

Outline

Norms of Communication

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① Communication and Conflict

② Tools from Philosophy of Language

③ Social Norms

Natural Communication

Male Túngara Frog Calls

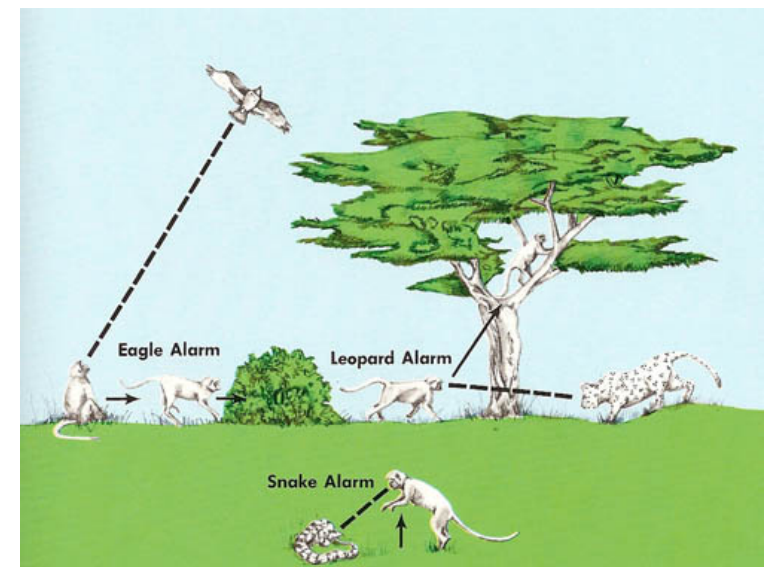


- Call: whine and low-pitched 'chucks'
- Females: prefer more, lower chucks
- Females use general echo-location abilities to find male

(Gillam 2011; Maynard Smith & Harper 2003; Ryan 1985)

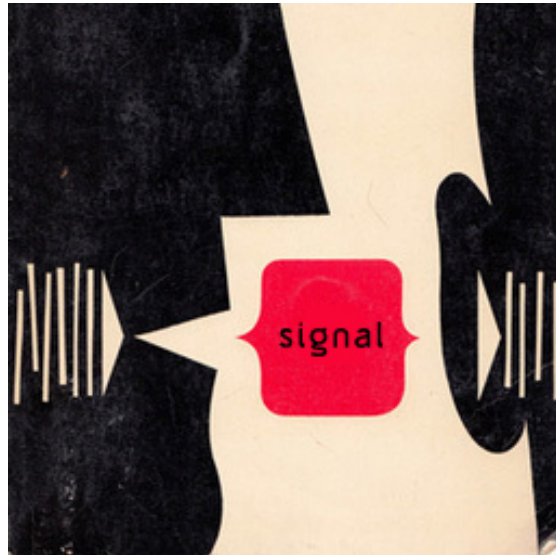
Natural Communication

Vervet Alarms (Cheney & Seyfarth 1990)



Natural Communication

Human Media: speech, text, images, gesture



Communication is Risky Business

Or: How Bats Ruin Frog Dates



Communication is Risky Business

Or: *Photuris versicolor* femme fatale

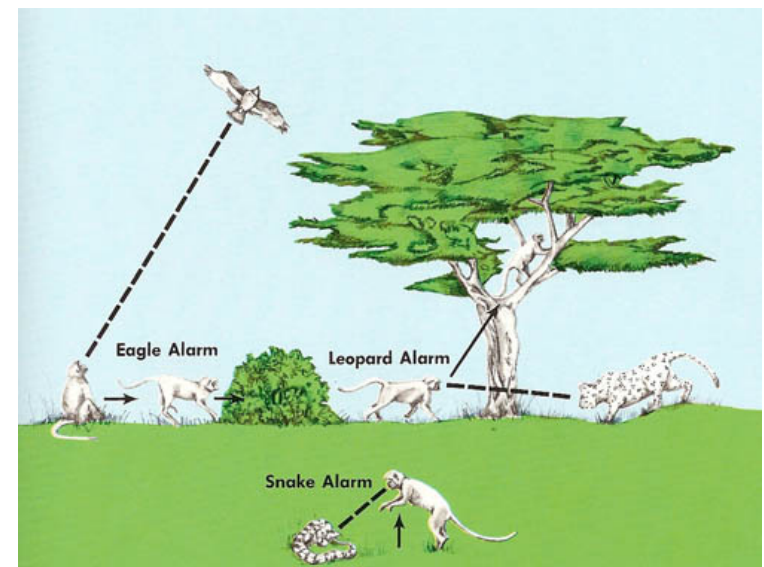


(Lloyd 1975; Stegmann 2009)

- Females prey on males of multiple *Photuris* species
- Mimic mating flash of that species, then eat male
- Produce a special flash for conspecifics, don't eat them

Communication is Risky Business

Vervets Lie (Cheney & Seyfarth 1990)



Communication is Risky Business

Humans Lie a Lot! (Feldman et al. 2002)

- 60% of humans lie every 10 mins (Feldman et al. 2002)



Communication is Risky Business

Humans Lie a Lot! (Feldman et al. 2002)

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Human Communication is Risky Business

Beyond Lying

For Hearers

- Psychological harm (e.g. hate speech, gaslighting)
- Misleading/Manipulation
- Social risks (e.g. guilt by association)

For Speakers

- 'Punishing messenger'
- Social risks (e.g. shaming, no uptake, misconstrual)

Natural Communication

The Central Problem (Maynard Smith & Harper 2003: Ch.1)

The Basic Question

How can communication persist in a hostile environment?

