IMPERATIVES AND INTENTION-BASED SEMANTICS

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IMPERATIVES

IMPERATIVES

(1) **Do the right thing**

(2) **Snow is white**

(3) **Fly me to the moon** and **let me play among the stars**

(4) **Make us omelettes** or **I'll get us some bagels**

(5) **Help me** if **you can**

(6) If **the manuscript is finished**, **send it off** and **I will open up a bottle of wine to celebrate**.

(7) **Attack** if **the weather is good**.
The weather is good.
So, **attack**!

THE QUESTION

⟦Snow is white⟧ = ???

⟦Do the right thing⟧ = ???

DATAPOINT 1
MIXED COORDINATION

(We're about to go into the bar together. I say:)

Buy us drinks and I'll find a table.

NOTES:

- Needn't have a conditional meaning (Starr 2016, ms).
- Can mean roughly: 'I'll find a table. Buy me a drink.'

DATAPOINT 1
MIXED COORDINATION

(We're at a book store. Each of us has three books, but we only have enough money for five, total:)

Put back Naked Lunch or I'll put back Waverley.

(Starr 2016, ms)

NOTE:

- Needn't have a conditional meaning.

DATAPOINT 2
CONDITIONALS

IMPERATIVE CONSEQUENTS:

‘If **your friend is tending bar**, **buy me a drink**.’

MIXED-CONJUNCTION:

‘If **your friend is tending bar**, **buy us drinks** and **I’ll find a table**.’

MIXED-DISJUNCTION CONSEQUENTS:

‘If **we only have $5**, **put back Naked Lunch** or **I’ll put back Waverly**.’

DATAPOINT 3
IMPERATIVE INFERENCE

Go to the bar and **buy me a drink.**

↳So, **go to the bar**!

DATAPOINT 3
IMPERATIVE INFERENCE

Buy me a drink.

You won't buy me a drink unless **you go to the bar**.

↳So, **go to the bar**!

Attack if **the weather is good**.

The weather is good.

↳So, **attack**!

DATAPOINT 4
ROSS'S PARADOX

Post the letter!

#So, **post the letter** or **burn the letter!**

Pet Herbie!

#So, **pet Herbie** or **try to take his ball!**

DATAPOINT 5
FREE CHOICE

Have a cinnamon role or **have a blueberry bar.**

↳So, **have a pork pie.**

DATAPOINT 6
SPEECH ACTS

Work late today.

DATAPOINT 6
SPEECH ACTS

Command: Work late today.

(Uttered by your boss.)

DATAPOINT 6
SPEECH ACTS

Request: **Work late today.**

(Uttered by your coworker.)

DATAPOINT 6
SPEECH ACTS

Permission: **Work late today.**

(Uttered by your spouse.)

DATAPOINT 6
SPEECH ACTS

Instruction: **Work late today.**

(Uttered by your productivity guru.)

INTENTION-BASED SEMANTICS

cf. Grice, Strawson, Schiffer, Bach & Harnish, Neale

IBS

IBS

1. Communication is intention-recognition.

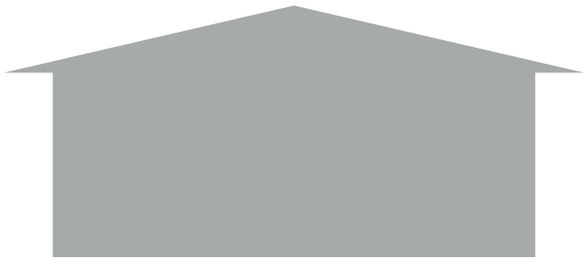
2. Semantic facts should be explained in terms of underlying facts about the psychology of rational communicators.

