English Nonfinite Complements

The external and internal syntax of nonfinite expressions in English
Syntactic processes affecting both finite and nonfinite clauses

Arguments from the external and internal syntax of nonfinites

1. Infinitival and gerundial subjects
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4. Pseudo-clefting
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6. Subject-oriented adverbs in object control structures
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1. Infinitival and gerundial subjects

The argument:
- Infinitives are either VPs or clauses by hypothesis.
- Clauses but not VPs may occupy the subject position in sentences.
- Infinitives and gerunds may occupy the subject position in sentences.
→ Therefore, infinitives and gerunds are clauses.

Evidence:
As is well known, infinitives and gerunds may occur in subject position:

(1) a. [To teach Elizabeth] is a pleasure.
    b. [Teaching Elizabeth] is a pleasure.

Conclusion (supported by empirical evidence):
Therefore, infinitives and gerunds are clauses.
2. Extrapoosition of infinitival subjects

It is well known that clausal subjects may (sometimes must) be extrapoosed.

(2) a. [That the world is round] is obvious.
    b. It is obvious [that the world is round].

The assumption that infinitival subjects are clauses predicts that the may be extrapoosed.

Evidence:

(3) It is a pleasure [to teach Elizabeth].

As this example shows, the prediction is borne out by the facts, providing additional support (i.e. empirical evidence) for the conclusion that infinitives are clauses.
3. Infinitival and gerundial objects

The argument:
- Infinitives and gerunds are either VPs or clauses by hypothesis.
- Clauses but not VPs may occupy the object position in sentences.
- Infinitives and gerunds may occupy the object position in sentences.
→ Therefore, infinitives and gerunds are clauses.

Evidence:

(4) Mary wants [to stay at home].

(5) John quit [smoking].

Conclusion (supported by empirical evidence):
Therefore, infinitives and gerunds are clauses.
4. Pseudo-clefting

Introduction: the pseudo-cleft structure

(6) a. I need a long cool drink.
   b. What I need is a long cool drink.

As is well known, only constituents may occur in the focus of a pseudo-cleft. Very importantly, this restriction implies that constituents may not be split between the cleft clause and the focus. This is clear from the data below:
(6) a. I need a long cool drink.
   b. What I need is [a long cool drink]
   c. *What I need [a] is [long cool drink]
   d. *What I need [a long] is [cool drink]
   e. *What I need [a long cool] is [drink]
The argument: If infinitives are either VPs or clauses by hypothesis, and if clauses but not VPs can be pseudo-clefted, and if infinitives can be pseudo-clefted, then it follows that infinitives are clauses.

(7) a. He suspected that Bill saw Monument Valley.
   b. What he suspected was [\text{CLAUSE} \text{that Bill saw Monument Valley}].
   c. *What he suspected that [Bill] was [\text{VP} \text{saw Monument Valley}].

Contrast (7b) and (7c): a clause may but the VP of a clause may not occur in the focus of a pseudo-cleft.

As (7c) shows, the VP of a sentence may not be separated from the subject of that sentence by pseudo-clefting.

The empirical question: Do infinitives occur in the focus of pseudo-clefts? (If they do, they are clauses.)
Evidence:

(8) a. He wanted to visit Monument Valley.
   b. What he wanted was TO VISIT MONUMENT VALLEY.

Conclusion (supported by empirical evidence):

Therefore, infinitives like to visit Monument Valley in sentences like (8a-b) are clauses.

So, the structure of (8a) is something like this:

(8) c. He wanted [CLAUSE to visit Monument Valley]

Now consider

(9) a. He wanted (for) Bill to see Monument Valley.
   b. What he wanted was FOR BILL TO SEE MONUMENT VALLEY.
   c. *What he wanted for Bill was TO SEE MONUMENT VALLEY.

Precisely the same kind of reasoning applies to (9a-c), and exactly the same conclusion follows: Infinitives like for Bill to see Monument Valley in sentences like (9a-b) are clauses.
So, the structure of (9a) is something like this:

(9) d. He wanted [\text{CLAUSE for Bill to see Monument Valley}]

Now compare (7a-c) and (9a-c), repeated:

(7) a. He suspected that Bill saw Monument Valley.
   b. What he suspected was [\text{CLAUSE that Bill saw Monument Valley}].
   c. *What he suspected that Bill was [\text{VP saw Monument Valley}].

