Unbounded dependency constructions

Relative clauses belong to a larger class of constructions known as unbounded dependency constructions. In this final section of the chapter we examine the properties of this more general category of constructions.

7.1 Definition and taxonomy

What is meant by an unbounded dependency construction can be seen by considering a set of examples such as those in [1]:

[1] i This is the book, [which, [she recommended ...]].
   ii This is the book, [which, [I think she recommended ...]].
   iii This is the book, [which, [I think you said she recommended ...]].

The outer brackets enclose the relative clause, while the inner ones enclose the nucleus. The nucleus contains a gap in the position of object of the verb recommended, and this gap is linked to the relative phrase which in prenuclear position. The relation between the gap and which is comparable to that between an anaphoric pronoun and its antecedent - between, for example, which and its antecedent book. Which derives its interpretation from book, and the gap derives its interpretation from which: a component of the meaning of all three examples is "she recommended x", where x is some book. We will say, therefore, that the gap is anaphorically linked to which, i.e. that which is antecedent for the gap.

This relation between the gap and which is a dependency relation. Semantically, the gap derives its interpretation from which, as we have just seen. And syntactically which requires an associated gap: the object of recommended cannot be realised by an ordinary NP - compare 'This is the book which she recommended 'War and Peace'.'

The dependency relation between the gap and its antecedent is unbounded in the sense that there is no upper bound, or limit, on how deeply embedded within the relative clause the gap may be. In [i] the gap is object of the topmost verb in the relative clause. In [ii] it is object of the verb that heads a clause embedded as complement to the topmost verb (think). In [iii] there are two layers of clause embedding: the recommend clause is complement in the say clause, and the latter is complement in the think clause. And there is no grammatical limit on how many such layers of embedding there can be. Adding a third might give, for example, the book which I think you said Kim persuaded her to

21 The dependency relation between a gap and its antecedent is not to be equated with that of a dependent to a head. Dependent and head are functions within a syntactic construction, and the gap is not a dependent of which in this sense. The gap and which are related anaphorically, not as functions within a construction.
recommend. And further layers still can be added without loss of grammaticality even though they may result in stylistically undesirable complexity.

A second unbounded dependency construction is the open interrogative, illustrated in:

[2] i What, [does he want \_\_\_]?
   ii What, [do you think he wants \_\_\_]?
   iii What, [do you think she said he wants \_\_\_]?

The gap represents the object of want and is anaphorically linked to the interrogative phrase what in prenuclear position. This relationship indicates that the question concerns the object of want: the meaning contains the component “he wants x”, and answers to the question supply a value for the variable x. Again, the dependency relation between the gap and the interrogative phrase is unbounded: the examples show the want clause progressively more deeply embedded, and again there is no grammatical limit as to how many layers of embedding are permitted.

In the light of these examples we may define an unbounded dependency construction as follows:

[3] An unbounded dependency construction is one which sanctions within it an anaphoric gap, with no upper bound on how deeply embedded the gap may be.

### Constructions with and without unbounded dependency words

The two constructions considered so far, wh relatives and open interrogatives, have it in common that they are marked by the presence of a distinctive type of word functioning as or within the prenuclear element. Which in [1] is a relative word and what in [2] is an interrogative word. As we have seen, there is a large degree of overlap between relative and interrogative words, and we refer to them jointly as unbounded dependency words, i.e. words that are markers of an unbounded dependency construction. Exclamatives what and how also belong in this category, for exclamatives are also an unbounded dependency construction, as is evident from such examples as:

[4] i What a disaster, [it was \_\_\!]!
   ii What a disaster, [it turned out to be \_\_\!]!
   iii What a disaster, [it seems to have turned out to be \_\_\!]!

Not all unbounded dependency constructions are of this kind, however. In preposing, the prenuclear position is filled by a phrase or clause that can also occur in a canonical clause construction. Compare:

[5] i The other chapters, [she wrote \_\_\_ \_ herself].
   ii The other chapters, [I think she wrote \_\_\_ \_ herself].
   iii The other chapters, [I think she said she wrote \_\_\_ \_ herself].

The other chapters is an ordinary NP, functioning as object in the canonical She wrote the other chapters herself, but in [5] it is in an unbounded dependency relation with a gap.

These examples illustrate the main preposing construction, with the preposed element in prenuclear position within a clause. It is also possible for the preposed element to

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22 These words are often referred to as ‘wh words’; the category, however, is obviously not unique to English, and we prefer to use a more general term.
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occupy prenuclear position within a PP (see Ch. 7, §4.4):

[6]  i  [Stupid, [though he is _],] he saw through their little game.
    ii  [Stupid, [though you no doubt think he is _]], he saw through their little game.
    iii  [Stupid, [though I expect you think he is _]], he saw through their little game.

The outer brackets enclose the PP, and the inner ones its nucleus, containing a gap anaphorically linked to the preposed AdjP stupid.

Constructions with prenuclear and external antecedents

We have now introduced five unbounded dependency constructions: wh relatives, open interrogatives, exclamatives, preposing in clause structure, and preposing in PP structure. In all of these, the antecedent for the gap is located in prenuclear position. There are also unbounded dependency constructions where the antecedent is located outside the clause altogether. One clear case is that of non-wh relatives:

[7]  i  This is the book; [she recommended _].
    ii  This is the book; [I think she recommended _].
    iii  This is the book; [I think you said she recommended _].