3. We communicate indirectly when nonlinguistic evidence of our intentions overrides linguistic evidence.

IBS

SEMANTIC FACTS

FACTS ABOUT COMMUNICATION



FACTS ABOUT THE PSYCHOLOGY OF RATIONAL, COOPERATIVE AGENTS

MEANING AND INTENDING

By doing something, x, S, **MEANT** something iff, for some audience, A, and response **R**, S did x intending

(i) A to to have a certain response **R**

(ii) A to recognise that S did x intending (i)

MEANING AND INTENDING

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Different kinds of speech act aim at different kinds of responses

i.e., different values for **R**

MEANING AND INTENDING

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(i) A to to have a certain response **R**

(ii) A to recognise that S did x intending (1)

Asserting P

R = belief that P

MEANING AND INTENDING

By doing something, x, S, **MEANT** something iff, for some audience, A, and response **R**, S did x intending

(i) A to to have a certain response **R**

(ii) A to recognise that S did x intending (1)

Directing someone to φ

R = intending to φ

COMMUNICATION

To communicate with someone is to get them to recognize which effect **R** you're trying to produce in them.

LINGUISTIC MEANING

The linguistic meaning of a sentence gives hearers defeasible evidence about what the speaker is trying to communicate.

I.e., it tells hearers what kind of effect the speaker is trying to have (assuming they're speaking literally).

SEMANTICS

...is the study of a component of the mind that computes partial and defeasible evidence about what speakers intend by their utterances.

Specifically, it computes **R** values
(or at least properties of **R** values).

SEMANTIC VALUES: A PROPOSAL

The semantic value of a clause is the kind of mental state that a speaker would try to produce by producing a literal, unembedded utterance of it.

SEMANTIC VALUES: A PROPOSAL

(cf. N. Charlow 2014)

⟦Snow is white⟧ =
the belief that snow is white

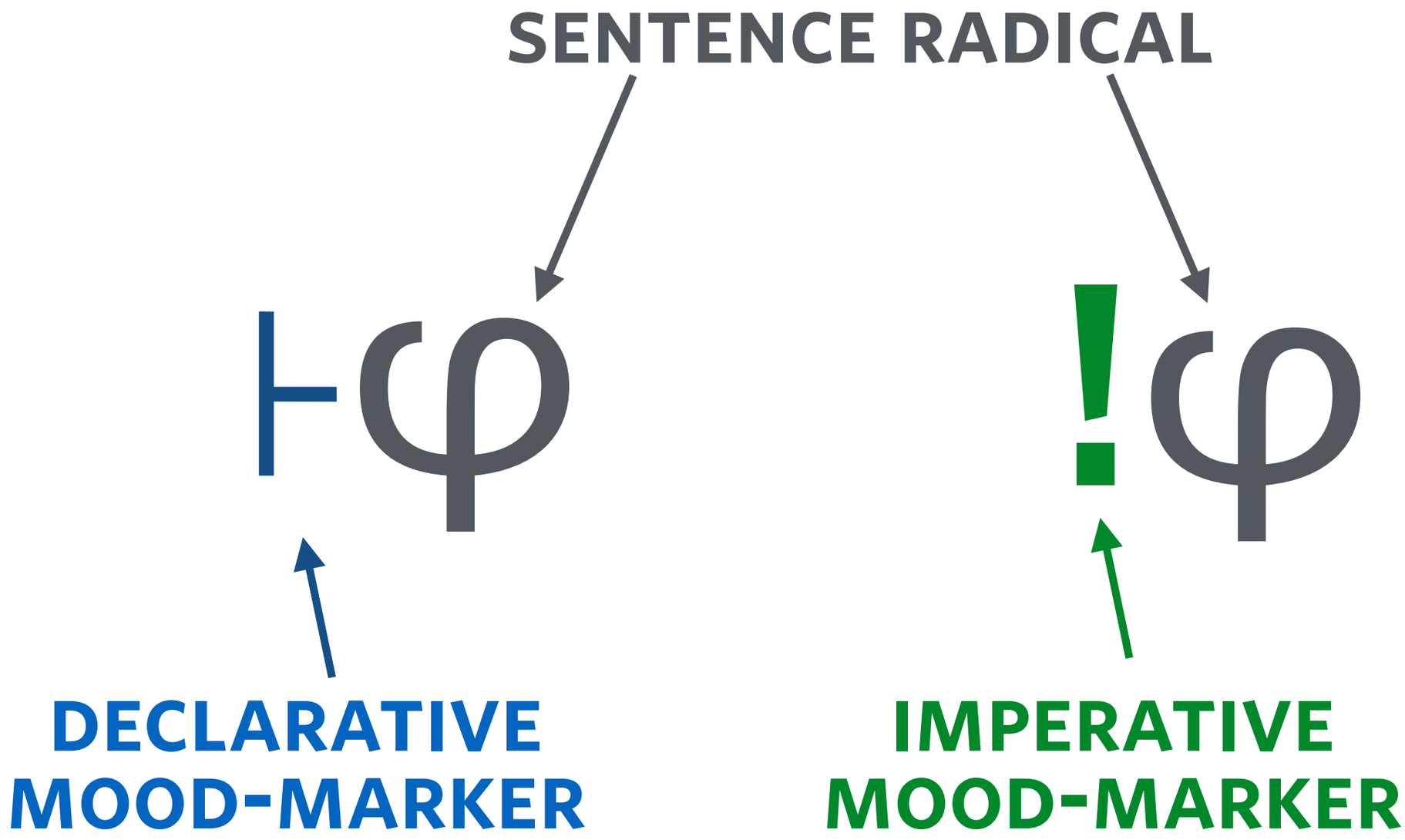
⟦Do the right thing⟧ =
the intention to do the right thing

