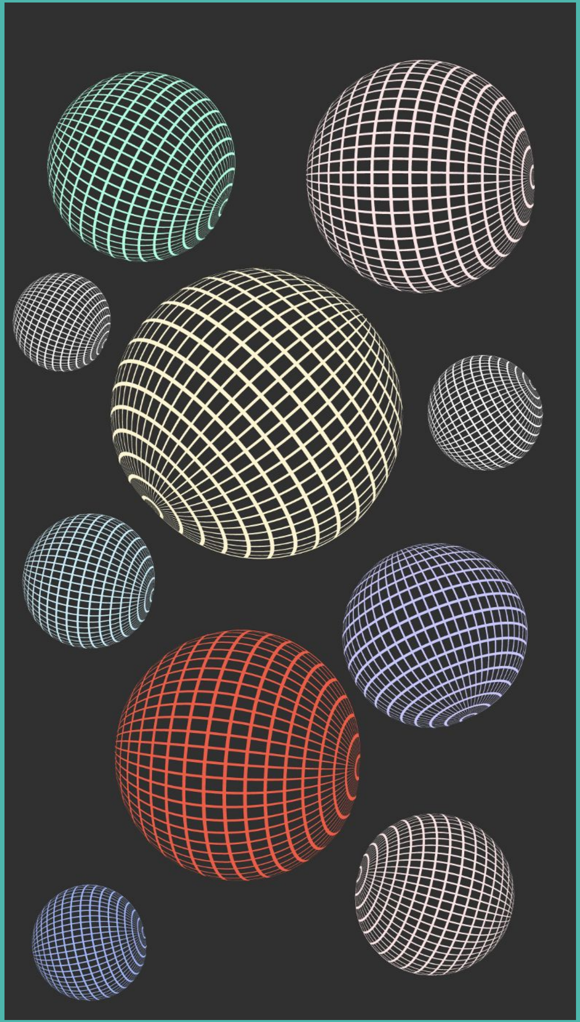
Intensional Semantics

Intensional Semantics vs Truth-Conditional Semantics



Truth-Conditional Semantics

We have been using set theory to model the meanings of fragments of language. Our method has been to find expressions in set theory that are *truth-conditionally equivalent* to sentences of English. So implicitly, we have been assuming that giving the truth-conditions for fragments of English is sufficient to determine the meanings of those fragments, and that knowing the meaning of those fragments amounts to knowing their truth-conditions.

This idea is known as **truth-conditional semantics**.

The Limitations of Truth-Conditional Semantics (1)

There are good reasons for thinking that the truth-conditions of sentence are not all there is to know about its meaning.

Example:

‘2+2=4’ vs ‘every square is a rectangle’

Same truth-conditions, *different* meanings

The **truth-conditions** for a sentence are the conditions or circumstances under which that sentence is true

The Limitations of Truth-Conditional Semantics (2)

If we hold that the mind computes representations by means of algorithms, it seems that we will need to associate more information with bits of language than just their truth-conditions. For there are many distinct algorithms that could be associated with processing bits of language that would produce truth-conditionally equivalent outputs.

Example:

> How does the mind compute ‘All A’s are B’s’? The following would be computed by distinct procedures, but have the same truth-conditions:
>
> $\{x \mid x \text{ is an } A\} \subseteq \{x \mid x \text{ is a } B\}$
>
> $\{x \mid x \text{ is an } A\} \subseteq \{x \mid x \text{ is an } A \text{ and } x \text{ is a } B\}$
>
> $|\{x \mid x \text{ is an } A\}| = |\{x \mid x \text{ is an } A \text{ and } x \text{ is a } B\}|$
>
> $|\{x \mid x \text{ is an } A\}| = |\{x \mid x \text{ is an } A\} \cap \{x \mid x \text{ is a } B\}|$

Intensional Semantics

Instead of just associating a sentence with some truth-conditions, we can associate it with an **intension**.