- How can signals provide reliable information at all?

Some Answers (Maynard Smith & Harper 2003)

- 1 Indices and handicaps (costly signals, natural meaning)
 - *Handicap*: cost of production is lower when accurate
 - *Index*: cannot be inaccurate
- 2 Common interest (e.g. toxic insect coloring)
- 3 Reputation/social memory (vervet liars are ignored)
- 4 Punishment...

Why Reputation Alone

Doesn't Work for Humans

The Basic Question

How can communication persist in a hostile environment?

- How can signals be reliable when interests conflict?
- Reputation can explain this when:
 - 1 Deception not widespread
 - Can only ignore so many individuals before a communication system will break down
 - 2 All members of the population interact repeatedly
 - Or are linked through trusted proxies
- Great for vervets, not so great for humans

The Basic Question

And Orthodox Tools in Philosophy of Language

The Basic Question

How can communication persist in a hostile environment?

- How can signals be reliable when interests conflict?

Tools from Philosophy of Language

- 1 Signaling Games/Conventions (Lewis 1969)
- 2 Communicative Intentions (Grice 1957)
- 3 Conversational Scorekeeping (Stalnaker 1978; Lewis 1979)

Claim

None of these three tools help answer the Basic Question

Communication as a Coordination Problem

Lewis (1969) on Convention and Signaling Games

Example Coordination Problems

- 1 We want to meet, but we don't care where.
- 2 Several of us are driving on a road.
- 3 Hunt rabbits separately and eat poorly; hunt stags together and eat well, but one deserter will ruin it.

Communication as a Coordination Problem

- One of several alternative states $s_1, \dots, s_m$ holds. I'm in a good position to tell which; you're not.
- I want to use a signal to relay this information.
- My choice of signal depends on how you construe it.
- But how you construe it must depend on which signal I choose to convey this information.

Coordination Problems

What are They?

- Two or more agents must choose one of several actions
- Outcomes depend on actions chosen by other agents
- Pure coordination problem: each combination of actions leads to outcome of equal value to agents

	You go to Luigi's	You go to Fabio's
I go to Luigi's	1, 1	0, 0
I go to Fabio's	0, 0	1, 1

Table: Payoff Matrix for Restaurant Rendezvous

Coordination Problems

Why are Solutions Stable?

	You go to Luigi's	You go to Fabio's
I go to Luigi's	1, 1	0, 0
I go to Fabio's	0, 0	1, 1

Table: Payoff Matrix for Meeting Coordination Problem

- **Important property:** no agent can do better by changing their action alone (each combination of strategies is a *Nash Equilibrium*)
- **Important property:** no agent would have done better if *any* agent had alone acted differently (each combination of strategies is a *Coordination Equilibrium*)

Communication as Coordination

An Example

Example (Sexton and Paul Revere)

- 0 lanterns for 'go home', 1 for 'Red Coats are coming by land', 2 for 'Red Coats are coming by sea'
- *Receiver:* Paul Revere; *Sender:* Sexton; *Signals:* 0, 1, 2
- *States:* no attack coming s_0 ; by land s_1 ; by sea s_2
- *Actions:*
 - Sexton: send 0, 1 or 2
 - Revere: go home r_0 ; defend road r_1 ; defend port r_2
- Possible Sender Strategies: each pairing of states w/a unique signal; encoding strategy.
- Possible Receiver Strategies: each pairing of signals w/a unique response; decoding strategy.

Back to Basics

Human Communication as a Coordination Problem?

The Basic Question

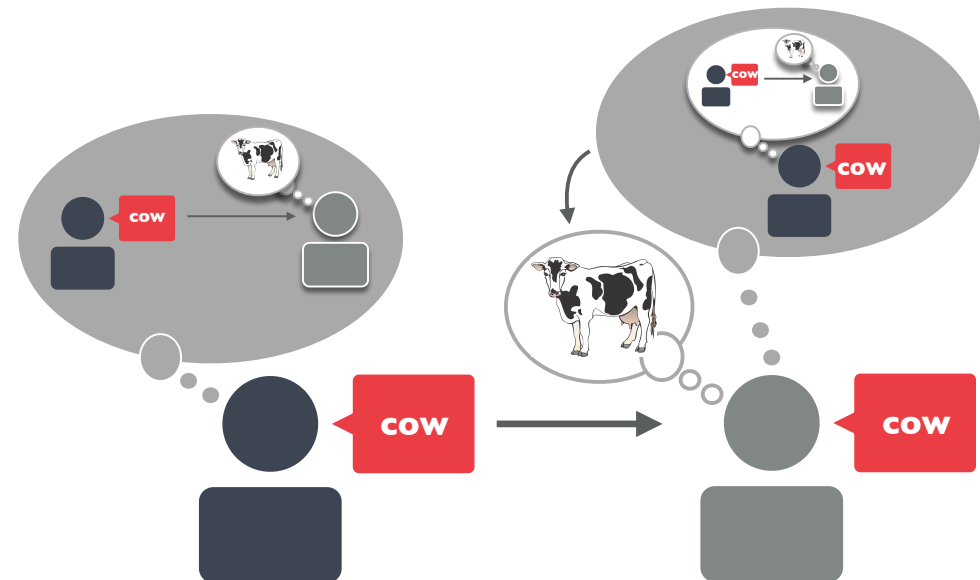
How can communication persist in a hostile environment?

- How can signals be reliable when interests conflict?