These are just like the wh relatives in [1] above, except that they contain no relative phrase in prenuclear position. The gap is thus related directly to the nominal book, rather than indirectly, via the relative pronoun which. This construction still satisfies the definition given in [3]: the relative clause can contain an anaphoric gap that is embedded indefinitely deeply within it.

Another construction of this type is the comparative clause:

[8]  i  Kim made more mistakes; than [Pat made _].
    ii  Kim made more mistakes; than [I think Pat made _].
    iii  Kim made more mistakes; than [I think you said Pat made _].

Comparative clauses function as complement to a preposition (than, as, or like); the gap is within the comparative clause while the antecedent is outside. Comparative clauses, however, differ in significant ways from other unbounded dependency constructions with respect to the kind of gap allowed and the way it is interpreted: we examine them in detail in Ch. 13, §2, and will pay no further attention to them here.

Major and minor unbounded dependency constructions

The final distinction to be made contrasts the major constructions listed above with minor ones, such as hollow clauses:

[9]  i  The machine; was too big [to take _ to home].
    ii  The machine; was too big [to ever want to take _ to home].
    iii  The machine; was too big [to imagine ever wanting to take _ to home].

The gap here is object of take, and has an external antecedent, the machine. As before, the gap can be embedded indefinitely deeply within the hollow clause. However, examples like [ii–iii] with respectively one and two levels of clause embedding are quite rare. Although there is in principle no limit to the depth of embedding this construction in practice allows deeply embedded gaps much less readily than those discussed above and for this reason can be regarded as a relatively minor member of the set of unbounded dependency constructions. Moreover, when the gap is located within a clause that is
embedded within the hollow clause, the embedded clause must be non-finite, like the hollow clause itself. Compare:

[10] a. The problem is too difficult [to expect a ten-year-old to be able to solve _].
   b. *The problem is too difficult [to expect that a ten-year-old could solve _].

While [i] is fully acceptable, [ii] is ungrammatical. This is because the hollow clause (enclosed within the outer pair of brackets) contains a finite clause within it (enclosed within the inner brackets), and the gap is inside this finite clause. The same constraint applies to infinitival relatives and infinitival open interrogatives, and we accordingly include these too in the set of minor unbounded dependency constructions.

**Summary taxonomy**

Unbounded dependency constructions may be classified in terms of the above distinctions as follows:

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**MAJOR CONSTRUCTIONS**

I. Prenuclear antecedent
   - Contain unbounded dependency word
   - No such word

II. External antecedent
   - Preposing in clause
   - Preposing in concessive PP

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**MINOR CONSTRUCTIONS**

IIA. Prenuclear antecedent
   - Infinitival wh relatives and open interrogatives
   - Hollow clauses, infinitival non-wh relatives

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7.2 Gaps and antecedents

**The syntactic functions of gaps**

Gaps occur in certain functional positions. In most of the examples used in §7.1 the gap represents the object of a verb. This is not of course the only possibility, but there are severe constraints on what functions can be realised by a gap. One general constraint is stated summarily in [12]:

[12] A gap in an unbounded dependency construction can function only as either:
   (a) a post-head dependent; or
   (b) subject in clause structure (immediate or embedded).

Compare, for example, the following open interrogatives:

[13] i  *What did you buy _?*
   ii  *What are you referring [to _]?*
   iii  *Where did you see them _?*
   iv  *Who do you think [_ was responsible]?*
   v  *Whose did you borrow [ _ , car] _ ?*
   vi  *How many did they receive [_ , applications] _ ?*
   vii  *How serious will it be [_ , a problem]?*
   viii  *Who have they shortlisted [_ and Kim] _ ?*
The inner brackets in [ii] and [iv–viii] enclose the constituent within which the gap is located: a PP in [ii], content clause in [iv], an NP in [v–vii], and an NP-coordination in [viii]. Examples [v–viii] are ungrammatical because the gap does not have one of the functions permitted by rule [12]. They can be corrected by making the gap conform to [12]:

\[\begin{align*}
\text{[14]} & \quad \text{i. Whose car did you borrow?} \\
& \quad \text{ii. How many applications did they receive?} \\
& \quad \text{iii. How serious a problem will it be?} \\
& \quad \text{iv. Who have they shortlisted in addition to Kim?}
\end{align*}\]

In addition to rule [12], certain more specific conditions apply:

Gaps not normally allowed in indirect object function
As we observed in Ch. 4, §4.3, one of the main syntactic differences between indirect and direct objects is that gaps are more or less excluded from the former function. The qualification 'more or less' is needed because there is some variation with respect to acceptability judgements on clauses with indirect object gaps, but for the most part there is a clear difference between the acceptability of direct and indirect object gaps. Compare:

\[\begin{align*}
\text{[15]} & \quad \text{i. a. This is the CD they got me last Christmas.} \\
& \quad \text{b. He's the one she got that CD last Christmas.} \\
& \quad \text{ii. a. The copies he sold me were defective.} \\
& \quad \text{b. The person he sold them seemed satisfied.} \\
& \quad \text{iii. a. How much do you owe them?} \\
& \quad \text{b. How many people do you owe more than $50?}
\end{align*}\]

In each pair the gap is direct object in [a], indirect object in [b]. Most verbs that take indirect objects also occur in an alternative construction with direct object + PP complement, and this construction can be used to express the meanings of the [b] examples: He's the one she got that CD for last Christmas, and so on. (The prepositional construction will also often be preferred over a ditransitive one with indirect object + gap in direct object function – e.g. the story that he was reading to his children, over the story that he was reading his children.)