(9) a. He wanted (for) Bill to see Monument Valley.
   b. What he wanted was [\text{CLAUSE for Bill to see Monument Valley}].
   c. *What he wanted for Bill was [\text{VP to see Monument Valley}].

The (b) examples and the (c) examples in (7) and (9) are parallel in structure as well as grammaticality. (This, of course, shows that the (a) examples are also parallel in structure.) These facts are, again, evidence that infinitives are clauses.
Summary

We are led to conclude that infinitives like *to visit Monument Valley* in sentences like (8) and infinitival expressions like *for Bill to see Monument Valley* in sentences like (9) are clauses.

The good news

- We have seen how pseudo-clefting reveals the constituent structure of sentences.
- We have derived some nice conclusions about the syntactic category of infinitives.
- Some of these conclusions nicely account for the intuition (often observed but never satisfactorily explained in traditional grammar) that sentences like (7) and (9) are so strikingly similar in both form and meaning.

The bad news

- These same conclusions raise some new problems.

(Wait to see whether this bad news is indeed bad news, or maybe good news.)
Problems raised

1. The subject of the infinitival clause in (8)
The object of want in (8a) is an apparently subjectless infinitive clause.

(8) a. He wanted [to visit Monument Valley].

Why is this a problem?
Because of the obligatory subject condition we have adopted from TradG (cf. Lecture 1 Data and Sample of Problems), which requires that every clause/sentence have a subject. This condition is technically known as the Extended Projection Principle, EPP (cf. Chomsky 1981).

• What is the subject of the apparently subjectless infinitival clause in (8)?
• Even worse: If the infinitive in (8) has no subject, it is not a sentence.

To make things even worse: the infinitive in (8) has an “understood” subject: the wanter (the matrix subject) and the visitor are the same person, “he.”
1. If we cannot show that infinitives like *to visit Monument Valley* in (8) have a subject, we are in trouble: the conclusion we have just drawn must be revised. Note that this must be shown **independently**.

2. On the other hand, if we CAN independently show that infinitives must be assumed to have subjects anyway, then we will have found strong additional support for the conclusion just reached. The conclusion will be corroborated, because if independent evidence suggests that infinitives always have subjects, then, by the EPP, it follows that infinitives are sentences.

2. The category of *for* in (9)

(9) a. He wanted [CLAUSE for Bill to see Monument Valley].

What is *for*?

P? — No!

A (new) Complementizer we have just discovered? — Very likely!
3. The notions *sentence* and *clause*

(10) a. John knows [that the world is round].
   b. John knows [the world to be round].

On traditional assumptions, the complement of *know* in (10a) is a clause, but the bracketed expression in (10b) is not.

We have been led to conclude that strings of words like *the world to be round*, *for Bill to see Monument Valley*, etc. are clauses.

This conclusion is not consistent with some conditions on sentencehood assumed in TradG: tense-marking, subject–verb agreement, and the nominative subject condition.

These traditional assumptions are entirely unmotivated.

→ They are easily revised, i.e., discarded.

→ A *sentence/clause* may be *finite or nonfinite*. 
5. Finite clauses and infinitives conjoined

The argument: If, by hypothesis, only identical categories can be coordinated, and if nonfinites can be coordinated with finite clauses, then nonfinites are clauses.

Conjoined finite clauses (cf. a) and conjoined nonfinites of similar morpho-syntactic types (cf. b) occur freely:

(11) a. [John is writing a novel] and [he expects the world to give it critical acclaim].
    b. [To write a novel] and [for the world to give it critical acclaim] is John’s dream.

Certain NF expressions may also be conjoined to finite clauses:

(12) John expected [to write a novel] but [that it would be a critical disaster].

The second conjunct in (12) is clearly a clause. On the assumption that coordinated expressions are of the same category, it follows that the first conjunct (the infinitive) is a clause, too.
6. Subject-oriented adverbs in object control structures

The argument: If clauses must have subjects (by the EPP), and if nonfinites must have subjects, then nonfinites are clauses.
An adequate account of the distribution of “subject-oriented” adverbs forces the assumption that infinitives and gerunds always have subjects.

