Force and Conversational States

William Starr
(joint work w/Sarah Murray)

will.starr@cornell.edu
http://williamstarr.net

December 5th, 2015

Outline

Frege on Sentential Force
At the Dawn of Contemporary Semantics

Frege (Frege 1918: 310) on Communication

"The influence of one person on another is brought about for the most part by [content]. One communicates [content]. How does this happen? One brings about changes in the common outside world which, perceived by another person, are supposed to induce him to apprehend [a content] and take it to be true."

1. There's a content,
2. And a way of relating to it

The Big Question
Communicating Content *and* Force

The Big Question

What features of the signal (changes in the common outside world) and signaling situation convey the latter? Is the latter itself some kind of content, or is it conveyed in another sense?

- Metasemantic theories: force resides in signal production/consumption strategies (Lewis 1969; Millikan 2005)
  - Content is an abstraction of this process
- Animal communication: same! (Scott-Phillips 2008)

Empirical Question

How do Languages Convey the Function of a Content?

Universal Clause Types (König & Siemund 2007)

(1) Maya is singing. (Declarative)

(2) Is Maya singing? (Interrogative)

(3) Maya, sing! (Imperative)

Sentential Force/Mood (Semantic)

Characteristic function of a clause type.

- Determined by competence fluent speakers share

Utterance Force (Pragmatic) [After Austin 1962]

Actual function of a particular use of a signal.

- Determined by particulars of exchange between agents

Classical Speech Act Theory

Austin

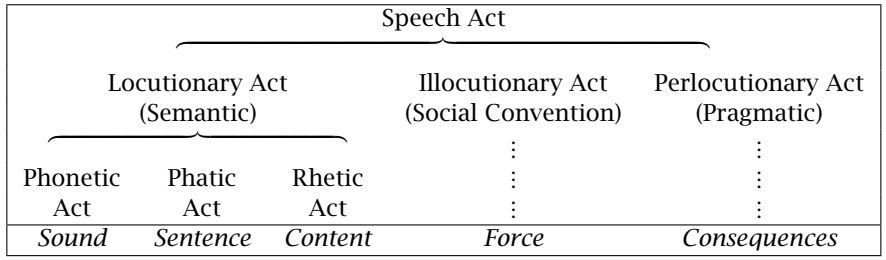


Figure 5: Austin (1962) Analysis of Speech Acts

Searle's Speech Act Theory

Searle

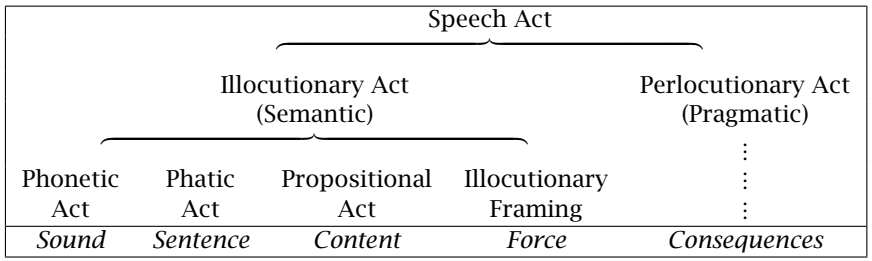


Figure 6: Searle (1968, 1969) Analysis of Speech Acts

Speech Act Theory

Force Conveyed as 'Meta-content'

- Searle (1969) each speech act has a content and force
  - Force is additional content specifying what kind of act main content is presented in
  - Force conveyed by rules associating certain morphology with certain kinds of acts
- Problems:
  1. Sentential vs utterance force
  2. Linguistic clash in speech act / sentence types
  3. Details...
  4. Only pushes problem of force back a step: how is force of meta-content determined?

