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Towards a comprehensive Construction Grammar account of control

A case study of Swedish infinitives*

Benjamin Lyngfelt
University of Gothenburg

Based on an extensive corpus study, this paper presents an overview of control patterns in Swedish infinitives and sketches a CxG account of the data. To capture the variety of control relations encountered, the approach combines elements of traditional CxG, Frame Semantics, and Sign-Based Construction Grammar. Three basic mechanisms are distinguished: control by selection, where the controlled element is coinstantiated with an argument of the selecting head; control by feature percolation, where the interpretation is determined by the syntactic and pragmatic context; and arbitrary “control”, which is treated as non-control, where the understood subject argument is specified for generic or arbitrary reference and, hence, needs no controller. More specific control patterns, including such issues as control shift and pragmatic control, are treated as specific variants of these three basic types.

Keywords: control, infinitive, implicit subject, Swedish, Construction Grammar, valence, frame, external argument, locality

1. Introduction

Constructions are typically treated as conventionalized pairings of form and meaning (or form and function) — both within frameworks such as Construction Grammar (henceforth CxG) and elsewhere. In other words, they are basically

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treated as signs, in the Saussurean sense. This is a pretty straightforward approach as long as it concerns constructions of some substantial form, such as specific morphemes or phrase types, even highly schematic ones, but perhaps somewhat less so when it comes to meanings connected to implicit elements and interpretive relations between different constituents. A challenging case at hand is control — the interpretation of understood subjects in non-finite clauses, such as infinitives and gerunds. Such subjects are obligatorily implicit, and their interpretation depends on factors outside the local clause.¹ Thus, control cannot be covered by some infinitival or gerund construction alone, but requires some way to account for the relation between the implicit subject and some other coreferential element in the context — its controller.

Most accounts of control focus on a subset of control structures, such as obligatory control in infinitival objects, or pragmatic (also called logophoric) control in adverbial adjuncts.² In this paper, I will assume a more general approach to control, from a constructional perspective. The account will be based on a corpus study of control in Swedish presented in Lyngfelt (2002).³ Lyngfelt investigated some 9,000 infinitival clauses in the Swedish Parole corpus, which consists of about 20 million running words. Although the study is restricted to infinitives, it offers extensive coverage of control structures in Swedish, since Swedish employs infinitives in most cases where e.g. English would use a gerund.

Due to the large variety of control patterns recognized, I will not propose full-fledged CxG analyses of them all. Instead, I will present a typology of control structures, outline simplified accounts for each basic type, and lay a foundation for explicit formalizations. The approach is headed in the direction of Sign-Based Construction Grammar (Sag 2007, 2008, in press; Michaelis in press; cf. also Sag et al. 2003, ch. 16).⁴ Since the empirical basis is Swedish, the analyses sketched

1. There is some disagreement on whether these infinitives etc. are clausal or merely VPs (or, as in Culicover & Jackendoff's (2005) model, some of them are infinitival clauses and others are infinitival phrases). Since nothing in the present account hinges on this, I will remain largely neutral on the matter, and any occurrences of terms like *infinitival clause*, used for convenience, should not be taken as a theoretical commitment. Most of the time, such structures will simply be called *infinitives*.

2. For reasons of space, I will not review the vast literature on control here. For an overview, see e.g. Davies & Dubinsky (2004, 2007), Landau (2000), Larson et al. (1992), or Lyngfelt (2002, 2009).

3. Lyngfelt (2002) proposes an Optimality-theoretic analysis of the data. The book is written in Swedish; for a preliminary version in English, see Lyngfelt (2000).

4. Sign-Based Construction Grammar (SBCG) is "a formal implementation of Construction Grammar" (Michaelis in press) and may be characterized as a hybrid between Construction Grammar and Head-Driven Phrase Structure Grammar (cf. Pollard & Sag 1994). A distinguishing

will pertain to Swedish constructions. Nevertheless, as should be evident from the examples in this presentation, virtually identical control patterns also occur in English and other related languages, and the proposed typology should be relevant for these as well. Although the distribution of various kinds of non-finite clauses varies greatly across languages, their interpretation patterns are strikingly similar.

I will argue that there are three basic types of control, which are illustrated in (1): complement control (1a–b), which is presumably lexically determined; so-called arbitrary control (1c), which is essentially non-control; and the rest (1d–e), which consists of a variety of patterns dependent on the syntactic and pragmatic context, and which display fundamental similarities across categories. Different kinds of CxG analyses will be suggested for these three basic types. In all examples, the understood subject of a non-finite clause will be marked by an index at the left edge of the verb, following Culicover & Jackendoff (2005) — even when not coindexed with another syntactic element, as in (1e).⁵

- (1) a. She_i promised me_j to_i think about it.
 b. She_i persuaded me_j to_j do it after all.
 c. Just_{arb} watching football is no fun.
 d. The students_i were assigned another project to_i report on.
 e. After_i flying from Europe to California, the jetlag was tough but not unbearable.

In (1a), the understood subject is controlled by the matrix subject; and in (1b), by the matrix object. Presumably, this difference depends on the meaning of the matrix verbs, which in CxG terms means that the control relations are specified by the lexical constructions for *promise* and *persuade*, respectively (cf. Section 2). In general statements such as (1c), on the other hand, the understood subject receives a generic or arbitrary reading. Although the intended interpretation may be quite obvious in a given context, the sentence is *presented* as true for any arbitrary individual. In other words, there is no controller, which is why arbitrary “control” is essentially non-control (cf. Section 3).

By contrast, the reference of the understood subjects in (1d–e) is neither lexically determined by a complement-taking head, nor specified for an arbitrary

property of SBCG that concerns the present treatment of control is a more hierarchical view of clause structure than in some other variants of CxG. The present approach is influenced by SBCG, but I will not offer a full-fledged SBCG formalization here. For the most part, the analysis will be grounded in more traditional CxG.

5. I do not employ the common marker PRO, since that notation is theory-laden with assumptions that it represents an invisible pronoun, especially within Chomskyan grammars. In a CxG setting, no such assumption is needed.

reading. Instead, the interpretation depends on the context — both syntactic relations, as in (1d), and pragmatic aspects, as in (1e). The specific interpretation patterns vary somewhat according to construction type; but I will argue that the interpretive strategies are essentially the same, and that the relations can be accounted for by the same basic mechanisms (cf. Sections 4–6).

Note the contrast between (1c) and (1e), the first a case of arbitrary “control” and the other illustrating what we may call pragmatic control. In neither case is there a syntactically realized controller, and in both cases the interpretation depends on pragmatics. However, they differ in one crucial respect: The adverbial adjunct in (1e) requires some kind of controller, whereas the non-finite subject clause in (1c) does not. Although the arbitrary reference in (1c) may be biased towards a pragmatically salient interpretation, this is characteristic of other generic constructions as well (e.g. the pronoun *one*) and not really a matter of control. Also note that there is a clear difference in distribution: arbitrary “control” structures typically appear in argument positions, whereas pragmatic control occurs in adjuncts.

2. Complement control

The discussion of complement control has mainly been concerned with verb complements, specifically infinitival object clauses. This section will focus on verb complements as well, but complements of nouns and adjectives will be brought into the picture in Section 4. Infinitival verb complements in Swedish come in three basic types: (mono-) transitive, ditransitive, and predicative constructions.⁶ In simple transitive structures (cf. Section 2.1), the understood subject is usually controlled by the matrix subject, although there are also some cases of arbitrary “control”. In ditransitive structures (Section 2.2), the dominating pattern is object control with some prominent exceptions displaying subject control. Predicative complements (also called subject complements), which have been largely ignored in the control literature, behave entirely differently from other complement structures with respect to control, and will be treated separately in Section 6.

Complement control has been the object of hosts of analyses (usually focusing on object infinitives). These are divided into two main camps: either purely syntactic, based on phrase structure configurations, or lexicalist, assuming that the choice of controller in complement control structures is determined by the matrix verb. The CxG tradition adheres to the lexicalist approach, as illustrated by the following analysis of the English control verb *try*:

6. The term *transitive* is used in a broad sense, including both objects and PP complements. Thus, *ditransitive* implies two complements but not necessarily two objects.

			TRY
syn	[cat: v]		inherit Subject
sem	frame TRY		
	FE #2 [Attempter]		
	FE #3 [Desired event]		
	...		
val { #2	syn #1 []	, #3	syn [cat vp _{inf}]
	rel θ agt		rel gf comp
	DA +		DA -
			sem frame []
			FE #1 []
			val { #1 [rel [gf subj]] }
lxm	try		

Figure 1. Minimal valence of *try* (Fried & Östman 2004: 64)

In the analysis in Figure 1, taken from Fried & Östman (2004), the understood subject is represented as a val(ence) feature in the infinitival complement (FE #2) of *try*. The subject function of this val feature is represented in its rel (syntactic relation) value, and its obligatory implicitness follows from not having any syn (syntactic representation) feature. As for the control relation, it is treated as coinstantiation; both the agent of *try* and the subject of the subordinate predicate are instantiated by the same syntactic element (as indicated by the index #1 marking both elements).⁷ The analysis is lexicalist in the sense that the coinstantiation relation is part of the specification of the (lexical) *try* construction.

I will adhere to the general lexicalist gist of this approach. However, as will be shown below, not all cases of complement control can be accounted for by a straightforward coinstantiation relation as in Figure 1. In particular, it cannot be applied to control shift (cf. Section 2.2).

