IC: Signals (Information)

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Many Interesting Variations on Reveal

- Basic IC Assumption:
  - payoff is revealed only *at* the end of the queue or privately only to the *agent*

What info do ***you*** have?

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What do later agents know about your info??

Possibilities

- Reveals publicly immediately after action?
- Reveals different based on action?
  - public/private? Learning by doing?
- Reveals different based on value?
- Reveals only if you pay for private info (S7)?
- Reveals only if you pay for predecessor info (S7.2)?
- Reveals with some noise? or bias?

Signal

- Perfect signal, known by agent.
  - correct IC, all the time
- Perfect signal, not known by agent
  - same as perfect signal
- Occasional signal
  - or heterogeneous signal quality
  - usually same as imperfect signal

More Interesting: Asymmetric Signals

- could learn perfectly if opt is A but not if opt is R
  - can we IC on R?
  - can we IC on A?

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- could learn perfectly if opt is A but not if opt is R
  - can we IC on R?
  - can we IC on A?
- think of perfect signal in one but not other case.

More Interesting: Costly Signals

- what if buying a signal costs c, where c is modest?
  - can we still IC? if so, sooner or later?

Beyond Binary Signals

- Brunnermeier "partial cascades" = for some signal values but not others.

Continuous Signals, Unbounded

- knife edge?
- Rosenberg-Vielle (2019)
- $$\int_q \frac{1}{[1 - F(q)]} \, dq$$
- With tiny tails, drawing extremes takes a long time.

Continuous Signals, Bounded

Signal From Action?

- Contrary action presumably means high info or private information or no public access.
- Appears even in lab settings.
  - Must be programmed in?
  - **Overconfidence**
  - How could this have survived natural selection?
  - Evolution could explain smart fish, dinosaurs, birds, monkeys, mollusks, or moss
    - very flexible theory (and random)
    - makes sense of observed, not easily predictive

Bernardo-Welch (2001)

- Took many rejections and years to publish
- Now reasonably well cited
  - Gans-Shepherd, 1994, How Are the Mighty Fallen: Rejected Classic Articles by Leading Economists.
  - Bernardo-Welch is *not a* classic article!
  - research is somewhat random, sort of like evolution.

Group Selection

- First-gen literature on group selection
  - Spock: "The needs of the many outweigh the needs of the few"
  - Happiness and altruism does not help a gene propagate
  - why would a single emperor penguin not shirk and refuse to move to the outside?
- Mostly wrong ... and poisoned the pool!

- Second-gen literature gene-based (Hamilton's rule)
  - altruism to save sibling can enhance gene survival
  - alas, you have most self genes.
  - necessary ingredient: first-order benefit to group, second-order cost to oneself.
- Alternative: group exclusion (ostracism)
  - when shirking is detectable

Third-Gen Group Selection “Attempt”

- Individuals suffer modest loss to altruism
  - altruism here is showing private info by acting on it
  - IC means modest probability of error (herd is prone)
  - “D”ove = altruist.
    - Teenagers? Overconfident Entrepreneurs? Stunt Males?
  - “H”awk = non-altruist
    - Doves get coockood; hawkish genes take over
    - European males (hawks) who sat out WW1? Good for your genes!
    - Ukrainian non-combatants!
    - Not normative, but descriptive.

- Group gains great benefit from altruism
  - exploration avoids dead ends for the *many*, possibly very large communities.
  - think steam engines
  - think EVs

Model

- Draw groups from frequency distribution, pit them against one another.
  - one group wins, probabilistically, based on rltv d&h
  - the loser group is killed.
  - the winner group expands in frequency in “redraw” pool
- Within winner group, the hawks will gain.

Rough

- 1/3 groups with 20% haws, 80% ents
- 2/3 groups with 60% hawks, 40% ents

- draw 20 vs 20 (1/3*1/3);
- draw 60 vs 60 (2/3*2/3);
- draw 20 vs 60 (2/3 * 1/3 * 2)

- same vs same : type-same survives but hawks gain.
  - say 20 to 21.
  - next gen: no 20% group, but 21% group.
- same vs other : 60% (more often) dies out
  - have 45% groups with 21% altruists
  - have 55% groups with 66% altruists

- irrelevant, but altruists in population just increased from 1 – 0.47 to 1 – 0.43.

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Q: Can 100% hawk groups survive?

Q: Can 100% dove groups survive?

- 100% only if without mutations; otherwise unstable, esp doves

Model Strength

- uses ICs in explanation
- can explain patently irrational behavior
- can explain effect on ICs

- beautiful (though not closed form) solution

Model Weaknesses

- No genetic basis
- Survival game not based on biological evidence.
- needs harsh survival parameters
  - not clear if this is wrong.
  - evolution is a harsh mistress

Wheels Reinvented Repeatedly

- Welch-Bernardo (2001): overconfident agents
- Khanna-Slezak (2000): assign special agents
- (Callander-Hoerner (2009): minority with counts)
- ADLO (2011): sacrificial lambs
- Arieli (2023): condescending agents

- Opposite: correlation neglect (Eyster-Rabin, Enke-Zimmermann): not realize same source of info, overcount. more prone to follow