

TOWARDS A REALISTIC THEORY OF CONTROL

Thomas F. Shannon

Department of German,
University of California, Berkeley

1. Introduction. The issue of "control" has recently attracted considerable attention within generative grammar. The main concern here has been determining the "missing" or "logical" subject of an infinitive complement. What matrix NP, if any, is the so-called "controller"? What regularities are at work here? Do any general, perhaps universal principles, account for the control properties found? The purpose of this paper is not to review these recent proposals on control but to propose an alternative account of our own. Before proceeding, let us first indicate the central phenomena which an adequate theory of control must handle. Our examples will come mostly from German, but clearly these phenomena are more general in nature and not restricted to this language.

A given matrix verb usually has a unique matrix NP which controls the lower clause. Another often overlooked but very important fact is that at least in languages like German certain matrix verbs require that the pronominal subject in a finite *daß*-clause must be coreferential with a specific superordinate NP, usually the controller of the alternative infinitive complement, if possible. Of course, an adequate theory of control should ideally connect these two related properties and account for crosslinguistic similarities. Thus, for instance, most three-place predicates, e.g. *erlauben* 'to permit', *bitten* 'to ask', *befehlen* 'to order', and *zwingen* 'to force' require object control in finite and non-finite complements, though some three-place matrix verbs, e.g. *versprechen* 'to promise', require subject control. Cf. the examples of object control given in (1) and subject control in (2).

(1) *Peter_i erlaubt/bittet/befiehlt/zwingt Paul_j, $\phi_{i/j}$ hier zu bleiben/daß er $\cdot_{i/j}$ hier bleibt.*

'Peter_i permits/asks/orders/forces Paul_j $\phi_{i/j}$ to remain here/that he $\cdot_{i/j}$ remain(s) here.'

(2) *Peter_i verspricht Paul_j, $\phi_{i/j}$ ihm den Wagen zu leihen/daß er $\cdot_{i/j}$ ihm den Wagen leiht.*

'Peter_i promises Paul_j $\phi_{i/j}$ to lend him the car/that he $\cdot_{i/j}$ lends him the car.'

Two-place verbs also often display subject control, e.g. *versuchen* 'to try' and *sich weigern* 'to refuse', which incidentally do not allow a *daß*-complement; cf. (3 & 4).

(3) *Peter_i versucht/weigert sich, ϕ_i Anna anzurufen/*daß er $\cdot_{i/j}$ Anna anruft.*

'Peter_i tries/takes the liberty/refuses ϕ_i to call Anna/*that he $\cdot_{i/j}$ calls Anna.'

Some two-place predicates take a complement as subject and assign control to the nominal object, e.g. *stören* 'to disturb', *überraschen* 'to surprise'.

- (4) *Es würde mich_i (nicht) sehr stören/überraschen, ϕ_1 jeden Tag nur Brot und Wasser zu essen zu bekommen.*

'It would (not) disturb/surprise me_i ϕ_1 to get only bread and water to eat every day.'

Furthermore, some verbs, e.g. *anbieten* 'to offer' in (5) (from Růžicka 1983), do not have a specific designated controller; instead control is "ambiguous", i.e. it can be assigned either to the subject or the object, as appropriate.

- (5) *Ich_i bot ihm_j an, $\phi_{i/j}$ mich zu erschießen.*

'I_i offered him_j $\phi_{i/j}$ to shoot me/myself.'

Some verbs also apparently allow split or joint control, that is, simultaneous control by more than one matrix NP, e.g. *vorschlagen* 'to propose' in (6).

- (6) *Peter_i schlug Maria_j vor, $\phi_{i/j/ij}$ ins Kino zu gehen.*

'Peter_i proposed to Maria_j $\phi_{i/j/ij}$ to go to the movies.'

However, some two-place verbs do not normally assign a matrix controller, e.g. *zulassen* 'to admit', *billigen* 'to tolerate, condone' in (7).

- (7) *Die Regierung_i läßt es nicht zu/billigt es nicht, ϕ_{*ij} Waffen nach Libyen zu exportieren.*

'The government_i does not allow/condone ϕ_{*ij} exporting weapons to Libya.'

These verbs are then said to impose arbitrary or indefinite control. Of course, if a given verb does not allow a matrix nominal NP, then no specific NP controller can be regularly assigned, as with e.g. *gelten* 'to be a matter (of)'.

- (8) *Es gilt nun, ϕ_1 sich zu entscheiden.*

'It's a matter now of ϕ_1 making up one's mind.'

Another related control phenomenon is what I will call "control switch": with some verbs the usual control relation can be reversed under certain conditions. Thus, one can find control switch from object to subject with a verb such as *bitten* 'to ask' (9), from subject to object with *versprechen* 'to promise' (10), and from arbitrary to subject with *dulden* 'to tolerate' (11).

- (9) *Peter_i bittet Paul_j, $\phi_{1/j}$ hier nicht bleiben zu müssen/daß er_{i/j} hier nicht bleiben muß.*

'Peter_i asks Paul_j, $\phi_{1/j}$ not to have to stay here/that he_{i/j} not have to stay here.'

- (10) *Peter_i verspricht Paul_j, ϕ_{*ij} hier bleiben zu dürfen/daß er_{j/i} hier bleiben darf.*

'Peter_i promises Paul_j, ϕ_{*ij} to be allowed to stay here/that he_{j/i} will be allowed to stay here.'

- (11) *Peter_i duldet es nicht, $\phi_{1/*j}$ beleidigt zu werden/ daß er_{ij} beleidigt wird.*

'Peter_i does not tolerate $\phi_{i/j}$ being insulted/that he_{i/j} is insulted.'

Apparently only certain matrix verbs allow this control switch, and it is only with certain constructions such as passive and "extrasubjective" modals (cf. Reinwein 1977) like *dürfen* and *müssen* in the complement that control switch can be found with these verbs.