Gaps in subject function
As we saw in §3.4, it is necessary to distinguish between an immediate subject (i.e. the subject of the topmost verb in the construction) and an embedded subject (the subject of a clause embedded within the unbounded dependency construction).

Embedded subject gaps are permitted only in bare content clauses, i.e. declaratives without the subordinator that (cf. Ch. 11, §3.1). Compare:

\[\begin{align*}
\text{[16]} & \quad \text{i. He's the man they think attacked her.} \\
& \quad \text{ii. He's the man they think that attacked her.} \\
& \quad \text{iii. He's the man they wonder whether attacked her.}
\end{align*}\]

With immediate subjects we can have a gap in Type 1B constructions (with external antecedent), but not in Type 1A (with prenuclear antecedent). Compare:
This is the copy; [that \[ that \_ i s \_ d e f e c t i v e \] \_ is defective].

This is the copy; [which \_ i s \_ d e f e c t i v e \] \_ is defective.

Who signed the letter?

In [i] that is the subordinator in prenuclear position, and the subject in the nucleus is realised by a gap anaphorically linked to the antecedent copy: this is a Type IB construction, with the antecedent of the gap external to the relative clause. (As we noted in §3.5.5, the subordinator that is generally not omissible when the gap is in immediate subject function.) In [ii-iii], by contrast, the subjects are realised not by a gap but by relative which and interrogative who in the absence of convincing evidence to the contrary, we take the structure to be the same as that of the canonical clauses This copy is defective and Kim signed the letter. Note, moreover, that the preposing construction does not allow preposing of an immediate subject. Compare:

This other chapters; [she wrote \_ \_ \_ herself].

She wrote the other chapters herself.

In [i] we have a gap in object position, but there is no gap, no preposing in [ii], where she is in its canonical position.

Hollow clauses

In the hollow clause construction the gap can only be complement of a verb or preposition: see Ch. 14, §6.

Function of the antecedent

In constructions with an external antecedent, the function of the antecedent is independent of that of the gap. Compare:

a. Have you seen the book; [I got \_ \_ \_ from the library]?

b. Where's the book; [I got \_ \_ \_ from the library]?

a. Their proposal; was hard [to accept \_ \_ \_].

b. We found their proposal; hard [to accept \_ \_ \_].

In [i] the bracketed clauses are non-wh relatives with the gap in object function. The antecedent is the nominal book, which is head of an NP, and this NP can occur in any NP function: it is, for example, object in [ia], subject in [ib]. In [ii] we have hollow clauses with the gap in object function. The antecedent is the NP their proposal, and again the function of this NP does not need to match that of the gap: in [iia] it is subject, while in [iib] it is object.

Prenuclear antecedents inherit function of the gap

The situation with antecedents in prenuclear position is quite different. These elements are located within the unbounded dependency construction itself, and thus do not have a function outside it. Because they fall outside the nucleus the only function that can be assigned directly to them is that of prenuclear dependent. This is shown in the following tree diagram for the preposing construction The others I know are genuine, corresponding to canonical I know the others are genuine.
We could not label the others as subject, for it clearly does not stand in the subject relation to the clause of which it is an immediate constituent. Nevertheless, it is understood as subject of are genuine, just as it is in the canonical counterpart I know the others are genuine. Notice, moreover, that the verb form are agrees with the others — again, just as it does in I know the others are genuine. We will regard these prenuclear antecedents, therefore, as taking on the function of the associated gap. In a secondary, or derivative, sense, that is to say, the others is subject of the content clause whose head (predicate) is are genuine. This information is retrievable from the tree diagram as it stands: the secondary function of the others is that of the co-indexed gap. Similarly in The others; I haven’t yet read _, we will say that the others is, in this derivative sense, object of read.

The same applies with constructions where the prenuclear element consists of or contains an unbounded dependency word, as in:

\[
\begin{align*}
\text{i) & the letters; \{which; [he says she wrote \ldots]\}\text{ } \\
\text{ii) & Who; \{do you think \ldots; wrote the letter\}?}
\end{align*}
\]

We will say that which in [i] is object of wrote and who in [ii] is subject of wrote. This is of course what is said in traditional grammar too: our concern here has been to show how that kind of statement can be reconciled with the tree diagrams that are used to represent syntactic structure in this book. Which and who are not labelled object and subject directly, but are treated as inheriting this function from the gap with which they are co-indexed.

**Match between antecedent and potential realisations of the gap function**

The anaphoric relation between the gap and the antecedent means that well-formedness is subject to the following condition:

\[
\text{[22] The syntactic and semantic properties of the antecedent must normally match those of expressions which in other constructions can occur as overt realisations of the gap function.}
\]
In the simplest cases, the antecedent expression itself can elsewhere realise the function of the gap. Illustrations of this situation are provided by preposing and hollow clauses:

23] i. a. To Kim [they gave a bicycle _], [preposing]
   b. They gave a bicycle to Kim.

ii. a. Kim is very hard [to please _], [hollow]
   b. It is very hard to please Kim.

In [ia] the PP to Kim is antecedent for the complement gap in the nucleus, and this PP can itself realise the same complement function, as shown in [ib]. Similarly in [ii]: the gap in [a] is object of please and the antecedent for this gap, the NP Kim, can elsewhere fill that function, as in [b]. These examples may be contrasted with the following:

24] i. *To Kim [they bought a bicycle _],
   ii. *That he comes home so late is very hard [to enjoy _],

In [i] the preposed complement contains the wrong preposition: we need for Kim, to match They bought a bicycle for Kim. In [ii] the antecedent is a content clause but enjoy does not license a complement of that kind: we need an NP, such as his novels, to match I enjoy his novels.

