verbs like *sink* as ergatives.[16] The classification of verbs as unaccusative/ergative is a matter of ongoing research. Many authors do not make any distinction between the terms, or consider verbs with transitive pendants like *sink*, which we label ergatives, as unaccusatives. The reader is referred to the literature for details.

4 Levels of Representation and Principles of the Grammar

In this chapter we have developed the hypothesis that all sentences are associated with two syntactic representations: D-structure and S-structure. In this section we discuss the relation between these levels and we shall give an overview of how the principles of grammar established in previous chapters apply to them.

4.1 The Structure Preserving Principle

There is an important constraint on the relation between syntactic representations: structures established at D-structure must be preserved at S-structure: transformations are structure preserving.

If a syntactic position is required at D-structure it will be present at S-structure as well. For instance, a position required by the projection principle at D-structure will also be present at S-structure. A position projected as a certain category at D-structure cannot change its category at S-structure: NP-positions remain NP-positions, I remains I, etc. A D-structure NP-position, for example, cannot be turned into a PP-position at S-structure. If we adopt the hypothesis briefly alluded to at the end of chapter 2 that syntactic category labels represent bundles of features ([±N], [±V]) then we conclude that features assigned at D-structure are preserved, i.e. they do not change. If NPs are also assigned the features [± anaphor; ± pronominal] then these features too are expected to be invariant between D-structure and S-structure. This point becomes relevant in chapter 8.

The structure preserving principle also has consequences for movement. One constraint which it imposes on movement is that phrasal projections

[16] In so doing we depart from Burzio's own analysis (1986) and we follow a suggestion in work by Belletti (1988: 4, 14), based on Hale and Keyser (1986, 1987). Obviously, the same type of analysis will also apply to the equivalents of the ergatives in other languages.

must move into positions which are themselves labelled as phrasal projections. NPs, for example, must not move into positions dominated by lexical categories (such as N) or intermediate phrasal categories (N′). Heads such as I must move into other head positions.

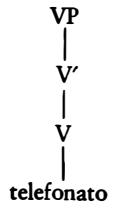
Second, movement will have to respect syntactic categories. For example, NPs can move into NP-positions without problem, but they will not be able to move into a position labelled AP. This does not mean that NPs must move to NP-positions. Provided all other principles of the grammar are respected, NPs will also be allowed to move to positions which are not specified for a syntactic category (see the discussion of *wh*-movement in section 2.3.1 and in chapter 7). The structure preserving principle does not prevent that a moved element is given a new position at S-structure, a position that does not exist at D-structure, as long as the new position created respects the principles of phrase structure. Such a move would not violate the principle that structure must be preserved.

Consider, for instance, the example of free subject inversion in Italian:

93a Il ragazzo ha telefonato.
the boy has telephoned.
93b Ha telefonato il ragazzo.

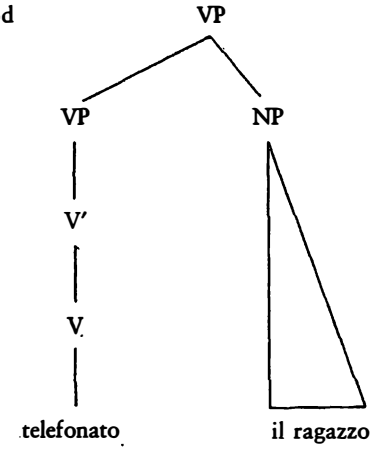
The VP of (93a) is as in (93c); *il ragazzo* is in [Spec, IP].

93c



In (93b) the subject NP occurs post-verbally. We assume that the D-structure (93b) is like that of (93a). At S-structure the subject NP *il ragazzo* is post-verbal. Recall from (58c) that *ne*-cliticization is impossible from the post-verbal subject of *telefonare*, suggesting that the postposed subject is not in the object position [NP, V′]. It is proposed in the literature that the post-verbal subject NP is adjoined to VP:

93d



The S-structure in (93d) is not incompatible with the structure preserving principle: all structure assumed at D-structure (93c) is preserved. We return to adjunction structures in chapter 7.

4.2 *The Theta Criterion*

In 2.2.1 we discussed the application of theta theory to the two levels of representation.

D-structure is a representation of lexical properties. D-structure representations are subject to the theta criterion: all syntactic arguments of the predicates must be realized. Moreover we must not randomly generate arguments (say NPs) which cannot be associated with any predicate since they will fail to receive a theta role.