2. Toward a Theory of Control. Recently we have seen a number of proposals within generative grammar to account for some or all of the just-mentioned phenomena of control. Basically, opinions here have largely fallen into two opposing camps. On the one side there are those who maintain that control is strictly a formal syntactic matter and governed by structural syntactic principles such as c-command and locality or distance within a tree configuration. This largely amounts to a version of Rosenbaum's (1967; 1970) "Principle of Minimal Distance." Proposals in this vein have come from Chomsky (1980), Koster (1978), Bresnan (1982), and Culicover and Wilkins (1984), for instance. In the other camp are those who base their theory of control on semantics, often thematic roles, including Růžička (1983), Nishigauchi (1984), Culicover and Wilkins (1986) and Gazdar et al. (1985). In Shannon (1987a) I have critically reviewed these proposals and shown that none of them can stand as a theory of control; cf. also Cutrer (1987). Such accounts make a number of empirically incorrect predictions, treat three-place subject-controlling verbs like *promise/versprechen* as lexical exceptions, and at any rate offer no explanation for the observed control behavior, especially the striking similarities found cross-linguistically with synonymous verbs. The crucial criticism is that such accounts lack explanatory power, and in no way show the inherent motivation of the regularities involved. Moreover, semantic theories which rely on thematic relations suffer from the fact that these relations themselves are ill-defined and hence form a poor basis for motivating the observed control properties.

In Shannon (1987a) I concluded that no theory which attempts to account for all the properties to be observed through a single principle or type of factor can be correct. Instead, it appears that control depends on a number of factors and is therefore not a unitary phenomenon; cf. Siebert-Ott (1983). Furthermore, we are also of the opinion that the central factor determining control is the meaning of the matrix predicate. Proposals in a similar vein have been made recently by Foley and Van Valin (1984) and Comrie (1984). In addition, we believe that it is mistaken to attempt to account for control switch as a central part of the theory of control: it is a marked phenomenon limited to certain matrix verbs and occurring largely only under certain semantic conditions. Moreover, not all verbs allow control switch to the same extent but rather show differing sensitivities to control switching constructions in the complement. Thus control switch too is heterogeneous and dependent on semantic (pragmatic) properties, both of the matrix verb as well as of the complement.

In my opinion, establishing the referent of the missing complement subject is ultimately the result of a series of inferences — often conventionalized through frequent use — based on the meaning of the matrix verb, the complement, and other semantic, pragmatic, and syntactic knowledge. If an infinitive

complement is used, then the subject of the complement is for whatever reason defocused or backgrounded in the sense of Kirsner (1979) and Shibatani (1985), i.e. it is not in the center of attention in the sentence. This implies that the referent need not be mentioned, either because it is unimportant or indefinite and therefore perhaps cannot even be named, or else because the referent is in some way inferable. The referent can be inferred for a number of reasons. The first overriding principle governing this motivating processes is that the meaning of the whole complement, including the yet to be established referent of the subject of the infinitive, must be consonant with the meaning of the matrix verb. Probably the most important and persuasive reason a referent can be inferred is because the meaning of the matrix verb necessitates that a given matrix NP be the referent. Specifically, because of their meaning certain verbs require that (the referent of) a given matrix NP have volitional control over the event expressed by the complement. I will refer here to the "control constraints" imposed by the matrix verb; in the following section several such constraints will be proposed and tested. If the meaning of the matrix verb requires volitional control of a given individual over the event specified in the complement, then the controller will be the matrix NP which designates the individual in question. I call such controllers "semantically induced or motivated".

In such cases, the meaning of the matrix verb necessitates coreference of the missing (or pronominal) subject of the complement with a given matrix NP. This is for instance true with three-place directive verbs including requestives like *bitten* 'to ask', requirements like *befehlen* 'to order', *auffordern* 'to require', and *anweisen* 'to instruct', and prohibitives like *verbieten* 'to forbid'. Since such verbs all designate an attempt by the speaker to get the hearer to do something, the event in question must be under the volitional control of the hearer (the syntactic nominal object) and for that reason all such verbs evince object control with an infinitive complement and obligatory coreference with the lower subject of a *daß*-complement. This is also true of many other verbs, e.g. non-performative, often causative verbs such as *befähigen* 'to enable', *lehren* 'to teach', *zwingen* 'to force', *veranlassen* 'to cause', etc. Thus, the normal control properties of control constraint verbs are completely expectable, for they are motivated by their meaning.

Furthermore, the otherwise "irregular" control properties of various verbs suddenly appear quite regular once their meaning is considered. Viewed in this way, the subject control found with commissive verbs like *versprechen* 'to promise'—a perennial problem for other theories and hence often simply marked as a "lexical exception"—no longer appears exceptional: despite the fact that they have a nominal object, they are still subject-controlling because with such verbs the speaker obligates himself to do something, which therefore must be under his volitional control. Moreover, the split or ambiguous control encountered with other verbs which we might call "collaborative" is equally unexceptional: with verbs like *anbieten* 'to offer', *vorschlagen* 'to propose', *vereinbaren* 'to agree to', *sich auf etwas einigen* 'to agree to', etc. both parties are potentially interested and involved in the event expressed by the complement and therefore possible candidates for control. Pace Růžicka (1983), the

ambiguous control properties of a verb like *anbieten* 'to offer' are not due to the existence of two homophonous verbs; rather, the meaning of the verb does not uniquely determine whose volitional control the event must be under. In addition, with many two-place verbs there is also a semantically induced controller, e.g. *versuchen* 'to try', *sich erlauben* 'to take the liberty (to)', *sich weigern* 'to refuse', etc. These verbs require subject control because their meaning necessitates that the subject have volitional control over the event in question.