Compare, again, the following examples of the it-cleft construction:

25] i. It was that jar [that she says she put the key in _], [NP ~ NP]
   ii. It was in that jar [that she says she put the key _], [PP ~ PP]
   iii. *It was that jar [that she says she put the key _], [NP ~ PP]
   iv. *It was in that jar [that she says she put the key in _], [PP ~ NP]

In [i] the antecedent is an NP, and this is the category needed to realise the gap function, object of the preposition in. In [ii] the antecedent is a PP, which can realise the function of goal complement in the put clause, as in She put the key in that jar. The other examples are ungrammatical because the antecedent fails to meet the requirements of the gap function: compare *She put the key that jar and *She put the key in in that jar.

Condition 22 is formulated in terms of matching rather than identity: there is no requirement that the antecedent expression itself should be able to realise the gap function. Three very general cases where it can’t are illustrated in:

26] i. Every book [we have consulted _] ignores this problem. [non-wh relative]
   ii. That’s not the reason [why _] [he did it _], [wh relative]
   iii. _ Don’t be so hard [to please _]. [hollow clause]

The bracketed clause in [i] is a non-wh relative of the integrated type. As explained in §4.1, the antecedent is the nominal book, not the sequence every book: the sentence doesn’t say that we have consulted every book. A nominal as such cannot realise the gap function, which requires a full NP: *We have consulted book. The antecedent can nevertheless be said to satisfy the matching requirement in that it can realise the gap function if an appropriate determiner is added to make it into a full NP: We have read a book.

The outer brackets in [26ii] enclose a wh relative clause, and here the relative phrase is required to occupy initial position, so relative why could not occur within the nucleus as a realisation of the gap function. The matching requirement is satisfied, however, in that why is a reason expression and non-relative expressions of that kind can realise the
alise the function

d hollow clauses:

[preposing]

[hollow]

leus, and this PP

ularly in [ii]: the

n, can elsewhere

following:

read for Kim, to

clause but enjoy

ovels, to match

[NP ~ NP]

[PP ~ PP]

[NP ~ PP]

[PP ~ NP]

gap function,
as in He did it for that reason. The same applies, of course, to other relative

expressions.

In [26iii] the antecedent for the gap in the hollow clause is not overtly expressed. But

it is understood, by virtue of being subject of an imperative, as you, and this can realise

the gap function: It is hard to please you. In Pat wants __ to be hard [to please __],

the antecedent (the subject of the be clause) is likewise missing, but this time it is

recoverable from the superordinate want clause.

Mismatches

There are a number of constructions where the matching requirement [22] is not strictly

observed. They are illustrated in [27], but as all are dealt with elsewhere in the book only

a summary commentary is needed at this point.


[27]  i  Who, [did you give it to __]?  

ii "He always chose those whom [he thought __ were most vulnerable]."

iii [What, [I'm hoping __]] is that nobody will notice my absence.

iv What on earth [do you want __]?  

v That no one realised such action might be illegal, [I find __ surprising].

vi That they'll give him a second chance, [I wouldn't gamble on __].

vii [Brilliant advocate, [though she is __]$, she's unlikely to win this case.

Examples [27i-ii] show that the inflectional case of prenuclear interrogative and

relative who does not always match that of pronouns in the position of the gap. Compare

the nominative who of [i], with accusative them in You gave it to them, and the accusative

whom of [ii] with the nominative required in He thought they were most vulnerable (see

§3.4 above, and Ch. 5, §16.2.3).

Fused relative what in [27iii] is an NP, but hope does not license an NP complement:

compare *I was hoping some respite. Hope takes declarative content clause complements,

and the presence of such a content clause following the fused relative is apparently

necessary for what to be admissible: compare *What I was hoping was a little peace and

quiet. The fused relative in [iii] is subject within a pseudo-cleft clause (see Ch. 16, §9.3),

and the same extended use of what is found with a few other verbs in pseudo-clefts.

Compare, for example, What we decided was to interview all the candidates. Although

decide does license NP complements, they don't stand in the same semantic relation to

it as what does here – compare The weather will decide the outcome, but not *We decided

an interview.

Example [27iv] is an open interrogative. Unlike relative phrases, interrogative phrases

are not in general required to occupy initial position – compare And so you want what,
exactly? (cf. Ch. 10, §4.5). Interrogative phrases containing emotive modifiers such as on earth,
the hell, ever, etc., however, can only occur initially, hence not in the position of the

gap in [iv]: *And so you want what on earth?

The remaining examples in [27] are preposings. In [v] the function of the gap is

that of object in a complex-transitive clause. The preposed content clause could not

23 In constructions with an external antecedent the case of the antecedent will be determined by its function

within its own clause, which is independent of the function of the gap. Compare He is hard to get on with _

(where he is subject and hence nominative) and I find him, hard to get on with __ (where he is object and

hence accusative). In [27i–ii], however, who is in prenuclear position, so its case does depend on the function

of the associated gap.

occur in post-verbal position: instead of "I find that no one realised such action might be illegal surprising we need the version with extraposition I find it surprising that no one realised such action might be illegal. In [vi] the preposed content clause could not replace the gap because the latter is complement of the preposition on, which does not license complements of this category: it requires an NP (see Ch. 11, §8.3, for further discussion of this very marginal type). Finally, [vii] has preposing of a predicative complement NP from within a concessive PP. Here there is a more systematic departure from the form found in non-preposed position, with the latter requiring an indefinite article: Although she is a brilliant advocate, she's unlikely to win this case.

