Introduction

Cooperation

In Linguistics:

Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged. (Grice, 1975)

In Biology:

Cooperation means that selfish replicators forgo some of their reproductive potential to help one another. (Nowak, 2006)

The Tragedy of the Commons (Hardin, 1968)

- Senders have an incentive to deceive receivers
- If senders have incentive to deceive, receivers shouldn’t listen
- If receivers don’t listen, senders have no incentive to signal

Mechanisms (Scott-Phillips, 2010)

Indices (Rely and McComb, 2003)

Handicaps (Zahavi, 1975)

Deterrents (Trivers, 1971)

Conscience is the inner voice that warns us somebody may be looking. (Mencmen, 1949)

Question: How do conflicts of interest shape signaling over time?

Evolutionary Game Theory

Signaling Games (Lewis, 1969)

Evolutionarily Stable Strategies

Conditions for stability in a population (Maynard Smith, 1982). For asymmetric games, only Strict Nash Equilibria are evolutionarily stable strategies (ESSs) (Selten, 1980):

Definition 1. A strategy profile \((s^*, r^*)\) is a Strict Nash Equilibrium if and only if:

\[ \forall s \neq s^*, E[U(s, s^*, r^*)] > E[U(s^*, r^*, r^*)] \]

\[ \forall r \neq r^*, E[U(s^*, s^*, r) > E[U(s^*, r, r^*)] \]

Conflicts of Interest (Crawford and Sobel, 1982)

\[ U_{S}(t, a) = -(a - [t + b])^2 \]

\[ U_{B}(t, a) = -(a - t)^2 \]

Game Structure

- Set of states \(T = \{t_0, t_1\} \)
- States equiprobable, \(\delta(t_0) = \delta(t_1) = \frac{1}{2} \)
- Set of messages \(M = \{m_1, \ldots, m_k\} \)
- Set of actions \(A = \{a_0, a_1, a_2\} \)
- Conflict \(b \in [0, 1] \)

Results

Separating, Cycling, Pooling

- For \(b < \frac{1}{2} \), separating equilibria are ESSs
- For \(b > \frac{1}{2} \), no separating equilibria, no ESSs
- For \(b > \frac{3}{4} \), pooling equilibria are neologism proof (Farrell, 1993)

Linguistic Cycles

Jespersen’s Cycle:

The original negative adverb is first weakened, then found insufficient and therefore strengthened... and this in turn may be felt as the negative proper and may then in the course of time be subject to the same development as the original word. (Jespersen, 1917)

Motives for change:

Emphatic negation tends to increase in frequency due to pragmatically motivated overuse... an obligatory element cannot be emphatic, for to emphasize everything is to emphasize nothing. (Kiparsky and Condoravdi, 2006)

Future Directions

- Nature of and distribution over type space
- Game dynamics (Hofbauer and Sigmund, 1998)
- Process of neologism formation and introduction

References