If the matrix verb does not impose a control constraint and there is thus no semantically induced controller in the narrow sense, the reference of the missing complement subject must be inferred in some other way. This means that other factors of a semantic, pragmatic, and perhaps syntactic nature must be taken into consideration. The main point, as always, is to derive a meaning of the complement, including the reference of its missing (or pronominal) subject, which does not conflict with the meaning of the matrix verb. In Shannon (1987a) I discuss these other motivating factors in detail. What I would like to show now is how "control constraints" account for the types of predicates allowed in the complement of certain verbs as well as their semantically induced controllers.

3. Previous Inadequate Proposals for Control Constraints. As mentioned earlier, various verbs are subject to certain restrictions on their complements. Compare the following, where '%' indicate anomaly.

(12) *Sie hat versucht/Karl erlaubt/befohlen, a) nach Hause zu gehen /b) %sich zu Hause zu befinden.*

'She tried/permitted/ordered Karl a) to go home/b) %to be located at home.'

The relevant restriction seems to be that the person who is given the permission/order or makes the attempt must have some sort of control over the matter in question. Obviously (12a) can be controlled in a sense in which (12b) cannot. Observing that the complement in (12a) describes an action, whereas in (12b) it describes a state, one might attempt to formulate in the grammar a restriction on these verbs and others to the effect that only actions may appear in their complement. One way to express this would be to state that the subject of the complement of such verbs must be an agent, in the sense of Case Grammar or θ -roles. Alternatively, the restriction could refer to the class of action verbs, if our theory made this category available.

Katz (1977) offers a different solution by requiring that the complement must designate a "non-state". This condition is supposed to account for the semantic anomaly of sentences like (13 [= Katz' 5.8]): since *understand* expresses a state, it violates the selection restriction on the complement of a verb like *order*.

(13) *I order you to understand the Gödel theorem.*

If this were a suitable way to express these constraints, selection restrictions could be stated in the same manner for the corresponding German verbs. One problem with this proposal is the very questionable status of selection restrictions (cf. Lyons 1977, Miller & Johnson-Laird 1976 for discussion).

Disregarding this difficulty, such a restriction can not correctly account for the data which it is supposed to handle, i.e. it is not descriptively adequate. Regardless of whether the selection restriction is stated to require an agent subject, an action verb or a non-state, it will not work properly.

To see this point, observe that the following examples are perfectly acceptable, even though the verb in the complement describes a state and not an action.

(14) a. *Ich habe Hans erlaubt/befohlen, im Garten zu schlafen.*

(14) b. *I permitted/ordered Hans to sleep in the garden.*

Katz (1972: 303) specifically mentions *sleep* as an example of a state, but the German and English examples given here are not anomalous when this verb is used in the complement. Moreover, there are also sentences with complements containing action verbs which are semantically anomalous, as in (15). None of these complements represent states, and yet they are not acceptable.

(15) %*Sie hat Peter erlaubt/befohlen, das Fenster unabsichtlich zu zerbrechen/gut Tennis zu spielen/den Schatz im Silbersee zu finden.*

'%She permitted/ordered Peter to unintentionally break the window/to play tennis well/to find the treasure in Silver Lake.'

Clearly, the restriction as formulated by Katz leads to incorrect predictions because it does not properly state what we have called the control constraints for these verbs. Examples such as (14) are acceptable because the state described is volitionally controllable, whereas sentences like (15) are anomalous because the actions involved are viewed as beyond such conscious control. A restriction requiring a non-statal verb or an action verb does not correctly express this generalization.

Jackendoff (1972: chap. 5) also discusses restrictions of this type and claims that thematic relations—specifically his notion of Agent—are relevant. For Jackendoff "The Agent NP is identified by a semantic reading which attributes to the NP will or volition toward the action expressed by the sentence." Certainly Jackendoff is on the right track in referring to volition, but unfortunately he does not clarify the matter any further. Moreover, it is very doubtful that there is any notion of agent designating volitional causation or any inherent semantic feature [\pm volitive] (cf. Cruse 1973) which is specifiable in the narrow confines of a competence grammar. Judgments on volitional control of a state of affairs depend very heavily on general assumptions about intentions and possibility as well as on specific contextual information which may alter those assumptions. Pleines (1976) and Miller & Johnson-Laird (1976) argue that many verbs do not directly express intentional as opposed to unintentional actions and that this information should not be incorporated as part of their meaning in the form of an agent case or any other marking, unless it forms a necessary part of the meaning of the verb. Intentionality is a matter of extra-linguistic knowledge and assumptions and does not have to be coded linguistically — though of course it may be.

Another reason why Jackendoff's proposal does not cover control restrictions properly is that various verbs differ in the amount or kind of control they

require: a simple feature such as Agent or [\pm volitive] would not be sensitive enough to account for these differences. Jackendoff claims that verbs like *try*, *persuade*, *force*, and *promise* mark the complement subject as an Agent, i.e. they impose a volitive reading on this NP. This would explain why the following sentences are semantically anomalous.

- (16) a. %I tried/promised/ordered him/persuaded him/forced him to be short.
 (16) b. %Ich versuchte/versprach/befahl ihm/überredete ihn dazu/zwang ihn dazu, klein zu sein.

Observe, however, that these verbs do not all show the same behavior, as we see in the following examples.

- (17) He tried%/ordered me/%permitted me to understand the theory/to please the crowd.
 (18) a. Er versuchte, die Theorie zu verstehen/dem Publikum zu gefallen/%(vom Arzt) untersucht zu werden.
 (18) b. %Er befahl mir, die Theorie zu verstehen/dem Publikum zu gefallen/(vom Arzt) untersucht zu werden.
 (18) c. Er erlaubte mir, %die Theorie zu verstehen/%dem Publikum zu gefallen/(vom Arzt) untersucht zu werden.