2.1 Monotransitive structures

Infinitival complements in ordinary (mono-)transitive verb phrases display quite consistent control behavior. Almost invariably, the understood subject is coreferent with the matrix subject, as illustrated in (2).⁸ In objects, the infinitival marker

7. For a full explication of the formalism, see Fried & Östman (2004).

8. All Swedish examples in the text are taken from the Swedish Parole corpus, unless otherwise noted. Apart from indices for coreference, the following abbreviations will be used in the glosses, where relevant: DEF for definite, POSS-REFL for possessive reflexive, S for an *s*-suffix employed in passives and middles/unaccusatives, GEN for genitive, BARE for bare noun, UT for utter/non-neuter (gender), and NEUT for neuter.

is typically optional, as in (2a), whereas in PP complements, it is obligatory, as in (2b) using the preposition *med* ('with').⁹ This slight structural difference is of no consequence with respect to control, however.

- (2) a. Ändå vägrade hyttmästaren_i (att)_i ge henne avtalsenlig
yet refused furnacemaster-DEF_i (to) give her agreement-according
 lön. [att present in original]
salary-BARE
 'Yet the furnace master refused to give her the stipulated salary.'
- b. Vem_i misslyckades med att bli en kartongmänniska?
who_i failed with to become a cardboard-person
 'Who would fail to become a cardboard person?'

The standard pattern may be schematically represented as in (3) below. (3a) illustrates direct infinitival verb complements, whereas (3b) shows the PP variant. Note that the infinitival marker *att* is optional in (3a) but obligatory in (3b).

- (3) a. [NP_i V [(att)_i VP]]
 b. [NP_i V [P [att_i VP]]]

The control relation is coreference, not identity. The subject arguments of the infinitive and the matrix clause have separate semantic roles and are therefore distinct, although coreferential, elements. This is the key characteristic distinguishing control from raising auxiliaries. One may still, however, treat control as a form of unification, as long as the semantic roles are being kept distinct, as in Figure 1 above (cf. Fried & Östman 2004: 63ff.).

There is also an empirical difference between auxiliaries and control verbs in that subject control is not obligatory in all monotransitive complement control structures. As shown in (4), there also exist a few cases of arbitrary "control":

- (4) a. Stefan föreläser om att_{arb} hitta humorn i tillvaron [...] (Google)
Stefan lectures about to_{arb} find humor-DEF in existence-DEF
 'Stefan is lecturing about finding the humor in existence'
- b. [...] jag o en polare diskuterade att_{arb} bygga hus. (Google)
I and a friend discussed to_{arb} build house-BARE
 'A friend and I discussed building houses / house building.'

In these sentences, the implicit subject arguments are not coreferential with their matrix subjects. Instead they receive an arbitrary, generic reading (although, out of context, at least (4b) would be ambiguous between an arbitrary reading and

9. The preterite verb form in Swedish, as in *misslyckades* ('failed'), has developed uses beyond simply expressing past tense (cf. e.g. Teleman et al. 1999, ch. 31), which is why the verb in example (2b) is translated *would fail* rather than simply *failed*.

FÖRELÄSA			
syn	[cat: v]		
sem	frame LECTURE		
	FE #2 [Lecturer]		
	FE #3 [Subject matter]		
	...		
val { #2	syn [cat: n]	, #3	syn [cat: vp _{inf}]
	rel θ agt		rel gf comp
	DA +		DA -
			sem frame []
			FE #1 [sem [arb]]
lxm	<i>föreläsa</i>		

Figure 2. Arbitrary “control” complement of *föreläsa*

ordinary subject control, a situation called *optional control* in Lyngfelt, 2000, 2002).¹⁰ As mentioned above, I view such cases as non-control. These infinitives are more nominal in character than ordinary control structures, as reflected by the more nominal form of the English paraphrases — especially the possibility of using a compound noun in (4b), which would be an option (*husbygge*) in Swedish as well. I will return to this in Section 3.¹¹

Since arbitrary “control” in verb complements seems to be restricted to certain matrix verbs, typically verbs of communication, it goes well with a lexicalist approach. Presumably verbs like *föreläsa* (‘lecture’) and *diskutera* (‘discuss’) may select for infinitives with an arbitrary reading. For instance, in a *föreläsa* construction along the lines of Figure 1 above, there would be no valence requirement on the subordinate infinitive and accordingly no coinstantiation relation. Instead, the understood subject would be specified for arbitrary reference, as in Figure 2.¹² Note, however, that few verbs exclusively assign an arbitrary reading; rather, verbs like *diskutera* are compatible with both subject control and arbitrary “control” — on this approach, corresponding to two different constructions.

10. Arbitrary “control” is also common in English *wh*-infinitivals (cf. e.g. Barrie 2007), as in *He really knows how to*_{arb} *make good pancakes.*

11. Another kind of deviation from ordinary subject control is partial control (cf. Landau 2000), as in (i). For reasons of space, I will not discuss such cases here.

(i) Hon_i föreslog att i₊träffas på deras öppna förskola [...] (Google)
she_i suggested to i₊meet on their open kindergarten
 ‘She suggested to meet at their open kindergarten.’

12. For simplicity, I have taken the liberty of omitting the preposition in Figure 2. Thus, the infinitive (#3 in the figure) is represented as a direct complement of the verb *föreläsa* (‘lecture’), although it is actually embedded in a PP, as in (4a).

Figure 2 displays the arbitrary “control” variant as a specific subsense of *diskutera*. Another option, that would work equally well with the present approach, would be to treat the verb as underspecified for control type and let the difference be determined by what kind of infinitive is entered as a complement (cf. Figure 4 in Section 3).

Notice that, unlike in Figure 1, the infinitival complement has no *val* feature. Swedish infinitives have no syntactically realized subjects, and in the case of arbitrary “control” there is no coinstantiation or other control relation either. In technical terms, the relevant frame element is specified for genericity, thus cancelling the *val* feature inherited by the verb. I will return to this matter in Section 3 and spell out the analysis in Figure 4.

2.2 Ditransitive structures

Ditransitive control structures are more complicated. The dominating pattern is object control, i.e. that the understood subject is controlled by the indirect object of the matrix clause, as in (5a). There is also a restricted but prominent secondary pattern of subject control, notably with the verb *lova* (‘promise’), as in (5b):

- (5) a. Hon_i bad honom_j ta ledigt en dag.
she_i asked him_j take free one day
 ‘She asked him to take a day off.’
- b. Men du_i måste lova mig_j att vara försiktig.
but you_i must promise me_j to be careful
 ‘But you must promise me to be careful.’

This difference, often called the *promise/persuade* issue, is one of the most prominent topics in the vast literature on control. Most modern analyses rely on selection, i.e. assume that the control relation is determined by the matrix verb. Lyngfelt (2002) ascribes the difference between subject and object control to the *orientation* of the matrix verb. In terms of the control verb classes of Pollard & Sag (1994:285ff.), predicates of commitment (*promise, pledge*) are oriented towards the subject, whereas predicates of influence (*allow, ask, persuade*) are oriented towards the object.¹³ The former usually yields subject control and the latter tends to go with object control.¹⁴

13. Pollard & Sag (1994) also assume a third class, verbs of orientation (not to be confused with the notion of orientation employed here), which mainly consists of monotransitive verbs assigning subject control.

14. Note, however, that Swedish *lova* (‘promise’) is compatible with both patterns, as illustrated by the ambiguous sentence in (i)

Note that the orientation of a verb is not a coincidence but follows from the semantics; a verb of influence could not be subject oriented. Also, since orientation is essentially a semantic notion, verbs are not primarily oriented towards subjects or objects but rather towards participant roles / frame elements like Commitor (*promise*) and Influenced (*ask, persuade*), respectively (Pollard & Sag 1994; cf. also Culicover & Jackendoff 2005). Hence, instead of subject and object oriented, I will use the terms *agent oriented* and *patient oriented*.

The semantic nature of complement control is perhaps best shown by the fact that the syntactic control patterns can, under certain circumstances, be reversed. This phenomenon is called control shift (or *coercion*, cf. Pollard & Sag 1994) and is illustrated for the patient-oriented verb *övertala* ('persuade') in (6):

- (6) a. Då hade hon_i förmodligen lyckats övertala mig_j att följa med.
then had she_i presumably managed persuade me_j to follow with
 'Then she probably would have managed to persuade me to come along.'
- b. Då hade hon_i förmodligen lyckats övertala mig_j att få följa med. (Google)
then had she_i presumably succeeded persuade me_j to get-to follow with
 'Then she probably would have managed to persuade me to let her come along.'

The verb *övertala* ('persuade') is patient oriented and usually displays object control, as in the constructed example (6a). However, with infinitival *få* ('get to, be allowed to') in the complement, we get subject control instead, as in (6b). Thus, from a syntactic point of view, the control relation is shifted. The same effect occurs with other object control verbs, and also works in the opposite direction with *lova* ('promise').

- (i) Mamma_i lovade barnen_i att köpa glass. (Lyngfelt, 2002: 139)
mom_i promised kids-DEF_j to buy icecream
 'Mom promised the kids to buy icecream.'

This ambiguity follows from the polysemy of *lova*, which has a 'commit' sense that goes with subject control, and an 'allow' sense that displays object control. In the 'commit' sense, *lova* also lends itself to so-called split control (cf. Landau 2000; or *joint control*, cf. Culicover & Jackendoff 2005), as illustrated by the following sentence:

- (ii) Så jag_i lovade barnen_j att gå ut igen sedan [...] (Google)
so I_i promised kids-DEF_j to go out again afterwards
 'So I promised the kids to go out again afterwards'

Viewed in isolation, either subject control or object control is a likely interpretation in (ii). The actual context reveals that both the subject and the object were meant to go out, which makes the sentence a case of split control.