Semantic Fragment

Declaratives, Interrogatives, Imperatives and Connectives

Declarative and Connective Semantics

Given a space of possible worlds W, agents $x \in D$

1. Atomics $[\![\mathsf{A}]\!] = \{w \mid \mathsf{A} \text{ is true in } w\}$
2. Negation $[\![\neg\phi]\!] = W - [\![\phi]\!]$
3. Conjunction $[\![\phi \wedge \psi]\!] = [\![\phi]\!] \cap [\![\psi]\!]$
4. Disjunction $[\![\phi \vee \psi]\!] = [\![\phi]\!] \cup [\![\psi]\!]$

Sentential Mood Semantics

1. Interrogative $[\![?\phi]\!] = \{[\![\phi]\!], W - [\![\phi]\!]\}$
2. Imperative Where variable assignment s, context c
   $[\![!\phi(\mathsf{x})]\!]_{s,c} = \{\langle w, add_c\rangle \mid w \in [\![\phi(\mathsf{x})]\!]_{s[\mathsf{x}/add_c],c}\}$

(Simplification of Hausser 1980; Portner 2004)

Mutual Assumptions

Portner (2004, 2007)

Portner's Contexts

1. **Common Ground (CG)** The mutually conversationally adopted propositions
2. **Question Set (QS)** The mutually conversationally adopted questions
3. **To-Do List (TDL)** For each conversationalist, the properties it has been mutually conversationally adopted they are to make true

Formally: $C = \langle CG, QS, TDL\rangle$

The Dynamics of Mutual Assumptions

Characteristic Effects of Clause Types (Portner 2012, 2007, 2004)

Portner's Analysis of Discourse Conventions

1. **Declarative Effect** The content of a declarative marked clause is to be added to CG
2. **Interrogative Effect** The content of an interrogative marked clause is to be added to QS
3. **Imperative Effect** The content of an imperative marked clause is to be added to addressee's TDL

- This is an account of sentential force in terms of it's intended uptake conditions (Grice-Stalnaker)
- Not part of compositional linguistic meaning

Empirical Adequacy

A Story

A Story (sort of)

Donate blood because vampires need to eat too! Donate lots of blood unless you are weak or diseased. Do it regardless of whether you need the money. Help out others but you should be careful with these vampires. You may see a handsome vampire but don't let him kiss your neck. I'm tired so let's stop talking about vampires. Light your bottle rocket or I'll light mine, I don't care which. Although, let's aim it at the moon.

Issues
For Standard Discourse Dynamics

'Discourse Conventions' are Semantic

Clause-types are recursively combined, and 'discourse conventions' need to match. Dynamic meanings are needed to capture this.

No Analysis of Utterance Force

The force of an utterance is much more than its effect on mutual assumptions.

Building Block 1
Contextual Information

- Informational content (*propositions*) = set of worlds
- One informational content particularly useful for understanding how linguistic interactions unfold:

Context Set (c)

As communication and inquiry unfold, a body of information accumulates. Think of this information as what the agents are mutually taking for granted for the purposes of the conversation. I call the set of worlds embodying this information c, short for the *context set*. (Stalnaker 1978; Lewis 1979)

Building Block 1
The Role of Information

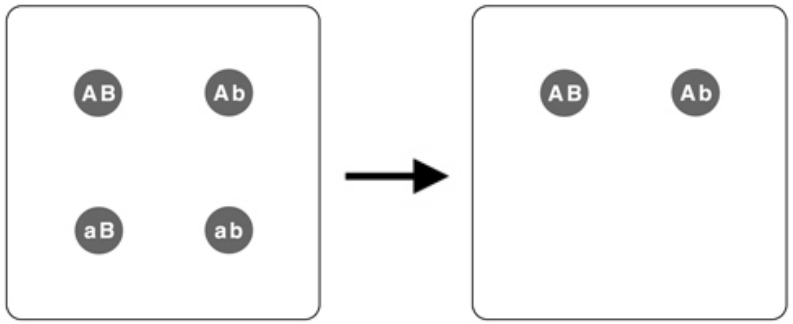


Figure: Gaining the information that A

- Communication progresses by gaining shared information, i.e. eliminating possible worlds.
- $\{w_{\mathsf{AB}}, w_{\mathsf{Ab}}, w_{\mathsf{aB}}, w_{\mathsf{ab}}\} \Rightarrow \{w_{\mathsf{AB}}, w_{\mathsf{Ab}}\}$

Building Block 2
Issues

- It's not just information that accumulates in communication and inquiry (Bromberger 1966)
- There are issues (e.g. Hamblin 1958; Roberts 1996).
- One model: ways of grouping worlds in c into alternative propositions.

