



Partial Blocking and Coordination of Meaning

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Outline

- Partial Blocking
- Previous Explanations of Partial Blocking
- An Explanation Based on Indicated Information
- Some Remarks on Blocking and Semantic Meaning

Partial Blocking

1. Black Bart killed the sheriff.
 2. Black Bart caused the sheriff to die.
- **direct vs. indirect** killing.



Blocking between non-synonyms

1. John mopped the floor with water.
2. John mopped the floor with a liquid.
+> John didn't use water.

I-Implicatures

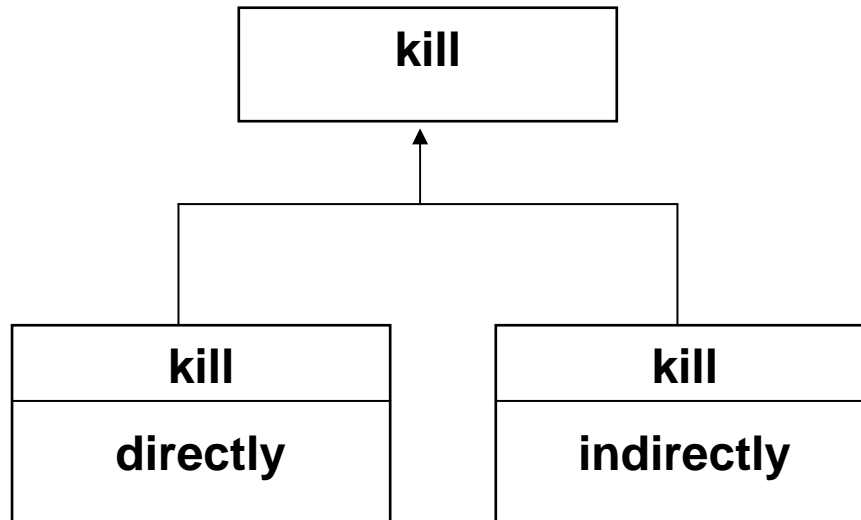
1. The doctor kissed the nurse. She is beautiful. +> The nurse is beautiful.
2. A secretary called me in. +> A female secretary called me in.
3. There is a road leading to the hotel. +> There is a hard-surfaced road leading to the hotel.

Common Features

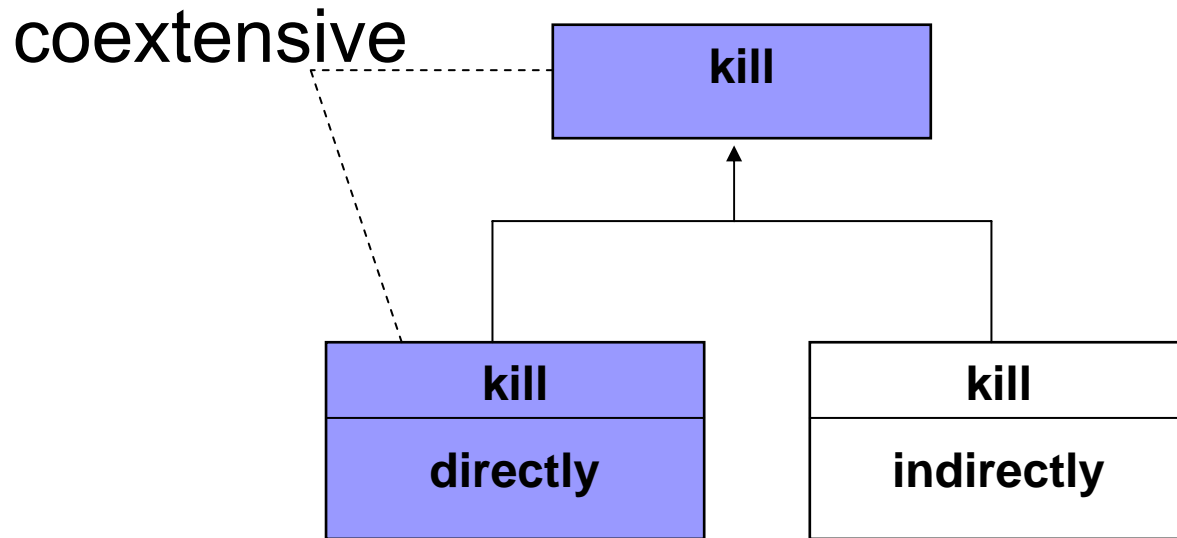
- Simple forms tend to receive a typical interpretation.
- Complex forms tend to denote untypical events or objects.