However, one might well argue that there really is no control shift. Several scholars have stressed that control is essentially a semantic phenomenon (cf. e.g. Farkas 1988; Sag & Pollard 1991; Pollard & Sag 1994; Lyngfelt 2000, 2002, 2009; Culicover & Jackendoff 2005), often citing control shift as a crucial piece of evidence. The relevant observations are (a) that the distribution of subject control and object control in ditransitives depends on the meaning of the matrix verb, and (b) that the syntactic control pattern may be shifted, typically by a role-reversing auxiliary in the infinitive. Assuming that control is essentially semantic in nature, it is not necessarily directly tied to the (syntactic) subject of the infinitive per se, and the two observations may be reconciled. Consider, for example, the sentences in (7), with the patient-oriented verb *be* ('ask'):

- (7) a. Hon_i bad honom_j att inte_j resa.
she_i asked him_j to not_j go
 'She asked him not to go.'
- b. Lilly_i [...] ber kommandanten_j att_i få träffa sin judiska väninna.
Lilly_i asks commandant-DEF_j to_j get-to meet POSS-REFL Jewish friend
 'Lilly asks the commandant to get to meet her Jewish friend.'
- c. Han_i ber ____j att_i få träffa läkaren.
he_i asks ____j to_j get-to see doctor-DEF
 'He asks to get to see the doctor.'

Normally, infinitival complements of *be* ('ask') receive object control, as in (7a), but in (7b), with the auxiliary *få* ('get to') in the infinitive, the pattern is shifted to subject control. In fact, with a *få*-infinitive, the usually ditransitive verb *be* ('ask') may even be realized in a mono-transitive structure, as in (7c), again with subject control.

However, in all three cases it is still the matrix object referent that is *in* control of the subordinate event — even in (7c) where the object is implicit — in (7a), by performing an action (or not), and in (7b–c) by allowing someone else to. In other words, the orientation of the verb has not shifted, and *be* ('ask') remains an object control verb semantically, which suggests that the relation determined by the selecting predicate is a semantic one. The same reasoning applies to the sentence-pair in (6).

Farkas (1988) accounts for this 'in control' notion by assuming a RESP(onsibility) feature. If the control relation imposed by the matrix verb concerns this (semantic) RESP feature, rather than the syntactic subject, the connection to syntactic arguments becomes a matter of linking. Usually, RESP is linked to the subject argument (of the infinitive, in this case), but in (7b–c) it is not — precisely because the understood subject is not in control of the event. In a similar vein, Sag & Pollard

(1991) make a distinction between external argument (X-ARG) and subject, assuming that the controlled element is X-ARG and that the connection to the understood subject depends on the internal semantics of the infinitival complement — specifically, it depends on selectional restrictions on the subordinate predicate — (cf. also Farkas 1988, Lyngfelt 2002, and Pollard & Sag 1994).¹⁵

In CxG terms, following the common practice of combining CxG and Frame Semantics (e.g. Fillmore 1982, Gawron 2008), the ‘in control’ notion of RESP/X-ARG may be connected to a frame element. It may then be associated with a syntactic argument by linking rules. This means that the control relation determined by the selecting predicate primarily concerns frame elements only, where the frame of the main predicate includes information about a frame element in the complement predicate frame, as schematically illustrated in (8):¹⁶

- (8) a. A_i Pred P SOA[sA_i sPred sP ...].
 b. A Pred P_i SOA[sA_i sPred sP ...].

Both structures in (8) represent ditransitive predicates where the third frame element (SOA) is a state-of-affairs argument, which in turn contains a subordinate predicate (sPred) with frame elements of its own. In (8a), the first frame element of the subordinate predicate (sA) is associated with the first frame element of the matrix predicate (A). This structure corresponds to agent-oriented verbs like *lova* (‘promise’). For patient-oriented verbs, e.g. *övertala* (‘persuade’), sA is coreferent with P, the second frame element of the matrix predicate, as in (8b).

Relating the frame elements to syntactic arguments is then determined by the valence requirements of the lexical predicates involved (i.e. the lexical constructions instantiating the frames). Concerning the infinitival complement, actor type verbs connect the understood subject with sA and undergoer type verbs connect it with sP.

15. Both Farkas and Sag & Pollard stress that such a feature is also relevant to other structures, e.g. imperatives, and thereby find it independently motivated (cf. also Landau 2000:183ff.). Note, however, the difference between these X-ARG/RESP notions and other uses of the same terminology. The X-ARG feature of Sag & Pollard (1991) is not quite the same thing as the X-ARG feature of Sag (2007, in press), which I will adopt to account for predicative complements, cf. Section 6. Also, although there may be some relation between Farkas’s RESP feature and the notion of (event) RESP(onsibility) sometimes employed in the analysis of middles (cf. e.g. Stroik 2006:315ff.), they seem to be essentially different notions.

16. I am aware that the representations in (8) are not standard Frame Semantics, but I hope they serve to illustrate the point nonetheless. *A* and *P* typically correspond to Actor/Agent and Patient (or Undergoer/Target), respectively, and SOA indicates a state-of-affairs argument; *s* marks elements of the subordinate frame.

But how do the schematic structures in (8) account for the control shift data in (7)? First, *be* ('ask') is an patient-oriented verb, corresponding to (8b), which means that the matrix object (P) is in control of the subordinate event (coreferent with sA) in all three sentences. In (7a), the head of the infinitive (sPred) is the verb *resa* ('go, travel'), which is an actor subject type verb where sA is linked to the understood subject. Thus, we get object control. In (7b–c), however, sPred is *få* ('get to, be allowed'), which is an undergoer subject type of verb. The subject of *få* corresponds to sP, the one being allowed; whereas sA, the allowing entity, is not syntactically realized in the infinitive (in (7c) it is not expressed in the matrix clause either). Since sP is coreferent with the matrix subject (A) in these cases, the resulting interpretation corresponds to subject control. Nevertheless, the object (P) is still the referent *in* control of the subordinate event.

The key to this analysis is the disassociation between the (semantic) first frame element and the (syntactic) subject of the subordinate predicate. This is illustrated in Figure 3. In e.g. Fried & Östman's (2004:64) more standard analysis of *try* in Figure 1 above, a frame element of the subordinate event is associated with the subject (and both of them with the controller) by unification; whereas in Figure 3, the relations between frame elements and grammatical functions in the infinitival complement are left unspecified by the *be* ('ask') construction. Therefore a constraint may be placed on a frame element without directly applying to a specific grammatical function.

	BE
<pre> syn [cat: v] sem frame ASK FE #2 [Asker] FE #3 [Askee] FE #4 [Action asked for] ... val { #2 syn [cat: n] , #3 syn #1 [cat: n] , #4 syn [cat vp_{inf}] } rel θ agt rel θ pat rel gf comp DA + DA - DA- sem frame [] FE #1 [RESP] val { [rel [gf subj]] } </pre>	
lxm	<i>be</i>

Figure 3. The control relation in the patient-oriented verb *be* ('ask')

Assuming the RESP feature from Farkas (1988), the patient orientation of the verb *be* ('ask') is represented in Figure 3 as coinstantiation of the matrix object/patient

and a subordinate frame element compatible with RESP — typically an agent.¹⁷ Notice, however, that it is *not* coindexed with the subject of the infinitive. Whether the RESP-marked element is associated with the subject or not follows from the valence of the subordinate predicate. Usually the subject is linked to the controlled element, but only if it is compatible with the RESP feature; this is the case in (7a). If not, there is still a valence requirement to be met, and the subject is therefore coinstantiated with the other argument of *be* — which results in subject control, as in (7b–c).¹⁸

An agent-oriented verb like *lova* (‘promise’) would be analyzed the same way, except that the RESP element would instead be coindexed with the matrix subject/agent.

3. Arbitrary “control”

Arbitrary control is something of a misnomer, since it is not really a form of control, but rather non-control. Hence, I prefer to call it arbitrary “control”. Its main characteristics are the absence of a controller and a generic or arbitrary interpretation of the understood subject argument. It is the standard pattern of interpretation in infinitival subjects, both clause-initial (9a) and extraposed (9b), as well as in so-called *tough*-constructions (9c) and independent infinitives (9d). It also occurs, although less commonly, in verb complements (cf. Section 2.1 above).

- (9) a. Att_{arb} dricka sig berusad ökar risk-en för slaganfall.
 to_{arb} drink oneself drunk increases risk-DEF for stroke
 ‘Getting drunk increases the risk of getting stroke.’
- b. Men det är onödigt att_{arb} ta risker.
 but it is unnecessary to_{arb} take risks
 ‘But it is unnecessary to take risks.’
- c. Naturen är svår att_{arb} upptäcka.
 nature-DEF is difficult to_{arb} discover
 ‘Nature is hard to discover.’
- d. Att_{arb} skriva uppsats
 to_{arb} write essay-BARE
 ‘How to write essays / Essay-writing’

17. It would be a welcome simplification if RESP could be reduced to a semantic role requirement (cf. e.g. Culicover & Jackendoff 2005), such as an agent feature. However, under the right pragmatic circumstances, control shift may occasionally occur also with an agentive understood subject, as in the following English example from Farkas (1988):

(i) The pupil_i asked the teacher_j to_i leave early.

18. Why the matrix object is null instantiated in (7c) is beyond the scope of the present paper.

All the examples in (9) are quite clear cases of arbitrary “control”; (9a–c) are general statements presented as true for anyone (in the given situation), and (9d) is a heading that pertains to anyone engaging in the activity in question. Nevertheless, as is typical for generic expressions, the arbitrary interpretation may still be restricted by the context. Consider, for instance, the sentences in (10):

- (10) a. Att_{arb} sjunga på svenska är en självklarhet.
to_{arb} sing on Swedish is a self-evident-ness
 ‘To sing in Swedish is a matter of course.’
- b. Det kunde inte skada att_{arb} prata om det i alla fall.
it could not hurt to_{arb} talk about it in all cases
 ‘It wouldn’t hurt to talk about it at least / in any case.’
- c. Grus-et kände-s halt att_{arb} gå på.
gravel-DEF felt-s slippery to_{arb} walk on
 ‘The gravel felt slippery to walk on.’