Combinations of unbounded dependency constructions
It is possible for certain unbounded dependency constructions to combine in such a way that the gap in one is the antecedent in the other. In the following, for example, an open interrogative is combined with a cleft relative:

[28]  
i  Which jar, was it [\_ [that she says she put the key in \_] ]?  
ii  In which jar, was it [\_ [that she says she put the key in \_] ]?

These are the open interrogative counterparts of the declarative clefts given in [25i–ii] above. The first gap has the interrogative phrase as its antecedent, and itself serves as antecedent for the second gap. In both examples the matching requirement is satisfied. In [i] the gap in the put clause is object of in, and hence requires an NP antecedent: this requirement is met because the gap in the be clause has the overt NP which jar as its antecedent. Similarly in [ii] the gap in the put clause requires a PP antecedent, and this requirement is satisfied because the gap in the be clause has an overt PP as its antecedent. Interrogative counterparts of the ungrammatical [25iii–iv] will thus be ungrammatical too:

[29]  
i  *Which jar, was it [\_ [that she says she put the key in \_] ]?  
ii  *In which jar, was it [\_ [that she says she put the key in \_] ]?

But there is an additional constraint, illustrated in:

[30]  
i  *Which jar, was it [in \_ ] [that she says she put the key \_ ]?

The antecedent for the gap in the put clause is the PP headed by in: we have enclosed it in square brackets and co-indexed it with the gap in the relative clause. This PP contains a gap with the interrogative phrase as antecedent. What makes the sentence ungrammatical is that the antecedent for one gap contains another gap within it, so we have two gaps with different interpretations - "which jar" and "in which jar". Thus while the antecedent for a gap may itself be a gap, as in [28], it cannot merely contain a gap.

7.3 Location of gaps

We have said that there is no upper bound on how deeply a gap may be embedded within an unbounded dependency construction. This does not mean, however, that there are no constraints on whereabouts in the construction the gap may occur. Compare, for example:

[31]  
i  I told her [what, [you insisted that we need \_]].
ii  'I told her [what, [that we need \_, is agreed]].

While [i] is acceptable, [ii] is completely unacceptable. And the cause of the unacceptability is clearly grammatical, not semantic. The meaning of [i] can be given as "I told her
The value of $x$ in the proposition 'You insisted that we need $x$', and the intended meaning of [ii] is similarly 'I told her the value of $x$ in the proposition 'That we need $x$ is agreed'. This meaning can in fact be expressed by means of the extraposition construction: *I told her what it is agreed that we need.*

The structure for the interrogative clause in [3i] is as follows:

```
[32] Clause
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prenucleus:</td>
</tr>
<tr>
<td>Nucleus:</td>
</tr>
<tr>
<td>Subject:</td>
</tr>
<tr>
<td>Predicate:</td>
</tr>
<tr>
<td>Compl: Clause:</td>
</tr>
<tr>
<td>Marker: Subordinator:</td>
</tr>
<tr>
<td>Head: Clause:</td>
</tr>
<tr>
<td>Subject:</td>
</tr>
<tr>
<td>Predicate:</td>
</tr>
<tr>
<td>O: _____________</td>
</tr>
</tbody>
</table>

[[what] [you] [insisted] [that] [we] [need]]
```

The boxes enclose points in the tree that lie on the path from the top down to the gap, and grammaticality depends on the function and category labels that occur on this path. The deviance of [3ii] is due to the fact that the path to the gap passes through a constituent with the form of a clause and the function of subject: *that we need __* is subject of *is agreed*. Note that we are concerned here with the path to the gap, not with the gap itself. We noted in §7.2 that (under restricted conditions) the gap can be subject, as in *Who, [do you think __ wrote the letter]*? what is not admissible is for the gap to be part of a larger clause that is functioning as subject.

In this section we will review a range of constituent types, examining whether or not they may occur on the path leading to the gap. Before we start, however, two general points should be made. In the first place, while the status of [3i–ii] as respectively well-formed and deviant is quite clear, there are many intermediate cases where the status is uncertain. Secondly, while we can confidently say that [3ii] violates a rule of grammar, the acceptability of examples may also be affected by semantic considerations. Compare:

```
[33]  i  That's a subject, [that Steven Jay Gould wrote a book about __].
    ii  *That's a subject, [that Steven Jay Gould despises a book about __].*
```

24 Constituent types that do not allow gaps within them are often called 'islands.'
These have the same grammatical structure, differing only lexically, with [i] having write and [ii] despise as the verb of the relative clause. But they differ significantly in acceptability: [i] is clearly acceptable, while [ii] is very unnatural. This difference has a semantic explanation. The relative clause combines with the antecedent subject to form a nominal that denotes a class of subjects. In the case of [i], this class has some coherence: to say of some subject that Steven Jay Gould wrote a book about it points to a selection of significant topics in areas like evolutionary biology, geology, palaeontology, etc. The class denoted by the nominal in [ii] has no such coherence. What would have to be true of a subject in order for it to be an $x$ such that Steven Jay Gould despises a book about $x$? Someone, at some time in history, has to have written a book about $x$ that Gould despises for some reason (it is badly written, or was plagiarised, or has annoyingly pretentious page design, or is full of mistakes, or whatever reason there might be). The subject in question could be shoes, ships, sealing wax, cabbages, or kings. In other words, there is no sensible characterisation of a class of subjects in [ii] at all, and as a result the example seems anomalous.

