

**Meaningful talk:
signs as signals**

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Outline

1. Motivation: signs as signals
2. Three models of *rendez-vous*: cheap talk, costly talk, and meaningful talk
3. Linguistics: language is not empty
4. Implications for unilateral communication using natural language
5. Closing remarks

1. Motivation

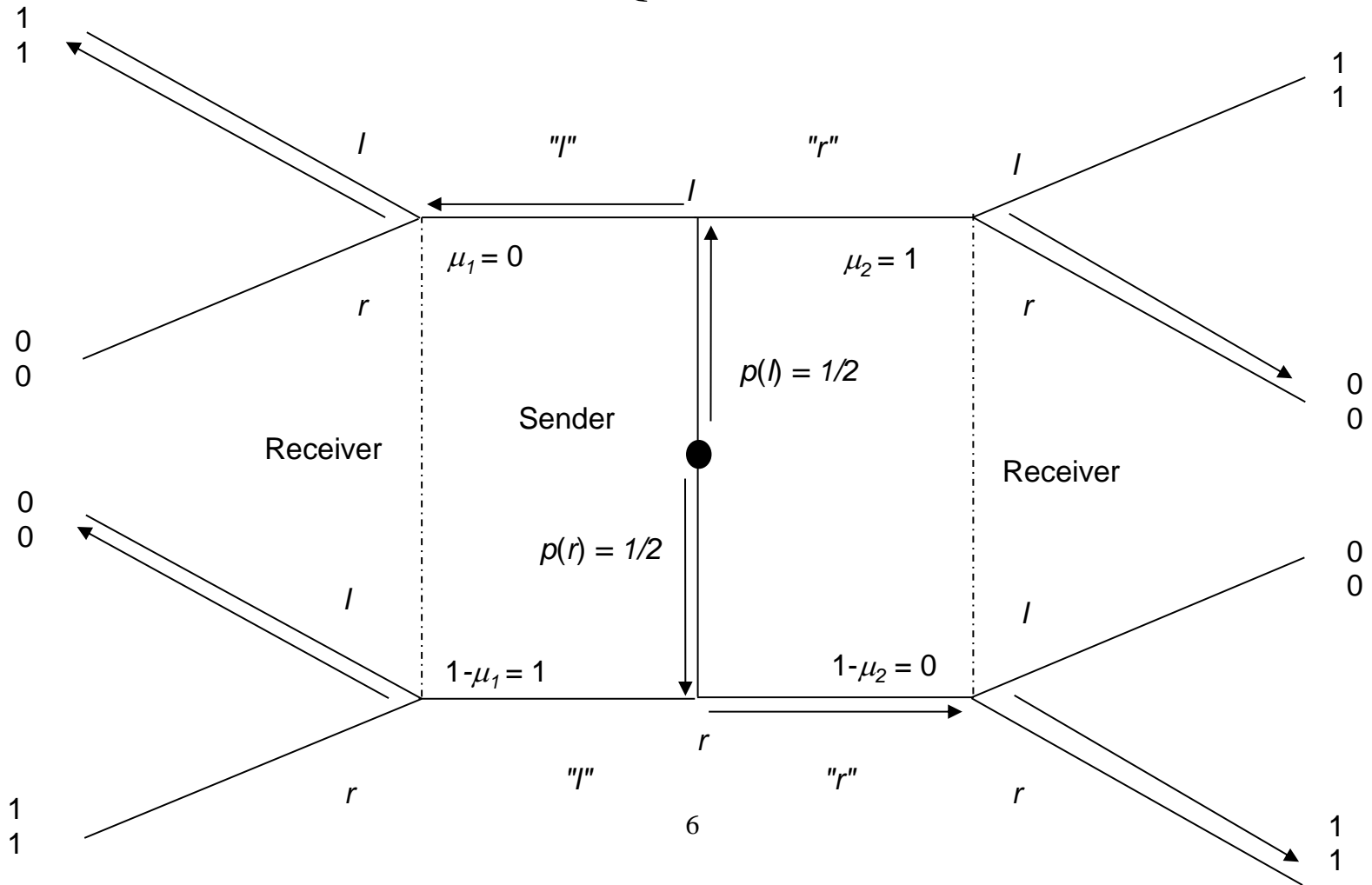
- Place language within literature on signaling: signs (linguistics) as signals (game theory)
- Signal: informed sender sends intentional message to uninformed receiver (burn bridges in Schelling 1960)
- Subset of signaling models: cheap-talk games where signals are payoff-irrelevant
- But cheap-talk is empty talk
- Costly-talk models: cost of misrepresentation for senders, but no restriction on receivers
- Here: meaning of messages used in communication process must be shared by both players

