

### 3.1.3. Negation in English

Many questions that arise concerning the use of conjunction to analyze English sentences do not apply to negation. In particular, since a compound formed by negation has only a single component, there is no need to worry identifying components that make independent contributions to the whole. It is important, though, to be sure that the component that we uncover is related to the whole compound in the way that negation indicates—that is, we need to make sure that the two are contradictory.

Negative prefixes on adjectives (*un-*, *in-*, *a-*, etc.) sometimes function as stylistic variants for *not*. But the effect of such a prefix may not always be to negate since the result of adding it may not always be contradictory to the original sentence. For example, *happy* and *unhappy* seem to be used sometimes as synonyms for *joyful* and *sad*. In such usage, the sentence *Hal is unhappy* is not the negation of *Hal is happy* because both might be false. The only way to distinguish such cases from ones where the prefix is a sign of negation (as in *The road is unfinished*) is to ask yourself whether a sentence with a negative prefix and the corresponding sentence without it jointly exhaust all possibilities.

When doing this, it is important to remember the difference between truth and appropriateness. That is, to show that *Hal is happy* and *Hal is unhappy* are not jointly exhaustive, it is not enough to find a case where it would not be appropriate to assert either—as when Hal’s state of mind is neutral—for one of the two inappropriate assertions might still be true. It would even be possible for *unhappy* to be appropriate in exactly the same circumstances as some term like *sad* even though the two had different truth conditions. While it is not easy to rule out this sort of possibility, remember that we have one test to use. Imagine being asked the two questions *Is Hal happy?* and *Is Hal unhappy?* when you know his state of mind is neutral. Ask yourself if you would reply *No* to both or reply *No* to one and *Yes, but ...* to the other.

Some sentences can be analyzed as negations even though they do not contain either *not* or a stylistic variant because they contain another logical expression that introduces a negative element. For example, *The road was neither smooth nor straight* can be analyzed as the negation of *The road was either smooth or straight*. In this case, we were able to simply remove the negative element in order to identify the component to which negation is applied; but, in other cases, some restatement may be needed to formulate a component that is contradictory to the whole

compound.

That is often the case when negation is introduced by way of words or phrases containing *no*. For instance, *No one bought the book* is negative, but what is it the negation of? It is not the negation of *Everyone bought the book*, for to deny that would be to say only that there is at least one person who failed to buy it. *No one bought the book* must be the negation of *At least one person bought the book* or, more briefly, *Someone bought the book*. English is regular enough on this point that you could make it a rule of thumb to treat *no* as indicating the negation of *some*, but this is not a rule to be applied without thought. Again, the best general policy is to ask yourself whether the original sentence and the component you take to be negated are really contradictories—whether it really is the case that they cannot both be true and cannot both be false.

A related problem concerns the word *any*. This often appears in negative sentences—such as *I didn't speak to anyone*. Although this sentence is a negation, it cannot be analyzed as the negation of *I spoke to anyone*—a sentence that is hard to understand (except in contexts where it is elliptical for something like *I spoke to anyone I wanted to*). Instead, *I didn't speak to anyone* is the negation of *I spoke to someone* where this is understood to mean *I spoke to at least one person*. The problem with retaining *any* in the component of a negation is that it is generally used only in the presence of certain other words—*not* is one, but also *if* and some others—and it is hard, if not impossible, to understand the force of *any* when it is removed from such a context. But English is fairly regular here, too; and a sentence in which *any* is used with *not* can usually be regarded as a negation whose component can be stated using *some* in place of *any*.

For this approach to *no* and *not ... any* to work, it is important that *some* mean 'at least one'. Now, in some contexts, the fact that *some* is used with a singular noun can lead to an implicature of 'only one'. For example, a sentence like *I spoke to someone* may implicate that *only* one person was spoken to. To see that this implicature is not an implication, imagine speaking to two people and being asked, "Did you speak to someone?" I think the natural answer would be *Yes* rather than *No*—though you might add *In fact, I spoke to two people* if this further information was relevant. If that is right, the suggested analysis of *I spoke to no one* and *I didn't speak to anyone* does work, but the best policy is still to ask yourself whether the component you identify is really contradictory to the original sentence.

Similar issues arise when we consider the result of negating a negation (that is, the form  $\neg \neg \phi$  or *not not  $\phi$* ). Although we can capture some

further English constructions by this form, we find no new logical properties since it is the most familiar of logical principles that the two forms  $\neg \neg \phi$  and  $\phi$  are logically equivalent. That is, doubling a negation cancels it. The sentence *The road is not unfinished* is merely a roundabout way of saying that the road is finished. It is true that double negations do not always seem to have the same force as positive statements; but this is naturally ascribed to a difference in appropriateness without a difference in truth conditions. To get a sense of the play of implicatures here, consider the following dialogue (with underlining used to mark emphasis):

A: *Hal is not unhelpful.*

B: *So, in other words, he's helpful.*

A: *Well, yes, but he's not really helpful.*

B: *You mean he just appears to be helpful?*

A: *No, he's really helpful. He's just not really helpful.*

This shows—if the point needed making—that truth conditions are often less the foundations of communication than walls to bounce things off. But even so, they make their presence felt—and that is what we are trying to capture. When logicians question the equivalence of a double negation and a positive statement, it is usually on different grounds.

And, surprising as it may be, the equivalence of  $\phi$  and  $\neg \neg \phi$  is actually one of the more controversial principles among logicians. A small school of mathematics called **intuitionism** grew up around efforts in the early part of the 20<sup>th</sup> century by the Dutch mathematician L. E. J. Brouwer (1881-1966) to give what he took to be a philosophically satisfactory account of the continuum (the full range of real numbers including irrational numbers like  $\pi$  and the square root of 2). He came to reject certain ways of proving the existence of mathematical objects, and he also rejected certain logical principles—the equivalence of  $\phi$  and  $\neg \neg \phi$  among them—which could be used to justify such proofs. Brouwer did not succeed in transforming mathematical practice, but his ideas have proved useful in the study of computation and have led to a deeper understanding of the implications of various logical principles concerning negation.