Let us turn now to the review of constituent types. In the examples, we use one pair of square brackets to delimit the constituent in question, and another to delimit the unbounded dependency construction if it is less than the whole sentence. Antecedents are underlined if they contain more than the one word that carries the subscript index.

(a) VP in predicate function

[i] Most of the criticisms, he [accepted $\ldots$] with good grace.

[ii] I don't know [where, he [found it $\ldots$]].

[iii] It was to her cousin, [that she [sold the business $\ldots$]].

VP predicates readily allow gaps within them. In [i] we have a preposing with a direct object gap, in [ii] an open interrogative with an adjunct gap, and in [iii] a cleft relative with a complement gap linked to a PP antecedent.

(b) AdjPs in predicative complement function

[i] Whether it's ethical, I'm not [so certain $\ldots$].

[ii] That's the only crime [of which, they could find him [guilty $\ldots$]].

Example [i] has preposing of a clausal complement of certain. In [ii] the relative PP of which is antecedent to the gap functioning as complement of guilty.

(c) Declarative content clause in post-head complement function

[i] It was here, [she said [she found the knife $\ldots$]].

[ii] I don't know [who, he thinks [he is $\ldots$]].

[iii] Here's a book, [I think [$\ldots$] might help us].

[iv] He's the only one, [that I'm [sure she told $\ldots$]].

Gaps are readily allowed here: an adjunct in [i], predicative complement in [ii], subject in [iii], object in [iv]. The adjunct case has the potential for ambiguity. In the interpretation indicated by the inner brackets in [i], the gap belongs in the find clause: it is a matter of where she found the knife. The gap could also be in the say clause: It was here, [she said [she found the knife $\ldots$]]. In this interpretation it is a matter of where her utterance took place.
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 she said [she took place.

 (See Ch. 10, §7.12, for discussion of such ambiguities in open interrogatives.) In [iv] the content clause is complement of an adjective rather than a verb.

 (d) Closed interrogative clause in complement function

 [37]  

 i There are several books, here [that I'm not sure [if you've read _i]].

 ii The actor had to be careful with the amount of venom poured into a character [who; in the end we don't know [whether to hate or pity _i]].

 iii 'The woman boarding in front of me was carrying a huge sports bag. [that the cabin crew wondered [whether there was going to be enough room for _i]].

 Interrogative content clauses accept gaps much less readily than declaratives. Examples are rarely found in published material, though [ii] is an attested example from a weekly magazine. Acceptability seems to diminish quite rapidly with increasing complexity, with [iii], for example, quite questionable in comparison with [i-ii].

 (e) Open interrogative clauses in complement function

 [38]  

 i These are the only dishes; [that they taught me [how; to cook _i]].

 ii The man in the dock was a hardened criminal; [that the judge later admitted he didn't know [why; he had ever released _i in the first place]].

 iii 'Here's another photograph; [that I can't remember [where; we took _i]].

 iv *It's Max; [that I'd like to know [who introduced _i to your sister]].

 Gaps are permitted in open interrogatives only under quite restrictive conditions. Example [i], with how as the questioned element (and with a very short interrogative clause), seems completely acceptable. Example [ii], with why, is more or less acceptable in speech but this type would not normally occur in published material. Example [iii], with where, is more questionable, whereas [iv] can be regarded as ungrammatical, and the same will apply to other examples where the interrogative phrase is in complement function. It will be noted that in [i-iii] there are two gaps, one associated with the open interrogative construction (and having the index j), the other with the relative clause in which the interrogative is embedded: compare the canonical construction I cook spaghetti bolognese this way.25

 (f) Non-finite clause in post-head complement function

 [39]  

 i It's you; [I want [to marry _i]].

 ii What; did you [tell the police _i]?

 iii I wonder [what; they intend [doing _i about it]].

 iv They are the ones [to whom; he had the weapons [sent _i]].

 These illustrate all four types of non-finite clause: respectively to-infinitival, bare infinitival, gerund-participial, and past-participial. This category includes the non-finite complements of auxiliary verbs, as in [ii] or What; are you [reading _i]?, etc.

 25 In "There are words or terms; in this Guide [that you may not be sure [what; they really mean _i]] (taken with minor and irrelevant modification from an Australian government publication) the personal pronoun they is used instead of a gap linked to the antecedent words or terms. Pronouns used in place of a gap in relative clauses are known as 'resumptive pronouns'. In some languages they represent a regular feature of relative clause formation, but in English they are ungrammatical, as evident from their inadmissibility in simpler constructions like words or terms [which; you may not understand them].
(g) PP

   [40]  
      i  Some of us; he wouldn't even speak [to __].
      ii  This is the knife; [you should cut the tomatoes [with __]].
      iii  *What day; will you not be able to return the book [until __]?
      iv  *Here is a list of the objections; [that they went ahead [despite __]].
      v  *You pay me, I'll do it [if __].
      vi  *It was this proposal; [that they sacked me [because I criticised __]].