If there were just a single restriction on Agent subjects with volitive control or on an inherent semantic feature [\pm volitive], all these verbs should behave alike: the fact that they do not do so shows that this restriction is incorrect. Different verbs may require slightly different kinds and amounts of control, so that the requirement of a volitive Agent subject in all cases simply will not suffice: it is not "fine-grained" enough. We will now show what kinds of restrictions are at work with such verbs and how they can be formulated within the framework which was presented at the beginning of this chapter.

4. The Proper Formulation of Control Constraints: A Comparison of *erlauben*, *befehlen*, and *versuchen*. The preceding discussion has made it clear that some verbs restrict their complements events which are subject to a certain amount of volitional control. We have claimed that these control constraints cannot be stated in the grammar uniformly for all such verbs as a single restriction on non-states, agentive subjects, or even on the presence of some ad hoc semantic feature like [\pm volitive]. However, these restrictions appear to follow naturally from an analysis of the meanings of such verbs and their "control constraints". These constraints can be formulated in terms of the assumptions concerning intentions and possible goals which these verbs entail. It is also claimed that actual judgments of these possibilities necessarily involve knowledge and beliefs of an encyclopedic, inherently non-linguistic nature.

To illustrate this, let us consider the control constraints for three different exemplary German verbs: *versuchen* 'to try', *erlauben* 'to permit', and *befehlen* 'to order'. The verb *versuchen* indicates that someone does something with the intent of achieving a certain goal. One must be able to imagine some sort of plan that can attain this goal, otherwise it is foolhardy to say that one is attempting to achieve it (cf. Miller & Johnson-Laird 1976). Whether such a goal

is in fact achievable is hardly a linguistic matter; our judgment depends on what we consider to be possible, not on any strictly linguistic knowledge. By virtue of its meaning, *versuchen* is thus subject to the following restriction, which we can call the (semantic) "control constraint" for *versuchen*.

(19) $\text{VERSUCHEN}(x, y) \Rightarrow \text{POSSIBLE}(\text{CAUSE}(\text{INTEND}(x, \text{ACHIEVE}(x, y)), \text{DO}(x, S)))$

If someone tries to achieve some goal *y*, it must be possible that his intent to achieve the goal will cause him to do something to this end.

For directives, the control constraints involved are considerably stronger than with *versuchen*. With *befehlen* 'to order', for example, the intention to achieve the goal must guarantee the result. This conclusion follows from the fact that when one is ordered to do something, just an attempt to do it will not suffice. Morally speaking, one has no choice in the matter: one is obligated to achieve the goal. With *befehlen* the control constraint implies that it must be possible for the intention to cause the achievement of the goal; this can be formulated as follows.

(20) $\text{BEFEHLEN}(x, y, z) \Rightarrow \text{POSSIBLE}(\text{CAUSE}(\text{INTEND}(y, \text{ACHIEVE}(y, z)), \text{ACHIEVE}(y, z)))$

Finally, *erlauben* 'to permit' imposes a similar but slightly different restriction: the permittee must at least be able to choose whether the event in question happens to him or not. This follows from the fact that *erlauben* expresses permissibility; the permittee is not under an obligation to achieve a goal but is free to choose what happens as a result of the permission. Therefore the permittee's intention must be sufficient to allow him to participate in the event proposed. We formulate this control constraint as follows, where *S_y* designates the thing permitted in which *y* participates.

(21) $\text{ERLAUBEN}(x, y, z) \Rightarrow \text{POSSIBLE}(\text{ALLOW}(\text{INTEND}(y, z), S_y))$

4.1. The Acceptability of Action Verbs in the Complement of Control Verbs.

In order to see how these control constraints operate, let us analyze some examples of different types of verbs in the complements of these verbs. Since action verbs represent the most frequently encountered semantic verb type in the complements of these verbs, we will start with them. Generally, action verbs denote a change of state which can in principle be intentionally brought about. Most frequently, perhaps always, this involves some sort of causation. Action verbs like *töten* 'to kill' are acceptable in the complement of these verbs, at least in principle.

(22) *Hans hat versucht/Ich habe Hans befohlen/erlaubt, den Tyrannen zu töten.* 'Hans tried/I ordered/permitted Hans to kill the tyrant.'

In principle, such action verbs do not violate the restrictions which have been formulated for these three verbs. The compatibility of *töten* with these verbs is clearly shown in the following procedures, where we use "KILL" to express the routine for *töten* and "H" and "T" to represent *Hans* and *Tyrann*.

(23) $\text{a.VERSUCHEN} \Rightarrow \text{POSSIBLE}(\text{CAUSE}(\text{INTEND}(\text{H}, \text{ACHIEVE}(\text{H}, \text{KILL}(\text{H}, \text{T}))), \text{DO}(\text{H}, \text{S})))$

(23) b.BEFEHLEN => POSSIBLE(CAUSE(INTEND(H, ACHIEVE(H, KILL(H, T))), ACHIEVE(H, KILL(H, T)))

(23) c.ERLAUBEN => POSSIBLE(ALLOW(INTEND(H, KILL(H, T)), KILL(H, T)))

However, in judging whether the action is controllable in the proper sense, we rely not just on our general beliefs but also on other information. Thus if the object of *töten* were *das Gespenst* 'the ghost', we would assume the action to be impossible under normal conditions and reach different acceptability judgments. This observation, though obvious, is not trivial, because restrictions such as Katz' or Jackendoff's could not handle such cases independently, while ours can.

Intentionality-negating adverbs, which are regularly unacceptable with verbs that include intentionality as part of their meaning like *ermorden* 'to murder', also lead to anomaly when *töten*, which allows such adverbs in principle, is embedded under these control constraint verbs, since such actions are not properly controllable.

(24) %Hans hat versucht/Ich habe Hans befohlen/erlaubt, den Tyrannen unabsichtlich zu töten.

'%Hans tried/I ordered/permitted Hans to unintentionally kill the tyrant.'

It is difficult — indeed impossible under normal circumstances — to imagine how someone could plan to kill someone else unintentionally; for this reason sentences like (24) violate the control constraints which hold for these verbs. The incompatibility involved comes out clearly in the following routines, where we use "UNINTENTIONALLY" to represent *unabsichtlich*.

