
The Pragmatics of Figurative Language

Reuben Cohn-Gordon

Extending Rational Speech Acts (RSA) Model



r_1



r_2

RSA is a powerful formalization of Gricean intuitions, but can it be extended to more complex phenomena like focus, manner implicatures, questions, and figurative language?

Compelling Similes about La Croix

“la croix tastes like my ability to retain information for exams if the exam im studying for is what certain fruits taste like”

“la croix is what juice would taste like to a ghost”

“la croix tastes like it was made by a society in which flavor is the scarcest natural resource”

“la croix tastes like it was created by someone who didn't want to admit he'd never tasted fruit so had a friend quickly describe it to him”

“la croix tastes like if you were drinking carbonated water and someone screamed out loud the name of a specific fruit in the other room”

Failed Figurative Language

“John was as tall as a six-foot-three-inch tree.”

“My own words rang inside my head like a bell inside my head”- Community

“I needed answers like a fish needs a bicycle: a lot” -
Community

Theoretical Insights

Figurative language should be more informative than literal:

“John and Mary had never met. They were like two hummingbirds who had also never met.”

“The red brick wall was the color of a brick-red Crayola crayon.”

You don't want to express the wrong dimension of meaning:

“When she spoke, he thought he heard bells, as if she were a garbage truck backing up.”

“Her hair glistened in the rain like nose hair after a sneeze.”

More generally, it should be clear what is being conveyed:

“She walked into my office like a centipede with 98 missing legs.”

Restricting the Enterprise

Predicative metaphors are of the form **A is a B**:

“The lawyer is a shark.”

“Life is a journey.”

“Compositional semantics is a nightmare.”

Plan

informal proposal (Grice)

formal proposal (Kao, 2014)

Informal Pragmatic Theory

When you hear “John is a shark”:

1. You know that John is not literally a shark (perhaps)
2. You therefore infer that the speaker is employing a metaphor (Quality).
3. Further, you infer that the speaker is trying to convey certain aspects of sharks that *do* pertain to John, e.g. viciousness. (Relevance/Quantity)

- n.b. “John is a shark” might not always be a metaphor

Formal Proposal

The challenge is to make this informal account precise:

- For prediction
- For computational modeling
- For understanding

How?

Rational Speech Acts: a variation of the model from class

RSA Recap

U: Utterance, W: Possible Worlds (states)

Note that: U is a synonym for M, and W for R. This matches up with the reading.

Speakers :: $P(U | W)$

Listeners :: $P(W | U)$

$$P_{LIT}(w|u) \propto [[u]](w) * P(w)$$

$$P_S(u|w) \propto P_{LIT}(w|u)$$

$$P_L(w|u) \propto P_S(u|w) * P(w)$$

The Game

“The party is ___”

4 Possible States of the party:

energetic \wedge violent	\neg energetic \wedge violent
energetic \wedge \neg violent	\neg energetic \wedge \neg violent

$U = \{\text{riot, funeral, energetic, unenergetic, violent, nonviolent}\}$.

[[riot]]=energetic and violent, [[funeral]] = neither energetic nor violent

The Game

“The party is ___”

4 Possible States of the party:

energetic \wedge violent	\neg energetic \wedge violent
energetic \wedge \neg violent	\neg energetic \wedge \neg violent

$U = \{\text{riot, funeral, energetic, unenergetic, violent, nonviolent}\}.$

[[riot]]=energetic and violent, [[funeral]] = neither energetic nor violent

The Game

“The party is ___”

4 Possible States of the party:

energetic \wedge violent	\neg energetic \wedge violent
energetic \wedge \neg violent	\neg energetic \wedge \neg violent

$U = \{\text{riot, funeral, energetic, unenergetic, violent, nonviolent}\}.$

[[riot]]=energetic and violent, [[funeral]] = neither energetic nor violent

The Game

“The party is ___”

4 Possible States of the party:

$\text{energetic} \wedge \text{violent}$	$\neg \text{energetic} \wedge \text{violent}$
$\text{energetic} \wedge \neg \text{violent}$	$\neg \text{energetic} \wedge \neg \text{violent}$

$U = \{\text{riot}, \text{funeral}, \text{energetic}, \text{unenergetic}, \text{violent}, \text{nonviolent}\}.$

$[[\text{riot}]] = \text{energetic and violent}, [[\text{funeral}]] = \text{neither energetic nor violent}$

P_{LIT} is literal interpreter, as before

You hear: The party was a riot. (Alternative metaphor: “The party was lit”)

Priors $P(w)$ on what the party is like:

energetic \wedge violent : 0.2	\neg energetic \wedge violent : 0.05
energetic \wedge \neg violent : 0.65	\neg energetic \wedge \neg violent : 0.1

What do you infer at P_{LIT} ?