In [i–iv] the gap is complement of a preposition and has an NP as antecedent. This results in what is called a stranded preposition – a transitive preposition with the complement missing but understood. It is a very common construction except in formal style: see Ch. 7, §4.1. Stranding is most generally permitted when the PP is in complement function, as in [i]. With PPs functioning as adjunct, acceptability depends on the semantic type of the adjunct and the particular preposition; for example, instrumental with strands easily, whereas until is fairly resistant to stranding, and with despite it is excluded.

PPs do not permit gaps linked to a finite clause antecedent, as illustrated in [40v]. The preposing here must apply to the whole PP, not just the complement: If you pay me, I'll do it __. Nor do they permit a gap within a finite clause that is complement of the preposition, as we see from [vi]. Again it can be corrected by having the gap in place of the whole reason PP: It was because I criticised this proposal that they sacked me __.

(h) NP

NP s accept gaps considerably less readily than VPs. Gaps cannot occur as or within modifiers in NP structure (see subsection (i), Modifiers, below). Complements are normally either PPs or clauses, and we will consider these two cases in turn.

PP complements

   [41]  
      i  Of which institute; did you say they are going to make him [director __]?
      ii  To which safe; is this [the key __]?
      iii  He knows little about any of the companies [in which; he owns [shares __]].
      iv  I can't remember [which country; she served as [prime minister of __]].
      v  What kinds of birds; have you been collecting [pictures of __]?
      vi  It's a topic; [that I'd quite like to write [a book about __]].
      vii  *It's a topic; [you should read [my philosophy tutor's book on __]].

In [i–iii] the gap itself functions as complement and has a PP as antecedent. In [iv–vi] the gap is complement of the preposition, yielding a further case of preposition stranding. The NP in [iv–vi] is indefinite, and this construction is clearly acceptable except in formal style. Where the NP is definite, however, and especially where it has a genitive determiner, acceptability is generally very much reduced, as in [vii].

Clausal complements

   [42]  
      i  *That it was my fault; I emphatically reject [the insinuation __].
      ii  *How the accident happened; they haven't begun to address [the question __].
      iii  *How much; did the secretary file [a report that it would cost __]?
      iv  *He's someone; [I accept your contention that we should not have appointed __].
      v  How many staff; did he give you [an assurance that he would retain __]?
Examples [i–ii] have the gap itself in complement function, but this time— in contrast to [41] the result is very clearly ungrammatical. Preposing must apply to the whole NP: *The insinuation that it was my fault; I emphatically reject _, and The question how the accident happened, they haven’t begun to address _,* 26 In [iii–v] the gap is within the declarative content clause functioning as complement in NP structure. In general, this construction is of low acceptability. There is, for instance, a very sharp difference between [iii–iv] and comparable examples where the clause is complement of a verb: *How much, did the secretary report that it would cost_,? and *He’s someone, [that I agree we should not have appointed _,]*. However, the construction is by no means wholly excluded. It is most acceptable in examples containing collocations of light verb + noun such as *give an assurance, make the claim, hold the belief,* etc., which have essentially the same meaning as the verbs *assure, claim,* and *believe* respectively (cf. Ch. 4, §7). Thus [v] does not differ appreciably in acceptability from *How many staff, did he assure you that he would retain _,?*

The examples in [42] involve content clauses; with infinitival complements gaps are more generally admissible:

1. *What, had Dr Harris secretly devised [a plan to steal _,]?*
2. *It is not clear [which felony, he is being charged with [intent to commit _,]].*

(i) Modifiers

1. *That’s the car, [that I’m saving up [to buy _,]].*
2. *Which month, are you taking your holidays [in _,] this year?*
3. *It’s this river, [that I want to buy a house [by _,]].*
4. *List the commodities, [that you have visited countries [which produce _,]].*

Gaps occur very much less readily in modifiers than in complements. One type of modifier where they are unquestionably allowed, however, is an infinitival clause of purpose in VP structure, as in [i]. Example [ii] shows a gap inside a PP functioning as modifier of temporal location, but we noted in (g) above that the stranded preposition construction has a quite strong preference for PPs in complement function. Modifiers in NP structure very strongly resist internal gaps, as illustrated in [iii–iv]. In [iii] the gap is in a PP modifying *house,* while that in [iv] is in a relative clause modifying *countries.*

(j) Subjects

1. *They have eight children [of whom, [five _,] are still living at home].*
2. *They have eight children [who, [five of _,] are still living at home].*
3. *What, would [to look at _,] too closely] create political problems?*

Gaps are almost wholly excluded from occurring within a subject. The main exception is the construction shown in [i], where the gap is complement within the subject NP and has a PP as antecedent. Examples like [ii–iii] are completely ungrammatical; in [ii] the gap is within a PP dependent in the subject NP, while in [iii] it is within a clause functioning as subject. The clause in this example is infinitival, but the same prohibition

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26 Examples like *Why he did it; I have no idea _,* are acceptable, but here we take the interrogative clause to be a complement in the structure of the VP, not the NP: see Ch. 4, §6.
applies to finite clauses, as seen in the example used in the introduction to this section, [31ii].

(k) Coordinates
We saw in §7.2 that a gap cannot itself function as a coordinate (cf. [13viii]), but there are also constraints on the occurrence of gaps within coordinates. Compare:

[46] i Who was the guy; [that [Jill divorced _] [and Sue subsequently married _]]?
   ii *Who was the guy; [that [Jill divorced Max] [and Sue subsequently married _]]?

