

Two dilemmas for deliberative groups

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Central questions

1. How are deliberative groups created and sustained?
2. What determines when deliberative groups operate efficiently?
3. Are the benefits from deliberation (when they exist) enough to bring about deliberation?

Two game theory problems

**WATCH
WHATEVER
WHENEVER.**



With Sony's Betamax SL-8600 video recorder, you can see any TV show you want to see anytime you want to see it.

Because Betamax, which plugs into any TV set and is easy to operate, can videotape a show up to three-hours long (with the L-750 videocassette) while you're doing something else—even while you're out of the house, by setting the electronic timer.

It can also videotape something off one channel while you're watching another channel.

And remember, Sony has more experience in videorecorders than anyone (over 20 years!). In fact, we've sold more videorecorders to broadcasters and industry than any other consumer manufacturer. We even make our own tape.

For years you've watched TV shows at the times you've had to. Now you can watch them at the times you want to.

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THE LEADER IN VIDEO RECORDING

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Two game theory problems



- Pure coordination
- Coordination with Pareto superior and inferior equilibria
- Coordination with disagreement over equilibria

Two game theory problems

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Coordination problems

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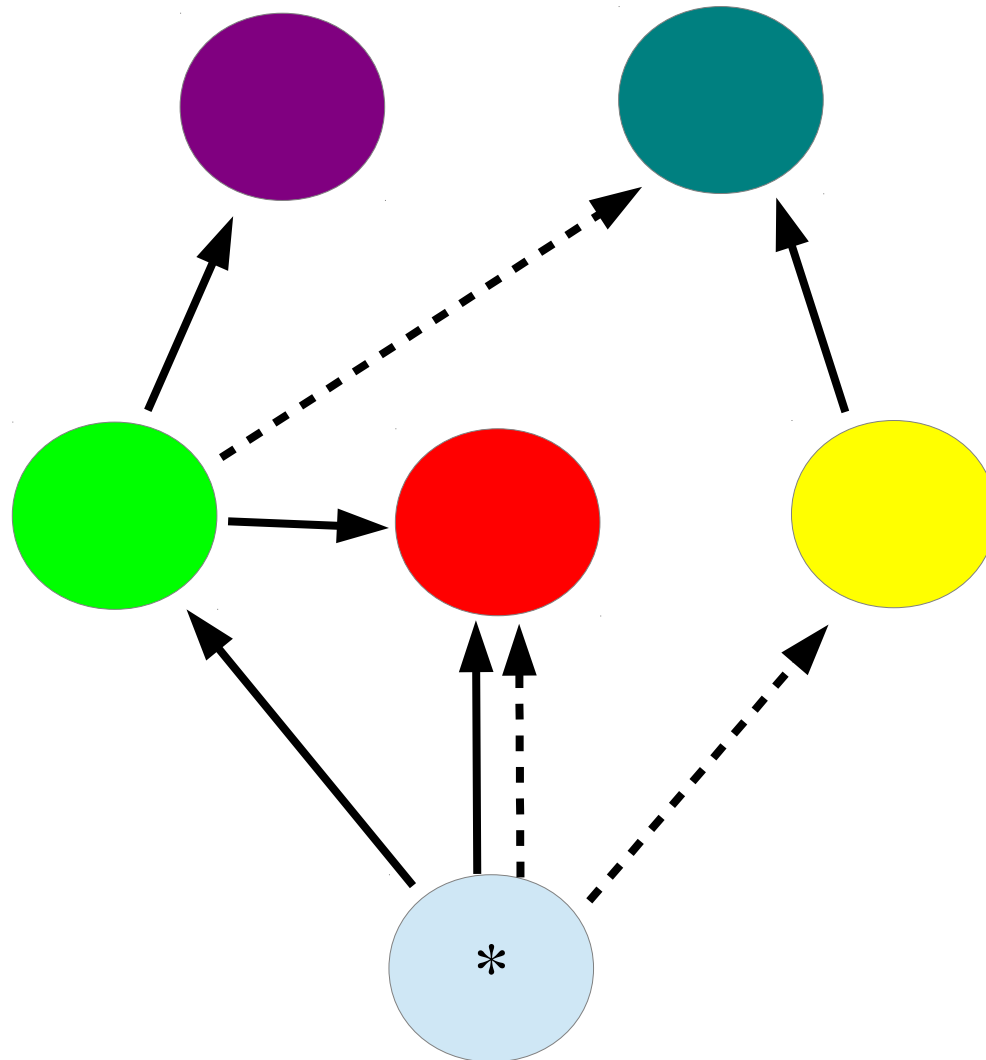
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Modeling problem solving