Human Communication $\neq$ Coordination

- Lewis' (1969) model *is* appropriate to particular instances of human communication
 - E.g. Sexton and Revere
- But explains how that communication emerges in terms of common interests
 - Like poisonous frog coloring
- Provides no insight about how communication can emerge when interests conflict

COMMUNICATIVE INTENTIONS



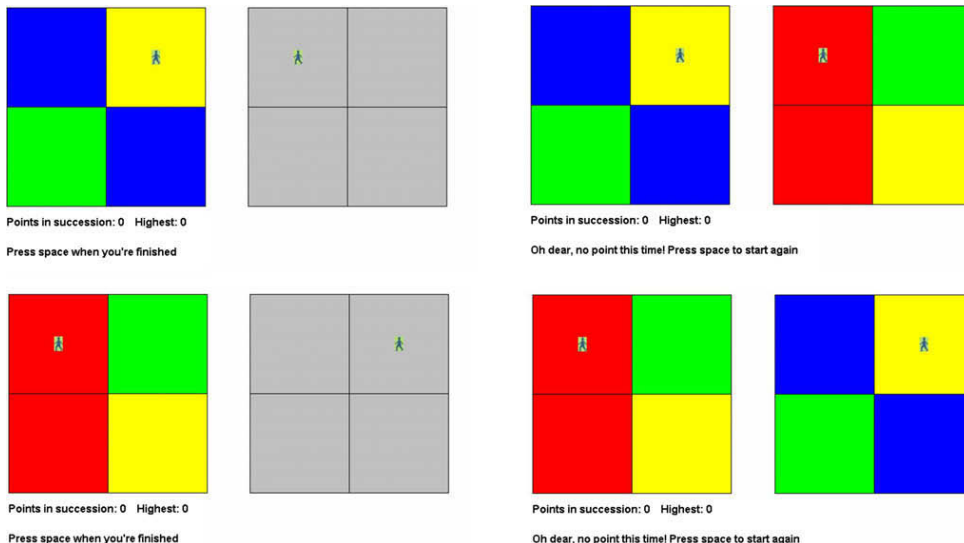
Communicative Intentions

More Precisely

Communicative Intention (Grice 1957)

Using a signal σ , X **intends** to bring about some particular effect in Y 's state of mind by means of Y **recognizing** X 's intention to do so.

- Communication happens via recognizing communicative intentions
- Enforces *some* transparency between speaker and hearer
- But: how exactly do communicative intentions **enable communication**?
- And **when** do they have this power?



- *Setup*: player only knows colors of own squares, but sees squares other player visits; played repeatedly, colors distributed randomly; can move in each direction, finish.



Cognition

journal homepage: www.elsevier.com/locate/COGNIT



Signalling signalhood and the emergence of communication

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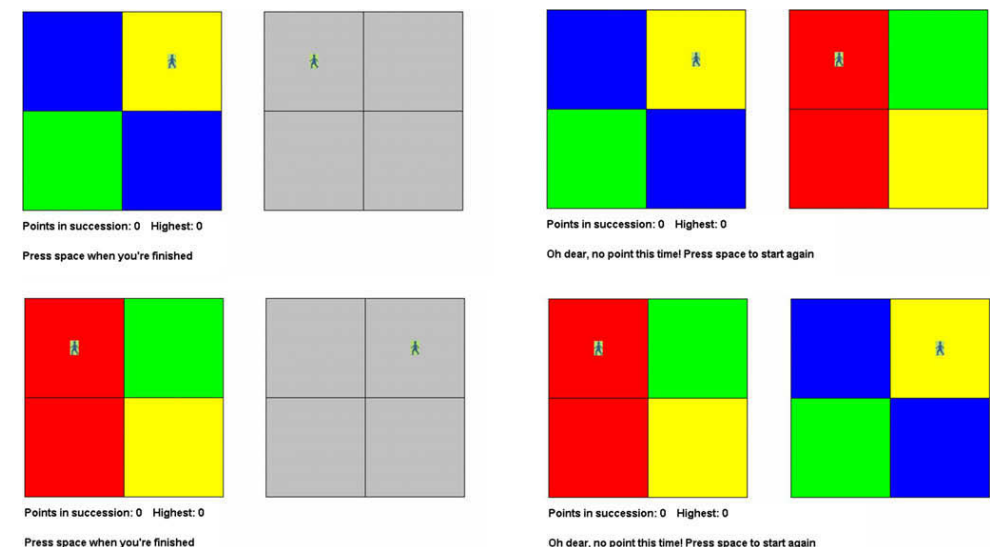
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ABSTRACT

A unique hallmark of human language is that it uses signals that are both learnt and symbolic. The emergence of such signals was therefore a defining event in human cognitive evolution, yet very little is known about how such a process occurs. Previous work provides some insights on how meaning can become attached to form, but a more foundational issue is presently unaddressed. How does a signal signal its own signalhood? That is, how do humans even know that communicative behaviour is indeed communicative in nature? We introduce an experimental game that has been designed to tackle this problem. We find that it is commonly resolved with a bootstrapping process, and that this process influences the final form of the communication system. Furthermore, sufficient common ground is observed to be integral to the recognition of signalhood, and the emergence of dialogue is observed to be the key step in the development of a system that can be employed to achieve shared goals.

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- *Setup cont'd*: players receive **equal cash prize** if their avatars are on the same square; else nothing.