Alternatives (C) (e.g. Groenendijk 1999; Hulstijn 1997)

Alternatives represent the information the agents are seeking; their **issues**. Formally, this grouping of c may be identified with a set of sets of worlds; call it C. No need to also keep track of c: $c = \bigcup C$.

Building Block 2
The Role of Issues

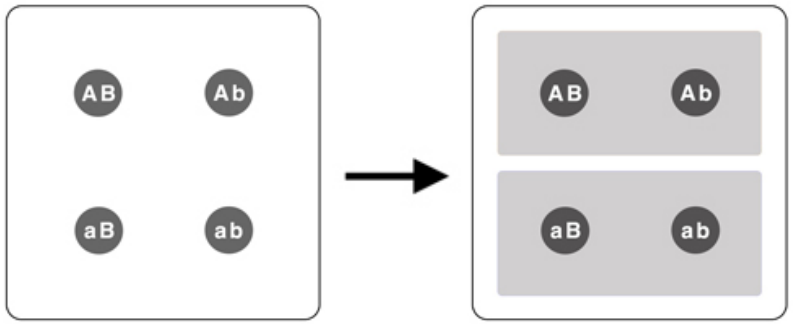


Figure: Recognizing the issue whether A

- Inquiry also progresses by recognizing issues, i.e. introducing alternatives
- $\{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}\} \Rightarrow \{\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\}$

Building Block 3
Preferences and Their Role in Choice

- Agents not only gather and seek information
  - They form preferences between alternatives that can be brought about
- Central to decision theoretic approaches to rational choice, as applied in philosophy, AI and economics (e.g. Ramsey 1931; Newell 1992)
- Those tools applied to pragmatics of imperatives
  - Articulate how imperatives can be used to influence choices, actions, permission, requirement (Starr 2013)
- Of relevance here: the preferences being mutually taken for granted for the purposes of an interaction
  - Parallel to Stalnaker's common ground

Building Block 3
Preferences

- A body of preferences can be represented as a binary **preference relation** on alternatives
- I.e. a set of pairs of propositions constructed from c

Preference States (R)

- $\langle a, a' \rangle \in R$: a is preferrable to a'
- Each pair in R is called a *preference*
- Alternatives related by R: A_R
- Worlds among those alternatives: c_R

Preference States
Capture Information

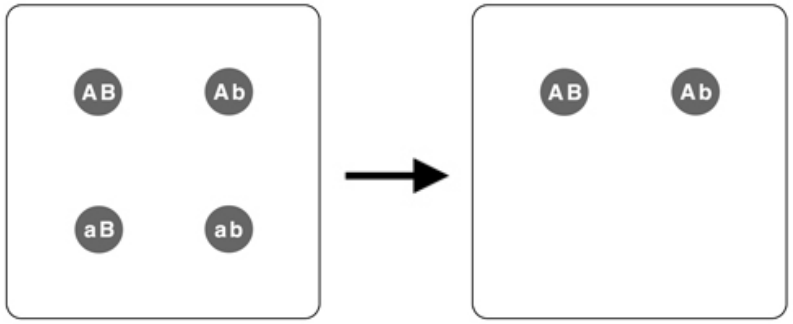


Figure: Gaining information that A

Old $\{w_{AB}, w_{Ab}, w_{aB}, w_b\} \Rightarrow \{w_{AB}, w_{Ab}\}$

New $\{\langle\{w_{AB}, w_{Ab}, w_{aB}, w_b\}, \varnothing\rangle\} \Rightarrow \{\langle\{w_{AB}, w_{Ab}\}, \varnothing\rangle\}$