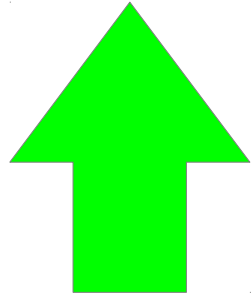
- A complex problem that has many solution
- Deliberation proceeds by considering one solution at a time
- Each individual has a “conceptual scheme” which determines which alternative solutions are considered possible by an individual

Hong, L., & Page, S. E. (2004). Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proceedings of the National Academy of Sciences of the United States of America*, 101(46), 16385–9. doi:10.1073/pnas.0403723101

Modeling problem solving



Deliberation



Increases the number
of solutions that an
individual can think
of per unit of time

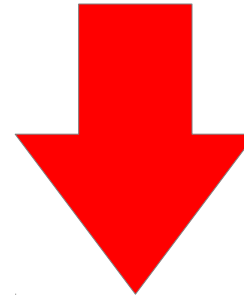
b

Deliberation



Increases the number
of solutions that an
individual can think
of per unit of time

b



Decreases the time an
individual has to try
solutions

c

Choosing to deliberate



0



0

Choosing to deliberate



~~0~~

$b - c$



~~0~~

$b - c$

Do or do not deliberate?

- $b > c$
 - Deliberate!

- $c > b$
 - Do not deliberate!

Second-hand schemes

- $b(1)$ = The benefit of first-hand schemes
- $b(2)$ = The benefit of second-hand schemes
- $b(3)$ = The benefit of third-hand schemes

More than two?

- $b(1) - b(2) > c$
 - Deliberate with everyone!
- $b(1) > c > b(1) - b(2)$
 - Deliberate, but let others do the work!
- $c > b(1)$
 - Don't deliberate