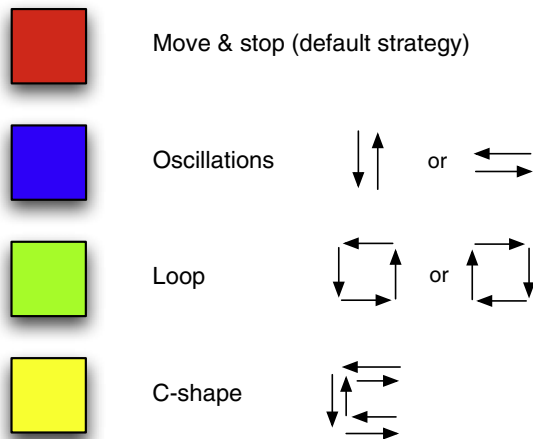


Fig. 2. A typical emergent system. In this communication system red is the default colour. If participants have a red square, they move to it and wait. If they do not have red they will signal one of the other colours by using the movements indicated. If one participant signals a colour that the other participant also has, that participant will move to the relevant square and hit space to end their turn. Otherwise, the participants will signal alternative colours until an agreement is reached. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)



- 12 pairs, played an average of 207 rounds
 - 7 reported some communicative success
 - Scores: 83, 66, 54, 49, 39, 17, 14
 - 5 reported none
 - Scores: 7, 5, 4, 3, 3
- 5 of 7 successful cases evolved as above
- 2 others were unilaterally imposed by one player, until the other recognized it (54, 39)

Communicative Intentions

Enable Communication (Scott-Phillips et al. 2009)

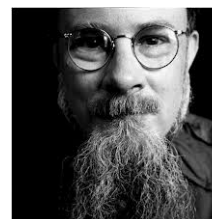
Role of Communicative Intentions (Scott-Phillips et al. 2009)

- How is a pattern of movement recognized as a signal?
- By recognizing that it is accompanied by a **communicative intention**!
- Recognizing communicative intentions allows **communication to emerge**

The Basic Question Again

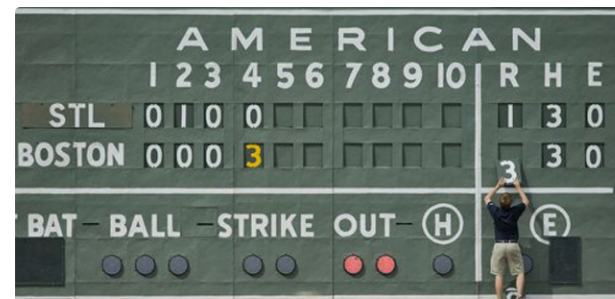
- Scott-Phillips et al.'s (2009) task is a **coordination game**
- A game with conflicting interests would stifle communication, communicative intentions or no
- Communicative intentions no help when interests conflict

SCOREKEEPING



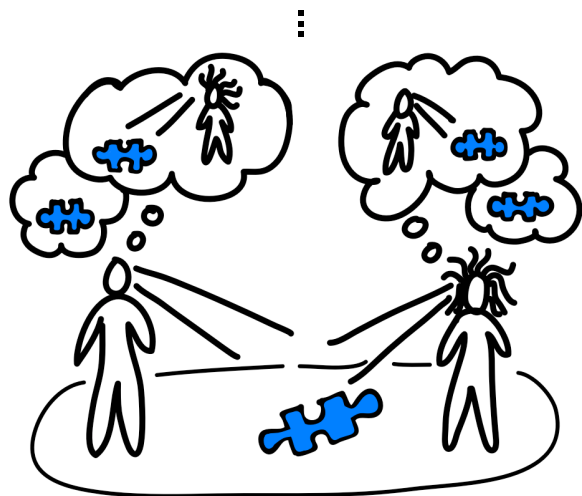
WITH ANY STAGE IN A WELL-RUN CONVERSATION, OR OTHER PROCESS OF LINGUISTIC INTERACTION, THERE ARE ASSOCIATED MANY THINGS ANALOGOUS TO THE COMPONENTS OF A BASEBALL SCORE.

(LEWIS 1979, "SCOREKEEPING IN A LANGUAGE GAME")



