Propositional attitudes

Readings: Portner, Ch. 9

1. What are attitude verbs?

- We have already seen that verbs like *think*, *want*, *hope*, *doubt*, etc. create intensional environments. For example, (1a) and (1b) don't jointly entail (1c).

(1) a. Tom can run fastest.
b. Neil thinks that he can run fastest.
c. Neil thinks that he is Tom.

- Such verbs indicate that their subject holds a certain mental state, or attitude, regarding the proposition denoted by the embedded sentence. So we call such verbs attitude verbs.
- We'll focus on attitude verbs that encode belief (such as *think* or *doubt*) and desire (such as *want* and *hope*).

2. Possible world semantics for attitude verbs

2.1. Motivating possible world semantics for attitude verbs

- Why do we need possible worlds to account for attitude verbs?
- Consider the following sentences:

(2) a. Little Emma thinks there is a monster under her bed.
b. Little Emma wants to find a unicorn.

In-class Exercise 1

- Try to translate (2a) to predicate logic without using possible worlds.

- Which problems do you run into?

- We thus need to treat the complement of *think* intensionally, as a set of possible worlds.

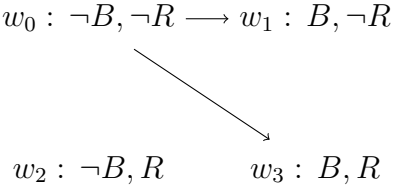
2.2. Fleshing out the possible-world-based analysis

- We resort once again to accessibility relations:
  - The accessibility relations of belief attitude verbs deliver worlds that are compatible with what the subject believes at the world of evaluation.
  - The accessibility relations of desire attitude verbs deliver worlds in which all the subject's desires are fulfilled.
  - Every attitude verbs we've looked at so far has imposes requirements on all the worlds delivered by the accessibility relation, i.e., they come with universal quantificational force (express modal necessity).

(3) $[\![x \text{ believes } p]\!]^w = 1$ iff $\forall w' : [R^x_{epi}(w, w') \rightarrow p(w')]$
x believes p is true iff p is true in all worlds compatible with *x*'s beliefs

(4) $[\![x \text{ wants } p]\!]^w = 1$ iff $\forall w' : [R^x_{bou}(w, w') \rightarrow p(w')]$
x wants p is true iff p is true in all worlds compatible with *x*'s desires

- Let's look at an example. Let B stand for *There is a monster under little Emma's bed*, and R for *There is a monster on little Emma's roof*. Now let's assume the model in (5) where w_0 is the world of evaluation and the arrows point to the worlds accessible from w_0:

(5)


- The sentence (2a) (*Little Emma thinks there is a monster under her bed*) is true in (5), because B holds in all accessible worlds. Yet, the truth of this sentence doesn't commit us to the existence of monsters in the actual world.
- We can now also capture the fact that (6a) and (6b) do not jointly entail (6c), since *the tallest building in NYC* will pick out different referents in the world of evaluation and in little Emma's belief worlds:

(6) a. The tallest building in NYC is One World Trade Center.
b. Little Emma thinks that her house is the tallest building in NYC.
c. Little Emma thinks that her house is One World Trade Center.

In-class Exercise 2

- Given the model in (8), determine for each of the accessibility relations in (9) whether sentence (7) is true.

(7) Jim thinks that Hannah is in the library.

(8) w_0 (world of evaluation) : Hannah is not in the library, Susan is angry.
w_1 : Hannah is not in the library, Susan is not angry.
w_2 : Hannah is in the library, Susan is angry.
w_3 : Hannah is in the library, Susan is not angry.

(9) worlds accessible from w_0:

a. w_0, w_1, w_2, w_3
b. w_0, w_2, w_3
c. w_2, w_3
d. w_2

- Now do the same thing for the model in (11), the accessibility relations in (12), and the sentence (10).

(10) Molly wants Richard to do his homework.

(11) w_0 (world of evaluation) : Richard doesn't do his homework, Susan is angry.
w_1 : Richard doesn't do his homework, Susan is not angry.
w_2 : Richard does his homework, Susan is angry.
w_3 : Richard does his homework, Susan is not angry.