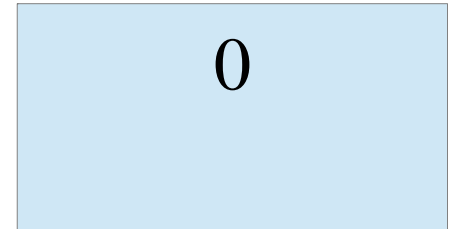
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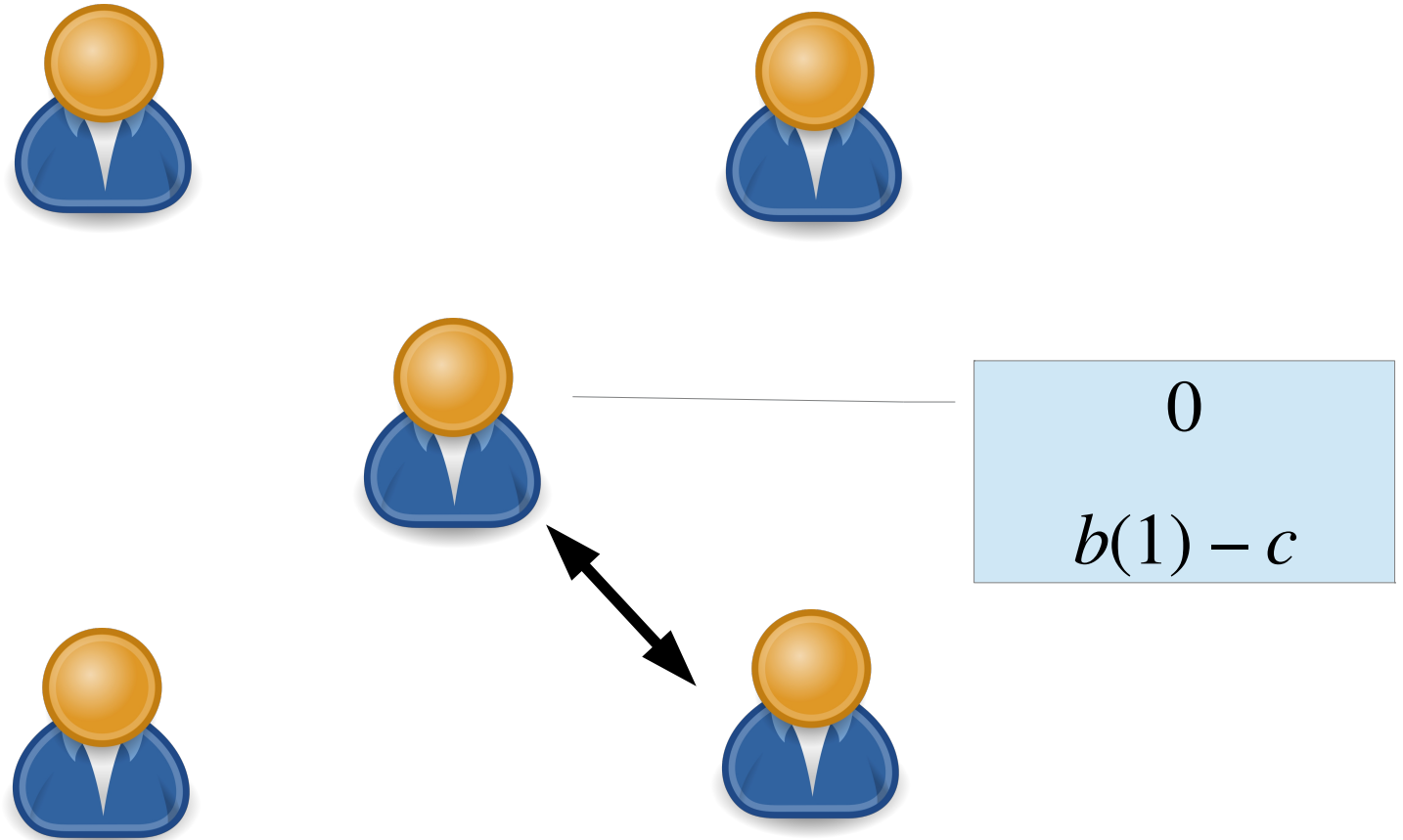
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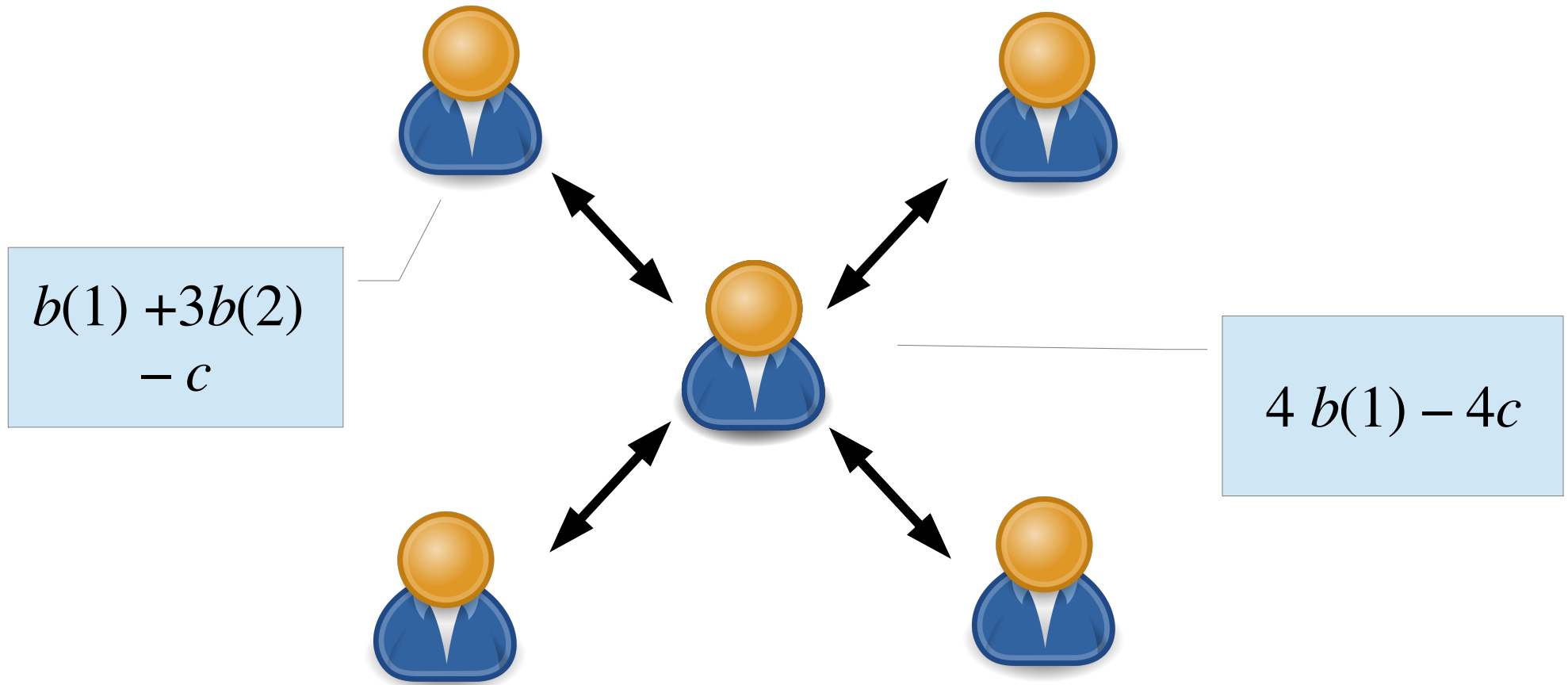