Although (10a) is phrased as a general statement, it is obviously not true for all subjects (there are many singers, even in Sweden, who choose to use other languages) and may be interpreted as a subjective opinion of the speaker. The sentences in (10b–c) concern specific situations, and therefore the arbitrary reference is restricted to those involved. Also, the verb *känns* (‘feel’) in (10c) involves an experiencer, with whom the understood subject is naturally associated. In all of these cases the arbitrary reference is constrained in two ways: First, it is restricted to relevant entities. This arguably holds for any generic statement, although it is less striking when this set constitutes a whole class of entities. Second, within the set of relevant entities there is a contextual bias towards pragmatically-salient referents — often including the speaker. Even clearly generic statements like those in (9) are usually uttered with respect to a more specific situation, and the arbitrary reference is accordingly associated with salient referents. This, too, is common to other generic expressions as well.

Two factors that clearly correlate with such interpretive biases are tense and evaluative expressions. Both are illustrated in (11):

- (11) a. *Bryta ny mark var slitsamt och tungt*
arb break new ground was strenuous and heavy
men samtidigt friskt och stimulerande.
but simultaneously fresh and stimulating
 ‘Breaking new ground was strenuous and heavy but at the same time refreshing and stimulating.’
- b. *Bryta ny mark är slitsamt och tungt men*
arb break new ground is strenuous and heavy but
samtidigt friskt och stimulerande.

simultaneously fresh and stimulating

'Breaking new ground is strenuous and heavy but at the same time refreshing and stimulating.'

The past tense in (11a) indicates that a specific event is reported, and therefore the arbitrary reference is associated with the referents involved in this event. More general statements are typically in the present tense, as the constructed example (11b), where the tense shift also shifts the focus from a specific event to any event of the appropriate type. Even in the latter case, however, the evaluative adjectives restrict the reading to a subjective experience of such events. Since the subjective evaluation is a claim made by the speaker, the arbitrary reference is clearly speaker-biased. The relevance of such factors indicates that the contextual bias of the interpretation is not strictly a matter of control.

There are, however, a few cases where the interpretation of understood subjects in infinitival subjects is syntactically restricted. Two such examples are given in (12):

- (12) a. För dem_i är det alltför energikrävande att_i slåss hela tid-en [...]
for them_i is it too energy-demanding to fight whole time-DEF
 'For them, it takes too much energy to fight all the time.'
- b. Det åligger byggnadsnämnd-en_i att_i se till att de
it befalls housing-committee-DEF_i to_i see to that the
aviserade åtgärder-na är konkreta och tidsbestämda.
announced measures-DEF are concrete and time-bound
 'It befalls the housing committee to see to it that the announced measures are tangible and of fixed duration.'

The phrase *för dem* ('for them') in (12a) is an explicit experiencer marker, thus specifying the identity of the understood subject.¹⁹ It instantiates a kind of optional experiencer construction, which is part of the language's resources for marking otherwise implicit referents. In (12b), the basic meaning of the matrix predicate is that the activity referred to in the infinitival subject is assigned to the object, and the interpretation of the infinitival subject is restricted accordingly. Both structures may be viewed as special cases of the reference being specified by the context, in (12a) by a construction meant to do just that.

19. Note that this *för*-phrase does not correspond to the well-known English *for...to*-construction, as in *For him to be elected Prime Minister would be disastrous*. Rather, it corresponds to the *for*-phrase in *To be elected Prime Minister would be disastrous for him*. The present account will have nothing to say about *for...to*-constructions, which would be an important subtopic if the approach advocated here were applied to English.

Since arbitrary “control” covers the whole range from an unrestricted generic reading to completely specific reference, the distinguishing property cannot be a lack of interpretation of the understood subject. Rather, I will argue, it is the lack of a *need* for an interpretation. Ordinary infinitives are predicating expressions, i.e. they are predicated of an entity — specifically, of a subject. Therefore the infinitive requires a subject argument to be predicated of, and this understood subject requires an interpretation. Structures of arbitrary “control”, on the other hand, are not really predicated of a subject; rather they *refer* to an activity irrespective of who or what is performing it. The arbitrary interpretation of the subject argument follows from this property. As an illustration, consider the (constructed) ambiguous sentence in (13):

- (13) V_i pratade om att $_{i/arb}$ åka till Indien.
we_i talked about to $_{i/arb}$ go to India
 ‘We discussed/talked about going to India.’

On one reading, (13) is a case of subject control; the subject referents were discussing whether to go to India, or perhaps planning a trip there. On the other interpretation, it is a case of arbitrary “control”, where they merely talk about the phenomenon of going to India: why so many people do that nowadays, how expensive it is, dos and don’ts etc. In the latter case, the ‘going to India’ is not predicated of a subject, the infinitive merely refers to the act as such. Arguably, the same reasoning applies to other cases of arbitrary “control”, as the reader may confirm by checking the other examples in this section.

Thus, the difference between control and non-control may be treated as a distinction between predicating and non-predicating infinitives, which may be represented as in Figure 4:

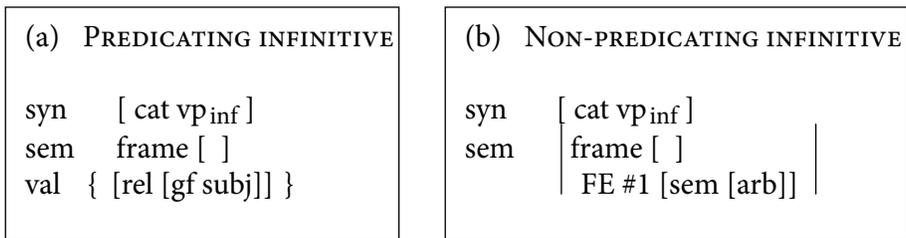


Figure 4. Predicating and non-predicating infinitival constructions

The need for a controller in (ordinary) predicating infinitives is represented as a val(ence) feature in the left box (a) in Figure 4. Notice that this feature has a rel(ation) value but no syn feature, since the subject of an infinitive is not syntactically realized. By contrast, non-predicating infinitives (i.e., infinitives of arbitrary “control”) need no controller, as shown by the absence of a val feature in the right

box (Figure 4b; cf. also Figure 2 above). Instead, the understood subject is specified for an arbitrary interpretation.

Arguably, the difference between predicating and non-predicating infinitives corresponds to the general distinction between predicating and referring expressions (tracing its origins back to Aristotle).²⁰ It was mentioned in Section 2.1 that infinitives of arbitrary “control” have a more nominal flavor (and in many cases they could be substituted for by e.g. deverbal nouns without significant changes in meaning), and the reason for this seems to be that they are referring to activities rather than predicating them of a subject. Hence, infinitives of arbitrary “control” may be viewed as non-predicating infinitives.

It should be noted, however, that although the functional distinction between predicating and non-predicating infinitives may provide a motivation for the difference in control behavior, nothing in the analysis really hinges on this. What is crucial is that ordinary control involves an unsaturated subject argument in need of an interpretation, whereas arbitrary “control” does not (since it is specified for arbitrary reference). This is represented by the absence or presence of a *val* feature in the infinitival construct. In the cases where the arbitrary reference of the understood subject is specified by the context, this is analogous to the bias for salient interpretations typical of any generic expression and thus not a matter of control.

Presumably, non-predicating infinitives in complements are selected by the head of the mother construct.²¹ I will have nothing to say about how they are licensed in other environments — typically as subjects, in *tough*-constructions, or as independent utterances. It seems, however, that their distribution within clauses is restricted to argument positions; they never appear as adjuncts. The only instances of arbitrary reference in adjuncts that I have come across are cases where the controller is itself an arbitrary referent (cf. Section 6).

In addition, something should be said about *tough*-constructions (as in *Important things are hard to do* or *This is a tough problem to solve*). These are structurally related to infinitival subjects, as illustrated in (14):

20. In a sense, of course, all expressions have both referring and predicating properties, but I take the liberty of simplifying away from such nuances here.

21. In SBCG, constructs are “in essence local trees that are licensed by some construction of the grammar [...] or by a lexical entry” (Sag 2007, cf. also Michaelis in press). More technically, they are “configurations of signs: a set of daughter signs and one more sign that is the mother of those daughters” (Sag in press). Although this conception differs somewhat in perspective from the traditional CxG notion of constructs as instances of languages use, the present use of the term is compatible with both. The mother construct of the infinitive is simply whatever expression of which the infinitive is a constituent.

- (14) a. Fråga-n_i var enkel att_{arb} svara på ____i.
question-DEF was simple to_{arb} answer on ____i
 ‘The question was easy to answer.’
- b. Det var enkelt att_{arb} svara på fråga-n.
it was simple to_{arb} answer on question-DEF
 ‘It was easy to answer the question.’
- c. Att_{arb} svara på fråga-n var enkelt.
to_{arb} answer on question-DEF was simple
 ‘Answering the question was easy.’

The *tough*-construction in (14a) is essentially equivalent in meaning to the infinitival subjects in (14b–c) and the structural relation between them seems obvious. In early transformational grammar, sentences like (14a) were derived from subjects via so-called *tough* movement, and although the transformation as such is outdated, the term *tough*-construction remains. Due to the similarity between infinitival subjects and *tough*-constructions it is only expected that they adhere to the same control pattern, i.e. arbitrary “control”. Characteristic of *tough*-constructions is the gap in the infinitive, corresponding to the extracted noun (*frågan* ‘the question’ in (14a)).²² As will be shown in the following section, this gap is of some relevance for control issues.