COMPOSITIONAL SEMANTICS

TWO ASSUMPTIONS

TWO ASSUMPTIONS

1. Clauses factor, at LF, into a mood-marker and a moodless sentence radical.



TWO ASSUMPTIONS

2. The semantic value of a sentence radical is a set of possible worlds.

$$(\forall \varphi)\, [\![\varphi]\!] \in W$$

THE SEMANTICS

For any sentence radical φ:

⟦⊢φ⟧ is a belief

(namely: the belief that ⟦φ⟧ is true)

⟦!φ⟧ is an intention

(namely: the intention to make ⟦φ⟧ true)

How to formalize this?

COGNITIVE MODELS

cf. Charlow (2014)

$$M_A = \langle B_A, I_A \rangle$$

COGNITIVE MODEL OF A
= a set-theoretic representation
of A's beliefs and plans

B_A

A's **BELIEF STATE**
=the set of worlds compatible
with what A believes

I_A

A's **INTENTION STATE**
=the set of worlds compatible
with what A intends

BELIEFS AND INTENTIONS

Beliefs and intentions are formalized as properties of cognitive models:

Belief that dogs are better than cats:

$\lambda M_A . B_A \subseteq \{w : \text{dogs are better than cats at } w\}$

Intention to high-five Beyoncé:

$\lambda M_A . I_A \subseteq \{w : \text{A high-fives Beyonce at } w\}$

CLAUSAL SEMANTIC VALUES

So, the semantic values of clauses are properties of cognitive models too.

For any sentence radical φ,

$$[\![\vdash\varphi]\!]^c = \lambda M_A \,.\, B_A \subseteq [\![\varphi]\!]^c$$

$$[\![!\varphi]\!]^c = \lambda M_A \,.\, I_A \subseteq [\![\varphi]\!]^c$$

COGNITIVE MODELS

M_A

COGNITIVE MODEL OF A

=a set-theoretic representation
of A's beliefs and plans

...under the idealized assumption that A's thoughts are ideally coherent.

TWO KINDS OF IDEALIZATION
FIRST: GALILEAN

BA IA

Conflate mental states with necessarily equivalent contents.

Compare: Galileo's model of projectile motion without air resistance.

(Distinction between Galilean and Minimal idealization due to Weisberg 2007)

TWO KINDS OF IDEALIZATION
SECOND: MINIMALIST

BA IA

Mental states are consistent and closed under entailment.