=> Horn's principle of **division of pragmatic labour**.

The Conceptual Graph



Effect of Strengthening



Questions

- How can partial blocking be explained *from first principles*?
- Why doesn't the stronger interpretation resulting from blocking become part of semantic meaning?



Previous Explanations of Partial Blocking

Partial Blocking

1. Black Bart killed the sheriff.
2. Black Bart caused the sheriff to die.
 - **direct vs. indirect** killing.
1. Sue smiled.
 2. Sue lifted the corners of her lips.
 - **regular vs. artificial** smile.

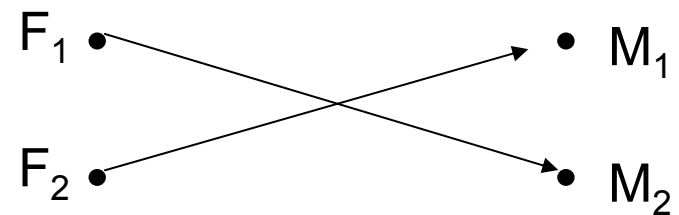
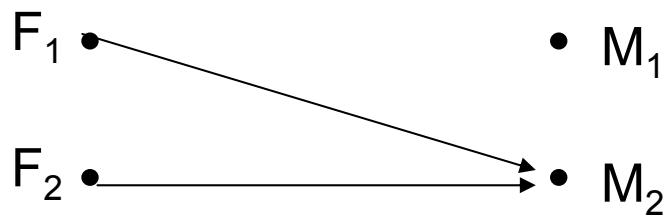
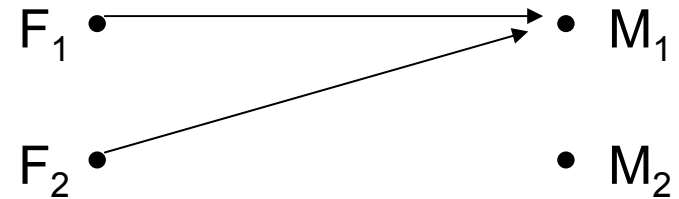
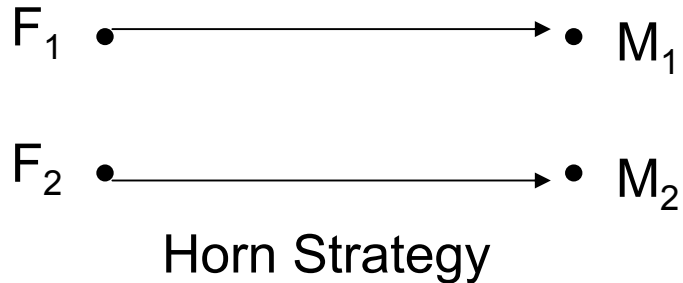
Horn's derivation

1. The speaker used marked expression E' containing 'extra' material . . . when a corresponding unmarked expression E , essentially coextensive with it, was available.
2. Either (i) the 'extra' material was irrelevant and unnecessary, or (ii) it was necessary (i.e. E could not have been appropriately used).
3. [(2i) is excluded (due to Horn's R Principle)]
4. Therefore, (2ii), from 2, 3 . . .
5. The unmarked alternative E tends to become associated (by use or — through conventionalization — by meaning) with unmarked situation s , . . .
6. The marked alternative E' tends to become associated with the complement of s with respect to the original extension of E/E'

Other explanations

- BI-OT (Blutner, Jäger):
 - Systematic statement of Horn's division of pragmatic labour.
 - No explanation.
- Evolutionary Models (v. Rooij, Jäger):
 - language use converges towards evolutionarily stable strategies;
 - rely on chance events.

Form-Meaning Maps



Anti-Horn Strategy

A Dynamic Explanation

(After Jäger, 2006)

1. Sue smiled. \rightarrow Sue smiled in a regular way.
 2. Sue lifted the corners of her lips. \rightarrow Sue produced an artificial smile.
- w_1 : Sue smiles genuinely.
 - w_2 : Sue produces artificial smile.
 - F_1 : to smile.
 - F_2 : to lift the corners of the lips.
 - $(p(w_1) = 0.9, p(w_2) = 0.1)$

The first Stage

- Hearer's strategy determined by semantics.
- Speaker is truthful, else the strategy is arbitrary.