(25) a.VERSUCHEN => POSSIBLE(CAUSE(INTEND(H, ACHIEVE(H, UNINTENTIONALLY (KILL(H, T))))), DO(H, S))

(25) b.BEFEHLEN => POSSIBLE(CAUSE(INTEND(H, ACHIEVE(H, UNINTENTIONALLY (KILL(H, T))))), ACHIEVE(H, UNINTENTIONALLY(KILL(H, T))))

(25) c.ERLAUBEN => POSSIBLE(ALLOW(INTEND(H, UNINTENTIONALLY(KILL(H, T))), UNINTENTIONALLY(KILL(H, T)))

Since these routines for the control constraints can be constructed quite easily by simply plugging in the appropriate readings for the complement, we will hereafter refrain from formalizing them for each example.

Note that all three verbs do not always behave exactly alike with action verbs.

(26) Ulf hat versucht/%Ulf hat Karl befohlen/erlaubt, gut Tennis zu spielen.

'Ulf tried/%ordered/permitted Karl to play tennis well.'

The sentence with *versuchen* is acceptable, whereas those with *befehlen* and *erlauben* are anomalous. While it may be possible for someone to do something which might make him play tennis well (e.g. practicing every day), one cannot readily imagine the success of such an action as depending on volition. Even here there are subtle differences due to the meaning of the matrix verb. Some speakers find the sentence with *befehlen* more plausible than the one with

erlauben. This is apparently because with *befehlen* one obligates the person to do something, but with *erlauben* it is left up to their choice. It is easier to think of a context where one could try to get someone to improve his tennis game by telling him to do so. An appropriate context for *erlauben*, where his playing tennis well depends on our permission, is more difficult to devise. Here we see that one matrix verb may make a context of use more plausible than the other, thereby affecting the acceptability judgments.

4.2. The Acceptability of "Pseudo" Action Verbs in the Complement. Besides such true action verbs, other verbs express changes that are not normally considered to be under the volitional control of the person involved. One such group includes verbs like *niesen* 'to sneeze', *husten* 'to cough', *rülpsen* 'to burp', *gähnen* 'to yawn', and *weinen* 'to cry'. The acceptability of these verbs in the complements of *versuchen*, *befehlen*, and *erlauben* hinges crucially on assumptions about their controllability and the plausibility of a context in which a person might influence such an occurrence. These verbs seem most acceptable with *versuchen*.

(27) *Sie versuchte, zu niesen/husten/rülpsen/gähnen/weinen.*

'She tried to sneeze/cough/burp/yawn/cry.'

Such sentences do not sound anomalous to the extent that one can imagine a context where someone has sneezing, coughing, etc. as a goal and can do something with the intent of bringing this about. It is somewhat more difficult — though certainly not impossible — to imagine a context in which someone has control over these "actions" and would ask for permission or be ordered to perform them. The former context is perhaps even less probable, so that these verbs sound distinctly curious without additional context to strengthen these assumptions.

(28) a. *%Ich befehle/erlaube dir, zu niesen/husten/rülpsen/gähnen/weinen.*

'%I order/permit you to sneeze/cough/burp/yawn/cry.'

The meaning of the matrix verb obviously contributes to the (im)plausibility of a context of use. If we change the sentence slightly, the situation becomes much more plausible and the acceptability of the sentences is greatly improved.

(28) b. *Ich befehle dir, nicht/erlaube dir nicht, so laut zu niesen/husten/rülpsen/schnarchen.*

'I order you not/do not permit you to sneeze/cough/burp/snore so loud.'

Since most people can keep down the noise level of (some of) these events, such sentences make sense. As we see here, one does not have to be able to initiate the action, but only to influence it properly (i.e. prevent or at least muffle it). The plausibility of control cannot simply be reduced to the presence of an agent subject, a non-statal verb or an inherent semantic feature of the verb [\pm volitive], because it varies according to the context.

Another class of verbs which express a change not normally under volitional control is represented by verbs like *finden* 'to find', *erreichen* 'to reach',

gewinnen 'to win'. Such verbs do not denote an action performed but rather the result of an action, the achievement of a possible goal. Hence it is not surprising to find that such verbs are in general perfectly acceptable with *versuchen*.

- (29) *Hans hat versucht, die Ostereier zu finden/das Spiel zu gewinnen/den Bus zu erreichen.*

'Hans tried to find the Easter eggs/to win the game/to catch the bus.'

With *versuchen* the result does not have to be under direct volitional control, it only has to be possible for the person to do something to achieve the goal. However, achievement verbs are generally not acceptable with directives (although we will see exceptions to this).

- (30) *%Ich habe Peter erlaubt/befohlen, das Rennen zu gewinnen/die Ostereier zu finden/den Bus zu erreichen.*

'%I permitted/ordered Peter to win the race/to find the Easter eggs/to catch the bus.'

The reason for this anomaly is fairly obvious: achievement verbs denote a possible result of an action, something which depends mainly on chance, not choice. Therefore, the control restrictions for *erlauben* and *befehlen* are violated.

It is important to realize that such achievements are not always beyond conscious control and that not all such sentences are anomalous. Plausible contexts of use for *befehlen* seem to come to mind more readily. Moreover, not all achievement verbs are equally anomalous. Negative achievement verbs, for example, can be interpreted more easily as depending on choice and not just chance and thus do not appear to violate the control restrictions on directives.

- (31) *Ich habe Klaus erlaubt/befohlen, das Spiel (absichtlich) zu verlieren/beim Examen durchzufallen.*

'I permitted/ordered Klaus to (intentionally) lose the game/fail the exam.'

