variously goes by the name of *restructuring* or *clause union*, denies that there are two distinct clauses and takes control to be a fundamentally monoclausal construction. The clause union analysis reached a peak of popularity in the 1980s (Bach 1979; Bresnan 1982; Chierchia 1984; Dowty 1985; Culicover and Wilkins 1986), but has recently seen a resurgence with the advent of more articulated clause structures (Cinque 1999; 2001; 2004; 2006; Wurmbrand 2002; 2003; 2004; Grano 2012).

Wurmbrand (2004) identifies two ways in which a structure such as (59) might be reduced. In *lexical restructuring*, the control verb is the main, lexical predicate of the clause and it selects a reduced complement headed by the embedded verb, typically a VP which lacks an external argument. Only the control verb has an external argument. In *functional restructuring*, the control verb is a type of auxiliary or functional head in the inflectional layer and the embedded verb is the lexical head of the clause. In this case, only the embedded verb has an external argument. These two scenarios are schematized in (60), where vP is the projection that introduces the external argument (EA).

(60) a. *Lexical restructuring*
[$_{CP}$ … [$_{vP}$ EA [$_{VP1}$ control-verb [$_{VP2}$ … embedded-verb]]]]
b. *Functional restructuring*
[$_{CP}$ … [$_{FP}$ control-verb [$_{vP}$ EA [$_{VP}$ … embedded-verb]]]]

The fundamental difference between these two variants is whether the control verb is analyzed as a lexical or functional head. Functional heads according to Cinque (2006) occur in the non-thematic portion of the clause. They are subject to ordering restrictions, do not have any arguments (including an external argument), and have unique complement types. Lexical heads, in contrast, are in the thematic domain and have argument selection properties. Because of the tight syntactic and semantic connection between the two predicates in both types of restructuring structures, it is typically exhaustive control (EC) predicates that are most amenable to such analyses.

Wurmbrand presents evidence from clause-bound A-movement for lexical restructuring with some German EC predicates. For example, long passivization of the embedded verb's object to the matrix subject position, across the control verb, is possible with the EC verb 'try' in (61a). This option is not available to the non-restructuring verb 'plan', (61b). Wurmbrand argues that the contrast arises because the complement of 'try' does not contain an external argument controllee that blocks the movement, while the complement of 'plan' does.

(61) German
a. … dass der Traktor zu reparieren versucht wurde
that the tractor.NOM to repair tried was
lit. 'that the tractor was tried to be repaired'
'… that they tried to repair the tractor'
b. *… dass der Traktor zu reparieren geplant wurde
that the tractor.NOM to repair planned was
'… that they planned to repair the tractor'
(Wurmbrand 2003, 57; exs 46a–46b)

Cinque (2004) argues that functional structuring obtains in Italian. As a consequence, control predicates are rigidly ordered, as his work has independently argued is the case for functional heads more generally. For example, *volere* 'want' and *smettere* 'stop' require the order *volere* > *smettere*, (62). This is a reflection of the universal ordering of volitional modality before terminative aspect.

(62) Italian
a. Non vi vuole smettere di importunare.
NEG 2PL want.3SG stop.INF di bother
'He doesn't want to stop bothering you.'
b. *Non vi smette di voler importunare.
NEG 2PL stop.3SG di want.INF bother
('He doesn't stop wanting to bother you.')
(Cinque 2006, 18, ex. 29)

Haddican (2005) argues that both lexical and functional restructuring are present in Basque and are morphologically distinguished.

A consequence of the functional restructuring configuration, (60b), is that the control verb lacks an external argument and is akin to a raising verb (Cinque 2006). This initially seems unwelcome in that a hallmark of control verbs is that they impose selectional restrictions on their subjects:

(63) Mary/*The storm wanted to avoid a disturbance.

Cinque (2006) suggests that the restrictions are a consequence of the verb's semantics. Grano (2012) proposes that control verbs are subject-oriented raising predicates. They contain a dependent variable which comes to be bound by the surface subject.

It seems clear that not all cases of OC can be reduced to restructuring. Landau (2004) highlights the relevance of Hebrew finite control,[6] which shows that the complement may be propositional. What remains to be fully articulated is the conditions under which restructuring does obtain, ways in which restructuring can be identified, distinguishing characteristics of the two types of restructuring, and issues regarding the obligatoriness of restructuring.

6 Conclusion

The topic of control has been at the forefront of theorizing in generative grammar from the mid-1960s. Since that time, the empirical domain has deepened both within English and cross-linguistically. The chapter began with a survey of the major control phenomena that have been the focus of attention: subject and object complement control, but also adjunct control and more recently backward and copy control. The dominant theoretical approaches to these data within Principles and Parameters were then discussed. The standard analysis remains one that invokes the null formative PRO; however, the MTC and restructuring alternatives fare well in certain empirical domains. The current analytical trend is toward a non-unified approach to control phenomena, utilizing multiple analyses (Wurmbrand 2002; 2003; Dubinsky and Hamano 2007; Van Urk 2010; Grano 2012). Landau's (2015) reformulation of the PRO-based Agree Theory of control could also be seen as an instance of this trend. Even if control is not a single analytical phenomenon, the analysis of control phenomena will continue to play a central role in theory construction and testing.

SEE ALSO: Accusative Plus Infinitive Constructions in English; Gerundive Nominalizations; Implicit Arguments; Inflected Infinitives in Romance; Secondary Predication; Verb Clusters, Verb Raising, and Restructuring

Notes

1. From the outset, Transformational Grammar distinguished Equi-NP Deletion (OC) from Super-Equi-NP Deletion (NOC) (Rosenbaum 1967; Grinder 1970).
2. A logophoric center is an individual or individuals whose speech, thoughts, feelings, or general state of consciousness is being reported. See Clements (1975), Sells (1987), and Büring (2005), among others.
3. The latter two types may be ambiguous between raising and control predicates. Diagnostics can be used to distinguish the two (Perlmutter 1970; Davies and Dubinsky 2007; Polinsky 2013; Landau 2013, and others).
4. Because the paper was still in manuscript form when this chapter was written, we do not present the analysis here.
5. Adjuncts receive a different treatment involving sideward movement, allowing OC. See Hornstein (1999; 2001) for details.
6. See Hashemipour (1988), Terzi (1992) (Greek), Uchibori (2000) (Japanese), Ghomeshi (2001) (Persian), Landau (2004) (Hebrew), Potsdam and Polinsky (2007) (Malagasy), and Lee (2009) (Korean) for further discussion of finite control in various languages.

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