1. Three models of *rendez-vous*

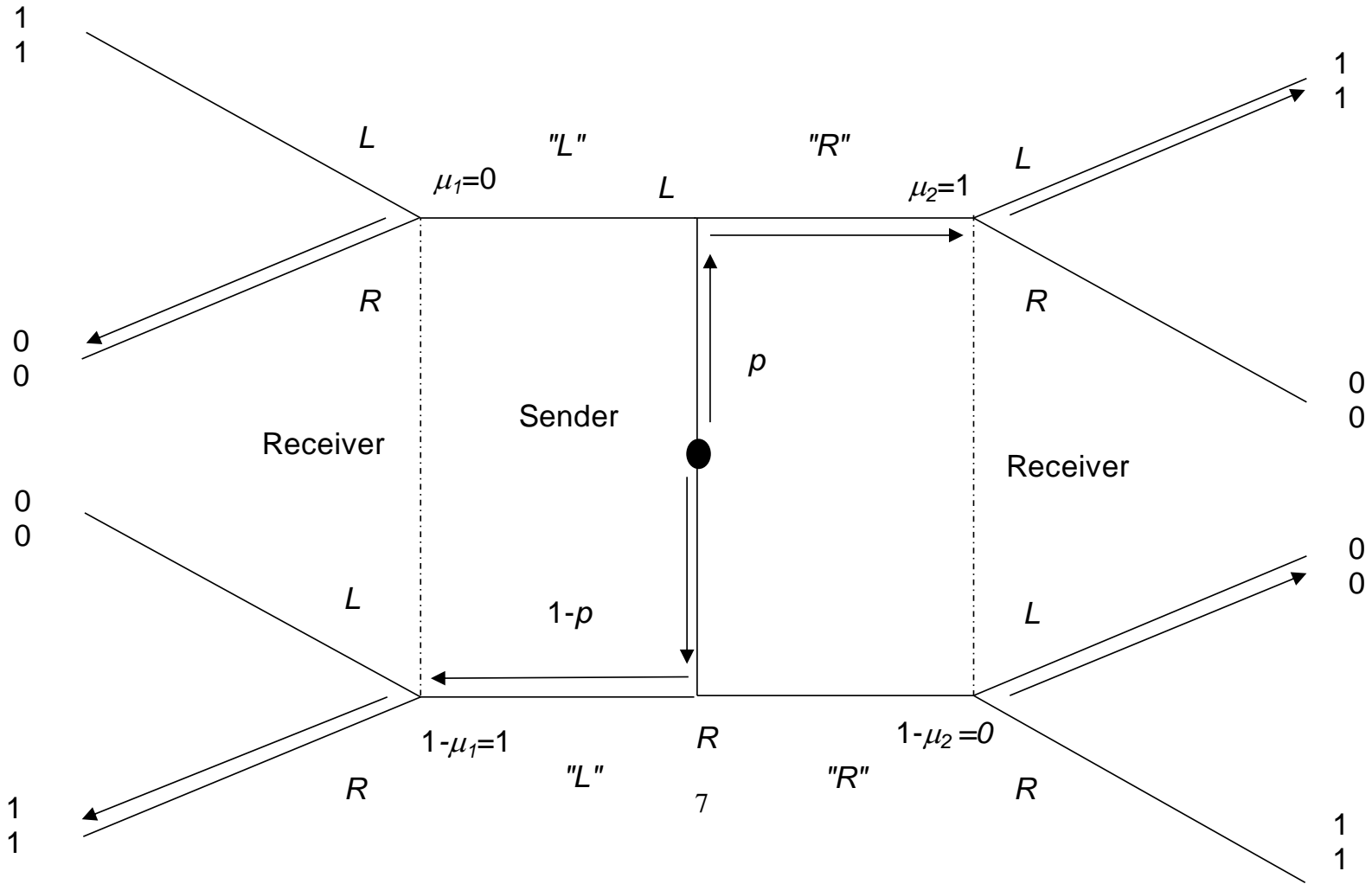
- Analyze classic example from philosophy of language with three different models
- **Cheap talk:** unilateral communication between sender and receiver when signals are payoff-irrelevant (Crawford and Sobel 1982)
- How do seller and buyer get together in decentralized market for used cars?
- Four pieces of information: a car is for sale, seller's phone number, meeting time and meeting place
- Focus here on meeting place: this is pure coordination game