Compare: Explanations of ideal gas laws in which it is assumed that particles in low-pressure gas don't collide.

TWO KINDS OF IDEALIZATION
SECOND: MINIMALIST

$$I_A \subseteq B_A$$

TWO KINDS OF IDEALIZATION
SECOND: MINIMALIST

$$I_A \subseteq B_A$$

Doxastic Constraint on Intending

A can't intend to ψ if it is ruled out by A's beliefs that A will ψ.

TWO KINDS OF IDEALIZATION
SECOND: MINIMALIST

$$I_A \subseteq B_A$$

Strict Means-End Coherence

If:

(I) A intends to φ.

(II) A believes that ψing is necessary for φing.

then:

(III) A intends to ψ.

CLAUSAL SEMANTIC VALUES

So, the semantic values of clauses are properties of cognitive models too.

For any sentence radical φ,

$$[\![\vdash\varphi]\!]^c = \lambda M_A \,.\, B_A \subseteq [\![\varphi]\!]^c$$

$$[\![!\varphi]\!]^c = \lambda M_A \,.\, I_A \subseteq [\![\varphi]\!]^c$$

CONJUNCTION

Where Φ,Ψ are sentences that may be imperatives, declaratives, or combinations of the two:

What is ⟦Φ and Ψ⟧?

CONJUNCTION

$$[\![\Phi \text{ and } \Psi]\!] =$$

$$\lambda M \,.\, [\![\Phi]\!](M) = 1 \text{ and } [\![\Psi]\!](M) = 1$$

Intuitively: we use conjunctions to put people into a state of satisfying both conjuncts.

CONJUNCTION

$[\![$**Buy us drinks** and **I'll find a table**$]\!]^c$ =

λM . $I_M \subseteq [\![$**A_c buys us drinks**$]\!]^c$ and $B_M \subseteq [\![$**S_c finds a table**$]\!]^c$

(The property of being a mind that intends to buy drinks and believes that $speaker_c$ will find a table.)

DISJUNCTION

Where Φ,Ψ are sentences that may be imperatives, declaratives, or combinations of the two:

What is ⟦Φ or Ψ⟧?

DISJUNCTION

SUBMODELS

A Φ-satisfying submodel of M is a cognitive model M_Φ such that:

i. $[\![\Phi]\!](M_\Phi) = 1$

and

ii. $\mathbf{B}_{M_\Phi} \subseteq \mathbf{B}_M$

and

iii. $\mathbf{I}_{M_\Phi} \subseteq \mathbf{I}_M$

DISJUNCTION

WEAK DISJUNCTION

$$[\![\Phi \text{ or } \Psi]\!] =$$

$$\lambda M \,.\, (\exists M_\Phi)(\exists M_\Psi)(M_\Phi \uplus M_\Psi = M)$$

Intuitively: we use disjunctions to put people into a state of being committed to at least one disjunct, though they needn't be settled on which one.

DISJUNCTION

WEAK DISJUNCTION

$[\![\text{Put back Naked Lunch or I'll put back Waverly}]\!]^c$ =

λM . M is in a state of either:

(a) intending to put back Naked Lunch; or

(b) believing that speaker_c will put back Waverly; or

(c) indecision between options (a) and (b), but commitment to at least one.

DISJUNCTION

A problem with **WEAK DISJUNCTION**:

(1) A: I'll put back Naked Lunch.

(2) B: Put back Naked Lunch *or* I'll put back Waverly.

If A is being sincere with (1), then B's response is redundant. So why doesn't it *sound* redundant?

DISJUNCTION

A problem with **WEAK DISJUNCTION**:

(1) A: Class is in room 505.

(2) B: It's in 505 *or* it's in 506.

If A is being sincere with (1), then B's response is redundant. So why doesn't it *sound* redundant?

DISJUNCTION

WEAK DISJUNCTION

$[\![$Put back Naked Lunch or I'll put back Waverly$]\!]^c$ =

λM . M is in a state of either:

(a) intending to put back Naked Lunch; or

(b) believing that speakers will put back Waverly; or

(c) indecision between options (a) and (b), but commitment to at least one.