S_0	H_0
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_2$	$F_2 \mapsto \{w_1, w_2\}$

The second Stage

- Hearer's strategy unchanged.
- Speaker chooses best strategy given hearer's strategy.

S_1	H_1
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_1, w_2\}$

The third Stage

- Speaker's strategy unchanged.
- Hearer chooses best strategy given speaker's strategy.
- Any interpretation of F_2 below yields a best response.

S_2	H_2
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto ?$

The third Stage continued

There are three possibilities:

S_2	H_2
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_1\}$

S_2	H_2
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_2\}$

S_2	H_2
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_1, w_2\}$

A fourth Stage

Speaker's optimisation can then lead to:

S_3	H_3	S_3	H_3
$w_1 \mapsto F_2$	$F_1 \mapsto \{w_1, w_2\}$	$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_1\}$	$w_2 \mapsto F_2$	$F_2 \mapsto \{w_2\}$

S_3	H_3
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_1, w_2\}$

A fifth Stage

Hearer's optimisation can then lead to:

S_4	H_4
$w_1 \mapsto F_2$	$F_1 \mapsto \{w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_1\}$

Anti-Horn

S_4	H_4
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1\}$
$w_2 \mapsto F_2$	$F_2 \mapsto \{w_2\}$

Horn

S_4	H_4
$w_1 \mapsto F_1$	$F_1 \mapsto \{w_1, w_2\}$
$w_2 \mapsto F_1$	$F_2 \mapsto \{w_1, w_2\}$

(extinguishes)



Blocking and Indicated Information

Blocking between non-synonyms

1. John mopped the floor with water.
2. John mopped the floor with a liquid.
+> John didn't use water.

Signalling Game

A signalling game is a tuple:

$$\langle N, \Theta, p, (A_1, A_2), (u_1, u_2) \rangle$$

- N : Set of two players S, H .
- Θ : Set of types representing the speaker's private information.
- p : A probability measure over Θ representing the hearer's expectations about the speaker's type.

- (A_1, A_2) : the speaker's and hearer's action sets.
- (u_1, u_2) : the speaker's and hearer's payoff functions with