Common Ground

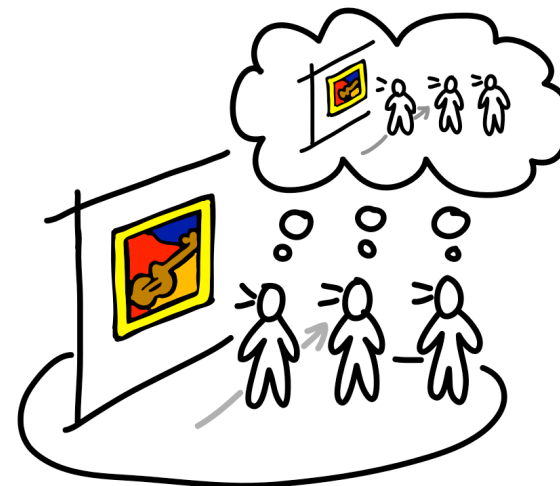
One Aspect of Scorekeeping



<http://www.stefanomastrogiacomio.info/common-ground/>

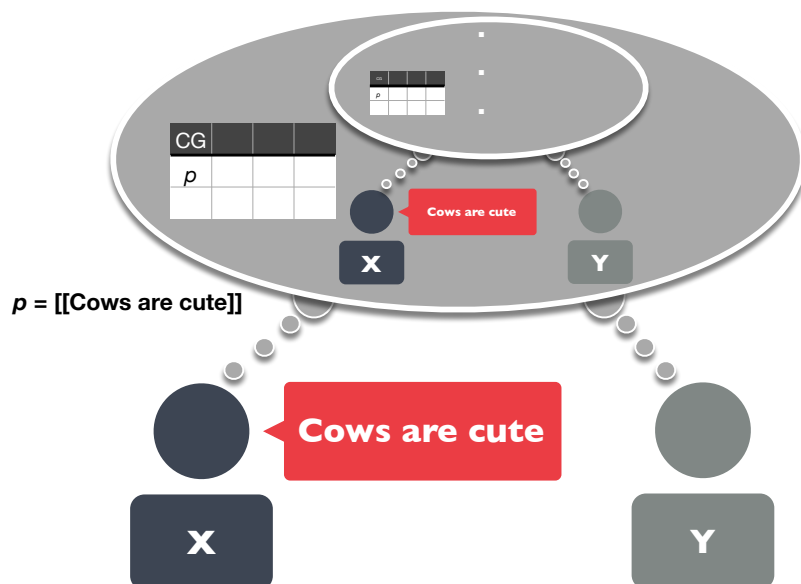
Common Ground

One Aspect of Scorekeeping



<http://www.stefanomastrogiacomio.info/personal-common-ground-2/>

SCOREKEEPING



Common Ground in More Detail

Fagin et al. (1995: §6.1), Clark (1996: Ch.4), Stalnaker (2002)

Common Ground (CG)

For any proposition p , if (a) holds, then p is **common ground** between X and Y .

- (a) Both X and Y are assuming that p , both X and Y are assuming that both X and Y are assuming that p , both X and Y are assuming that both X and Y are assuming that both X and Y are assuming that p ...

Crucial Point

Common ground is defined in terms of what agents are assuming for the purposes of their exchange.

- Necessary if agents don't already have all the same beliefs
- Necessary if agents want to 'set aside differences'

The Basic Question

And Scorekeeping

Scorekeeping vs. Communicating

- p being CG for X and Y doesn't entail X and Y believe p
- **Good news:** scorekeeping model applies even when beliefs/interests conflict
- **Bad news:** scorekeeping doesn't model how information is *communicated* from one agent to another at all

Prisoner's Dilemma

Game of Conflict

A Prisoner's Dilemma

- 1 *Bob* and *Mike* to be interviewed separately by detective
- 2 Common knowledge: detective has conclusive evidence they committed minor crime
- 3 Not enough evidence to convict for suspected major crime
- 4 Each can *Inform* by admitting to major (joint) crime
 - If only one informs, informer gets no punishment for either crime
 - If both inform, both receive slightly reduced punishment
- 5 Each can *Deny* either party committed major crime
 - If both deny, both punished for minor crime

Prisoner's Dilemma

Informing is Only Stable Choice

		Mike	
		<i>Deny</i>	<i>Inform</i>
Bob	<i>Deny</i>	(-2, -2)	(-5, 0)
	<i>Inform</i>	(0, -5)	(-4, -4)

Table: Prisoner's Dilemma Payoff Matrix

- Only one Nash Equilibrium: both *Inform*
- That's the only combination of actions where neither can end up better off by changing their action

Crucial Point

Rational, self-interested agents will inform, even though they'd collectively be better off denying

Prisoner's Dilemma

And Actual Humans

- Human behavior in **one-off** Prisoner's Dilemmas has been extensively studied in behavioral economics and social psychology (Ledyard 1995)
 - One-off so reputation/reciprocation can be factored out
- Humans overwhelmingly tend to cooperate (*Deny*) rather than defect (*Inform*)
- In fact, even in one-off games, many people will, at their own expense, punish defectors (Bicchieri 2005)
 - Despite the fact that punishing in a one-off game doesn't make much sense...

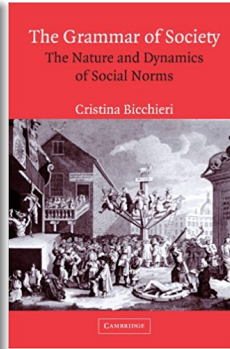
Social Norms

According to Bicchieri (2005)

Social Norms (Bicchieri 2005: 11)

A practice is sustained because each agent *A* prefers to conform to the practice given that two conditions obtain, and they do, in fact, obtain:

- 1 *A* expects others to conform and
- 2 *A* either believes that others expect *A* to conform or that others prefer *A* to conform and will informally sanction non-conformity (shame, disgust, etc.).



Social Norms

Transform Games of Conflict to Coordination Games (Bicchieri 2005)

Denial Norm

For each agent *A* among population Bob and Mike belong to:

- a. *A* expects others to *Deny* in cases like the Prisoner's Dilemma
- b. *A* either believes that others expect *A* to *Deny* or that others prefer *A* to *Deny* and will informally sanction non-*Deny* actions (with shame, disgust, physical threats, etc.) and/or reward *Deny*-ing (social inclusion, glorification, etc.)

- Now consider how this pattern of expectations will change the preferences of members of *A*

Social Norms

Transform Games of Conflict to Coordination Games (Bicchieri 2005)

		Mike	
		<i>Deny</i>	<i>Inform</i>
Bob	<i>Deny</i>	(-2, -2)	(-5, 0)
	<i>Inform</i>	(0, -5)	(-4, -4)

Table: Original Prisoner's Dilemma Payoff Matrix

		Mike	
		<i>Deny</i>	<i>Inform</i>
Bob	<i>Deny</i>	(0, 0)	(-5, -4)
	<i>Inform</i>	(-4, -5)	(-8, -8)

Table: Prisoner's Dilemma under Denial Norm

Social Norms

Psychological Implementation (Bicchieri 2005: Ch.2); (Cialdini et al. 1991)

- Actual human social norms are constituted by expectations that are:
 - Context sensitive (situational)
 - Cognitively simple (scripts, stereotypes)
 - Unconscious
 - Integrated w/practical tasks
 - Products of cultural evolution rather than design
 - Exploit innate tendencies
- Think: littering, smoking, child-rearing
- Difficult to change, but massive precipitous changes do happen

Back to the Basic Question

Social Norms

The Basic Question

How can communication persist in a hostile environment?

