

#### 4.1.4. Further examples

The first example below illustrates the difference between *not both* and *neither-nor*, but it does so with an analysis of the latter that is closer to English than the one that was used in the examples of 3.1.5.

*Ann and Bill didn't both enjoy the meal but neither complained*

*Ann and Bill didn't both enjoy the meal*  $\wedge$  *neither Ann nor Bill complained*

$\neg$  *Ann and Bill both enjoyed the meal*  $\wedge$   $\neg$  *either Ann or Bill complained*

$\neg$  (*Ann enjoyed the meal*  $\wedge$  *Bill enjoyed the meal*)  $\wedge$   $\neg$  (*Ann complained*  $\vee$  *Bill complained*)

$\neg$  (A  $\wedge$  B)  $\wedge$   $\neg$  (C  $\vee$  D)

**not both A and B and not either C or D**

[A: *Ann enjoyed the meal*; B: *Bill enjoyed the meal*; R: *Ann complained*; S: *Bill complained*]

The second example is a sample of the complexity of structure we are now in a position to find in even fairly ordinary sentences.

*Either Smith went ahead without Jones or Hardy backing him, or else Brown knew of his wishes and carried them out without consulting him*

*Smith went ahead without Jones or Hardy backing him*  $\vee$  *Brown knew of Smith's wishes and carried them out without consulting him*

(*Smith went ahead*  $\wedge$   $\neg$  *Jones or Hardy backed Smith*)  $\vee$  (*Brown knew of Smith's wishes*  $\wedge$  *Brown carried out Smith's wishes without consulting him*)

(*Smith went ahead*  $\wedge$   $\neg$  (*Jones backed Smith*  $\vee$  *Hardy backed Smith*))  $\vee$  (*Brown knew of Smith's wishes*  $\wedge$  (*Brown carried out Smith's wishes*  $\wedge$   $\neg$  *Brown consulted Smith*))

(A  $\wedge$   $\neg$  (J  $\vee$  H))  $\vee$  (K  $\wedge$  (C  $\wedge$   $\neg$  N))

**either both A and not either J or H or both K and both C and not N**

[A: *Smith went ahead*; C: *Brown carried out Smith's wishes*; H: *Hardy backed Smith*; J: *Jones backed Smith*; K: *Brown knew*

*of Smith's wishes; N: Brown consulted Smith]*

Notice how often it was necessary to replace a pronoun by its antecedent in order to uncover components that were independent sentences. If this replacement changed the meaning, analysis would be impossible. Consider a sentence like the one above but having *a certain partner* where that one has the name *Smith*.

*Either a certain partner went ahead without Jones or Hardy backing him, or else Brown knew of his wishes and carried them out without consulting him*

We can analyze this as a disjunction *A certain partner went ahead without Jones or Hardy backing him*  $\vee$  *Brown knew of a certain partner's wishes and carried them out without consulting him*; but we can go no further with the analysis until we have other sorts of logical form at our disposal.

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