

# Mind, Matter, and Language

## Lecture 2: Compositionality

---

Wolfgang Schwarz

19 September 2019

University of Edinburgh

**Please put up your name tent, or make a new one.**

## **Review: Sentence Meaning**

---

## Review: Sentence Meaning

- Meaning connects sounds and scribbles with the (rest) of the world.

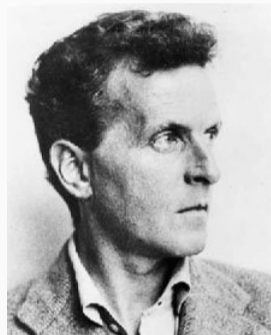
## Review: Sentence Meaning

- Meaning connects sounds and scribbles with the (rest) of the world.
- This connection arises from the way the sounds and scribbles are conventionally used in the relevant population.

## Review: Sentence Meaning

*Understanding a sentence means knowing what is the case if the sentence is true.*

Ludwig Wittgenstein, TLP (1921), 4.024

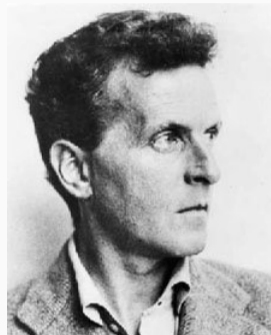


## Review: Sentence Meaning

*Understanding a sentence means knowing what is the case if the sentence is true.*

Ludwig Wittgenstein, TLP (1921), 4.024

The meaning of a sentence is given by its **truth-conditions**.



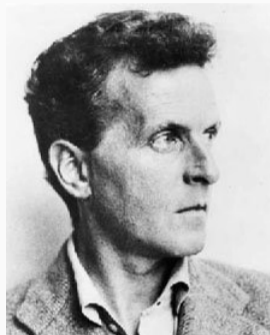
## Review: Sentence Meaning

*Understanding a sentence means knowing what is the case if the sentence is true.*

Ludwig Wittgenstein, TLP (1921), 4.024

The meaning of a sentence is given by its **truth-conditions**.

- 'وعث زمل سيار' is true iff quicksand is present.
- 'It is raining' is true iff it is raining.





## Review: Sentence Meaning

There are other aspects of meaning.

- Compare 'it is warm but windy' and 'it is warm and windy'.

## Review: Sentence Meaning

There are other aspects of meaning.

- Compare 'it is warm but windy' and 'it is warm and windy'.
- Compare 'uncle Bob passed away' and 'uncle Bob kicked the bucket'.

## Review: Sentence Meaning

There are other aspects of meaning.

- Compare 'it is warm but windy' and 'it is warm and windy'.
- Compare 'uncle Bob passed away' and 'uncle Bob kicked the bucket'.
- Compare 'there are  $\sqrt{36}$  apples in the basket' and 'there are 6 apples in the basket'.

## Review: Sentence Meaning

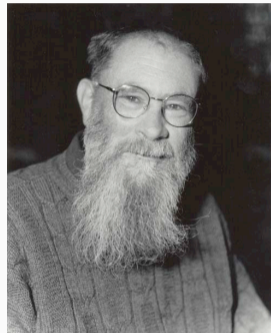
There are other aspects of meaning.

- Compare 'it is warm but windy' and 'it is warm and windy'.
- Compare 'uncle Bob passed away' and 'uncle Bob kicked the bucket'.
- Compare 'there are  $\sqrt{36}$  apples in the basket' and 'there are 6 apples in the basket'.
- Compare '2+2=4' and 'there are infinitely many prime numbers'.

## Review: Sentence Meaning

*In order to say what a meaning is, we may first ask what a meaning does, and then find something that does that.*

David Lewis, "General Semantics" (1970)



# Compositionality

---

If you know Arabic, you know that

- 'وعث زمل سيار' is true iff quicksand is present.

If you know English, you know that

- 'It is raining' is true iff it is raining.

How do you know this?

You also know under what conditions the following sentence is true:

*If you want to keep a pet koala, you need a license from the koala registry on George Street.*



You also know under what conditions the following sentence is true:

*If you want to keep a pet koala, you need a license from the koala registry on George Street.*

But you never explicitly learned the truth-conditions for this sentence.

You also know under what conditions the following sentence is true:

*If you want to keep a pet koala, you need a license from the koala registry on George Street.*

But you never explicitly learned the truth-conditions for this sentence.

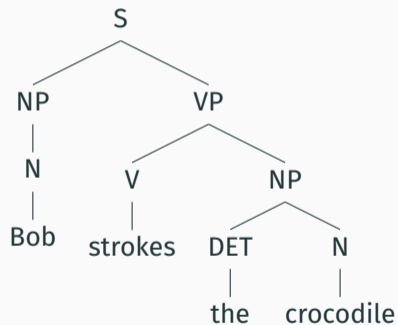
You understand the sentence because you understand the words that compose the sentence.

## The Principle of Compositionality

The meaning of a complex expression is determined by the meaning and arrangement of its parts.

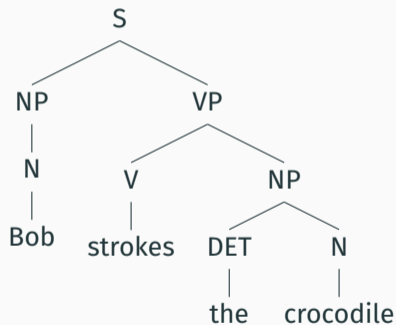
## Compositionality

The **syntax** of a language specifies how its basic expressions combine to form sentences and other complex expressions.