DISJUNCTION

WEAK DISJUNCTION

⟦Put back Naked Lunch or I'll put back Waverly⟧^{c} =

λM . M is in a state of either:

(a) ~~intending to put back Naked Lunch; or~~

(b) ~~believing that speakers will put back Waverly; or~~

(c) indecision between options (a) and (b), but commitment to at least one.

DISJUNCTION

WEAK DISJUNCTION

$[\![\Phi \text{ or } \Psi]\!] =$

$\lambda M . (\exists M_\Phi : I_{M_\Phi} \neq \varnothing)(\exists M_\Psi : I_{M_\Psi} \neq \varnothing)$
$(M_\Phi \uplus M_\Psi = M)$

Intuitively: In uttering a disjunction, I intend for you to treat both disjuncts as a genuine alternative, at least initially and for the purposes of practical reasoning.

cf. Zimmermann (2000); Geurts (2005): “genuineness”

DISJUNCTION

STRONG DISJUNCTION

[[Put back Naked Lunch or I'll put back Waverly]]^{c} =

λM . M is in a state of indecision between intending to put back Naked Lunch and believing that speaker$_{c}$ will put back Waverly, but commitment to at least one of these options.

DISJUNCTION

A problem with **STRONG DISJUNCTION**?

"I can say to my children at some stage in a treasure hunt, *The prize is either in the garden or in the attic. I know that because I know where I put it, but I'm not going to tell you*. Or I could just say (in the same situation) *The prize is either in the garden or in the attic*, and the situation would be sufficient to appraise the children of the fact that my reason for accepting the disjunction is that I know a particular disjunct to be true [and therefore the other is not an epistemic possibility]."

(Grice 1975; Simons 2004)

CONDITIONAL

Where Φ is a declarative and Ψ is a declarative, imperative, or combination of the two:

What is ⟦if Φ then Ψ⟧?

CONDITIONAL

MAXIMAL SUBMODEL

A maximal Φ-supporting submodel $M_{\uparrow\Phi}$ of M meets the following conditions:

(i) $M_{\uparrow\Phi}$ is a submodel of M;

(ii) There is no submodel M^* of M such that:

- $M_{\uparrow\Phi}$ is a submodel of M^*; and
- $M_{\uparrow\Phi} \neq M^*$

Intuitively: $M_{\uparrow\Phi}$ is one of the "largest" submodels of M.

CONDITIONAL

$$[\![\text{if } \Phi \text{ then } \Psi]\!] = \lambda M \,.\, (\forall M^{\Phi})[\![\Psi]\!](M^{\Phi})$$

M satisfies [[if Φ then Ψ]] iff every maximal Φ-satisfying submodel of M satisfies Ψ.

Intuitively:

In uttering 'if Φ then Ψ', I intend you to enter a state of mind such that, if you were to also form the belief [[Φ]], it would be irrational for you not to also enter the state [[Ψ]] (ceteris paribus).

CONDITIONAL

⟦If Quinn is bartending, buy the first round⟧ =

λM_A . If A were to be in mental state M_A and believe that Quinn is bartending, A would intend to buy the first round.

CONSEQUENCE

CONSEQUENCE

$\{\Phi_1 \ldots \Phi_n\} \models \Psi$ iff:

$(\forall M)$ if $[\![\Phi_1]\!](M)=1, \ldots, [\![\Phi_n]\!](M)=1$, then $[\![\Psi]\!](M)=1$

Ψ follows from $\{\Phi_1 \ldots \Phi_n\}$ iff every cognitive model that satisfies all of the premises also satisfied the conclusion.

Intuitively: a coherent mind that satisfied the premises would also satisfy the conclusion.

CONSEQUENCE

Go to the bar and **buy me a drink.**

↳So, **go to the bar**!

CONSEQUENCE

Attack if **the weather is good**.