- Two sender types: left (L) and right (R)
- Priors: both types equally probable
- No communication: Bayesian Nash equilibrium where receiver plays each pure strategy half the time
- Talk may allow coordination
- Uninformative (babbling) equilibrium where the message does not depend on types
- Informative equilibria: when “ R ” refers to R and “ L ” refers to L , but also the opposite
- Epistemic problem: verbal information — only information actually added through communication — not taken into account in updating priors

CHEAP TALK: NATURAL (SENSIBLE) INFORMATIVE EQUILIBRIUM

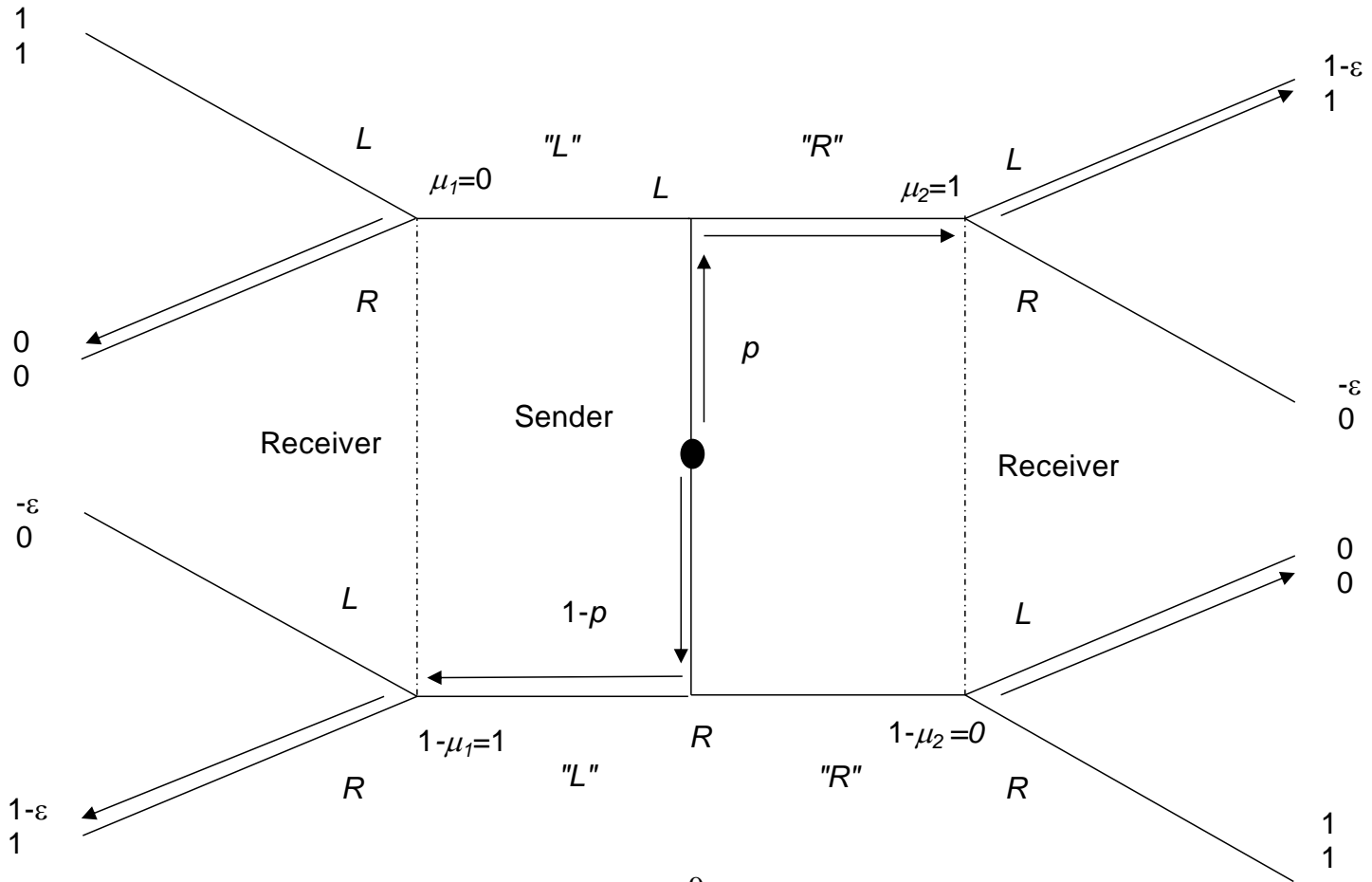


CHEAP TALK: UNNATURAL (UNSENSIBLE?) INFORMATIVE EQUILIBRIUM