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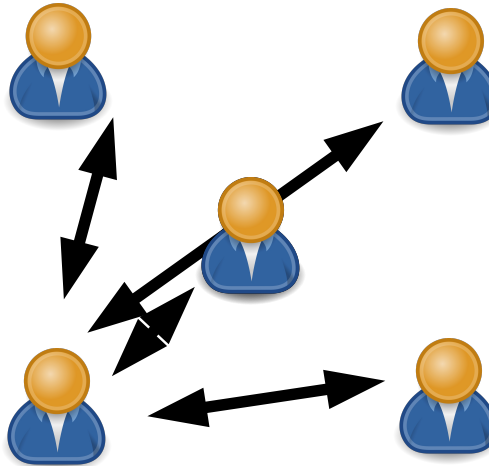
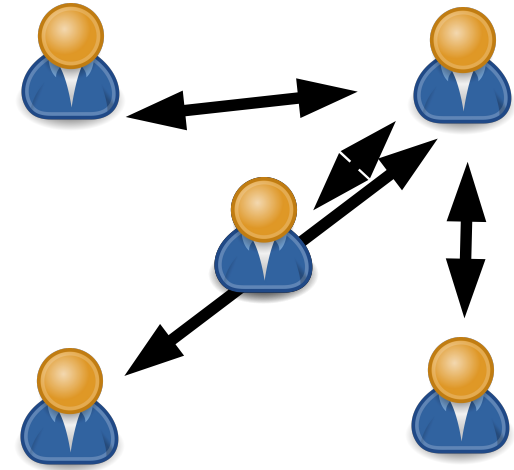
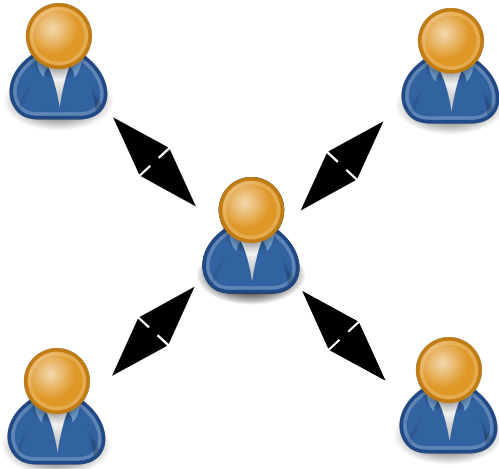
$$b(1) > c > b(1) - b(2)$$