It is easier to intentionally fail at such endeavors than it is to succeed, though some events can certainly be influenced more easily than others. When judging such "contextless" sentences, speakers do not confront them in the total vacuum of Katz' null context, but rather bring their general beliefs and knowledge about possible situations and possible referents to bear in order to justify the necessary assumption that the outcome is a matter of choice and not chance. Whether speakers succeed in constructing such a context is another matter, contingent upon numerous extraneous factors, but this does not alter the fact that their judgments are based on real world knowledge and not on strictly linguistic information. Again it is clear that inherent linguistic features cannot cope with such an evaluation process; some sort of more powerful procedures like the ones outlined here must in fact be resorted to.

4.3. The Acceptability of Statal Verbs in the Complement. Let us consider next verbs which denote a state. The sentences in (32) are anomalous because one cannot normally control how well one sleeps; with *versuchen* (33), however, the example is fine.

(32) a. %*Jürgen hat Peter erlaubt/befohlen, gut zu schlafen.*

(32) b. %*Max ordered/permitted Bill to sleep well.*

(33) a. *Kurt hat versucht, gut zu schlafen.* b. *Bill tried to sleep well.*

Verbs of position express a state which is under volitional control when they denote the end result of possible voluntary movement. One can choose to sit, stand or lie in a certain place, for a certain length of time, not to move from that position, etc. Therefore the following examples are non-anomalous.

(34) *Rolf hat versucht/Rolf hat Moni erlaubt/befohlen, dort zu sitzen/liegen/stehe.*

'Rolf tried/permitted/ordered Moni to sit/lie/stand there.'

On the other hand, a verb like *sich befinden* 'to be located', which does not express the result of conscious behavior but rather stresses the purely locational aspect, is hardly acceptable with directives or *versuchen*.

(35) %*Rolf hat versucht/Moni hat Rolf erlaubt/befohlen, sich dort zu befinden.*

'%Rolf tried/permitted/ordered Moni to be located there.'

Other verbs also designate states which are not easily controlled, e.g. *lieben*, *verstehen*, or *glauben*. They are fairly acceptable with *versuchen* because one might be able to do things to influence one's own inner state. But with *erlauben* and *befehlen* these verbs are much less acceptable, since they are not under one's direct volitional control and usually not subject to another's authority.

(36) a. *Peter versuchte, Elfriede zu lieben/die Theorie zu verstehen/an Gott zu glauben.*

'Peter tried to love Elfriede/to understand the theory/to believe in God.'

(36) b. %*Sein Vater erlaubt/befiehlt Uwe, Elfriede zu lieben/die Theorie zu verstehen/an Gott zu glauben.*

'%His father permits/orders Uwe to love Elfriede/to understand the theory/to believe in God.'

Even here one might imagine plausible contexts of use for such examples as (36b) which would render them non-anomalous. Once again, examples with *befehlen* seem to come more quickly to mind.

4.4. The Acceptability of Process Verbs in the Complement. The final group of verbs which will be considered consists of verbs which designate a process (cf. Perlmutter and Postal 1984 on "unaccusative" verbs; also Shannon 1987b, to appear b, for an opposing view). Since a process is something which happens to a person and not something he initiates, it is not normally viewed as being under voluntary control; the subject is a patient, not an agent. For this reason process verbs are not usually acceptable with directives.

(37) %*Klaus erlaubt/befiehlt Gabi, zu genesen/wachsen/sterben.*

'%Klaus permits/orders Gabi to recover/grow/die.'

We fail to see how Katz' selection restriction on non-states would suffice to account for such cases, for processes are not states but changes of state; it would not rule out these examples. Presumably a restriction against a non-agent subject would work in such instances.

Nevertheless, certain processes can be influenced, if not directly controlled, by our efforts, so that such verbs are acceptable in the complement of *versuchen*.

(38) *Er versuchte zu genesen/wachsen/sterben.* 'He tried to recover/grow/die.'

As always, acceptability here depends on the judgment whether one can do anything to help bring about the desired outcome. Note that under the appropriate circumstances some processes can be viewed as subject to a certain amount of volitional control. When this is so, the resulting sentences are acceptable with directives. Consider *sterben* as an example. The apparent anomaly of this verb in (37) shows that we usually do not view death as controllable (suicide is of course another matter). But in the proper context volitional control may be attributed to the individual. For instance, a doctor might try to encourage a dying patient to continue his struggle to survive by saying:

(39) a. *Ich erlaube Ihnen nicht, zu sterben!* 'I will not permit you to die!'

(39) b. *Ich befehle Ihnen, nicht zu sterben!* 'I order you not to die!'

A check for an agent or an inherent semantic feature [\pm volitive] will not work here. In this case the patient does not volitionally initiate an action; he is still an experiencer and not an agent. But the doctor assumes that — or acts as if — the patient's intention not to die and the resultant inner battle to survive could prevent him from dying, whereas his giving up would allow him to die. This explains the marginality of sentences such as (39) out of context; they violate our general assumptions about the controllability of death and force the hearer to search for a context which would support the apparently untenable assumption. Only if he can find such a context will the sentence make sense and be judged acceptable.

Up to now we have seen a number of differences between *versuchen* and the directives *erlauben* and *befehlen*, but relatively few differences between the latter two verbs. One further process, the passive, points out such a difference nicely. The passive clearly expresses a process, for it denotes something which is done to the subject. Passives are not acceptable with *versuchen* or with most directives such as *befehlen*.

(40) *%Ich habe versucht/Sie hat mir befohlen, (vom Arzt) untersucht zu werden.*

'%I tried/She ordered me to be examined (by the doctor).'

That a passive should be unacceptable with these verbs is rather obvious from their control constraints. Both verbs require that the person (strive to) achieve his goal, which must therefore be something that can be controlled or influenced in some way. Since the occurrence of this process depends on the will of the agent of the passive, the proper formulation of such a goal is not a passive. Instead the *sich lassen* construction must be used, for it denotes a

process which one volitionally initiates or permits rather than something which one just passively undergoes.