Preference States

Capture Issues

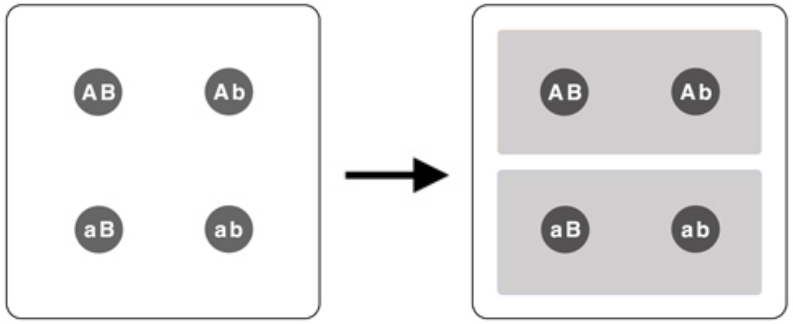


Figure: Recognizing the issue whether A

Old $\{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}\} \Rightarrow \{\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\}$

New $\{\langle\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \varnothing\rangle\}$

$\Rightarrow \{\langle\{w_{AB}, w_{Ab}\}, \varnothing\rangle, \langle\{w_{aB}, w_{ab}\}, \varnothing\rangle\}$

Preference States

Obviously Capture Preferences

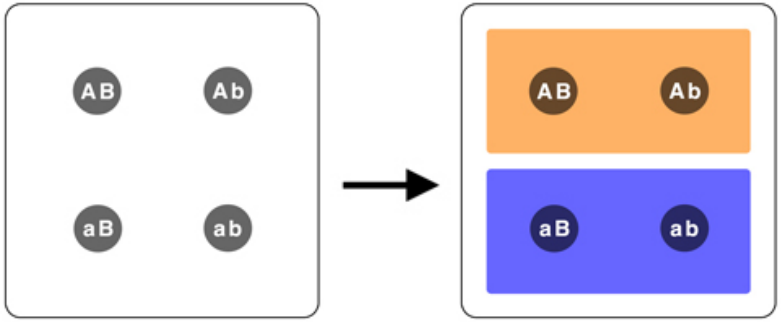


Figure: Coming to prefer A (to ¬A)

New $\{\langle\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \varnothing\rangle\}$

$\Rightarrow \{\langle\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\rangle\}$

Dynamic Linguistic Meanings

In Preference Semantics

Static Meaning A content (set worlds, etc.)

Dynamic Meaning A function (characteristic effect) from one 'state' to another (Heim 1982; Veltman 1996)

Dynamic Preference Semantics

1. Linguistic meaning: function from one R to another R'
   - $R[\phi] = R'$, $[\phi]$ says how R and R' differ
2. Contents: R
3. Role of contents: ruling out possibilities, seeking information, choosing alternatives

Mood: changes which contents are playing which roles

Declaratives

Eliminate Worlds

Declarative Semantics (▷A)

1. Eliminate non-A-worlds from each alternative
   - Throwing out ones with no preferred A-worlds

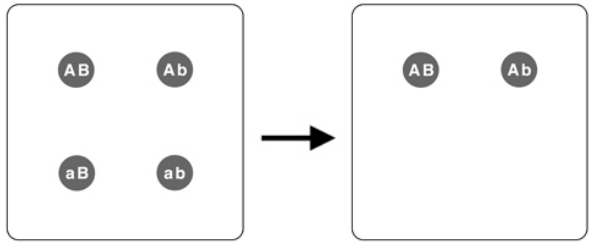


Figure: R updated with ▷A

Interrogatives

Introduce Alternatives

Interrogative Semantics (?A)

1. Accept all of the issues/preferences in R
2. Add a preference for all A-worlds in c_R to $\varnothing$, and one for non-A-worlds in c_R to $\varnothing$

