12.4: Propositional attitudes

*Believe* and *hope* belong to a broad class of verbs which are often referred to as propositional attitude verbs, because they take a propositional argument (expressed as a complement clause) and denote the mental state or attitude of an experiencer toward this proposition. Other verbs in this class include *think*, *expect*, *want*, *know*, etc. As we have just mentioned, the complement clauses of these verbs are referentially opaque. Some further examples of sentences involving such verbs are presented in (10).

(10) a. John believes [that the airplane was invented by an Irishman].
b. Henry wants [to marry a Catholic].
c. Mary knows [that Abraham Lincoln ended slavery in America].

Frege pointed out that when we substitute one co-referential expression for another in the complement clause of a propositional attitude verb, the truth value of the sentence as a whole can be affected. For example, since *Mark Twain* and *Samuel Clemens* refer to the same individual, the principle of substitutivity predicts that the positive statement in (11a) and its corresponding negative statement in (11b) should have opposite truth values. However, it is clearly possible for both sentences to be true at the same time (and for the same person named *Mary*). By the same token, the principle of substitutivity predicts that (11c) and (11d) should have the same truth value. However, it is hard to imagine a person of normal intelligence of whom (11d) could be true.

(11) a. Mary knows [that *The Prince and the Pauper* was written by Mark Twain].
b. Mary does not know [that *The Prince and the Pauper* was written by Samuel Clemens].
c. Mary does not know [that Samuel Clemens is Mark Twain].
d. ?#Mary does not know [that Samuel Clemens is Samuel Clemens].

As mentioned above, this property of propositional attitude verbs is called referential opacity; the complements of propositional attitude verbs are an example of an opaque context, that is, a context where denotation does not appear to
be compositional, because the principle of substitutivity fails. Frege used the following pair of examples to further illustrate referential opacity. Both of the complement clauses in (12) are true statements, but only the first is something that Copernicus actually believed (he believed that the planetary orbits were circles). Since the denotation of a declarative clause is its truth value, and since the two complement clauses have the same truth value if considered on their own, the principle of substitutivity would predict that sentences (12a) and (12b) as a whole should have the same denotation, i.e., the same truth value. But in fact (12a) is true while (12b) is false.

(12) a. Copernicus believed [that the earth revolves around the sun].
    b. Copernicus believed [that the planetary orbits are ellipses].

Propositional attitude verbs pose a significant problem for the principle of Compositionality. Frege’s solution was to propose that the denotation of a clause or NP “shifts” in opaque contexts, so that in these contexts they refer to their customary sense, rather than to their normal denotation. For example, the denotation of the complement clauses in (12), because they occur in an opaque context, is not their truth value but the proposition they express (their customary sense). This shift explains why NPs or clauses with different senses are not freely substitutable in these contexts, even though they may seem to have the same denotation.

Frege’s proposal is analogous in some ways to the referential “shift” which occurs in contexts where a word or phrase is mentioned, as in (13b), rather than used, as in (13a). In such contexts, the quoted word or phrase refers only to itself. Substitutivity fails when referring expressions are mentioned, as illustrated in (13c–d). Even though both names refer to the same individual when used in the normal way, these two sentences are not equivalent: (13c) is true, but (13d) is false.

(13) a. Maria is a pretty girl.
    b. Maria is a pretty name.
    c. Samuel Clemens adopted the pen name Mark Twain.
    d. Mark Twain adopted the pen name Samuel Clemens.

We can now understand why sentences like those in (14), which contain a nonreferring expression, nevertheless can have a truth value. Hope and want are propositional attitude verbs. Thus the denotation of their complement clauses is not their truth value but the propositions they express. The denotation (i.e., truth value) of the sentence as a whole can be derived compositionally, because all the constituents have well-defined denotations.

(14) a. Ponce de León hoped to find the fountain of youth.
    b. James Thurber wanted to see a unicorn.