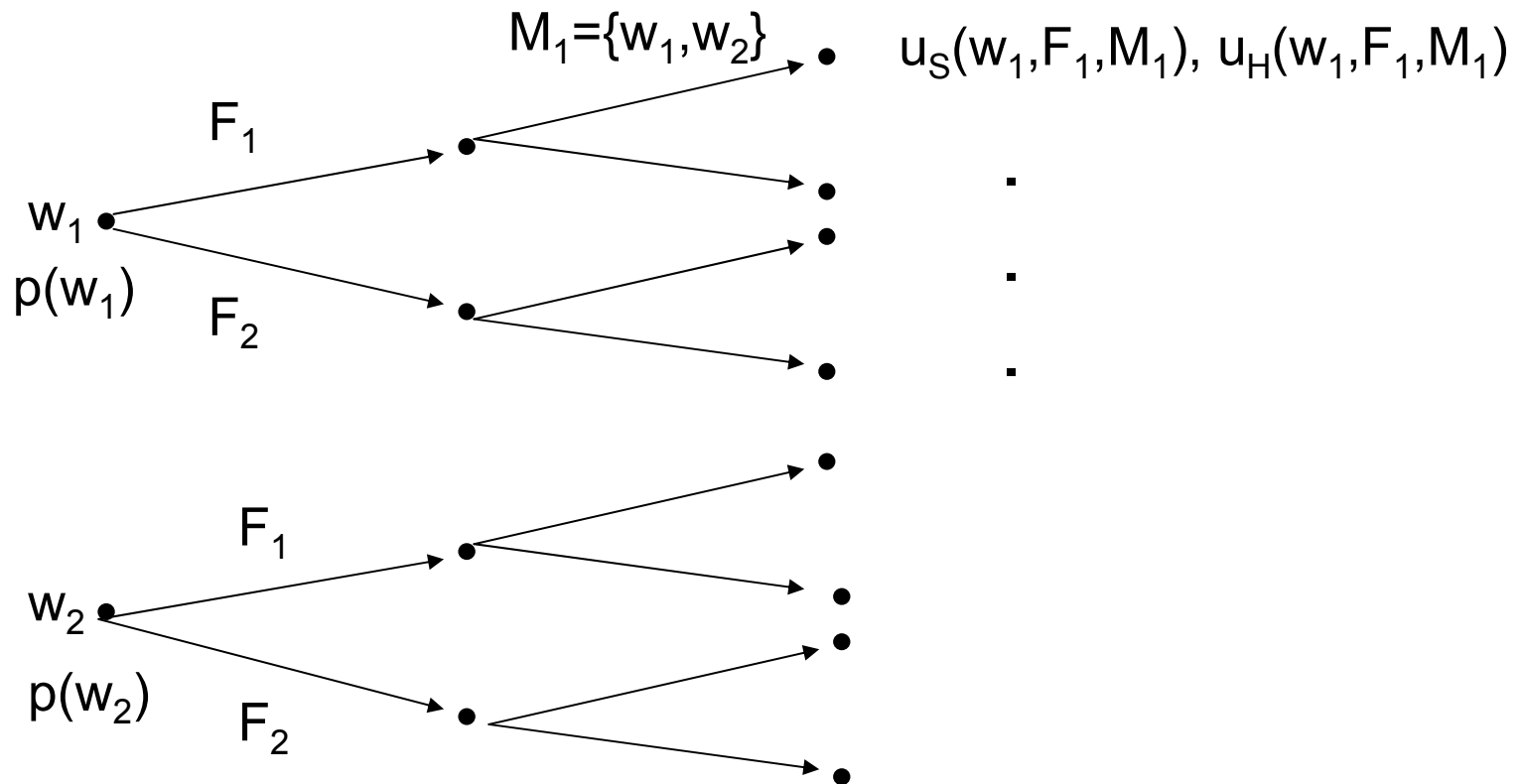
$$u_i: A_1 \times A_2 \times \Theta \rightarrow \mathbf{R}$$



Playing a signalling game

1. At the root node, a type is assigned to the speaker.
2. The game starts with a move by the speaker.
3. The speaker's move is followed by a move by the hearer.
4. This ends the game.

A signalling game

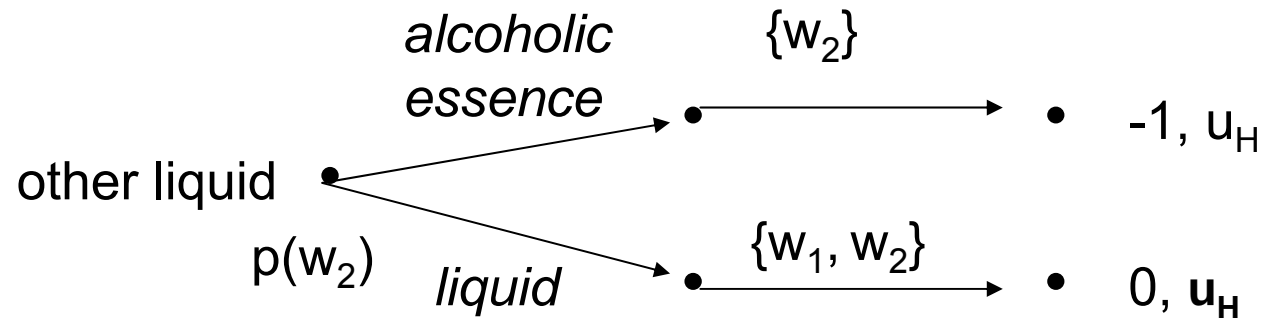
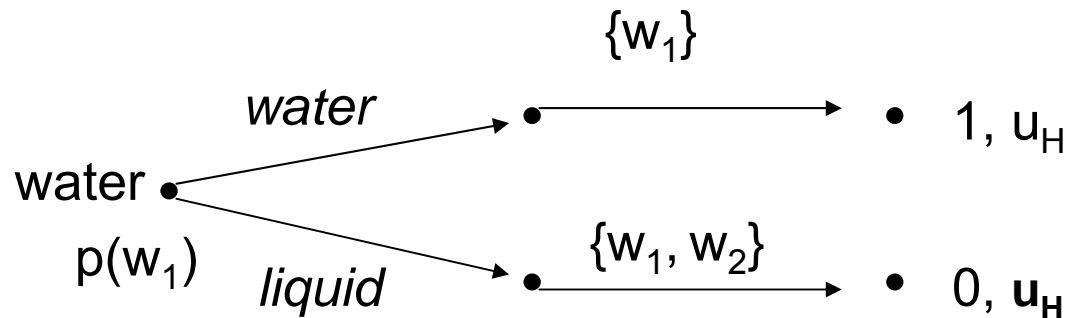