	Specification by Intension	Specification by Extension
Sets	{x | x is the president}	{Biden}
Function	f(x) = x +2	{<0,2>,<1,3>,<2,4>...}

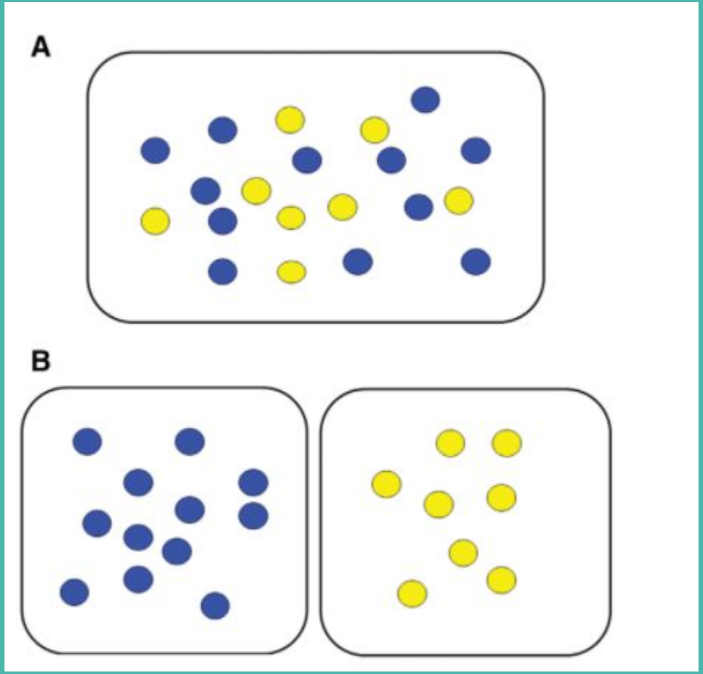
An **intension** is a rule or instruction for determining an **extension** (like the truth value of a sentence).

The Benefit of Intensional Semantics

If we have an intensional semantics, we can distinguish different hypothesis about the intension associated with a fragment of language, even if these distinct intensions determine the same truth-conditions.

These distinct hypotheses may yield testable predictions...

Testing for Intensions



Two Proposals about 'Most'

Expressions of the form 'most A's are B's' are computed as:

1. $$|\{x \mid x \text{ is an } A\} \cap \{x \mid x \text{ is a } B\}|$$
$$>$$
$$|\{x \mid x \text{ is an } A\}| - |\{x \mid x \text{ is an } A\} \cap \{x \mid x \text{ is a } B\}|$$

1. $$|\{x \mid x \text{ is an } A\} \cap \{x \mid x \text{ is a } B\}| > |\{x \mid x \text{ is an } A\} \cap \{x \mid x \text{ is not a } B\}|$$

Different Cognitive Requirements

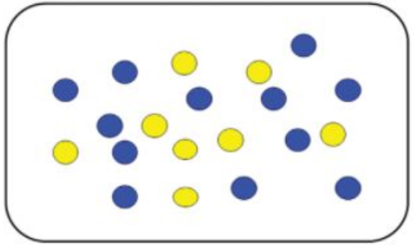
Proposal 1 requires computing the size of the set of A's, but proposal 2 does not. Meanwhile, proposal 2 requires computing the size of the set of A's that aren't B's, but proposal 1 does not.

If we adopt some auxiliary assumptions, this leads to a prediction...

Auxiliary Assumptions (1)

Some visual scenes make the size of the set of A's more readily accessible than the size of the set of A's that are not B's:

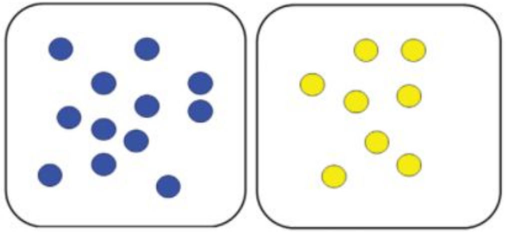
A



It is easier to estimate the size of the set of *balls* than the size of the set of *balls that are not blue*

In others, the opposite is true:

B



It is easier to estimate the size of the set of *balls that are not blue* than the size of the set of *balls*.

Auxiliary Assumptions (2)

If the information required to compute a sentence is more easily visually extractable from scene A than from scene B, participants will prefer associating that sentence with that scene.

Therefore...?

Predictions

If proposal 1 is correct, speakers should prefer to associate ‘most balls are blue’ with scene A rather than scene B.

If proposal 2 is correct, speakers should prefer to associate ‘most balls are blue’ with scene B rather than scene A.