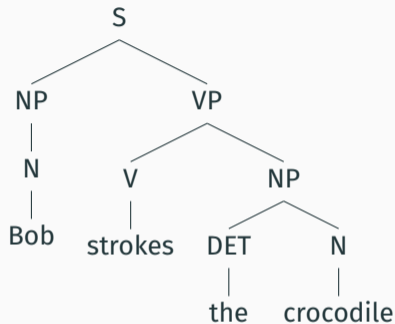


## Compositionality

The **syntax** of a language specifies how its basic expressions combine to form sentences and other complex expressions.



The **semantics** of a language specifies what its expressions mean.



A semantics of English should

- associate meanings with simple expressions ('Bob', 'strokes', etc.),
- specify rules for how these meanings combine to the meaning of complex expressions.

## Word meaning

---

What is the meaning of

- 'Bob'?
- 'strokes'?
- 'the'?
- 'crocodile'?



**The idea theory:** the meaning of an expression is a concept (an “idea”) in the mind of speakers and hearers.

**The idea theory:** the meaning of an expression is a concept (an “idea”) in the mind of speakers and hearers.

Problems:

**The idea theory:** the meaning of an expression is a concept (an “idea”) in the mind of speakers and hearers.

Problems:

- What is a concept?

**The idea theory:** the meaning of an expression is a concept (an “idea”) in the mind of speakers and hearers.

Problems:

- What is a concept?
- The concept of a crocodile may vary from speaker to speaker. Which of these concepts is the meaning of ‘crocodile’?

**The idea theory:** the meaning of an expression is a concept (an “idea”) in the mind of speakers and hearers.

Problems:

- What is a concept?
- The concept of a crocodile may vary from speaker to speaker. Which of these concepts is the meaning of ‘crocodile’?
- What is the concept associated with ‘the’ (or ‘if’, ‘is’, ‘a’, etc.)?

**The idea theory:** the meaning of an expression is a concept (an “idea”) in the mind of speakers and hearers.

Problems:

- What is a concept?
- The concept of a crocodile may vary from speaker to speaker. Which of these concepts is the meaning of ‘crocodile’?
- What is the concept associated with ‘the’ (or ‘if’, ‘is’, ‘a’, etc.)?
- How can ideas be combined to give us truth-conditions for sentences? ‘Bob strokes the crocodile’ vs ‘The crocodile strokes Bob’.

**The referential theory:** the meaning of an expression is a thing in the world to which the expression refers.

**The referential theory:** the meaning of an expression is a thing in the world to which the expression refers.

- 'Bob' refers to Bob.
- 'the crocodile' refers to the relevant crocodile.
- 'Boris Johnson' refers to Boris Johnson.
- 'Edinburgh' refers to Edinburgh.



**The referential theory:** the meaning of an expression is a thing in the world to which the expression refers.

- 'Bob' refers to Bob.
- 'the crocodile' refers to the relevant crocodile.
- 'Boris Johnson' refers to Boris Johnson.
- 'Edinburgh' refers to Edinburgh.

To understand a word, you have to know what it refers to.

**The referential theory:** the meaning of an expression is something in the world to which the word refers.

**The referential theory:** the meaning of an expression is something in the world to which the word refers.

Problems:

**The referential theory:** the meaning of an expression is something in the world to which the word refers.

Problems:

- What about names like 'Vulcan' and 'Santa Claus'?

**The referential theory:** the meaning of an expression is something in the world to which the word refers.

Problems:

- What about names like 'Vulcan' and 'Santa Claus'?
- What does 'crocodile' refer to?

**The referential theory:** the meaning of an expression is something in the world to which the word refers.

Problems:

- What about names like 'Vulcan' and 'Santa Claus'?
- What does 'crocodile' refer to?
- What does 'the' (or 'if', 'is', 'a', etc.) refer to?

**The referential theory:** the meaning of an expression is something in the world to which the word refers.

Problems:

- What about names like 'Vulcan' and 'Santa Claus'?
- What does 'crocodile' refer to?
- What does 'the' (or 'if', 'is', 'a', etc.) refer to?
- How can things in the world be combined to give us truth-conditions of sentences? A sentence isn't a list.

## Word meaning

A simpler example: 'Bob smokes'.

- 'Bob' refers to Bob.



## Word meaning

A simpler example: 'Bob smokes'.

- 'Bob' refers to Bob.
- 'Bob smokes' is true iff Bob smokes.

A simpler example: 'Bob smokes'.

- 'Bob' refers to Bob.
- 'Bob smokes' is true iff Bob smokes.
- What does 'smokes' refer to?

A simpler example: 'Bob smokes'.

- 'Bob' refers to Bob.
- 'Bob smokes' is true iff Bob smokes.
- What does 'smokes' refer to?
- How do we get the meaning of 'Bob smokes' from the two word meanings?

'Bob smokes'

**One idea:**

- 'Bob' refers to Bob.

'Bob smokes'

**One idea:**

- 'Bob' refers to Bob.
- 'smokes' refers to the set of people who smoke.

'Bob smokes'

**One idea:**

- 'Bob' refers to Bob.
- 'smokes' refers to the set of people who smoke.
- A sentence composed from a noun  $N$  and a verb  $V$  is true iff the referent of  $N$  is a member of the referent of  $V$ .

## Word meaning

'Bob smokes'

**Another idea:**

- 'Bob' refers to Bob.

'Bob smokes'

**Another idea:**

- 'Bob' refers to Bob.
- 'smokes' refers to a **function** that maps all and only the smokers to the truth-value True.



'Bob smokes'

**Another idea:**

- 'Bob' refers to Bob.
- 'smokes' refers to a **function** that maps all and only the smokers to the truth-value True.
- A sentence composed of a functional part *A* and an argument part *B* is true iff the referent of *A* returns True for the referent of *B*.