Tough-constructions typically appear in adjective phrases, although these may be disjointly embedded in noun phrases — *Det var en enkel fråga att svara på* (‘It was a simple question to answer’) — where the infinitive is adjacent to the head noun but rather modifies the adjective. In addition, Swedish also employs what is probably best described as a *tough* verb, namely the ‘be possible’ sense of *gå* (‘go’), which allows constructions with a similar kind of relation to infinitival subjects

22. An interesting property of Swedish *tough*-constructions, although not directly relevant for control, is the variation between agreeing and non-agreeing adjectives. Compare, for instance, the following sentence-pair (from Malmgren 1990: 102):

- (i) Den här bil-en_i är rolig att_{arb} köra ____i.
this here car-DEF-UT_i is fun-UT to_{arb} drive ____i
 ‘This car is fun to drive.’
- (ii) Bil-Ø är roligt att_{arb} köra ____i.
car-BARE-UT is fun-NEUT to_{arb} drive ____i
 ‘Cars are fun to drive / Car-driving is fun.’

In (i), the adjective *rolig* (‘fun’) agrees in gender (uter/non-neuter) with the definite noun *bilen* (‘the car’), whereas in (ii) it appears in the non-agreeing neuter form *roligt*. Presumably this is because the NP in (ii) is a bare noun with a generic reading. There seems to be a systematic difference in meaning, where the agreeing variant (i) asserts a property about a specific car but the non-agreeing variant (ii) is an assertion about car-driving in general (cf. Malmgren 1990).

(as illustrated by the constructed paraphrase in (15b)) and accordingly receives arbitrary “control”, as in (15a):

- (15) a. [Norska damer]_i går däremot att_{arb} besegra _____i.
 [Norwegian ladies]_i go on-the-other-hand to_{arb} beat _____i
 ‘On the other hand, Norwegian ladies are possible to beat.’
 b. Däremot går det att_{arb} besegra norska damer.
 on-the-other-hand goes it to_{arb} beat Norwegian ladies
 ‘On the other hand, it is possible to beat Norwegian ladies.’

4. Adverbial adjuncts and pragmatic control

Adverbial adjuncts seem to make something of a worst case for any approach to control. Lyngfelt (2002) reports a variety of subject control, object control, pragmatic control, and indirect control, and argues that the interpretation depends on interaction between several different factors. Nevertheless, all but a few exceptional specific constructions may be accounted for by the same basic mechanism. Adverbial infinitives are invariably ordinary (predicating) infinitives, i.e. they contain an unsaturated val feature, and common to all the patterns of adjunct control is that this val feature is saturated as locally as possible.²³

The dominating pattern is subject control, as in (16):

- (16) a. Börjar du_i spela blyg efter att_i ha skickat fyra dussin rosor till henne?
 begin you_i play shy after to_i have sent four dozen roses to her
 ‘Are you starting to act shy after having sent her four dozen roses?’
 b. Adjunkten_i försvann ut i nästa rum för att_i ordna
 lecturer-DEF_i disappeared out in next room for to_i arrange
 argumenten [...] arguments-DEF
 ‘The lecturer disappeared into the next room to order his arguments’

In both sentences in (16), the understood subject of the adverbial infinitive is coreferent with the matrix subject. This pattern is similar to subject control in verb complements (cf. Section 2) except that it cannot be accounted for by a lexicalist

23. This basically corresponds to the Minimal Distance Principle (MDP), which was proposed in early transformational grammar (Rosenbaum 1967) and has played a prominent role in the generative control literature ever since (the term MDP appeared a bit later). This principle has been shown to be insufficient to account for complement control (for instance, it does not apply to control shift, cf. Section 2.2); but it is usually adhered to, and gets violated only to satisfy other constraints (cf. e.g. Lyngfelt 2002).

approach (i.e. by a specific control verb construction). The adverbial is not selected by the verb, and consequently the control relation cannot be lexically determined. Instead, the control relation presumably follows from general properties of the grammar: the unsaturated val feature of the infinitive is saturated by coinstantiation with a frame element of the mother construct.

This mechanism is analogous to the treatment of extractions/filler-gap constructions (cf. Sag 2008). Both control and filler-gap constructions concern locally non-instantiated arguments, which are represented as valence features of their mother constructs. These features are visible to the next level and may therefore be associated with an element at that level. If there is no appropriate element available at that level, the val feature is passed on, or *percolated*,²⁴ to the next level — and so on, until saturated. Both control and filler-gap constructions work similarly in this respect, and the main difference between them concerns the content of the val features involved. The gap corresponds to an argument which is normally expressed in the syntax, i.e. it contains a syn feature — whereas the implicit subject argument does not; it merely requires an interpretation.

As we shall see in the following sections, the same configurational approach also applies to control in noun phrases and adjective phrases (Section 5), and, with a slight addition, to so-called indirect control (Section 6). In adverbial adjuncts, the usual outcome is that the controller is the external argument of the mother construct of the infinitive, i.e. the matrix subject, as in (16). Two exceptions to this pattern are object control in purpose clauses and speaker control in speech act adverbials, both of which are restricted to specific constructions and will be addressed in Section 4.2. A more general alternative to the pattern of subject control is what I will call pragmatic control (also called *logophoric control*, cf. e.g. Williams 1992).

4.1 Pragmatic control

When not coreferent with the matrix subject, understood subjects of adverbial adjuncts are instead associated with some other, pragmatically salient, referent in the context. This phenomenon, pragmatic control, is illustrated in (17). Note that none of the sentences involve arbitrary “control”. There is nothing generic or arbitrary about the interpretation of the understood subjects of these infinitives. In each case, there is a specific reading determined by the context.

- (17) a. Genom att flytta en produktionslinje till Italien blir en del
through to move a production-line to Italy become a part

24. Sag (2008) uses the term *inheritance* instead of *percolation*. Despite the atypical direction (inheritance from daughter to mother), this metaphor is perhaps more to the point, but stands the risk of being confused with other, more established, uses of *inheritance* in CxG.

personal överflödig.

personnel superfluous

‘By moving a production line to Italy, some of the staff will become superfluous.’

- b. *Energin koncentrerades till att lura ut snillrika tekniska lösningar till bilarna [...]*
energy-DEF concentrate-s to to figure out ingenious technical solutions to cars-DEF
 ‘The energy was directed towards figuring out ingenious technical solutions for the cars’
- c. *För att komma dithän [...] krävs det att vi litar på den enkla människan.*
human-DEF
 ‘In order to get there, it is necessary that we put our trust in the simple man.’

I will not dwell on the exact nature of pragmatic control — whether the defining characteristic is point of view, pragmatic salience, empathy, logophoricity, or a combination thereof — but rather focus on its grammatical properties. It is favored by sentence-initial adjuncts (17a), passive matrix clauses (17b), and expletive matrix subjects (17c). In the corpus-study of Lyngfelt (2002), all instances of non-subject control in adverbials (except the special patterns discussed in Section 4.2) displayed at least one of these three characteristics. In sentence-initial adjuncts, more than 20 percent of all infinitives in the study were pragmatically controlled, whereas only stray examples of pragmatic control in non-initial adjuncts were encountered. There also seem to be restrictions on non-initial adjuncts to match this difference in frequency. According to Lyngfelt (2002), pragmatic control in non-initial adjuncts occurs only when the subject is semantically unfit as a controller due to valence restrictions of the infinitival predicate. This is the case in (17b), where the infinitival predicate *lura ut* (‘figure out’) requires a human subject, which therefore cannot be controlled by the inanimate matrix subject *energin* (‘the energy’). Instead, the controller in (17b) is the implicit agent of the matrix clause. Such agent control is fairly common in passive sentences, especially in sentence initial adverbials. As for expletive subjects, as in (17c), they generally make poor controllers since they cannot match the semantic role requirements of the infinitival verb. If the sentence also contains a sentential extraposed subject, the adverbial infinitive is controlled by the subject of the subject clause, as indicated in (17c). We will return to this indirect control pattern in Section 6.

In Lyngfelt’s (2002) analysis, the availability of pragmatic control in clause initial adverbials depends on phrase structure. Sentence initial adverbials are presum-

ably adjoined above the subject, which is therefore not accessible to syntactically assigned control.²⁵ In the absence of a syntactic controller, the understood subject is simply associated with a pragmatically salient element in the context. In the majority of cases where even sentence initial adverbials receive subject control, the subject is also pragmatically salient. If not, it is not the controller either.

I will maintain this view, adhering to “the not too hierarchical model” of Swedish clause structure developed by Engdahl et al. (2004, cf. also Andréasson 2008), which is supported by basic constituency tests and according to which sentence-initial adjuncts are adjoined above the rest of the clause. Hence, in terms of the present approach: since the *val* feature of the infinitive cannot be matched by a syntactically accessible element, its interpretation is resolved by accommodation to the pragmatic context. In non-initial adverbials, on the other hand, the matrix subject *is* syntactically accessible. Therefore it will also be the controller, unless ruled out by valence restrictions. In the latter case, the unsaturated *val* feature percolates upwards; if still not matched by an appropriate controller in the maximal clause, we have to resort to pragmatics for an interpretation in this case as well.

Thus, pragmatic control follows the same basic mechanism as subject control in adverbials, with the addition that we resort to pragmatics in the absence of a syntactically accessible controller. It should be noted that speakers of Swedish disagree on the acceptability of pragmatic control, and it has been a concern for normative grammar. Nevertheless, it is a productive and quite common pattern in Swedish.