- How can signals be reliable when interests conflict?

A Hypothesis

Communication, like other forms of human coordination, is made possible by social norms

- Despite our conflicting interests

Juxtapose

Human Communication

Scenario 1: altruistic informing

You are visibly hungry and looking for something to eat. Behind you I see a donut. When I catch your gaze, I gesture in its direction. You turn, see it and eat it.

- Information valuable for you, but what do I get?
- Suppose we know we'll never meet again, so reciprocation is out...
- Not the kind of gesture non-human primates produce (Tomasello 2008)

Juxtapose

Human Communication

Scenario 2: altruistic construal

A fresh dozen donuts has been delivered to the office. Everyone has taken one except for me. I have a broken leg and I'm sitting at my desk across the office from you and the donuts. When I catch your glance, I point at the donut, and you pick it up and bring it over to me.

- Action is valuable for me, but what do you get?
- Suppose you're retiring to Antarctica tomorrow
- Not the kind of construal non-human primates produce (Tomasello 2008)

Norms of Communication

Their General Form

Production Norms

Specify conditions under which speakers are to make contributions to the conversational score

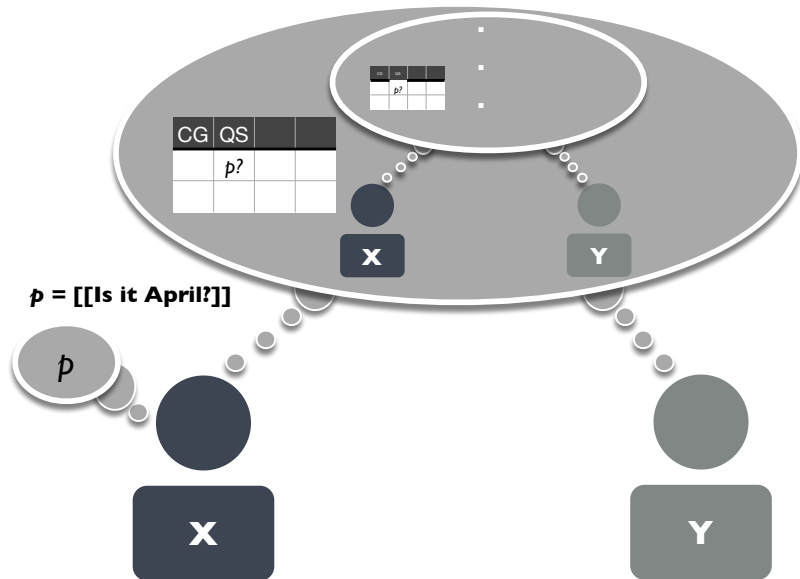
- E.g. When X is an authority w.r.t. p and Y needs to know whether p , X should add p to CG

Consumption Norms

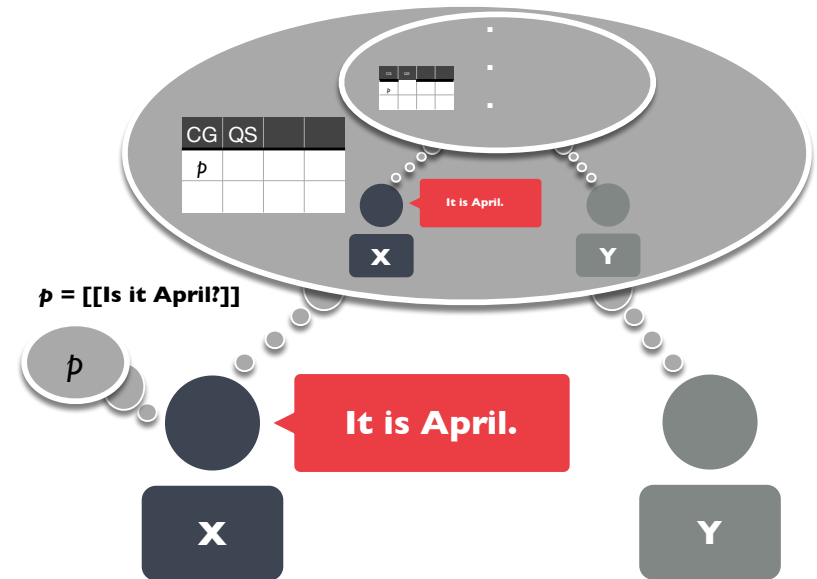
Specify conditions under which hearers are 'take up' contributions to the conversational score

- E.g. When p is added to CG by authority X and Y needs to know whether p , Y should believe p
- Toy examples only — deeply empirical question