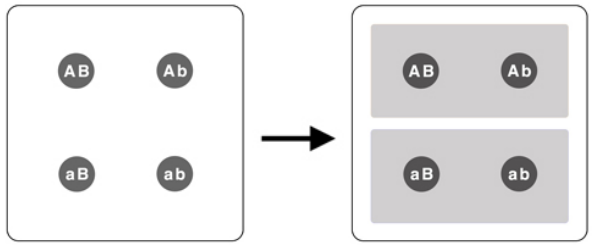


Figure: R updated with ?A

Imperatives

Order Alternatives

Imperative Semantics (!A)

1. Admit all of the preferences in R
2. Add preference for all A-worlds in c_R over non-A-worlds

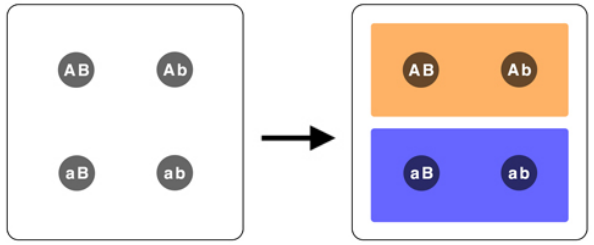


Figure: R updated with !A

Mood Under Connectives

Current Predictions, Extensions and the Need for Dynamic Meanings

- In dynamic semantics, *and* is analyzed as sequential update rather than content intersection
  - $R[\triangleright \mathsf{A} \wedge !\mathsf{B}] = R[\triangleright \mathsf{A}][!\mathsf{B}]$
- Dynamic, but not static, meanings deliver non-ambiguous analysis of *and*
  - There is no single operation on *contents* (propositions, issues, preferences) they perform (Starr 2013)
- Same argument for *or*; conditionals (Starr 2013)
  - E.g. $R[\phi \vee \psi] = R[\phi] \cup R[\psi]$
- Incorporates with fully compositional analysis of parentheticals (Murray 2014)

Attending to a Proposition

Modifying the Framework

- We can't/don't attend to all our information at once
- At-issue information: information we're attending to
- Not-at-issue information: that which isn't attended to
  - But still possessed
- So far, this distinction is lost:
  - If $\neg$A and $\neg$B-worlds are eliminated, no remaining world distinguishes A-information from B-information

Attending to a Proposition

A More Sophisticated Account

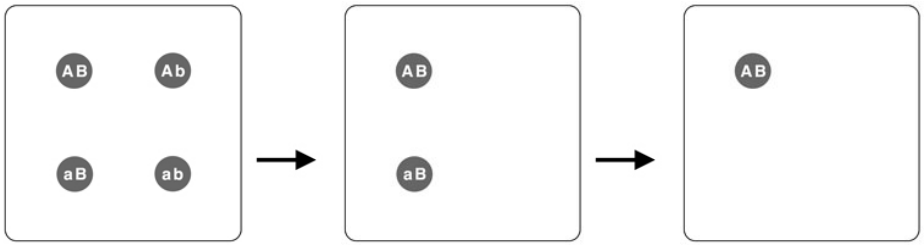
- We need to keep track of the propositions (and perhaps other things) that are being attended to
- Let S be a preference state with attention
  - Preference state, plus a list of propositions attended to
- $S = \langle R, \langle p_0, \ldots, p_n \rangle \rangle$
  - $D_S = \langle p_0, \ldots, p_n \rangle$, propositions under discussion
- The basic idea:
  - Both at-issue and not-at-issue propositions are intersected with c_R
  - Only at-issue propositions are brought to attention

Analysis of Evidentials: Direct

Attend to Scope, Not Evidential Proposition; Add Both

Cheyenne Direct Evidential Semantics ($\triangleright_{\text{dir}}$ A)

- B: Speaker has **direct** evidence that A
1. Eliminate non-B-worlds from each alternative
2. Bring proposition that A to attention
3. Eliminate non-A-worlds from each alternative