S-structure encodes the result of movement transformations. The structure preserving principle will also entail that movement leaves traces since positions created at D-structure must be preserved. Traces of movement form a chain with their antecedent. If we redefine the theta criterion in terms of chains (cf. 22)) we can maintain that the theta criterion also applies at S-structure, as discussed above. (See also section 4.6.)

4.3 *The Extended Projection Principle*

The EPP is another principle regulating syntactic structure which applies at all levels of syntactic representation: sentences must have subject positions,

[Spec, IP] positions, at all syntactic levels. It is important to point out here that the EPP imposes that the [Spec, IP] position be generated. The EPP does not impose that this position be filled by overt elements: we have already seen that it may be filled by a trace or by PRO. Also, the EPP does not require that the [Spec, IP] position be filled by arguments: we have seen that sometimes it is filled by an expletive element. Given the structure preserving principle discussed in 4.1 it follows that if the EPP forces us to generate a [Spec, IP] position at D-structure, this position is also present at S-structure.

4.4 *The Case Filter*

Throughout this chapter we have been assuming that the case filter applies at S-structure. NPs do not need to be assigned case at D-structure. Structural case is assigned at S-structure (cf. section 1.1).

This does not mean that at D-structure NPs must be caseless. All we are saying is that case is not checked at D-structure. In chapter 3 we adopted the idea that inherent case is associated with theta roles as a lexical property. The German DATIVE in (94a) was taken to be an inherent case. The verb *helfen* is assumed to have the lexical structure in (94b):

94a Poirot hilft ihm.
Poirot helps him-DATIVE

94b *helfen*: verb

1	2 DATIVE

If D-structure is a representation of lexical structure then we can assume that the DATIVE will be assigned to *ihm* at D-structure. As seen before, inherent case is unaffected by passivization.

94c Ihm wurde geholfen.
him was helped
'He was helped.'
94d *Er wurde geholfen.
he (NOM) was helped

4.5 The Binding Theory

4.5.1 LEVEL OF APPLICATION

In chapter 4 we discussed the module of the grammar which regulates the interpretation of NPs: the binding theory. At that point in the discussion we were not worried about levels of representation. We simply looked at sentences, pretending there was a unique syntactic representation associated with them. Now life is more difficult: we have two levels of representation and we may well ask at which point the binding theory (BT) is supposed to apply.

In order to decide at which level the BT applies we examine the application of the BT in examples in which movement has taken place. We shall consider the application of Principle A first and then that of Principles B and C.

The standard example that is often used to illustrate the application of Principle A is (95a).

95a They seem to each other to be intelligent.

The D-structure of (95a) is (95b) and its S-structure is (95c):

95b $[_{IP}$ e seem to each other $[_{IP}$ they to be intelligent]].
95c $[_{IP}$ They$_i$ seem to each other$_i$ $[_{IP}$ t$_i$ to be intelligent]].

Principle A of the BT requires that anaphors such as *each other* be bound in their GC. The GC of *each other* is the matrix clause. In the D-structure (95a) *each other* cannot be bound in its GC since there is no NP available to bind it. The correct binding configuration arises at S-structure: the derived subject *they* can bind the anaphor:

95d $[_{IP}$ They$_i$ seem to each other$_i$ $[_{IP}$ t$_i$ to be intelligent]].

Belletti and Rizzi claim that (95a) only shows 'that Principle A can be fulfilled at S-structure, not that it cannot be fulfilled at D-structure' (1988: 313). They include in the discussion examples such as (96):