Observation:

Certain adverbs in English, e.g. *intentionally, carefully*, etc., are regularly construed as predicated of the subject of the sentence in which they occur:

(13) John\textsuperscript{a} married Mary intentionally\textsuperscript{a}.
(14) Fred\textsuperscript{a} was willingly\textsuperscript{a} shaved by Sally.

Observation that raises a problem:

In sentences like (15) the property expressed by a “subject-oriented” adverb is (equally regularly!) understood as predicated of the surface object:

(15)a. John forced Bill\textsuperscript{b} to hit Harry intentionally\textsuperscript{b}.
    b. I persuaded Bill\textsuperscript{b} to carefully\textsuperscript{b} cut the cake.
The Problem
If adverbs like *intentionally* are subject-oriented, how is it that they are “object-oriented” in sentences like (15)?

Conceivable alternative solutions
Alt. 1. We might say that the “object-oriented” interpretation of otherwise subject-oriented adverbs in sentences like (15) is *exceptional*. This alternative, however, must be rejected, simply because such data cannot be dismissed as “exceptional,” because (a) such sentences are not rare, and, more importantly, (b) they *regularly* have an “object-oriented” interpretation.

Alt. 2. We might simply *abandon* the idea that there are subject-oriented adverbs in English, since there is plenty of evidence to the contrary (cf. the many sentences like (15), in which a “subject-oriented “adverb (SOA) is “object-oriented”). This would not only be no solution to the problem either, but instead would introduce an additional problem, because it would leave even the “regular subject-oriented” cases unexplained, in addition to failing to say anything about the “irregular” ones. Briefly, it would create two problems out of one (by re-introducing a non-problem as a problem).
Weaknesses of some of the alternatives

In addition to the weaknesses just pointed out, these alternatives share another kind of “weakness”: they are both weak in that the former does not take counter-evidence seriously (by attempting to dismiss it as “exceptional”), and the latter does not take the initial observation (and its account) seriously (by succumbing too easily to the weight of apparent counter-evidence).
A strong alternative emerges

Alt. 3. We may choose to take the bull by the horn and take the initial observation and its account very seriously: Once subject-oriented, always subject-oriented—even in sentences like (15), where they are apparently “object-oriented.”

The problems

(13) \([\text{Subject } \text{John}]^a \text{ married Mary intentionally}^a\]

(15a) \(\text{John forced } [\text{Object } \text{Bill}]^b \text{ to hit } \text{Harry intentionally}^b\)

• No visible subject in (15a) of which intentionally (an SOA!) is predicated.
• Intentionally is predicated of an invisible subject.
• Intentionally is apparently predicated of Bill, the object of force.
• Intentionally (an SOA!) cannot directly relate syntactically to the object.
• \(\Rightarrow\) The SOA must relate to an invisible (phonetically empty) subject, coreferential with the object. \(\Rightarrow\) The infinitive contains a phonetically empty subject (call it PRO), coreferential with the matrix object.
The apparent irregularity (in fact, an interestingly problematic regularity!) observed in (15) is explained if these examples are assumed to have the following structure:

(16) a. John forced Bill$_2$ [PRO$_2$ to hit Harry intentionally].
   b. I persuaded Bill$_2$ [PRO$_2$ to carefully cut the cake].

PRO is controlled by the matrix object (object control). The adverbs, in turn, are predicated of the complement Subject (PRO), and hence of its controller.

Summary and conclusions

An independent problem, the apparently irregular (or rather: paradoxically regular) behavior of subject-oriented adverbs, has been resolved by showing that the behavior of these adverbs is perfectly regular. By assuming that the apparently subjectless infinitives containing subject-oriented adverbs have a PRO subject, the regular behavior of the adverbs is predicted. (At least some) apparently subjectless infinitives have subjects. → They are sentences.

Sentences like (15) are biclausal: [Main clause [Infinitival subclause]]
Terminology:
**Control:** The process of determining the coreferentiality (the antecedent) of PRO.

**Subject control:** PRO is coreferential with (= is controlled by) the matrix subject.

**Object control:** PRO is coreferential with (= is controlled by) the matrix object.
7. Bound anaphora

The argument: General principles of Chomsky’s (1981) Government and Binding theory ⇒ anaphors and their antecedents must be clause mates. ⇒ Anaphors in apparently subjectless NF complements must have subject antecedents. (Sentences must have subjects.) ⇒ NF complements are sentences.