4.2 Speech act adverbials and purpose clauses

A special form of pragmatic control is found in speech act adverbials, which is a speaker-oriented category, where the subject of sentential expressions is always coreferent with the speaker, as illustrated in (18).

- (18) Men man kom inte närmare än 5–6 och nådde alltså inte
but one came not closer than 5–6 and reached consequently not
 tie-break, för att tala tennisspråk.
tie-break, for to speak tennis-language
 ‘But they didn’t come closer than 5–6 and thus didn’t reach tie-break, to use
 tennis terms.’

25. From a different theoretical viewpoint, the same contrast between initial and non-initial adjuncts might also be construed as an incremental interpretation effect. However, I will not pursue that path here.

The adjoined infinitive is in sentence-final position and the subject is human and therefore a possible agent of *tala* ('speak'); hence, the subject is both syntactically accessible and semantically appropriate as a controller. Still, we do not get subject control but speaker control. Presumably, this is because speech act adverbials constitute a special, speaker-oriented class of constructions, where the (understood) subject argument of infinitival variants is specified for coreference with the speaker.

Another exceptional pattern concerns purpose clauses, which sometimes receive object control, as illustrated by the ambiguous sentence in (19) (somewhat simplified from the original):

- (19) Investor_i har engagerat investmentbanker_j
*Investor*_i [=the name of a company] *has engaged investment-banks*_j
 för att _{i/j}förbereda introduktionen
for to _{i/j}*prepare introduction-DEF*
 'Investor has engaged investment banks to prepare the introduction.'

Again, Lyngfelt (2002: 180f.) accounts for the different interpretations in terms of phrase structure. On the subject control reading, the infinitive is assumed to be adjoined higher in the structure than on the object control reading, VP-external as opposed to VP-internal. Such an analysis matches the generalization that adjuncts are syntactically flexible and may quite freely modify larger or smaller parts of a sentence. However, it does not capture why object control is restricted to purpose clauses. Other adverbials receive subject control (or pragmatic control). From a CxG perspective, such reliance on assumptions about phrase structure is dispreferred and it is harder to motivate here than in the case of sentence initial adverbials. Presently, I offer no explanation but merely conclude that purpose clauses warrant further investigation.

5. Control in noun phrases and adjective phrases

Most literature on control is focused on complements and adjuncts of verbs or verb phrases. However, control infinitives are also common in noun phrases and adjective phrases. In this section, I will first give a descriptive account of the two phrase types separately, and then jointly address their analysis, based on the same mechanisms that were introduced with respect to structures with verbal heads.

5.1 Adnominal infinitives

Lyngfelt (2000, 2002) recognizes three kinds of adnominal infinitives (i.e. infinitives modifying noun phrases): infinitival relative clauses (20a), identifying infini-

tives (20b), and infinitival complements (20c–d). In all three types, the understood subject of the infinitive is determined by what we may term *possessive control*. Whoever is in possession, in a broad sense, of the matrix NP referent is also the controller. A test for this relation is the possibility to enter the possessor as a genitive modifier.

- (20) a. [...] utan en [människa till fots]_i att _jrådfråga _i
without a [human to foot-GEN]_i to _jadvice-ask _i
 ‘without any pedestrian to ask for advice’
- b. [...] för att de_i (har) återfallit i vanan att _ise kvinnan
for that they_i (have) relapsed into habit-DEF to _iview woman-DEF
 som en tjänsteande
as a servant-spirit
 ‘because they have relapsed into the habit of viewing women as servants’
- c. [...] därför blev ironin hans_i medel att _ihålla lämpligt avstånd
therefore became irony-DEF his_i means to _ikeep proper distance
 ‘therefore, irony became his means of keeping a proper distance’
- d. Kanske detta är ett försök att _isäga gott nytt år.
maybe this is an attempt to _isay good new year
 ‘Maybe this is an attempt to say happy new year.’

In (20a), the controller is the referent who has — or in this negated case, does *not* have — access to a pedestrian. Note that the head noun corresponds to a gap in the relative and is hence ruled out as a controller. In (20b), the head noun and the appositive infinitive stand in an identity relation, and so do their external arguments (i.e. the understood subject and the possessor, respectively, cf. Section 6). Whoever *has* the habit is also the understood subject of the infinitive, in this case going back to the matrix subject *de* (‘they’). In (20c), the possessor is explicitly present as a genitive modifier, which is coreferent with the understood subject of the infinitival complement. As illustrated in (20d), many nouns taking infinitival complements are deverbal nouns, where the infinitival complement equals the object, and the possessor/controller corresponds to the subject of the corresponding verb.

Possessive control is a local relation, but in most cases the possessor is not locally realized but inferred from the context. As illustrated by the infinitival relatives in (21), the possessor (and hence, the understood subject) may correspond to the matrix subject, object, or even an arbitrary referent:

- (21) a. Jag_i har en del böcker_j att _iläsa _j.
I_i have a part books_j to _iread _j
 ‘I have some books to read.’
- b. Det_i borde ge lagstiftare_j något_k att _jfundera på _k.
it_i should give legislators_j something_k to _jthink about _k

‘That should give legislators something to think about.’

- c. Det är så många praktiska problem_i att _{arb}lösa _i
it is so many practical problems_i to _{arb}solve _i
 ‘There are so many practical problems_i to _{arb}solve’

The controller in (21a) is the matrix subject and in (21b) the matrix object, but both relations are indirect, and the relevant generalization is that the understood subject is coreferent with the possessor — that is, the external argument of the matrix NP. In (21c), the possessor is unspecified, which yields an arbitrary reading, but it is still the case that the understood subject is coreferent with whoever the possessor is.

Also note that the matrix NP normally corresponds to a gap in the relative clause, and that most infinitival relatives in Swedish, unlike their English counterparts, do not passivize. This is illustrated by the contrast in (22a–b). There are, however, a few exceptional cases of infinitival relatives without a gap, as in (22c). This usage seems to be increasing due to influence from English, but it is still a quite marginal phenomenon in Swedish.

- (22) a. ett problem_i att _{*i}ta _i på allvar
*a problem_i to _{*i}take _i on seriousness*
 ‘a problem to take seriously’
 b. *ett problem_i att _itas på allvar
a problem_i to _itake-s on seriousness
 ‘a problem to be taken seriously’
 c. Jag är inte rätt person_i att _isvara på detta.
I am not right person_i to _ianswer on this
 ‘I am not the right person to answer this.’

Notice the difference in control behavior. The infinitival relatives without a gap deviate from the dominating pattern of possessive control in adnominals.²⁶ Presumably, this is precisely because they lack the gap. In ordinary infinitival relatives, the matrix head corresponds to an object gap, and therefore it cannot also control the understood subject, due to general restrictions on argument structure. In the variant without a gap, however, there is no such blocking effect, and the head is available as a controller. However, this contrast is restricted to infinitival relatives

26. The understood subject is not a gap in this sense. Gaps correspond to the ordinary positions of non-locally instantiated (\approx extracted) elements (cf. Sag (2008) on filler-gap constructions). Whereas understood subjects are obligatorily implicit, gaps could be replaced by actual constituents — and would be, if not for the extraction. In CxG terms, both understood subjects and gaps are unsaturated valence features of the subordinate predicate, but only gaps contain a syn feature.

(and, as we shall see in the next section, AP infinitives). It does not apply to the other types of adnominal infinitives, which do not include a gap but still adhere to possessive control.

5.2 AP infinitives

Infinitives within adjective phrases (*AP infinitives*) in Swedish are of two basic types, those with a gap in the infinitive (23a–b), i.e. *tough*-constructions (cf. Section 3), and those without it (23c–d). This distinction corresponds to the well-known *easy to please* / *eager to please* contrast in English.

- (23) a. Dom_i är inte värda att_{arb} hänga sig för ___i.
they_i are not worth to_{arb} hang oneself for ___i
 ‘They aren’t worth hanging oneself/yourself for.’
- b. Jag fann henne_i lätt att_{arb} tala med ___i.
I found her_i easy to_{arb} talk to ___i
 ‘I found her easy to talk to’
- c. Är du_i inte rädd (för) att_i trilla dit? [*för* present in original]
are you_i not scared (for) to_i fall there
 ‘Aren’t you afraid of getting addicted?’ [in this particular context]
- d. Förra sommar-en gjorde sjukdom honom_i oförmögen att_i förstå
last summer-DEF did disease him_i incapable to_i understand
skillnaden.
difference-DEF
 ‘Last summer, illness made him incapable of understanding the difference.’

As mentioned in Section 3 above, *tough*-constructions — which include a gap — receive arbitrary “control”, as in (23a–b). In the variant without a gap, the understood subject is coreferent with whatever the matrix adjective is predicated of, its *base of predication* (the term is from Telemann et al. 1999). Thus, in (23c), it is coreferent with the one to be afraid, and in (23d) with the one being incapable. In analogy with possessive control in adnominals, this local relation is implicit, and the base of predication is determined by the relation between the AP and the rest of the clause. In (23c), it corresponds to the matrix subject and in (23d) to the object. But the local relation — control by the base of predication — remains consistent, regardless of the global syntactic context.

In *tough*-constructions, however, the base of predication corresponds to the gap, as indicated in (23a–b). Again, we find the same contrast as regarding infinitival relatives: in the structure with a gap, the more local control pattern is blocked by the filler-gap relation (on filler-gap constructions, see Sag 2008).