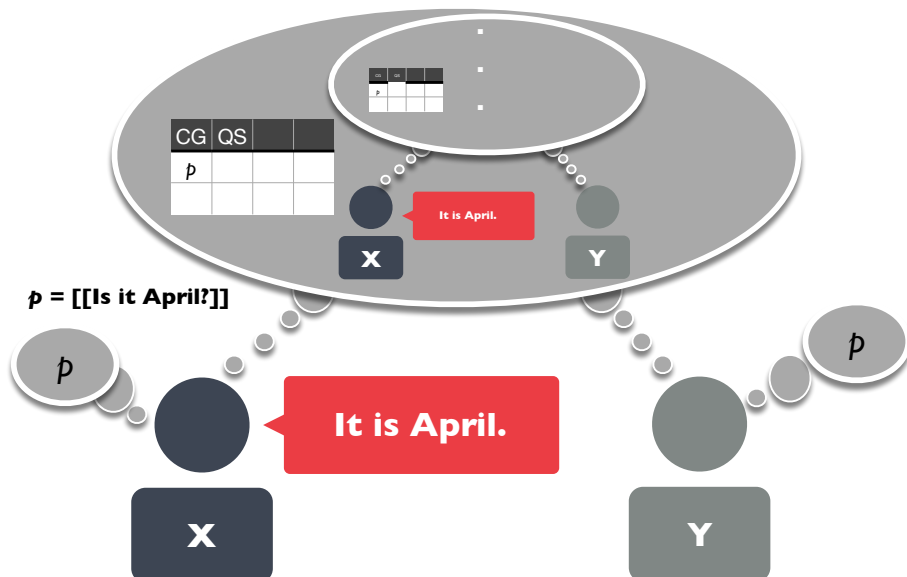
PRODUCTION NORM TRIGGERED



PRODUCTION NORM FOLLOWED



CONSUMPTION NORM FOLLOWED



Norms of Communication

Efficiency and Oppression

Efficiency

- If authority roughly correlates w/quality of information, then authority-based norms are efficient means for quickly disseminating information
- But: 'authority' will be constructed around stereotypical qualities, and be context-specific

Oppression

Quality information had by non-authorities will be suppressed, which may, in turn make it even harder for non-authorities to gain credibility

E.g. epistemic injustice (Fricker 2007)

Norms of Communication

Interim Conclusions

Proposals

- 1 Social norms make communication possible in human society despite our conflicting interests
 - They're self-fulfilling expectations about what agents like us do in particular situations
- 2 **Norms of communication** govern how public contributions should be produced and responded to
- 3 It is an open, largely empirical, question what the norms of communication in a given society are
- 4 Tools for investigating norms of communication: experiments, fieldwork, agent-based modeling, game-theoretic modeling

Norms of Communication

Applications: speech act force (Murray & Starr 2018)



hannah moskowitz @hannahmosk · 17h

do men know how many times we rewrite tweets to make SURE it doesn't look like we're asking for advice

and how much advice we still get

54 261 1.6K



Attractive Lemon @Lemonanyway · 6h

The best way to avoid this is to not present something as a problem. Because if you do then people will instinctively try to solve it.

4

- Illocutionary disablement (Langton 1993)
- Testimonial injustice (Fricker 2007)

Norms of Communication

Applications: Prohibited Words (Anderson & Lepore 2013)

Prohibitionism about Slurs

Slurs are offensive because they are prohibited words, **not** because of communicative effects:

- They rank individuals as inferior on scoreboard
- They are intended to express derogatory attitudes

- But how and why do words get prohibited?

Word Prohibitions are Norms of Communication

Prohibitive norms can evolve as a means for an oppressed group to resist acts involved in that oppression, e.g. communicative ones

Norms of Communication

Applications: emergent meaning

McConnell-Ginet (2012: 747)

"[C]hildren's books, syntax texts, newspapers, and many other media include many more references to men and boys than to women and girls. Notice that no particular utterer or utterance need have 'meant' that male human beings are more important than female or even more interesting or less problematic to discuss nor does anyone have to embrace such beliefs explicitly. Indeed, many people who themselves contribute to these patterns might be dismayed to realize that they have done so."

**New
New Work
Work on
on Speech
Speech Acts
Acts**

Edited by Daniel Fogal
Daniel W. Harris
& Matt Moss

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OUP, 2018

Norms of Communication

Conclusion

Summary

- ① Orthodox Tools ill-equipped to explain how communication stabilizes in face of conflicting interests
- ② Social norms are a general tool appropriate to solving problems like these
- ③ Norms of Communication are a specific tool appropriate to solving this problem — *empirical investigation needed*
- ④ Phenomena that falls outside realm of 'communicated content' should be re-examined with this tool
- ⑤ Engineering better norms of communication requires understanding how these structures come about

Thanks!

Special thanks to feedback from Josh Armstrong, Rae Langton and audience members at RuCCS. This work is deeply influenced by two joint papers on speech acts with Sarah Murray (Murray & Starr to-appear-, 2018).

References I

- L. Anderson & E. Lepore (2013). 'Slurring Words'. *Noûs* 47(1):25–48.
- C. Bicchieri (2005). *The Grammar of Society: The Nature and Dynamics of Social Norms*. Cambridge University Press, Cambridge.
- D. L. Cheney & R. M. Seyfarth (1990). *How Monkeys See the World: inside the mind of another species*. University of Chicago Press, Chicago.
- R. B. Cialdini, et al. (1991). 'A Focus Theory of Normative Conduct: A Theoretical Refinement and Reevaluation of the Role of Norms in Human Behavior'. vol. 24 of *Advances in Experimental Social Psychology*, pp. 201 – 234. Academic Press.
- H. H. Clark (1996). *Using Language*. Cambridge University Press, New York.
- R. Fagin, et al. (1995). *Reasoning About Knowledge*. The MIT Press, Cambridge, Massachusetts.
- R. S. Feldman, et al. (2002). 'Self-Presentation and Verbal Deception: Do Self-Presenters Lie More?'. *Basic and Applied Social Psychology* 24(2):163–170.
- M. Fricker (2007). *Epistemic Injustice: Power and the Ethics of Knowing*. Oxford University Press, New York.
- E. Gillam (2011). 'An Introduction to Animal Communication'. *Nature Education Knowledge* 2(11):10.
- H. P. Grice (1957). 'Meaning'. *Philosophical Review* 66(3):377–388.