Anaphors

English reflexives and reciprocals (*himself, each other, etc.*) are anaphors, because they always occur with a coreferential antecedent.

(17) Tom shaved himself.

(18) *Each other are happy.

An anaphor and its antecedent must be clause mates (Binding-theoretic principle)

(19)a. Mary thought [that Tom shaved himself].

b. *Mary thought [that Tom shaved herself].

(19b) is ungrammatical because the anaphor *herself* and its antecedent *Mary* are not constituents of the same clause, in violation of the principle.
A problem

(20) a. John said [it was difficult to shave himself].
    b. Mary said [that shaving herself was a pain in the neck].
    c. Helping oneself would be difficult.

If these sentences have the structure as indicated, BT predicts that they are ungrammatical, because they violate the structural restriction on anaphors and their antecedents: In (20a and b), the antecedent is outside the binding domain of the anaphor (the clause that contains the anaphor) it binds. (20c) contains no antecedent at all that binds the anaphor oneself.

Assuming BT,
- oneself in (20c) is bound by an invisible (phonetically empty) antecedent;
- the anaphors in (20a) and in (20b) are also bound by phonetically empty antecedents, i.e., the sentences cannot have the structure indicated.

We must assume a phonetically empty category (the antecedent of the anaphors) in (20a-c).
Solution
Assume that (20a–c) have the following structure:

(21) a. John said [it was difficult [PRO to shave himself]].
    b. Mary said [that [PRO shaving herself] was a pain in the neck].
    c. [PRO helping oneself] would be difficult.

On these assumptions, the problems noted above all disappear.

The structural representations in (21a–c) no longer violate BT. In (21a and b) the anaphor and its antecedent (the PRO subject of the infinitive and gerund) are clause mates. The anaphor in (21c) has an antecedent (PRO) in the required position (within the binding domain of the anaphor).

Each anaphor is bound by a coreferential antecedent, PRO, which in turn is controlled by a coreferential NP in the highest clause. The only exception is (21c), where PRO is not controlled. This is correct too. This explains how the understood agent of the gerund is an arbitrary person. Such a PRO is known as arbitrary PRO, PRO_{ARB}. 
Conclusion

An adequate account of the data and the need to solve the problems that the data raised on Binding-theoretic assumptions required that we assume a PRO subject in infinitives and gerunds. In other words, we found we MUST assume a phonetically empty PRO subject in apparently subjectless infinitives and gerunds. It seems, then, that all infinitives and gerunds have subjects.

If infinitives and gerunds have subjects, and if sentences but not VPs must have subjects by the Extended Projection Principle (EPP), then it follows that infinitives and gerunds are sentences.

Final descriptive remarks
As it turns out, sentences like (20a and b) are not biclausal, as traditionally assumed, and as is represented in (20a and b), but they contain three clauses, as represented in (21a and b). And (20c) is not monoclausal, but biclausal, as represented in (21c).
**Terminology:**

**Binding:** Binding is a coreference relation between noun phrases. A DP$_a$ is said to bind (i.e. be co-referential with) another DP$_b$ (and then DP$_b$ will be said to be bound by DP$_a$) iff DP$_a$ c-commands DP$_b$ and they are co-indexed.

**C-command (constituent-command):** A category $A$ c-commands another category $B$ if neither of them dominates the other and the first maximal projection that dominates $A$ also dominates $B$.

**Dominance:** The relation between a category and its constituents. A category dominates all of its constituents.

**Binding domain (minimal governing category):** A binding domain (minimal governing category) is the minimal structure (DP or IP) within which the relationships of binding obtain.
8. Split-antecedent phenomena

*They and each other*

The pronominal expressions *they* and *each other* share two features: (a) they are pronominal, and therefore may enter into coreference relations with other noun phrases, and (b) they are both notionally plural.

An important **difference**: the pronoun *they* may have split antecedents but the anaphor *each other* requires a unitary antecedent:

(22) a.  $\text{JOHN}_i$ told $\text{MARY}_j$ that $\text{THEY}_{i+j}$ had to leave.
    b.  $[\text{JOHN AND MARY}]_i$ like $\text{EACH OTHER}_i$.
    c.  *$\text{JOHN}_i$ talked with $\text{MARY}_j$ about $\text{each other}_i+j$.