Distributionally, the pattern without a gap is somewhat more versatile than the gap variant. Whereas the gap structure only occurs in APs with a predicative function, whose heads are ordinary adjectives, and where the infinitive is always adjacent to the head, the non-gap variant is more flexible in all these respects. It also occurs in APs functioning as objects or adverbials; the AP head may be a deverbal adjective or perfect participle; and the infinitive may be embedded in a PP, the latter property illustrated by the optional preposition *för* ('for') in (23c).²⁷ The choice between gap or non-gap structures seems to follow from the matrix head.

5.3 On analysis

Both possessive control in noun phrases and control by the base of predication in adjective phrases are essentially semantic relations, and it is not obvious what structural status they have. Assuming that they are somehow present in the grammatical structure, both the possessor and the base of predication may be treated as the external arguments of the NP och AP, respectively. This is analogous to the subject being the external argument of the verb — especially considering that the subject is the base of predication of the verb phrase or verbal predicate. Thus both patterns correspond to subject control in verbal projections: the unsaturated val feature of the infinitive is coinstantiated with the external argument of the matrix head. This relation is illustrated as a local tree in Figure 5.

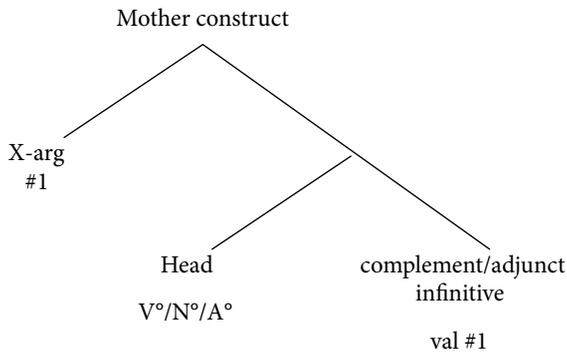


Figure 5. Generalized sketch of control by external argument

27. On the other hand, the gap variant more readily occurs intertwined with an NP:

- (i) *Soul är en gynnsam genre_i att_{arb} åldras i _i som artist.*
soul is a beneficial genre_i to_{arb} age in _i as artist
 'Soul is an agreeable genre for artists to grow old in.'

However, it is not self-evident that noun phrases and adjective phrases do have external arguments. Although the possessor may be expressed as a genitive modifier, that is not always or even usually the case. As for the base for predication, it is *never* locally realized within the adjective phrase. Hence, the empirical evidence for assuming a *syntactic* external argument seems to be rather thin. On the other hand, the semantic generalizations regarding control are quite robust and should somehow be incorporated in the analysis.

One may, of course, assume the possessor of nouns and the base of predication of adjectives to be frame elements without treating them as syntactically realized units. It seems reasonable, for instance, that the frame for an adjective like *ivrig* ('eager') contains both someone being eager and something that someone is eager for. This is also how the English adjective *eager* is analyzed in FrameNet, where a frame element corresponding to the base of predication seems to be generally assumed for adjectives. As for nouns, there is more variation. Deverbal nouns and other situational nouns like *problem* are presented with frame elements corresponding to a possessor in FrameNet (in the case of *problem* through the Predicament frame), whereas concrete nouns like *book* are not. As a tentative hypothesis, it seems reasonable that nouns occurring with infinitival complements or identifying infinitives generally contain a frame element corresponding to a possessor, whereas nouns construed with infinitival relatives are less consistent in this regard. Whereas the first two categories appear to be quite restricted, although the nature of these restrictions remains to be specified, infinitival relatives may appear with just about any noun.

In any case, the basic idea behind the analysis sketched in Figure 5 does not really depend on the existence of an external argument, or even a corresponding frame element. The central aspect is (a) that the understood subject corresponds to an unsaturated val(ence) feature of the infinitive, and (b) that this feature is accessible to the mother construct and may therefore be coinstantiated with an appropriate frame element. If there is no such element within the mother construct, the feature remains unsaturated at this level and should therefore be visible to the next level, the grandmother of the infinitive, and so on. Thus, the val feature percolates to the next level until saturated by valence cancellation. According to this approach, it is expected that the understood subject is coinstantiated with the closest appropriate controller available — which is exactly the case. If there is a genitive within the NP, this genitive is the controller; if not, the controller normally corresponds to an element in the mother construct of the NP — and the controller of AP infinitives may be found in the mother construct of the AP. Whether this element is a subject, object, or something else, depends on where the NP or AP fits into the clause. So whether we assume external arguments within NPs and APs or not, the same basic configurational approach applies.

So where does this leave the patterns of possessive control and control by the base of predication? Without some realization within the NP/AP, these local semantic patterns — robust as they are — would appear to be epiphenomenal, at least with respect to adjuncts. The perceived possessor, the base of predication, and the understood subject, are all determined by the same basic interpretive mechanisms, and are therefore associated with the same elements. This issue is left as an open question, since it does not crucially bear on the account in general. Regardless of the status of external arguments in noun phrases and adjective phrases, the same basic approach to control applies.

In analogy with the different analyses of complement control and adjunct control in verbal expressions, it seems reasonable, and would be theoretically consistent, to make a similar distinction regarding noun phrases and adjective phrases. Thus, complement control would presumably be determined by the selecting head and only adjunct control by percolation of an unsaturated val feature. On the other hand, the patterns of possessive control and control by the base of predication seem to apply to complements and adjuncts alike — except perhaps that it may be harder to motivate a possessor element in relative infinitival adjuncts. Still, just because a relation conforms to a syntactic generalization, this does not necessarily exclude it from possibly also being lexically determined.

6. Indirect control and locality

Although control in verb complements (cf. Section 2) is the main topic in the control literature, predicative complements (or *subject complements*) are rarely considered. They also behave entirely differently from other verb complements in that they consistently adhere to a pattern of indirect control. Since copular verbs roughly equate the subject and the predicative, sentential predicative complements always co-occur with subjects with some sort of sentential content. In this context, the controller is not the matrix subject itself but an element *within* this subject. The relation is structurally parallel in that the external (subject) argument of the predicative infinitive is coreferent with the external argument of the matrix subject. Such external arguments are realized differently, according to the phrase type of the subject. Two common types are exemplified in (24):

- (24) a. Men avsikten var aldrig att_i lämna tillbaka den.
 but intention-DEF was never to_i leave back it
 ‘But the intention never was to return it.’
- b. Att_i leva är att_i lära.
 to_i live is to_i learn
 ‘To live is to learn.’

In (24a), the subject is a noun phrase, and its external argument is an implicit possessor (cf. Section 5.1). It could have been expressed as a genitive (e.g. *min avsikt* ‘my intention’), but even when implicit it is always coreferent with the understood subject of the predicative complement. In (24b) the subject is itself an infinitive, and its external argument thus an implicit subject. The external implicit argument of the predicative is obligatorily coreferent with the external implicit argument of the subject.

In these cases, external arguments of the matrix subjects are arguably present in the structure even if they are implicit, at least as frame elements. A couple of sentences where the indirect control relation is not so straightforwardly structural are shown in (25):

- (25) a. (Det sades att Bukefalos, som ju betyder Oxhuvud, hade ärats genom att få bära två gyllene horn under striderna. / ‘It was said that Bukefalos, which means Oxhead, had been honored by getting to wear two golden horns during the battles.’)
 Det innebär nästan att _iupphöja hästen till en gudomlighet [...] *it means almost to _iraise horse-DEF to a divinity*
 ‘That almost means raising the horse to a divinity’
- b. Erotik var att _iförfina sin kropp (sublimera, sa Freud) [...] *eroticism was to _irefine POSS-REFL body (sublimate, said Freud)*
 ‘Eroticism was to refine one’s body (sublimate, said Freud).’

In (25), it is less obvious that the matrix subjects contain external arguments. Nevertheless, they are present in the content and coreferent with the understood subjects of the predicative complements. In (25a), the subject *det* (‘it, that’) is a pronoun referring back to a previous sentence, and the agent of that event (honoring the horse) is also the controller. In (25b), the subject *erotik* (‘eroticism’), although not quite a deverbal noun, still refers to a kind of activity (arguably, *erotik* in this context corresponds to *att utöva erotik* (‘to engage in eroticism’)); and the understood subject of the predicative is coreferent with whoever the executor of that activity is. Hence, although an external argument may not be structurally present, it is inferred from the context.

In many cases, the understood subject in predicative complements is assigned arbitrary reference. This is only to be expected, since the standard pattern in infinitival subjects is arbitrary “control”. The understood subject of predicative complements never receives arbitrary reference by itself; it is always coreferent with the external argument of the subject. Hence, the control relation of predicative complements is indirect control even in these cases, never arbitrary “control”.

Indirect control also occurs in some adverbial adjuncts, namely in sentences where the subject is a clausal element — either a full clause as in (26a) (repeated

from (17c)) or an infinitive as in (26b).²⁸ There are, however, a few exceptions displaying pragmatic control, as in (26c):

- (26) a. För att _ikomma dithän [...] krävs det att _{vi} litar på den enkla
for to _icome to-that-point demand-s it that we_i trust on the simple
 människan.
human-DEF
 'In order to get there, it is necessary that we put our trust in the simple man.'
- b. För att _ita till vara vattnet från monsunregnen gick det inte att
for to _itake to last water-DEF from monsoon-rains-DEF went it not to
 bara _idämma upp lämpliga vattendrag.
just _idam up suitable watercourses
 'To save the water from the monsoon rains it didn't do to simply block suitable streams.'
- c. För att _islippa olika tolkningar hade det dock varit bättre
for to _ibe-spared different interpretations had it however been better
 om alla som är offside blir avblåsta.
if all who are offside become called-off
 'To be spared different interpretations, it would have been better if all players who are offside are called off.'