The weather is good.

↳So, **attack**!

CONSEQUENCE

There are no unicorns

#Bring me a unicorn!

Doxastic Constraint on Intending

A can't intend to ψ if it is ruled out by A's beliefs that A will ψ.

CONSEQUENCE

Buy me a drink.

You won't buy me a drink unless **you go to the bar**.

↳So, **go to the bar**!

Strict Means-End Coherence

If:

(I) A intends to φ.

(II) A believes that ψing is necessary for φing.

then:

(III) A intends to ψ.

ROSS

Post the letter!

#So, **post the letter** or **burn the letter!**

This is predicted only if we adopt **STRONG DISJUNCTION**.

(Otherwise, we could treat it as a pragmatically.)

ROSS

Post the letter!

#So, **post the letter** or **burn the letter!**

You intend to post the letter.

⊭You intend to post the letter or to burn the letter.

FREE CHOICE

Have tea or **have coffee**.
⊨ So, **have tea**.

This sounds valid only if the conclusion is read as a weak use of the imperative: a permission, acquiescence, invitation, or instruction.

So what's the story with "weak uses"?

FREE CHOICE

Here's clause for weak imperatives that would validate this inference:

$$[\![\mathbf{i}\varphi]\!]^c = \lambda \mathbf{M}_A \,.\, \mathbf{I}_A \cap [\![\varphi]\!]^c \neq \varnothing$$

Intuitively: in saying 'have tea', my aim was for you to make having tea compatible with your plans (at least tentatively and for the purposes of practical reasoning).

This could be one of two semantic readings for imperatives or it could result from pragmatic weakening.

FREE CHOICE

Have tea or **have coffee**.

⊨ So, **have tea**.

Valid if:

We adopt **STRONG DISJUNCTION**; and

The conclusion's weak reading is semantic.

(Either could turn out to be pragmatic instead.)

FREE CHOICE

Have tea or **have coffee**.

⊨ So, **have tea**.

You intend to have tea or to have coffee.

⊨ It is compatible with your intentions to have tea.

SPEECH ACTS

SPEECH ACTS

Command: **Work late today.**
(Uttered by your boss.)

Request: **Work late today.**
(Uttered by your coworker.)

SPEECH ACTS

Command: **Work late today.**
(Uttered by your boss.)

Request: **Work late today.**
(Uttered by your coworker.)

Guiding idea

When we issue a directive, we normally also communicate a reason for the addressee to comply.

Directives of different kinds are backed by different kinds of reasons. (cf. Schiffer 1972)

SPEECH ACTS

Command: **Work late today.**
(Uttered by your boss.)

Backed by an indirect conditional threat, or an indirect appeal to authority.

Request: **Work late today.**
(Uttered by your coworker.)

Backed by an indirect expression of the speaker's desire.

SPEECH ACTS

What about non-directive uses?

Instruction: **Work late today.**

(Uttered by your productivity guru.)

SPEECH ACTS

Instruction: **Work late today.**

(Uttered by your productivity guru.)

Guiding idea

Here we *make as if* to direct someone to do something, in order to indirectly communicate a reason for them to do it.

Compare Grice's accounts of irony and metaphor.

e.g. "He's a fine friend."

SPEECH ACTS

What about “weak” uses?

Permission: **Work late today.**

(Uttered by your spouse.)

SPEECH ACTS

Permission: **Work late today.**

(Uttered by your spouse.)

Compare weak uses of declaratives, e.g., in brainstorming contexts:

> "It's lupus."

These work like epistemic modals—attempts to make the content compatible with the addressee's belief state.

A form of pragmatic weakening?

CONCLUSIONS

1. A theory of the semantics and pragmatics of imperatives with broad empirical coverage.

2. A new kind of theoretical motivation thanks to IBS: e.g., not only *predictions* of inferential data; also independently motivated *explanations* for why these data arise.

3. A case study in how IBS and compositional semantics can be mutually supporting.

THANKS