(12) worlds accessible from w_0:

a. w_1, w_2, w_3
b. w_2, w_3
c. w_3

3. Properties of accessibility relations

3.1. Reflexivity

- A relation is *reflexive* iff, for any individual, the relation holds between that object and itself.

  (13) $\forall x : R(x, x)$

- The accessibility relation for *believe* is not reflexive: for x to believe p in w, p doesn't have to be true in w.
- More generally, attitudes that have a reflexive accessibility relation are called *veridical* attitudes.

In-class Exercise 2
- Is *want* veridical?

- How about *know*?

- Can you think of an inference that we could use to test whether a given attitude is veridical?

3.2. Transitivity

- A relation R is *transitive* iff the following holds:

  (14) $\forall w, w', w'' : [(R(w, w') \wedge R(w', w'')) \rightarrow R(w, w'')]$

- This property corresponds to inferences of the following form:

  (15) Molly believes that it is cold outside.
  Molly believes that she believes that it is cold outside.

- We say that attitudes like *believe* that license this inference have the property of *positive introspection*.
- Does *know* also have this property? Many philosophers think that it doesn't.

4. Issues with the possible-world-based analysis of attitude verbs

4.1. Problem 1: gradability of desire

- Because the set of one's desire worlds in which *p* holds is a subset of the set of all the worlds in which *p* holds, the analysis of *want* proposed above has a the following logical consequence:

  (16) If *x wants p* is true, and *p* contradicts *q*, then *x wants q* is false.

- In other words, we cannot handle contradictory desires. For example, we would predict that Hannah can't have both desires in (17):

(17) a. Hannah wants to go home for Thanksgiving to see her parents.
  b. Hannah wants to stay at the dorm for Thanksgiving to study in peace.

- Let's see why that's the case:
  - Let G be the intension of *Hannah goes home* and S the intension of *Hannah stays at the dorm*.
  - Because Hannah can't do both, the sets G and S are disjoint: $G \cap S = \varnothing$.
  - (17a) requires that $\forall w' : [R^h_{boul}(w, w') \rightarrow G(w')]$.
  - (17b) requires that $\forall w' : [R^h_{boul}(w, w') \rightarrow S(w')]$.
  - The only way that can be the case is if $Acc_{boul}(\mathrm{h}) = \varnothing$.
- Similarly, the simplistic view can't account for sentences like this:

(18) a. Hannah wants to go home for Thanksgiving more than she wants to stay at the dorm.
  b. Hannah wants to go home for Thanksgiving as much as she wants to stay at the dorm.

- In other words, our account doesn't take into account the gradable nature of desire.
- We could solve this issue ordering worlds, so that some worlds are "better" than other.

4.2. Problem 2: undesirable entailments

In-class Exercise 2

- Draw a diagram representing (i) the proposition that George won, (ii) the proposition that George or Sam won, (iii) all worlds compatible with Jim's beliefs according to (19).

  (19) a. Jim believes that George won.
  b. Jim believes that George or Sam won.

- Does our account predict that (19a) entails (19b)? Do you think (19a) entails (19b)?

- A related example. (20a) and (20b) are mathematical truths and thus necessarily true in all possible worlds:

(20) a. Two plus two is four.
b. The square root of 60,025 is 245.

- Thus, in our theory (21a-b) come out as true in all worlds.

(21) a. Emma knows that two plus two is four.
b. Emma knows that the square root of 60,025 is 245.

What you need to know

Key notions: attitude verbs, desire attitude verbs, belief attitude verbs, reflexivity, veridicality, transitivity, positive introspection

Answers to the following questions:
- What are some issues with belief attitude verbs that arise under the analysis developed here?

Skills:
- Informally describe the truth conditions of sentences with desire and belief attitude verbs (e.g., *x believes that p* is true iff p is true in all of x's belief worlds).
- Given a model and an accessibility relation, determine if a given sentence containing a desire or belief attitude verb is true or false.