Reminder: $P_{LIT}(w|u) \propto [[u]](w) * P(w)$

P_{LIT} is literal interpreter, as before

You hear: The party was a riot. (Alternative metaphor: "The party was lit")

Posterior:

energetic \wedge violent : 1.0	\neg energetic \wedge violent : 0.0
energetic \wedge \neg violent : 0.0	\neg energetic \wedge \neg violent : 0.0

What do you infer at P_{LIT} ?

Reminder: $P_{LIT}(w|u) \propto [[u]](w) * P(w)$

P_S should be able to say “riot”

If the speaker only cared about conveying whether the party was energetic, then it would make sense for them to describe it as a riot (or a funeral, if it is a bad party), even if this is misleading with respect to whether the party is violent.

How to incorporate this intuition into our model?

The Problem

Suppose the party is energetic but there isn't a violent mob committing acts of civil disobedience and looting stores.

What do you say? What's the probability of saying "riot"?

Questions Under Discussion (QUDS)

$$Q_{\text{energetic}}(\text{energetic} \wedge \text{violent}) = \{ \text{energetic} \wedge \text{violent}, \text{energetic} \wedge \neg \text{violent} \}$$

$$Q_{\text{violent}}(\text{energetic} \wedge \text{violent}) = \{ \neg \text{energetic} \wedge \text{violent}, \text{energetic} \wedge \text{violent} \}$$

The QUD models the idea of only paying attention to some aspect of the world

Questions Under Discussion (QUDS)

$$Q_{\text{energetic}}(\text{energetic} \wedge \text{violent}) = \{ \text{energetic} \wedge \text{violent}, \text{energetic} \wedge \neg \text{violent} \}$$

$$Q_{\text{energetic}}(\text{energetic} \wedge \neg \text{violent}) = \{ \text{energetic} \wedge \text{violent}, \text{energetic} \wedge \neg \text{violent} \}$$

$$Q_{\text{energetic}}(\neg \text{energetic} \wedge \text{violent}) = \{ \neg \text{energetic} \wedge \text{violent}, \neg \text{energetic} \wedge \neg \text{violent} \}$$

$$Q_{\text{energetic}}(\neg \text{energetic} \wedge \neg \text{violent}) = \{ \neg \text{energetic} \wedge \text{violent}, \neg \text{energetic} \wedge \neg \text{violent} \}$$

The QUD models the idea of only paying attention to some aspect of the world

Questions Under Discussion (QUDS)

$$Q_{\text{violent}}(\text{energetic} \wedge \text{violent}) = \{ \text{energetic} \wedge \text{violent}, \neg \text{energetic} \wedge \text{violent} \}$$

$$Q_{\text{violent}}(\text{energetic} \wedge \neg \text{violent}) = \{ \text{energetic} \wedge \neg \text{violent}, \neg \text{energetic} \wedge \neg \text{violent} \}$$

$$Q_{\text{violent}}(\neg \text{energetic} \wedge \text{violent}) = \{ \text{energetic} \wedge \text{violent}, \neg \text{energetic} \wedge \text{violent} \}$$

$$Q_{\text{violent}}(\neg \text{energetic} \wedge \neg \text{violent}) = \{ \text{energetic} \wedge \neg \text{violent}, \neg \text{energetic} \wedge \neg \text{violent} \}$$

The QUD models the idea of only paying attention to some aspect of the world

Speaker with QUDs

$$\text{Speaker : } P_{\text{S-MET}}(u|w,q) \propto \sum_{w'} (1(q(w)=q(w'))) * P_{\text{LIT}}(w'|u) * P(u)$$

$$P_{\text{S-MET}}(\text{"riot"} | w=\text{energetic} \wedge \neg\text{violent}, q=q_{\text{energetic}}) = 0.27$$

Intuition: The metaphorical speaker prefers the utterances which convey *the aspect* of the world the QUD cares about to the literal listener.

Listener Infers World and QUD

$$P_{L-MET}(w,q|u) \propto P_{S-MET}(u|w,q) * P(w) * P(q)$$

Prior on worlds $P(w)$: same as for P_{LIT}

Prior on QUDs $P(q)$: uniform

Intuition: The metaphorical listener hears an utterance u , and finds the world *and* QUD which maximize the probability of the metaphorical speaker having said u .

P_{L-MET} Results

P_{L-MET} (“riot”) = {

$\langle w = \text{energetic} \wedge \neg \text{violent}, q = q_{\text{energetic}} \rangle : 0.54,$

$\langle w = \text{energetic} \wedge \text{violent}, q = q_{\text{violent}} \rangle : 0.24,$

$\langle w = \text{energetic} \wedge \neg \text{violent}, q = q_{\text{energetic}} \rangle : 0.17,$

$\langle w = \neg \text{energetic} \wedge \text{violent}, q = q_{\text{violent}} \rangle : 0.06,$

}

Conclusions

Formalizing intuitions can be really valuable for:

Understanding language/cognition

Making quantitative predictions

Making computational models