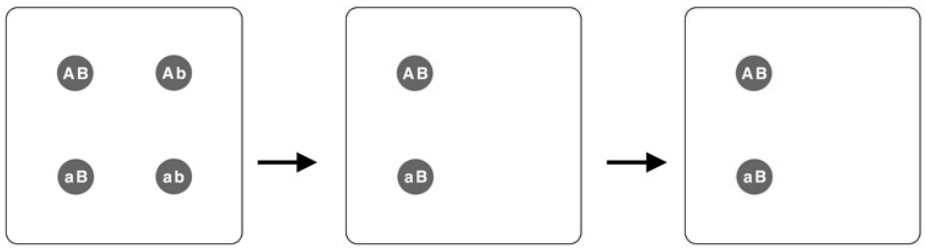
$\langle A \rangle$ $\langle A \rangle$

Analysis of Evidentials: Reportative

Attend to Scope, Not Evidential Proposition; Add Only Scope

Cheyenne Reportative Semantics ($\triangleright_{\text{rep}}$ A)

- B: Speaker has **reportative** evidence that A
1. Eliminate non-B-worlds from each alternative
2. Bring proposition that A to attention
3. Keep both A-worlds and ¬A-worlds



$\langle A \rangle$ $\langle A \rangle$

Utterance Force

Abstractly

- How to model the process by which utterances get particular forces?
- **Conversational state**: $c = \langle A_S, S, A_H \rangle$
  - S are mutual discourse assumptions/attention
  - A_S is speaker's private commitments
  - A_H is hearer's private commitments
- Sentential force: how ϕ updates S
- Utterance force: consequences of update to S for A_S and A_H

A Conversational State

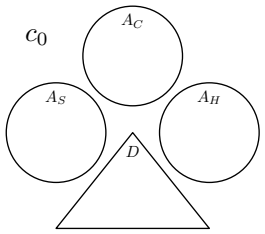


Figure: A conversational state

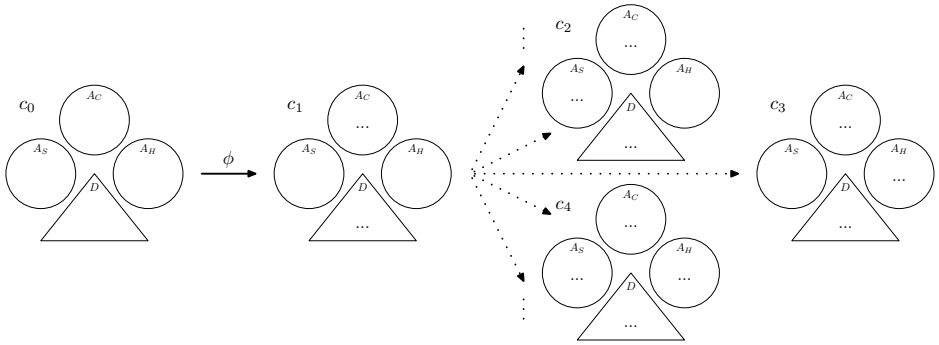


Figure: Semantic contribution and possible forces

Speech Acts

Underdetermination of Illocutionary/Utterance Force

(4) Judge: do 10 hours of community service! (*command*)

(5) Friend: do 10 hours of community service! (*sugg.*)

- What's the difference?
  1. Different intentions? Sure, but just that?
  2. Different private expectations about production/uptake
     - Different norms triggered by details of utterance situations; some learned, some not
- The plan:
  1. Spell out what norms are
  2. Show how they could generate an utterance force

The Judge's Norm

To Command

(4) Judge: do 10 hours of community service! (*command*)

1. Semantics of (4) generates shared preference for community service-worlds over non-
2. Utterance force of command:
   - Addressee is expected to adopt preference put forward by judge

Judge Magic Defer to the Judge's discourse contributions

The Friend's Plan

To Suggest

(5) Friend: do 10 hours of community service! (*sugg.*)

1. Semantics of (5) generates shared preference for community service-worlds over non-
2. Utterance force of command:
   - Speaker expected to have reasons for contribution
   - Hearer is expected to consider contribution

Friend Magic Provide help and consider help

Human Communication

What is it? Mutual Intention Recognition!