Strategies in a Signalling Game

- Strategies are functions from the agents information sets into their action sets.
- The speaker's information set is identified with his type $\theta \in \Theta$.
- The hearer's information set is identified with his the speaker's previous move $a \in A_1$.

$$S : \Theta \rightarrow A_1 \text{ and } H : A_1 \rightarrow A_2$$

A signalling game



Meaning in Signalling Conventions

Lewis (IV.4, 1996) distinguishes between

- indicative signals
- imperative signals

Two different definitions of **meaning**:

- **Indicative:**

A form F signals that w if $S(w)=F$

- **Imperative:**

A form F signals to interpret it as $H(F)$

Indicated Information

- p : expectations about state of the world.
- Indicated information given strategy S :
 - $\mu(w|F) := p(w|S^{-1}[F])$ for $F \in \text{ran } F$,
 - $\mu(w|F) := \perp$ else

It follows with optimal speaker's strategy S:

- $\mu(w_1|water) = 1$;
- $\mu(w_1|liquid) = 0$;
- $\mu(w_2|alcoholic\ essence) = 0$;
- $\mu(w_2|liquid) = 1$;

=> Hearer can infer from the use of *liquid* that it is not water.

Blocking between Synonyms

1. Black Bart killed the sheriff.
2. Black Bart caused the sheriff to die.
 - **direct vs. indirect** killing.
1. Sue smiled.
2. Sue lifted the corners of her lips.
 - **regular vs. artificial** smile.

Idea of Solution

- Add to the hearer's interpretation his expectations about the use of forms.
- This will lead to a gap between synonymous expressions.
- This gap can then lead to partial blocking.

- Let $[F]$ denote the semantic meaning of F .
- Let $\langle N, \Theta, p, (A_1, A_2), (u_1, u_2) \rangle$ be a signalling game.
- Let S be a given strategy pair with $S(w) = F \Rightarrow w \in [F]$.
- Then we assume that the hearer adopts the following interpretation strategy:

$$F \rightarrow ([F], \mu(\cdot | F))$$

with

- $\mu(w|F) := p(w|S^{-1}[F])$ for $F \in \text{ran } S$,
- $\mu(w|F) := \perp$ else

Model

1. Black Bart killed the sheriff.
 2. Black Bart caused the sheriff to die.
- w_1 : killed directly
 - w_2 : killed indirectly
 - F_1 : kill.
 - F_2 : cause to die
 - $p(w_1) = 0.9, p(w_2) = 0.1$

Start:

Hearer's Strategy = Semantic Meaning

	H_0
$w_1 \mapsto ?$	$F_1 \mapsto \langle \{w_1, w_2\}, \perp \rangle$
$w_2 \mapsto ?$	$F_2 \mapsto \langle \{w_1, w_2\}, \perp \rangle$

Adding Speaker's Strategy

S_0	H_0
$w_1 \mapsto F_1$	$F_1 \mapsto \langle \{w_1, w_2\}, \perp \rangle$
$w_2 \mapsto F_1$	$F_2 \mapsto \langle \{w_1, w_2\}, \perp \rangle$

Adding Indicated Information

S_0	H_1
$w_1 \mapsto F_1$	$F_1 \mapsto \langle \{w_1, w_2\}, (0.9, 0.1) \rangle$
$w_2 \mapsto F_1$	$F_2 \mapsto \langle \{w_1, w_2\}, \perp \rangle$

Speaker taking into account Hearer's expectations

S_1	H_1
$w_1 \mapsto F_1$	$F_1 \mapsto \langle \{w_1, w_2\}, (0.9, 0.1) \rangle$
$w_2 \mapsto F_2$	$F_2 \mapsto \langle \{w_1, w_2\}, \perp \rangle$