(26a) is a clear case of indirect control, where the understood subject of the infinitive is coreferent with the subject (*vi* 'we') of the extraposed subject clause. In (26b), the subject is itself infinitival, and the understood subject of the adjunct is coreferent with the understood subject of the (extraposed infinitival) subject. Both receive an arbitrary interpretation, as per subject infinitives, although the arbitrary controller is also associated with a pragmatically salient interpretation (cf. Section 3). For this reason, and because the adjunct precedes the subject, the indirect

28. A form of indirect control also occurs when an infinitive is embedded in another non-finite clause, and the understood subject of the subordinate predicate is controlled by the understood subject of the superordinate infinitive, as in (i). Thus, it is indirectly controlled by the ultimate controller, in this case the object of the main clause.

- (i) Han_i tvingade henne_j att _jgå omvägar för att inte _jpassera ett hus
he_i forced her_j to _jgo roundabout-ways for to not _jpass a house
 där det bodde en ensam kille.
where it lived a single guy
 'He made her take detours to avoid passing by a house occupied by a single guy.'

However, the intermediate implicit subject is just a special case of the controller being the closest available frame element, and hence the relation can be handled as per any other adverbial adjunct.

control relation is less obvious than in (26a). Nevertheless, the generalization that the understood subject of the adjunct is associated with that of the subject infinitive is quite robust. There are a few exceptions to the indirect control pattern, as in (26c), but these never concern cases where both the subject and the adjunct are infinitives. As for the interpretation of (26c), it fits the ordinary pattern for pragmatic control in clause initial adverbials.

Indirect control is a challenge to any analysis relying on syntactic configuration, since the controller is not directly available in the mother construct of the infinitive but embedded within another frame element. Hence, it seems to violate prevalent assumptions that syntactic relations are essentially local (cf. e.g. Sag 2007, in press). Even ordinary control poses a challenge to locality, since it concerns relations between elements that are arguments of different heads.

A standard solution to locality problems is that properties such as category and valence, head features in the terminology of Sag (2007, in press), are visible to the mother construct and may be percolated upwards in the structure. Note that this is always a step-by-step process, and no relation may ever apply directly to, say, a grand-daughter node. In addition, Sag (*ibid.*) assumes X-ARG (external argument) as a head feature, since certain grammatical processes affect not only sister constituents but also the external argument of a sister complement. Such a case would be arbitrary “control” in verb complements (cf. Sections 2 and 4), where the selecting head presumably specifies an arbitrary reading for the external argument of its infinitival complement. If X-ARG is visible to elements in the mother construct, just like e.g. valence features, such relations may be accounted for without any violation of locality (understood subjects of predicating infinitives would be available anyway, since they correspond to valence features).

Indirect control stretches locality further still, since not only the controlled element but also the controller is embedded. However, Sag’s X-ARG feature may provide a solution to this problem as well. Since the external argument is visible on its mother structure, it is not only accessible to the head but also to other locally available elements — and thus a potential target for the control relation. This relation is sketched in (27) and fits the general pattern in Figure 5 above.

(27)	Subject	Verb	Predicative infinitive
	X-ARG #1	copular	X-ARG #1
			val #1

Thus, with the addition of the X-ARG feature of Sag (2007, in press), indirect control may be accounted for by the same mechanism as other control relations. Admittedly, this is not quite what X-ARG was originally designed to handle, but it provides an attractive solution to an otherwise difficult problem.

7. Concluding remarks

The aim of this paper is to provide a comprehensive account of control structures — specifically with respect to Swedish, but the general approach should be applicable to other languages as well. I have proposed that there are three basic types of control mechanisms, which are employed in complement control, adjunct control, and arbitrary “control”, respectively. The relations between these three types are illustrated in Figure 6.

The basic distinction between control and non-control corresponds to the one between ordinary, predicating infinitives, which are controllable, and non-predicating infinitives, which are not. The former are predicated of an understood subject, which therefore requires an interpretation, whereas the latter refer to activities without predicating them of a particular subject argument. In the present approach, the need for an interpretation of the understood subject in predicating infinitives is represented as a valence feature. Non-predicating infinitives contain no such feature, since the subject argument is locally specified for arbitrary reference (cf. Section 3). This arbitrary interpretation may, however, be specified by the context, as with other generic expressions.

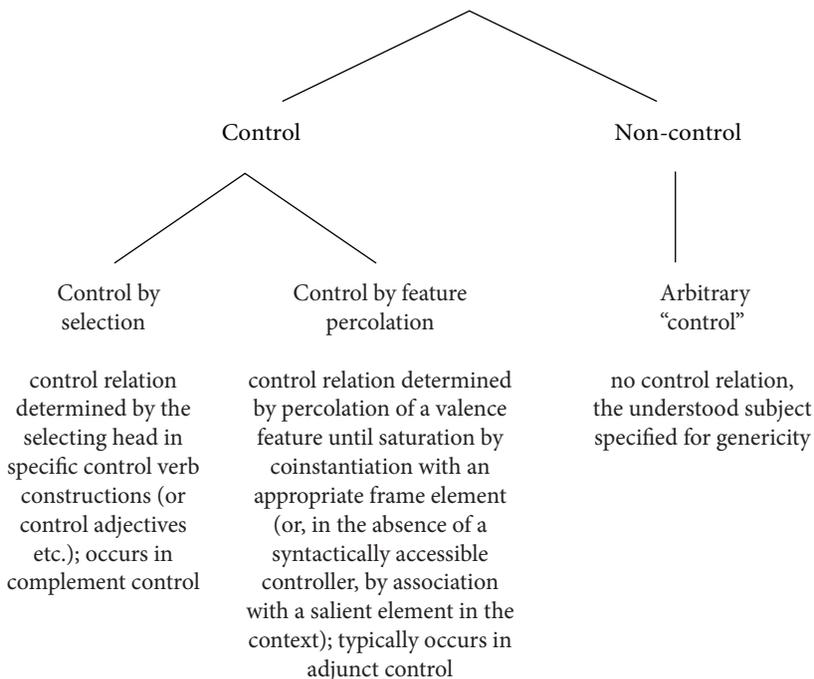


Figure 6. A basic typology of interpretation patterns in Swedish infinitives

Control in this approach is the relation between an unsaturated valence feature of the infinitive (or other non-finite clause) and some element that provides its interpretation. In complement control this relation is resolved by coinstantiation with another frame element of the head to which the infinitive is a complement, presumably specified by the selecting head in lexical control constructions — control by selection. Adjunct control, on the other hand, is typically not specified in ready-made control constructions. Instead, the unsaturated valence feature is provided with an interpretation by general properties of the grammar — specifically, by feature percolation; or, if no controller is provided by the syntax, with recourse to the pragmatic context. Hence, control by feature percolation is not a construction but should rather be classified as a relation between constructs. It arises as a consequence of the interaction between properties of the infinitive and properties of its context.

An exceptional pattern that fits neither of these two types is speaker control in speech act adverbials, which presumably constitute a special type of construction. Another possible exception is the variation between subject control and object control in purpose clauses, although I believe that this may eventually be incorporated into the general pattern of feature percolation. There may of course be other specific control constructions, e.g. *tough*-constructions, infinitival relative constructions, etc., but these are all specific variants of one of the three general patterns. Conversely, the specific (lexical) constructions involved in complement control may be instantiations of more general types, such as monotransitive control verb or patient-oriented ditransitive control verb. Given the semantic uniformity of the selecting heads involved in each type of control pattern, such general constructions seem to be well motivated. Also note that the relations in complement control usually conform to the basic feature percolation mechanism employed in adjunct control. Hence, it is not necessary to assume that all instances of complement control are lexically determined. Nevertheless, it seems a reasonable hypothesis that a lexical unit that selects an infinitival complement also has some influence on the relation between this complement and its syntactic environment. Furthermore, lexical constructions for the selecting heads would be required anyway, to account for basic lexical properties. Thus, regardless of whether the control properties follow directly from the lexical constructions as such or are inherited from more general control constructions, the basic generalization that the control relation is specified by the selecting construction remains.

There are, of course, some remaining issues to be resolved. As for the approach in general, the full analysis is not yet made formally explicit. A format that looks promising in this regard is provided by the recently developed Sign-Based Construction Grammar (SBCG, Sag 2007, 2008, in press; Michaelis in press). Although the metalanguage in the present paper for the most part conforms to more

traditional CxG, the approach is made in the spirit of SBCG; and some components, such as the X-ARG feature and a more hierarchical view of clause structure, have already been incorporated.

There are also some details of specific control patterns left to work out, for instance the status of external arguments in noun phrases and adjective phrases, and the distinguishing properties of the possessive element involved in possessive control in noun phrases (cf. Section 5). The latter topic, if not both, is closely related to the nature of genitive modifiers. Another outstanding issue concerns the specific contextual factors involved in pragmatic control (cf. Section 4) which are virtually disregarded in the present paper but clearly warrant further investigation — in particular, it should be enlightening to compare pragmatic control with the contextual bias involved in arbitrary interpretation.

Nevertheless, although several aspects of the analysis are left for further research, I am fairly confident that the present approach is on the right track. It seems quite clear, not only from this study but from the vast literature on control, that not all control structures may be accounted for by a single principle. The proposed split into three basic mechanisms appears to account for the variety of control patterns encountered in a fairly straightforward manner. It should also be evident from the presentation that Construction Grammar is well suited to handle control phenomena. Where purely lexicalist or purely syntactic approaches can only account for parts of the data, the CxG format allows for both construction-specific and more general patterns to be incorporated in the same overall approach.

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Author's address

Department of Swedish
University of Gothenburg
P.O. Box 200
SE-405 30 Gothenburg
Sweden

benjamin.lyngfelt@svenska.gu.se