References II

- R. Langton (1993). 'Speech Acts and Unspeakable Acts'. *Philosophy & Public Affairs* 22(4):293–330.
- J. O. Ledyard (1995). 'Public goods: a survey of experimental research'. In J. H. Kagel & A. E. Roth (eds.), *The Handbook of Experimental Economics*, pp. 111–194. Princeton University Press, Princeton, NJ.
- D. K. Lewis (1969). *Convention: A Philosophical Study*. Harvard University Press, Cambridge, Massachusetts.
- D. K. Lewis (1979). 'Scorekeeping in a Language Game'. *Journal of Philosophical Logic* 8(1):339–359.
- J. E. Lloyd (1975). 'Aggressive Mimicry in Photuris Fireflies: Signal Repertoires by Femmes Fatales'. *Science* 187(4175):pp. 452–453.
- J. Maynard Smith & D. Harper (2003). *Animal Signals*. Oxford University Press, New York.
- S. McConnell-Ginet (2012). 'Language, Gender and Sexuality'. In D. G. Fara & G. Russell (eds.), *Routledge Companion to the Philosophy of Language*, pp. 741–752. Routledge, New York.
- R. G. Millikan (1984). *Language, Thought and Other Biological Categories*. MIT Press, Cambridge, MA.

References III

- R. G. Millikan (2005). *Language: A Biological Model*. Oxford University Press, New York.
- S. E. Murray & W. B. Starr (2018). 'Force and Conversational States'. In D. Fogal, D. Harris, & M. Moss (eds.), *New Work on Speech Acts*, pp. 202–236. Oxford University Press, New York.
- S. E. Murray & W. B. Starr (to-appear-). 'The Structure of Communicative Acts'. *Linguistics & Philosophy*.
- M. J. Ryan (1985). *The Túngara Frog: a study in sexual selection and communication*. University of Chicago Press, Chicago.
- T. Scott-Phillips & S. Kirby (2013). 'Information, Influence and Inference in Language Evolution'. In U. Stegmann (ed.), *Animal Communication Theory: information and influence*, pp. 421–442. Cambridge University Press, Cambridge.
- T. C. Scott-Phillips, et al. (2009). 'Signalling signalhood and the emergence of communication'. *Cognition* 113(2):226 – 233.
- R. C. Stalnaker (1978). 'Assertion'. In P. Cole (ed.), *Syntax and Semantics 9: Pragmatics*, pp. 315–332. Academic Press, New York. References to Stalnaker 1999.
- R. C. Stalnaker (1999). *Context and Content: Essays on Intentionality in Speech and Thought*. Oxford University Press, Oxford.

References IV

- R. C. Stalnaker (2002). 'Common Ground'. *Linguistics and Philosophy* 25(5–6):701–721.
- U. E. Stegmann (2009). 'A Consumer-Based Teleosemantics for Animal Signals'. *Philosophy of Science* 76(5):864–875.
- M. Tomasello (2008). *Origins of Human Communication*. The Jean Nicod Lectures. MIT Press, Cambridge, MA.
- D. Wilson & D. Sperber (1995). *Relevance: Communication and Cognition*. Blackwell, Oxford, 2 edn.

Think of the Poor Frog

Communication $\neq$ Information Transmission

- Male frog **is** communicating w/female; **not** w/bat
 - Observation about different explanations of these processes, not intuition about *communication*
 - Frog signal didn't persist in species because of effects on bats, but because of effects on female frogs (Maynard Smith & Harper 2003)
- Info. trans. by 'code' $\neq$ animal communication

The Lesson (Millikan 1984, Maynard Smith & Harper 2003)

Communication requires effects on internal states that explain sustained proliferation of signaling system.

What is Communication

If Not Information Transmission?

Evolved Communication (Maynard Smith & Harper 2003: 3)

X communicates with Y using signal σ if and only if:

- ① σ affects the behavior of Y ,
- ② Production of σ by X evolved because of that effect,
- ③ σ is effective because Y 's response to it also evolved

The Adaptationist Model

Generalized

Refined Model of Animal Communication

- ① The (re)production of a state of affairs σ by X is a **signal** to Y if and only if:
 - (a) Perceiving σ produces some effect in Y ,
 - (b) σ was (re)produced by X because of that effect on Y
 - (c) and that effect on Y was (re)produced via their recognition of σ .
- ② X communicates with Y by (re)producing a state of affairs σ if and only if:
 - (a) Y perceives σ
 - (b) and σ is a signal to Y

(Drawing on Millikan 1984, 2005)

The Full Adaptationist Model

Learning from the Animals

Adaptationist Model of Animal Communication

- ① The production of a state of affairs σ by X is a **signal** to Y if and only if:
 - (a) Perceiving σ produces some effect in Y ,
 - (b) the production of σ by X evolved because of that effect on Y
 - (c) and that effect on Y is an evolved response to their recognition of σ .
- ② X **communicates** with Y by producing a state of affairs σ if and only if:
 - (a) Y **perceives** σ
 - (b) and σ is a **signal** to Y

(My Adaptation of Scott-Phillips & Kirby 2013: §18.5)

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)