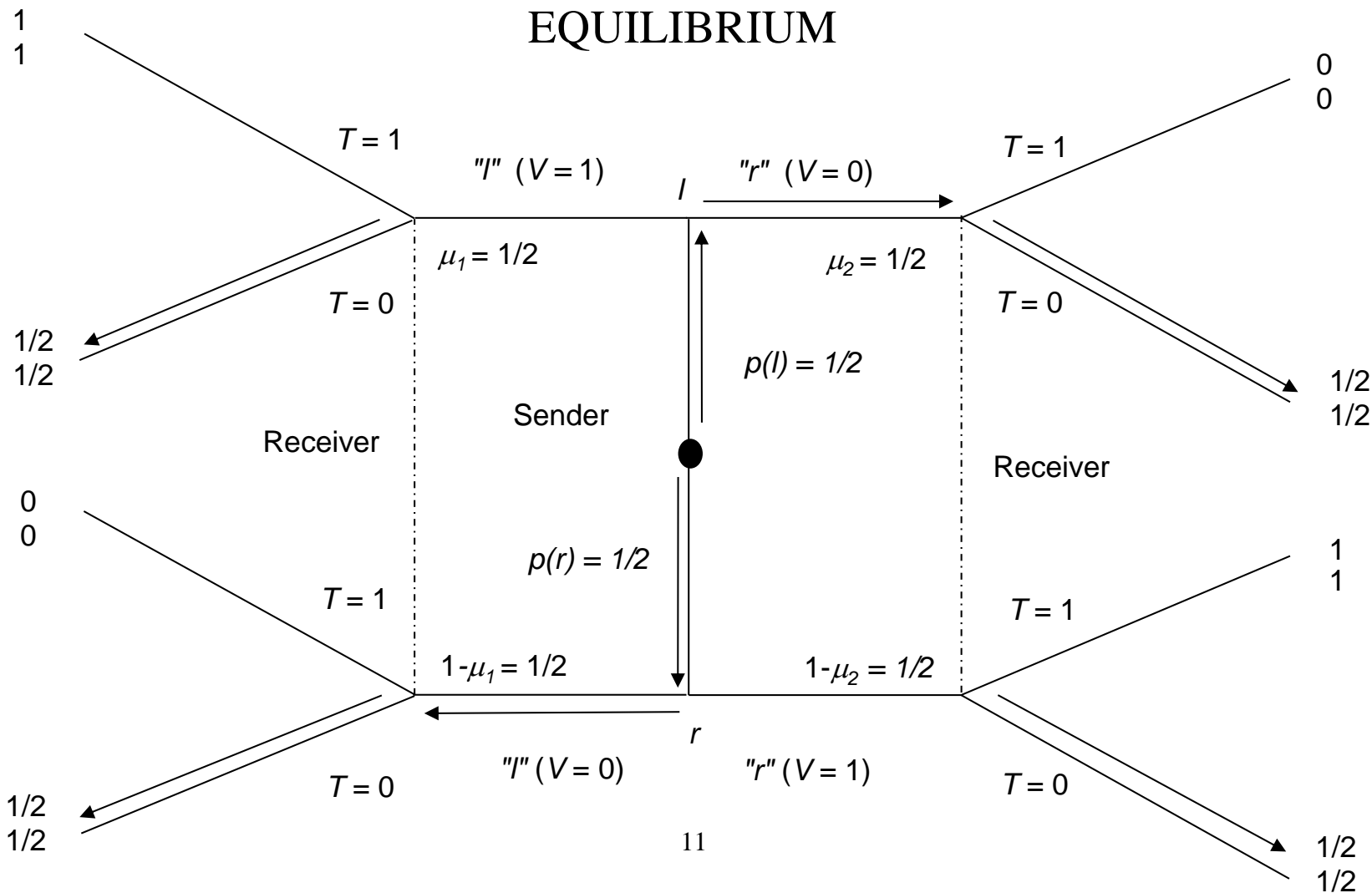
- **Costly talk** (Kartik, Ottaviani and Squintani 2007): misrepresenting type has a cost for sender, because of moral costs or because lies have to be fabricated
- Hence, messages have literal meaning for the sender
- No uninformative (babbling) equilibrium: if receiver disregards message, best strategy for the sender is to tell the truth; but if the sender tells the truth, the best strategy is for the receiver to trust the message
- Informative equilibrium where “ R ” refers to R and “ L ” refers to L , but also opposite: does not take into account fact that language has a literal meaning for receiver too

