4.1.s. Summary

While the logical word *or* is grammatically similar to *and*, its logical role is to weaken claims by hedging them with a second alternative rather than to strengthen them by adding with a second assertion. This difference from conjunction is expressed by the truth table of the connective disjunction , according to which a disjunction is true when at least one true sentence among its components, which are called disjuncts . The symbol ∨ (logical or) is our notation for the operation of disjunction, and its scope is marked by parentheses. Alternatively, we can write a disjunction φ ∨ ψ as `either` φ `or` ψ, where `either` serves (like `both` with conjunction) to indicate scope.

The truth of a disjunction when both its components are true distinguishes inclusive disjunction from another logical form, exclusive disjunction , that forms compounds that are true only when exactly one component is true. While English sentences stated with *or* often convey the idea that two alternatives are not both true, it can be argued that this information is conveyed as an implicature rather than an implication and that, as far as its truth conditions are concerned, the English word *or* may be taken as a sign of inclusive disjunction.

As is true of conjunction, there are cases where a word like *or* marking disjunction appears in a sentence but the sentence cannot be analyzed as a disjunction due to our inability to replace pronouns by their antecedents. Also, English has serial disjunctions just as it has serial conjunctions; and serial disjunction in English can be mimicked to some degree by run-on disjunctions , which suppress parentheses. Disjunction can be expressed in English by the phrase *at least one*, one of the group of related phrases indicating numerical compounding operations. In some cases, sentences containing these phrases can be analyzed by employing disjunction along with conjunction and negation.

Finally, disjunction provides an alternative, and more natural, way of analyzing *neither-nor* claims.

4.1.x. Exercise questions

1. Analyze each of the following sentences in as much detail as possible.
   a. *Either Tommy ate his vegetables or he didn't get any dessert.*
   b. *Mike heard neither the phone nor the doorbell.*
   c. *Either Mike wasn't home or he wasn't answering the phone.*
   d. *The package was sent, but either it's still on its way or it's been lost in the mail.*
   e. *Neither the House nor the Senate had acted on the bill, but the White House expressed confidence that it would pass.*
   f. *Sam won't pass through without either stopping by or calling.*
   g. *Either Davis or Edwards will take you or give you directions.*
   h. *We'll have either a can without an opener or an opener without a can.*
   i. *Neither Jan nor Ken had matches or a lighter.*
   j. *Both Ann and Bill were in town but neither knew the other was.*
   k. *Either Tom, Dick, or Harry will handle both the scheduling and the publicity.*
   l. *The scheduling will be handled by either Tom, Dick, or Harry-as will the publicity.*

2. Restate each of the following forms, putting English notation into symbols and vice versa. Indicate the scope of connectives in the result by underlining.
   a. A ∧ (B ∨ C)
   b. (A ∧ B) ∨ C
   c. `not either` A `or not` B
   d. `both either` A `or` B `and either` A `or` C

3. Synthesize idiomatic English sentences that express the propositions associated with the logical forms below by the intensional interpretations that follow them.

a. B ∨ N
   [B: *it was the butler*; N: *it was the nephew*]

b. ¬ (A ∨ S)
   [A: *the alarm worked*; S: *the sprinkler worked*]

c. ¬ A ∨ ¬ P
   [A: *the part arrived*; P: *the part was the problem*]

d. A ∨ ¬ (B ∧ C)
   [A: *Ann has a large car*; B: *Bill will ride with us*; C: *Carol will ride with us*]

e. (R ∨ D) ∧ W
   [D: *there was a heavy dew*; R: *it rained over night*; W: *it is wet*]

f. (A ∧ Z) ∨ (F ∧ ¬ (A ∨ Z))
   [A: *AAA ∧ Co. will profit from the deal*; F: *the deal will fall through*; Z: *ZZZ Inc. will profit from the deal*]

Homework assigned Wed 9/29 and due Fri 10/1

Analyze (using disjunction—rather than the *not-and-not* form—to analyze *neither-nor*):
Either Al made it to neither Fort Wayne nor Toledo or they either don't handle the part or were closed early
[Here "they" picks up its reference from the context; you can imagine it refers to a retail chain that has stores in Fort Wayne and Toledo.]