**Terminology—Split vs. unitary antecedents:**

*They* may have **split antecedents** in (22a): *they* is understood as coreferential with the “union of” two separate NPs – *John* and *Mary*. *John* and *Mary* are split: They are different constituents (cf. *John*: subject NP, *Mary*: indirect object NP).

*[John and Mary]* in (22b) is a constituent (two NPs conjoined under one category, a third composite NP), hence a **unitary antecedent** of *each other*. 
**The verb propose**

The verb *propose* allows a split-control interpretation:

(23)    John proposed to Mary to go to the movies.

On the most natural reading, the understood subject of the infinitive in (23) is ‘John and Mary’, i.e., the reference of this understood subject is jointly determined (technically: controlled) by the NP *John* and the NP *Mary*. This is made very clear by the synonymy between (23) and

(24)    John\textsubscript{i} proposed to Mary\textsubscript{j} that they\textsubscript{i+j} go to the movies.

Both the understood subject of the infinitive in (23) and the subject *they* of the complement sentence in (24) are controlled by the same split antecedents (split control).
Now consider

(25) John proposed to Mary to help each other.

Two simple observations first:
1. (25) is grammatical.
2. Part of the meaning of (25) is the idea that ‘John and Mary help each other”, i.e., each other is coreferential with two distinct NPs.

To continue: a problem
3. The anaphor each other must have a unitary antecedent in (25). (This follows (a) from the first observation above that (25) is grammatical and (b) from the requirement which each other imposes on its antecedent, i.e., that it be unitary.)
4. John and Mary cannot be the direct split antecedents for each other (because it requires a unitary antecedent).
5. → each other is bound by a phonetically empty (unitary) antecedent.
6. Finally: striking parallelism between the problematic (25) and (26) John, proposed to Mary [that they help each other].
The solution

Let us assume that (25) has the following structure (which parallels (26)):

(25) John\textsubscript{i} proposed to Mary\textsubscript{j} [i+j\text{PRO}_2 to help each other\textsubscript{2}].

The PRO subject of the infinitive is the unitary antecedent of each other, as required (cf. coindexing by the subscript \textsubscript{2}).

The PRO subject of the infinitive is controlled by two split antecedents in the matrix clause, as is made possible by the verb propose, and thus required for an adequate account of the interpretation of the sentence (cf. coindexing by subscripts \textsubscript{i} and \textsubscript{j}).

Conclusion

These assumptions are apparently necessary for a satisfactory account of the structure and interpretation of sentences like (25) (and its non-accidental parallelism with (26)). Because one of the necessary assumptions is that the infinitive has a PRO subject, it follows that

$\Rightarrow$ Infinitives are clauses.
To summarize the main points of the argument:
The anaphor *each other* must have an antecedent in (25). *John* and *Mary* cannot be the direct split antecedents for *each other*. ➞ It must be assumed that the antecedent of *each other* is the PRO subject of the infinitive. ➞ Apparently subjectless infinitives must be assumed to have a subject.
➢ Infinitives are clauses.
9. The structure at LF

The argument: All NF complements will have ‘subjects’ (arguments) and predicates in any decent semantic representation (and each predicate will have exactly one subject argument). The easier it is for the semantics to match up each predicate with its subject, the better (because it simplifies the theory). It is easiest if each semantic subject is represented in the syntax as a syntactic subject. ⇒ Apparently subjectless nonfinites must have (phonetically empty) subjects. ⇒ Nonfinites are sentences.

A syntactic theory that reflects the semantic structure of NF complements (and other constructions) more transparently is superior to less transparent theories (⇐ the problem of the syntax–semantics interface: the simpler the interface, the better).
One of the properties of the clausal analysis is that there is a one-to-one correspondence between subject and predicates in non-coordinate structures. That is to say, in the clausal analysis there is no predicate without a corresponding subject, every verb has a subject. Thus each verb in (27) has a corresponding subject:

(27) John\(_2\) wants [PRO\(_2\) to try [PRO\(_2\) to date Mary]].

Moreover, when there is no overt subject, there is always a (phonetically null) subject to preserve the pairing of subjects and verbs:

(28) [PRO to leave now] is impossible for John.

Under the nonfinite-VP (verbal-phrase) analysis the single subject in (27) would be related to three different verbs, and the verb in (28) would not be related to any subject at all. That is, not on the syntactic level of representation.
References


