Entailment is a fundamental semantic relationship between two sentences where the truth of the first sentence guarantees the truth of the second. In other words, if Sentence A is true, Sentence B **must** also be true. It's a non-reversible relationship, meaning the truth of the second sentence does not necessarily imply the truth of the first.

How Entailment Works

Entailment is a one-way implication. It's often represented as "A entails B."

- **Sentence A:** "John is a bachelor."
- **Sentence B:** "John is a man."

If Sentence A is true, then Sentence B must also be true, because the meaning of "bachelor" includes the meaning of "man." We can say that **Sentence A entails Sentence B**.

However, the reverse is not true. The truth of Sentence B ("John is a man") does not mean that Sentence A ("John is a bachelor") is true, as John could be married, a boy, or a widower.

Examples of Entailment

- **Example 1: Hyponymy**
    - **Sentence A:** "I bought a **tulip**."
    - **Sentence B:** "I bought a **flower**."
    - Sentence A entails Sentence B, because a *tulip* is a type of *flower*.
- **Example 2: Cause and Effect**
    - **Sentence A:** "The water boiled."
    - **Sentence B:** "The water is hot."
    - Sentence A entails Sentence B, as boiling water is necessarily hot.
- **Example 3: Verbs**
    - **Sentence A:** "She **killed** the fly."
    - **Sentence B:** "The fly **died**."
    - Sentence A entails Sentence B because the meaning of "killed" includes the result of "dying."

Entailment vs. Inference

While entailment is a logical relationship based purely on the meaning of the words, an **inference** is a conclusion drawn from evidence and reasoning, which may or may not be logically necessary. For example, if you see a person with an umbrella, you might infer that it's raining, but that's not a logical certainty; the person might just have it with them for later.

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