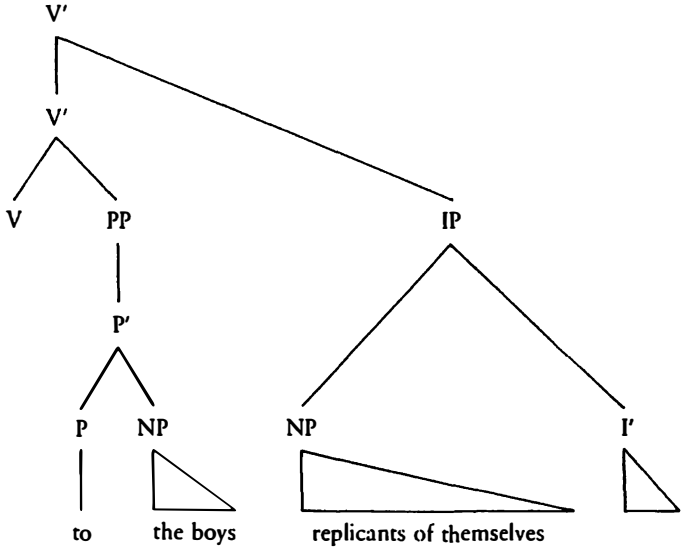
96a Replicants of themselves seemed to the boys to be ugly.
(from Johnson, 1985, quoted in Belletti and Rizzi, 1988: 316)
96b *D-structure*
$[_{IP}$ e seemed to the boys $[_{IP}$ replicants of themselves to be ugly]]

96c *S-structure*

$[_{IP}$ [Replicants of themselves]$_k$ seemed to the boys $[_{IP}$ t_k to be ugly]].

In (96a) the reflexive *themselves* is referentially dependent on the NP *the boys*, hence we expect it is bound by it. At S-structure (96c) the anaphor is not c-commanded by the antecedent *the boys*, hence is not bound by it. Belletti and Rizzi argue that D-structure (96b) stands a better chance of satisfying Principle A. However, even here there will be problems. It is not immediately clear how the NP *the boys*, which is a complement of the preposition *to*, can c-command the reflexive even at D-structure. The reader can verify for himself that the first branching node dominating the NP *the boys* will be the PP node dominating *to the boys*. One might try to circumvent the problem by saying that the PP node somehow does not count (but see Rizzi (1986c: 76–8) for discussion)

96d



Another problem with the example is that it contains a reflexive associated with what is called a *picture*-NP. NPs are known to be problematic for the BT.[17] Consider for instance (97):

[17] We have illustrated the problems with *picture*-NPs in chapter 4, exercise 3. For discussion of the data the reader is referred to work by Prewett (1977) and Jackendoff (1992). Nakajima (1984) proposes that *picture*-NPs should be kept outside the BT. Mohanan (1985) contains a similar suggestion.

97 This is a picture of myself which was taken years ago.

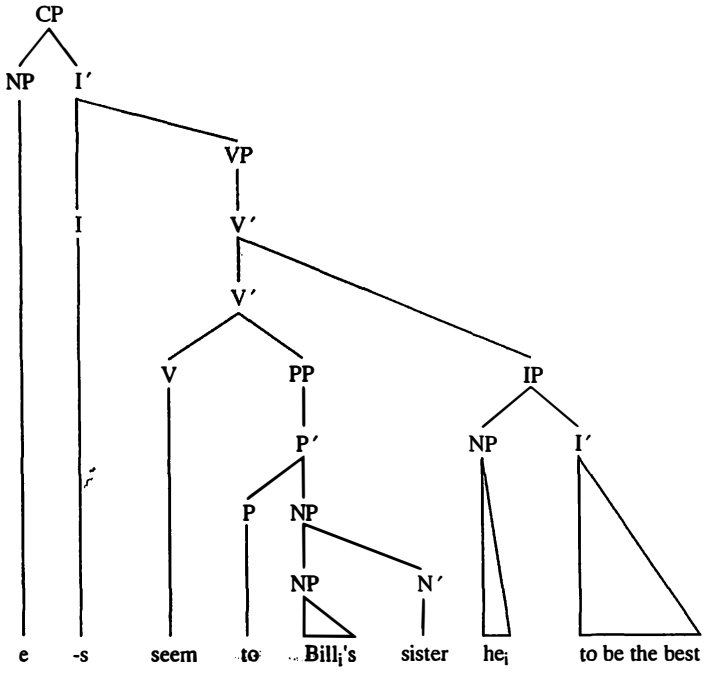
In (97) the reflexive *myself* lacks an antecedent and yet the sentence is grammatical. Because of their special behaviour it is sometimes proposed that *picture*-NPs be treated separately from other NPs with respect to the BT. Rizzi and Belletti's argument that Principle A can be satisfied at D-structure is weakened because it relies on *picture*-NPs, which are problematic for the binding theory anyway.

Let us consider the application of Principle C. (98a) is ruled out on the interpretation indicated by the coindexation: *Bill* must not be coreferential with *he* (Belletti and Rizzi, 1988: 318).