COSTLY TALK: UNNATURAL (UNSENSIBLE?) INFORMATIVE EQUILIBRIUM



- **Meaningful talk:** language has literal meaning for both senders and receivers
- Linguistics 101: sender has to use a shared code
- Furthermore, with asymmetric information, the only observable is the message (i.e., the sign):
 - (a) Receiver can understand meaning if and only if sender uses common natural language;
 - (b) Information updating done through the verbal information actually uttered: we assume that the receiver may either trust the message's literal meaning, or the common understandings it conveys, or disregard it, sticking to its priors

MEANINGFUL TALK: NO UNNATURAL INFORMATIVE EQUILIBRIUM



- Communication with language implies lead of faith: Bayesian updating based on verbal messages is not like Bayesian updating based on hard evidence
- Possibility of both trust and mistrust equilibria
- In trust equilibria, receiver accepts messages as true and uses messages to update beliefs
- In mistrust equilibria, receiver ignores verbal messages; since there is no new information, there is no updating of priors

3. Linguistics: language is not empty for receivers

- Receiver can understand literal meaning if and only if sender uses common natural language to utter message "*m*".
- Lost in Translation: scene where the Director speaks to Bob about Suntory Time commercial (taken from Motoko Rich, "What Else Was Lost in Translation", *New York Times*, September 21, 2003, and Wordreference Forum)

- If the message is not taken at face value, there are infinite ways of reinterpreting a message, once one goes outside the ordinary interpretation
- There is no clear alternative interpretation of the message other than what the context leads to expect, so messages that are not trusted are interpreted in terms of the priors: see two examples
- Example (i): if the message “I am at the information booth in Grand Central Station” is not trusted in the game of *rendez-vous* seen before, instead of second-guessing whether this message might instead mean something else like “I am in the lobby of the

Chrysler Building”, the receiver returns to its diffuse priors that any place is equally likely.

- Example (ii): in market for lemons, receiver mistrusts the message “This car is in great shape”. Interpreting the message in terms of the priors, as a claim that all types make regardless of quality, is natural given the strategic incentive for owners of lemons to inflate their claims.

4. Implications for unilateral communication

- An equilibrium is given by strategies, beliefs, and trust-functions $\tilde{\omega}^S$, $\tilde{\sigma}^S(w)$, $\tilde{\sigma}^R("m")$, $\tilde{\mu}("m")$, $\tilde{T}^R("m")$ that satisfy conditions (1) through (3):
 - (1) $\tilde{\sigma}^S(w)$ is best responses to $\tilde{\sigma}^R("m")$;
 - (2) $\tilde{\sigma}^R("m")$ is best response to $\tilde{\sigma}^S(w)$ given $\tilde{T}^R("m")$, and value of $\tilde{T}^R("m")$ is best response given what senders do
 - (3) A message " m_j " \in " \mathcal{M} " may either be mistrusted, so there is no new information and receiver sticks to priors, or trusted, so updating is done using the verbal message.

5. Final Remarks

- Messages comprehensible if and only if common language used, but have to infer equilibrium meaning
- Natural language may convey information about types though it provides no direct evidence
- Goal: combine game theory and linguistics to place semantic issues within idealized pragmatic setup (Wittgenstein: look at word use, i.e., pragmatics)