- (41) *Ich habe versucht/Sie hat mir befohlen, mich (vom Arzt) untersuchen zu lassen.* 'I tried/She ordered me to have myself examined (by the doctor).'

In this instance *erlauben* does not behave like the other two verbs, however, for the passive is sometimes possible in the complement, as in (42).

- (42) a. *Der Vater hat seiner Tochter erlaubt, (vom Arzt) untersucht zu werden.*

'The father permitted his daughter to be examined (by the doctor).'

- (42) b. *Der Friseur hat mir erlaubt, als nächster bedient zu werden.*

'The barber permitted me to be the next one served.'

The passive is acceptable here because with *erlauben* the person must be able to control the process only insofar as he can choose whether he will participate in it or not, he does not have to achieve it. He only has to be able to refuse or agree to it, and he does not have to bring it about. Examples like (42) meet this requirement and thus do not violate the control constraint which has been formulated for *erlauben*. The *sich lassen* construction might also be used here, but it extends the volitional control attributed to the individual; the point is that it is not necessary in these examples, as opposed to those with *versuchen* and *befehlen*.

Nevertheless, not all passives are acceptable in the complement of *erlauben*, but only those which one can willfully choose to undergo. Consider the following anomalous sentence.

- (43) %*Mein Vater hat mir erlaubt, von Elfriede geliebt zu werden.*

'%My father permitted me to be loved by Elfriede.'

This process is not one which is controllable by my conscious decision, because it involves the feelings of another. Another person's emotions do not depend directly on my choice; they are not normally the sort of the thing I can simply refuse to be subjected to, for they do not require my participation.

With passives we see a clear-cut difference between *befehlen* and *versuchen* on the one hand and *erlauben* on the other. The differing behavior of *versuchen* and *befehlen* versus *erlauben* demonstrates again that the restrictions are not simply a matter of checking for inherent linguistic features such as agent, non-state or [\pm volitive]. The only realistic way to account for these restrictions is a set of conditions like those which have been proposed here. Such conditions expressing the amount of controllability involved represent the kind of assumptions which hearers must feel warranted in making in order to judge the sentence acceptable.

5. **Other Restrictions.** Another argument in favor of the restrictions given here is that they also account automatically for some other apparently disparate facts that have not been considered so far in formulating these constraints. To see this point observe the following sentences.

- (44) a. %Max hat versucht, daß Karl über den Graben springt.
'%Max tried that Karl jump(s) over the ditch.'
- (44) b. %Klaus hat Maria befohlen/erlaubt, daß Hans über den Graben springt.
'%Klaus ordered/permitted Maria that Hans jump(s) over the ditch.'
- (45) a. Max_i hat versucht, ϕ_i über den Graben zu springen.
'Max_i tried ϕ_i to jump over the ditch.'
- (45) b. Klaus_j hat Maria_i befohlen/erlaubt, daß sie_i über den Graben springt/ ϕ_i über den Graben zu springen.
'Klaus_j ordered/permitted Maria_i that she_i jump(s) over the ditch/ ϕ_i to jump over the ditch.'

These verbs require coreference between a specific matrix NP and the lower subject, expressed or unexpressed. Such considerations provide another argument that the control constraints which have been proposed here are superior to restrictions requiring the presence of an agent subject, a feature [\pm votive], or a non-state. Observe that the examples in (44) do not violate such restrictions, because the complements contain these features. Hence even with these selection restrictions the grammar would still need to include some sort of mechanism like separate coreference constraints in order to avoid the incorrect coreference in such examples (cf. Reinwein 1977). Such approaches would appear to necessitate two different mechanisms to handle these problems. Our semantically well-motivated control constraints, on the other hand, can not only describe the facts correctly but also explain them as arising naturally from the meaning of the matrix verb. The fact that verbs like *erlauben*, *befehlen*, and *versuchen* require coreference between a given matrix NP and the subordinate subject follows directly from these conditions as formulated above without the need for any additional provisions such as separate coreference constraints or independent ad hoc stipulations of control. Thus, the control properties of these verbs are directly motivated by their meaning, i.e. they have "semantically induced controllers". Sentences such as (44a/b), which do not have the required coreference, violate the control constraints for these verbs. The fact that the logical subject of the infinitive as well as the pronominal subject in (45a/b) is interpreted as coreferent with the indicated matrix NP also follows from our account, since only this interpretation would not violate the semantic restrictions in force. It would seem that in other frameworks this would have to be stated separately, obviously missing an important generalization.

In addition, the conditions proposed here automatically explain another restriction: many verbs do not allow complements in the perfect. Cf. the following.

- (46) a. %Ich habe versucht, einen Bestseller geschrieben zu haben.
'%I tried to have written a bestseller.'
- (46) b. %Sie hat mir befohlen/erlaubt, Napoleon besiegt zu haben.

'%She ordered/permitted me to have conquered Napoleon.'

Note that selection restrictions on agent subjects, [\pm volitive], or non-states would not account independently for these restrictions. In order to handle them, we could of course always add to the grammar another separate set of restrictions on permissible time references in the complement (cf. Reinwein 1977: chap. 9). But there is no need for any further ad hoc restrictions on time reference in the grammar once we realize that those already posited account for these data as well. Since we have no control over past events in the world as we know it, there is no way that these conditions can be met when the time reference in the complement precedes that of the matrix clause, given standard assumptions about the world. Thus the time reference restriction is based on beliefs and knowledge about the controllability of possible states of affairs in the world and not on strictly grammatical considerations. The conditions which have been set up here are appropriate and sufficient to account for this restriction without any additional ad hoc statements in the grammar.