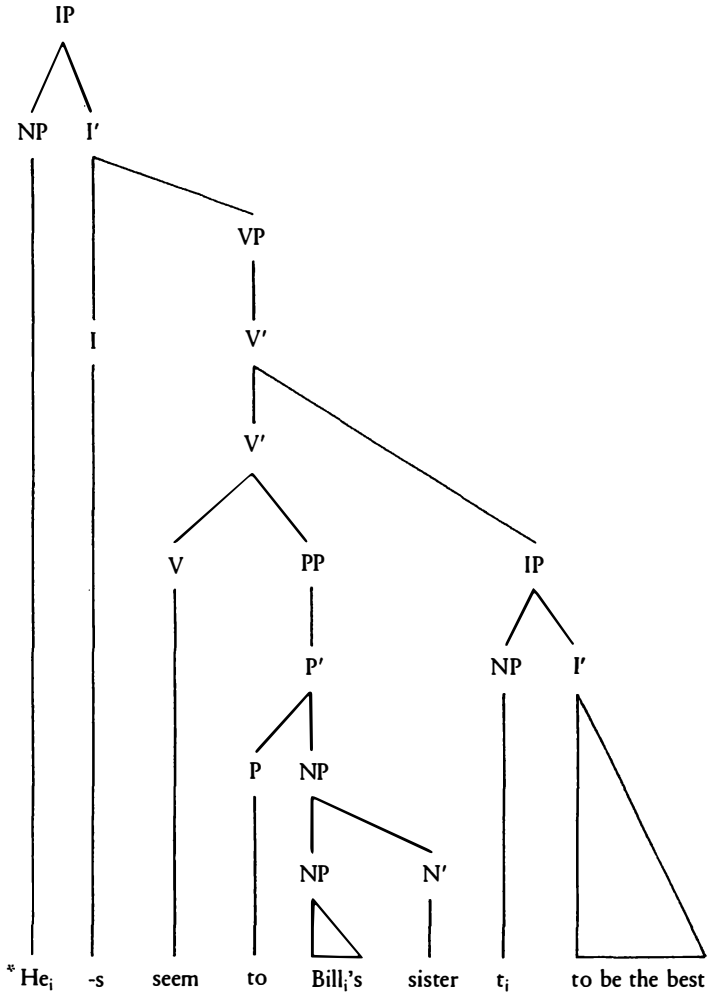
98a *He_i seems to $Bill_i$'s sister to be the best.

Consider the syntactic representations of the sentence:

98b *D-structure*



98c *S-structure*



If we were to assume that Principle C can be fulfilled at D-structure it would not be possible to rule out (98a) with the intended interpretation on the basis of the BT. At D-structure (98b), *he*$_i$ is coindexed with *Bill*$_i$ but *Bill* does not c-command the pronoun, nor does the pronoun c-command *Bill*, as the reader can verify on the tree diagram. The D-structure configuration (98b) is identical in the relevant respects to the structure of (99) where coindexation between *Bill* and *he* is allowed:

99a It seems to Bill$_i$'s sister that he$_i$ is the best.
99b D-structure/S-structure
It seems to Bill$_i$'s sister [that [he$_i$ is the best]].

We conclude that it is the S-structure representation (98c) which is ruled out by Principle C. *Bill*$_i$, an R-expression, is bound by *he*$_i$ and this violates Principle C. This suggests that Principle C must be satisfied at S-structure.

The same reasoning can be applied to (100) to demonstrate that Principle B cannot be satisfied at D-structure either:

100 *He$_i$ seems to him$_i$ to be likely to be the best.
(Belletti and Rizzi, 1988: 318)

We leave the reader to work out the D-structure and S-structure of this example.

On the basis of the discussion above, we conclude that Principles B and C apply to S-structure configurations. The evidence that Principle A can be fulfilled at D-structure is controversial.[18]

4.5.2 THE FEATURE COMPOSITION OF NP-TRACES

Let us return to a point left unexplained in section 2.3.1 above. It was observed that example (37a), repeated here as (101), is ungrammatical:

101 *John$_i$ seems that it is believed t$_i$ by everyone.

Let us try to explain why this should be so.

We have seen that traces of NP-movement occupy an NP-position and

[18] We return to the level of application of the binding theory in chapter 9, section 4.