Mutual Intentional Communication

For X to communicate with Y using σ requires, at least:

(a) X has a communicative intention to affect X and Y's common ground with σ

(b) It is common ground between X and Y that Y recognizes that intention.

(e.g. Wilson & Sperber 1995; Clark 1996; Searle 1969)

The Structure of Communicative Acts

A Big Picture

1. Locutionary act:
   - Utterance has characteristic function of updating R
     - That update has structure, namely it modifies which contents are playing which roles
     - 'Roles' captures in general model of rational activities: preferring, choosing, asking, informing
2. Illocutionary act:
   - **Intentional**: Utterance with an intention to move into a particular (range of) conversational state(s)
     - Shaped by **goal-oriented action**
   - **Social**: Aligning that intention with the distribution/balance of utilities in a population
     - Shaped by **social dynamics**

A Research Project

Games, Conversational Situations and Equilibria

- Many important pilot cases to analyze
  - Quiz and Rhetorical questions
  - Sarcastic assertions
  - Resolving questions with imperatives
  - Resolving questions with questions
  - Indirect speech acts
    - Assuming that intended effect has been repeatedly derived from basic effect, Lewisian convention implies that a new convention for the sentence will come to be
- Many different ways of thinking about social structure game-theoretically (Bicchieri)

Thanks!

References I

Austin, JL (1962). *How to Do Things With Words*. Oxford: Oxford University Press.

Bromberger, S (1966). 'Questions.' *The Journal of Philosophy*, **63(20)**: 597–606. URL `http://www.jstor.org/stable/2024253`.

Clark, HH (1996). *Using Language*. New York: Cambridge University Press.

Faller, M (2002). *Semantics and Pragmatics of Evidentials in Cuzco Quechua*. Ph.D. thesis, Stanford University, Palo Alto, CA. URL `http://personalpages.manchester.ac.uk/staff/martina.t.faller/documents/Thesis.pdf`.

Frege, G (1918). 'Der Gedanke.' *Beiträge zur Philosophie des deutschen Idealismus*, **I**: 58–77. Page references to English translation: Frege (1956).

Frege, G (1956). 'The Thought: A Logical Inquiry.' *Mind*, **65(259)**: 289–311. Translated by P.T. Geach, URL `http://www.jstor.org/stable/2251513`.

Groenendijk, J (1999). 'The Logic of Interrogation: Classical Version.' In T Matthews & D Strolovitch (eds.), *Proceedings from Semantics and Linguistic Theory (SALT) IX*, 109–126. Ithaca, New York: Cornell University.

Hamblin, CL (1958). 'Questions.' *Australasian Journal of Philosophy*, **36(3)**: 159–168. URL `http://dx.doi.org/10.1080/00048405885200211`.

References II

Hausser, R (1980). 'Surface Compositionality and the Semantics of Mood.' In J Searle, F Kiefer & M Bierwisch (eds.), *Speech Act Theory and Pragmatics*, 71–96. Dordrecht: D. Reidel. URL `http://www.linguistik.uni-erlangen.de/clue/fileadmin/docs/rrh/papers/surface_compositionality_and_the_semantics_of_mood.pdf`.

Heim, IR (1982). *The Semantics of Definite and Indefinite Noun Phrases*. Ph.D. thesis, Linguistics Department, University of Massachusetts, Amherst, Massachusetts.

Hulstijn, J (1997). 'Structured Information States: Raising and Resolving Issues.' In A Benz & G Jäger (eds.), *Proceedings of MunDial'97*, 99–117. Munich: Unversity of Munich. URL `http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.26.6905`.

König, E & Siemund, P (2007). 'Speech Act Distinctions in Grammar.' In T Shopen (ed.), *Language Typology and Syntactic Description: Clause Structure*, vol. 1, 2nd edn., 276–324. Cambridge: Cambridge University Press. URL `http://dx.doi.org/10.1017/CBO9780511619427`.