6. Conclusion.

This paper has outlined an alternative theory to control which is claimed to be both empirically and explanatorily more adequate than other recent proposals. Although the data derive mainly from English and German, the claims made here are broad enough to serve as the basis for a general crosslinguistic theory of control. Whereas previous approaches to the problem of control have generally sought a single factor or principle at work here, our proposal maintains that control does not depend on any single factor but on a number of them, central among which is meaning. Establishing the referent of the "missing" subject of an infinitive or the antecedent of a pronominal subject is viewed here as ultimately the result of a series of inferences — often conventionalized — based on the meaning of the matrix verb, the meaning of the complement, and other semantic, pragmatic, and syntactic knowledge. In the case of "semantically induced" controllers, i.e. ones clearly motivated by the meaning of the matrix verb, we argued that semantic restrictions, so-called "control constraint", must be formulated anyway to account for the restrictions found on the predicate of the complement and that they automatically account for the observed control behavior of the verbs in question. Such constraints were formulated for three representative German verbs and found superior to previous proposals in this area in handling several otherwise apparently distinct restrictions by means of a single, independently motivated principle. It is maintained that the present approach, which considers control to be a heterogeneous set of phenomena not governed by a single principle — but with meaning crucial and central —, is much better able than other, monolithic theories to account for and largely explain much more of the phenomena which any adequate theory of control must ultimately deal with.

REFERENCES

- Abraham, Werner. 1983a. "The control relation in German." In Abraham, Werner (ed.), *On the formal syntax of the Westgermania*. Amsterdam: Benjamins.

- Bresnan, Joan. 1982. "Control and complementation." In Bresnan, Joan (ed.), *The mental representation of grammatical relations*. Cambridge, Mass.: The MIT Press.
- Chomsky, Noam. 1980. "On binding." *Linguistic Inquiry* 11: 1-46.
- . 1981. *Lectures on government and binding*. Dordrecht: Foris.
- Comrie, Bernard. 1984. "Subject and object control: Syntax, semantics, and pragmatics." In Brugman, Claudia et al. (eds.), *Proceedings of the Tenth Annual Meeting of the Berkeley Linguistics Society*. Berkeley: Berkeley Linguistics Society.
- Cruse, D. A. 1973. "Some thoughts on agentivity." *Journal of Linguistics* 9: 11-23.
- Culicover, Peter and Wendy Wilkins. 1984. *Locality in linguistic theory*. New York: Academic Press.
- . 1986. "Control, PRO, and the projection principle." *Language* 62: 120-153.
- Cutrer, L. Michelle. 1987. "Theories of obligatory control." In Van Valin, Robert D (ed.), *Davis Working Papers in Linguistics*, No. 2: 6-37. Davis: Linguistics Program, University of California, Davis.
- Foley, William S. and Robert D. Van Valin, Jr. 1984. *Functional syntax and universal grammar*. Cambridge, Eng.: Cambridge University Press.
- Gazdar, Gerald, Ewan Klein, Geoffrey Pullum, and Ivan Sag. 1985. *Generalized phrase structure grammar*. Cambridge, Mass.: Harvard University Press.
- Jackendoff, R. 1972. *Semantic interpretation in generative grammar*. Cambridge, Mass.: The MIT Press.
- Katz, J. J. 1972. *Semantic theory*. New York: Harper and Row.
- . 1977. *Propositional structure and illocutionary force*. A study of the contribution of sentence meaning to speech acts. New York: Crowell. Cited according to the paperback edition, 1980. Cambridge, Mass.: Harvard University Press.
- Kirsner, Robert S. 1979. *The problem of presentative sentences in modern Dutch*. Amsterdam: North Holland.
- Koster, Jan. 1978. *Locality in syntax*. Dordrecht: Foris.
- Lyons, J. 1977. *Semantics*. Cambridge, Engl.: Cambridge University Press.
- Miller, George and P. N. Johnson-Laird. 1976. *Language and perception*. Cambridge, Mass.: Harvard University Press.
- Nishigauchi, Taisuke. 1984. "Control and the thematic domain." *Language* 60: 214-250.
- Perlmutter, David M. and Paul M. Postal. 1984. "The 1-advancement exclusiveness law." In Perlmutter, David M. and Carol Rosen (eds.), *Studies in relational grammar 2*. Chicago: University of Chicago Press.
- Pleines, J. 1976. *Handlung - Kausalität - Intention. Probleme der Beschreibung semantischer Relationen*. Tübingen: Narr.

- Reinwein, Joachim. 1977. *Modalverbsyntax*. Tübingen: Narr.
- Rosenbaum, Peter S. 1967. *The grammar of English predicate complement constructions*. Cambridge, Mass.: The MIT Press.
- , 1970. "A principle governing deletion in English sentential complementation." In Jacobs, Roderick A. and Peter S. Rosenbaum (eds.), *Readings in English transformational grammar*. Waltham, Mass.: Xerox.
- Růžička, Rudolf. 1983. "Remarks on control." *Linguistic Inquiry* 14: 309-324.
- Shibatani, Masayoshi. 1985. "Passives and related constructions: A prototype approach." *Language* 61: 821-848.
- Shannon, Thomas F. 1987a. *Aspects of complementation and control in modern German*. (Göppinger Arbeiten zur Germanistik, 424.). Göppingen: Kümmerle.
- , 1987b. "On some recent claims of relational grammar." In Aske, Jon, Natasha Beery, Laura Michaelis and Hana Filip (eds.), *Berkeley Linguistics Society. Proceedings of the thirteenth annual meeting, February 14-16, 1987*, 247-262. Berkeley: Berkeley Linguistics Society.
- , To appear a. "Prolegomena to a theory of control." To appear in Gentry, Francis (ed.), *Semper idem et novus. Festschrift for Frank Banta*.
- , To appear b. "Relational grammar, passives, and dummies in Dutch." To appear in Ton Broos (ed.), *PAANS 1986*. Washington: American University Press.
- Siebert-Ott, Gesa M. 1983. *Kontroll-Probleme in infiniten Komplementkonstruktionen*. Tübingen: Narr.