Creating new expectations

S_1	H_2
$w_1 \mapsto F_1$	$F_1 \mapsto \langle \{w_1, w_2\}, (1, 0) \rangle$
$w_2 \mapsto F_2$	$F_2 \mapsto \langle \{w_1, w_2\}, (0, 1) \rangle$

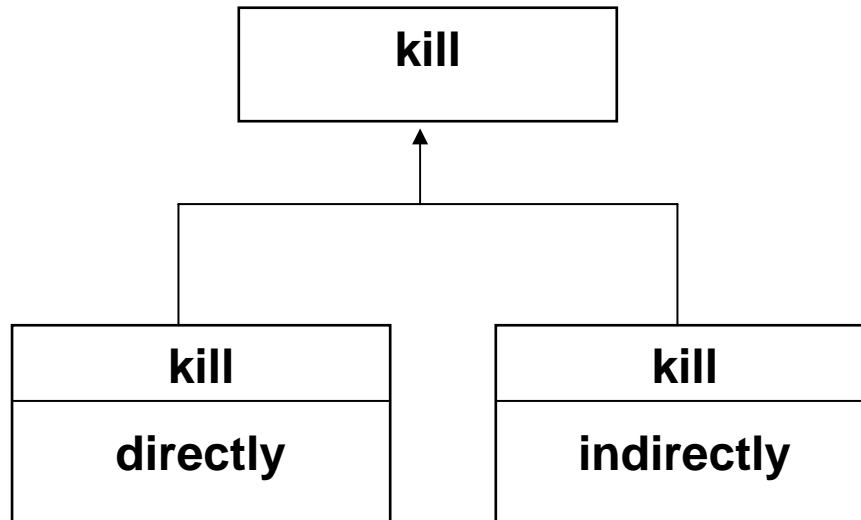
Some Google Search Results

- Verily, those whom the angels **cause to die** while they are wronging their own souls, the angels will say to them: 'What were you after? ...
- And whomever You **cause to die**, let him die in a state of belief in You.
- And had you seen when the angels will **cause to die** those who disbelieve, smiting their faces and their backs and ...
- the water of the river in my country will be stopped from reaching yours, which I shall **cause to die** of thirst. ...

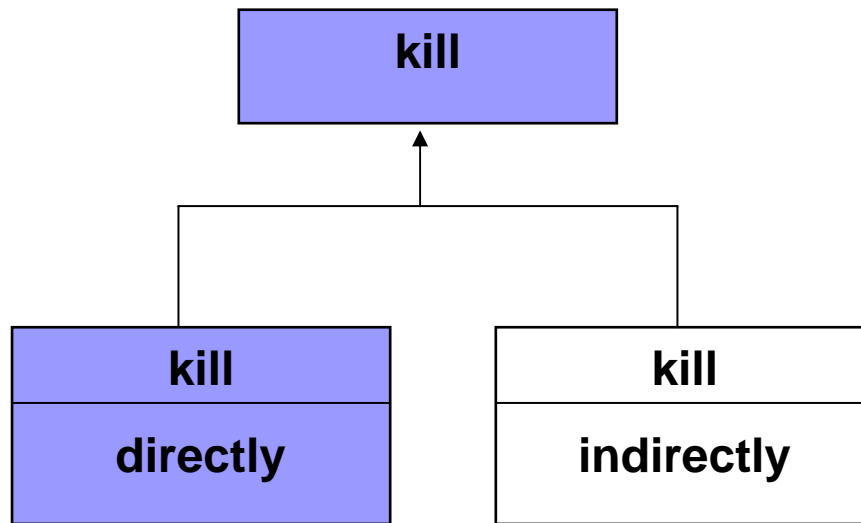


Blocking and Semantic Meaning


The Conceptual Graph



Effect of Strengthening



$$\mu(\text{directly} \mid \textit{kill}) \gg \mu(\text{indirectly} \mid \textit{kill})$$

- 
- Expectations do not affect semantic meaning:
 - Black Bart killed the sheriff by stuffing his pistol and causing the sheriff to fire at him.
 - Black Bart indirectly / justly / accidentally killed the sheriff.



Result

We can distinguish between:

- Expectations based on Lewis' indicated meaning.
- Semantic meaning as necessary for compositional semantics.

Both are parts of the hearer's interpretation of forms.