Lewis, D (1979). 'Scorekeeping in a Language Game.' *Journal of Philosophical Logic*, **8(1)**: 339–359. URL `http://www.jstor.org/stable/30227173`.

Lewis, DK (1969). *Convention: A Philosophical Study*. Cambridge, Massachusetts: Harvard University Press.

References III

Millikan, RG (2005). *Language: A Biological Model*. New York: Oxford University Press.

Murray, SE (2014). 'Varieties of Update.' *Semantics and Pragmatics*, **7(2)**: 1–53. URL `http://dx.doi.org/10.3765/sp.7.2`.

Newell, A (1992). *Unified Theories of Cognition*. Cambridge, MA: Harvard University Press.

Portner, P (2004). 'The Semantics of Imperatives within a Theory of Clause Types.' In RB Young (ed.), *Proceedings from Semantics and Linguistic Theory 14*, 235–252. Ithaca, NY: CLC Publications. URL `http://semanticsarchive.net/Archive/mJlZGQ4N/PortnerSALT04.pdf`.

Portner, P (2007). 'Imperatives and Modals.' *Natural Language Semantics*, **15(4)**: 351–383. URL `http://dx.doi.org/10.1007/s11050-007-9022-y`.

Portner, P (2012). 'Permission and Choice.' In G Grewendorf & TE Zimmermann (eds.), *Discourse and Grammar: From Sentence Types to Lexical Categories*, Studies in Generative Grammar. Berlin: Mouton de Gruyter. URL `http://semanticsarchive.net/Archive/jI1YjMyY/Permission_Choice_Portner.pdf`.

Ramsey, FP (1931). 'Truth and Probability.' In R Braithwaite (ed.), *The Foundations of Mathematics: Collected Papers of Frank P. Ramsey*, 156–198. London: Routledge.

References IV

Roberts, C (1996). 'Information Structure in Discourse: Towards an Integrated Formal Theory of Pragmatics.' In JH Yoon & A Kathol (eds.), *OSU Working Papers in Linguistics*, vol. 49. Columbus, Ohio: Ohio State University Press. References to Roberts (2012).

Roberts, C (2012). 'Information Structure in Discourse: Towards an Integrated Formal Theory of Pragmatics.' *Semantics and Pragmatics*, **5(6)**: 1–69. URL `http://dx.doi.org/10.3765/sp.5.6`.

Scott-Phillips, TC (2008). 'Defining Biological Communication.' *Journal of Evolutionary Biology*, **21(2)**: 387 – 395. URL `http://search.ebscohost.com.proxy.library.cornell.edu/login.aspx?direct=true&db=a2h&AN=28807716&site=ehost-live`.

Searle, JR (1968). 'Austin on Locutionary and Illocutionary Acts.' *Philosophical Review*, **77**: 405–424. URL `http://www.jstor.org/stable/2183008`.

Searle, JR (1969). *Speech Acts*. Cambridge, England: Cambridge Univesity Press.

Stalnaker, RC (1978). 'Assertion.' In P Cole (ed.), *Syntax and Semantics 9: Pragmatics*, 315–332. New York: Academic Press. References to Stalnaker 1999.

References V

Stalnaker, RC (1999). *Context and Content: Essays on Intentionality in Speech and Thought*. Oxford: Oxford University Press.

Starr, WB (2013). 'A Preference Semantics for Imperatives.' Ms. Cornell University, URL `http://williamstarr.net/research/a_preference_semantics_for_imperatives.pdf`.

Veltman, F (1996). 'Defaults in Update Semantics.' *Journal of Philosophical Logic*, **25(3)**: 221–261. URL `http://dx.doi.org/10.1007/BF00248150`.

Wilson, D & Sperber, D (1995). *Relevance: Communication and Cognition*. 2 edn. Oxford: Blackwell.