In general, a gap can occur within a coordinate element only if a gap with the same antecedent occurs in all other coordinates in the coordination construction. In [i], for example, each of the two coordinates (enclosed by the inner sets of brackets) contains a gap in object function with guy as its antecedent. The sentence presupposes that there was some guy x such that Jill divorced x and Sue subsequently married x. Example [ii] is ungrammatical because the gap figures in one coordinate but not the other.

There are certain conditions, however, under which this constraint is relaxed:

[47] i There are some letters; [that I must just [go downstairs] [and check _] over].
   ii What is the maximum amount; [I can [contribute _] [and still receive a tax deduction]]?
   iii He has built up a high level of expectations, [which; he must [either live up to _] [or suffer a backlash]].

These are cases of asymmetric coordination, i.e. cases where the coordinates are not of equal status from a semantic point of view (see Ch. 15, §§2.2.3–4). This is reflected in the fact that such coordinations have approximate paraphrases where one coordinate is replaced by an adjunct. Compare I'll go downstairs and check them over with I'll go downstairs to check them over; I contributed $1,000 and still received a tax deduction with Although I contributed $1,000, I still received a tax deduction; He must either live up to these expectations or suffer a backlash with If he doesn't live up to these expectations, he will suffer a backlash. Note that in each case the gap appears in the coordinate corresponding to the adjunct in the paraphrase. We pointed out at the beginning of this section that the acceptability of gaps in various locations is not determined by purely grammatical factors, and the contrast between [46] and [47] is a clear instance where a grammatical constraint is overridden by semantic factors.

7.4 Nested dependencies
It is possible for a sequence containing a hollow clause gap and its antecedent to be nested between the gap of a major construction and its antecedent. This kind of construction is illustrated in examples like Which of the two instruments will this piece be easier to play on?

The following is a rare attested example of a gap within an infinitival subject, showing that the constraint is not absolute: The eight dancers and their caller, Laurie Schmidt, make up the Farmall Promenade of nearby Nemaha, a town; [that [to describe __; as tiny] would be to overstate its size].
The analysis of this example is as follows:

\[
\text{Which of the two instruments, will this piece, be easier [to play \_ on \_]?}
\]

The brackets enclose the hollow clause, and the underlining marks the antecedents of the two gaps, one functioning as object of the verb \textit{play}, the other as object of the preposition \textit{on}. One plays pieces of music on instruments, as reflected in a main clause such as \textit{Kim will play the sonata on this piano}. The NP containing the noun \textit{piece} will thus be the antecedent for the gap which is object of \textit{play}, and the NP containing the noun \textit{instruments} will be antecedent for the gap which is object of \textit{on}.

It will be noted from the diagram that the first antecedent is linked to the second gap, and the second antecedent to the first gap: the pair with the \(j\) index is said to be nested between the pair with the \(i\) index. The dependency relations are required to be nested one within the other in this way. It is not possible for them to cross each other, as in:

\[
\text{Which piece; will the guitar, be easier [to play \_ on \_]?}
\]

It is plausible to see this constraint as serving to facilitate understanding: if only [48] is an admissible structure, the hearer will know that the first gap encountered will be linked to the most recently perceived antecedent.

7.5 Parasitic gaps

■ Omission of personal pronoun with gap as antecedent

Under certain conditions it is possible to omit a non-reflexive, non-genitive personal pronoun whose antecedent is a gap in an unbounded dependency construction:

\[
\begin{align*}
\text{i} & \quad \text{They do an annual report, [that I always throw \_ away without reading it].} \\
\text{ii} & \quad \text{They do an annual report, [that I always throw \_ away without reading \_].}
\end{align*}
\]

The second gap in [ii] is called a \textbf{parasitic gap}. It is 'parasitic' in the sense that a gap is permitted in this position only if the antecedent is also a gap. Thus in \textit{I always throw their annual report away without reading it}, the antecedent of the pronoun \textit{it} is an overt NP, and omission of the pronoun in this case leads to ungrammaticality: "I always throw their annual report away without reading \_."

The most clearly acceptable cases of parasitic gaps occur, like that in [50ii], in non-finite clauses located within adjuncts functioning in clause structure.

■ Parasitic gaps distinct from across-the-board gaps

The construction with an ordinary gap + parasitic gap is to be distinguished from that where two ordinary gaps appear in coordinated constituents:

\[
\text{It was a proposal, [that [Kim supported \_] [but everyone else opposed \_]].}
\]

Here the second gap cannot be replaced by a personal pronoun. There is thus nothing parasitic about the second gap here: it is required by the rules for coordination. As
explained in Ch. 15, §2.1, a distinctive property of coordination is that such processes as relativisation must apply 'across the board': if relativisation applies within one coordinate it must apply within all. This is what accounts for the difference in grammaticality in [46], where [i] satisfies the across-the-board requirement and [ii] violates it.

Parasitic and across-the-board gaps can combine, as in the following attested example, where the parasitic gap is marked by an initial subscript 'p':

[52]  *Fairbanks reached for a towel, a clean one and not the scarcely crumpled one, [that Comore himself had [used p_i] [and left p_i] thriftily on the ledge below the mirror rather than consign p_i to the linen basket].

The outer brackets enclose a relative clause within which there is a coordination functioning as complement of the perfect auxiliary *have*. The two coordinates, enclosed by the inner pairs of brackets, each have an ordinary gap as object (of *used* and *left* respectively), but in addition the second coordinate has a parasitic gap in the adjunct headed by *rather*. Again, the parasitic gap could be replaced by the personal pronoun *it*, but the ordinary gaps could not.