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Coordination problems

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Coordination problems

- Superior and inferior equilibria
- Expectations and mis-coordination
- The more possibilities the harder it gets

Jackson, M. O., & Watts, A. (2002). On the Formation of Interaction Networks in Social Coordination Games. *Games and Economic Behavior*, 41, 265–291.

Huttegger, S., Skyrms, B., & Zollman, K. J. S. (2014). Probe and Adjust in Information Transfer Games. *Erkenntnis*, 79, 835–853.

Zollman, K. J.S. (2015) Learning to collaborate. Manuscript.

Social dilemmas



(c) Kathy McEldowney

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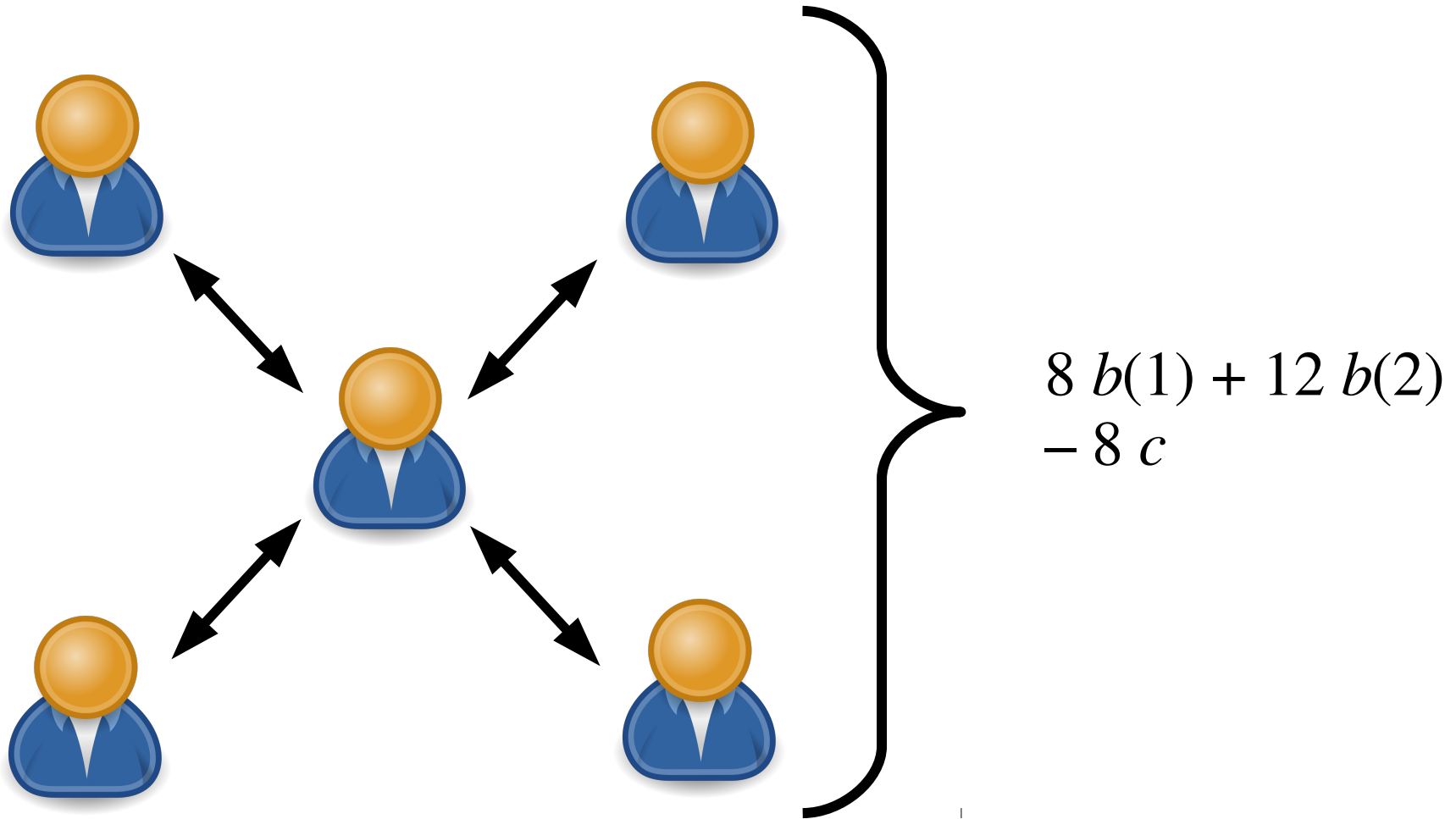
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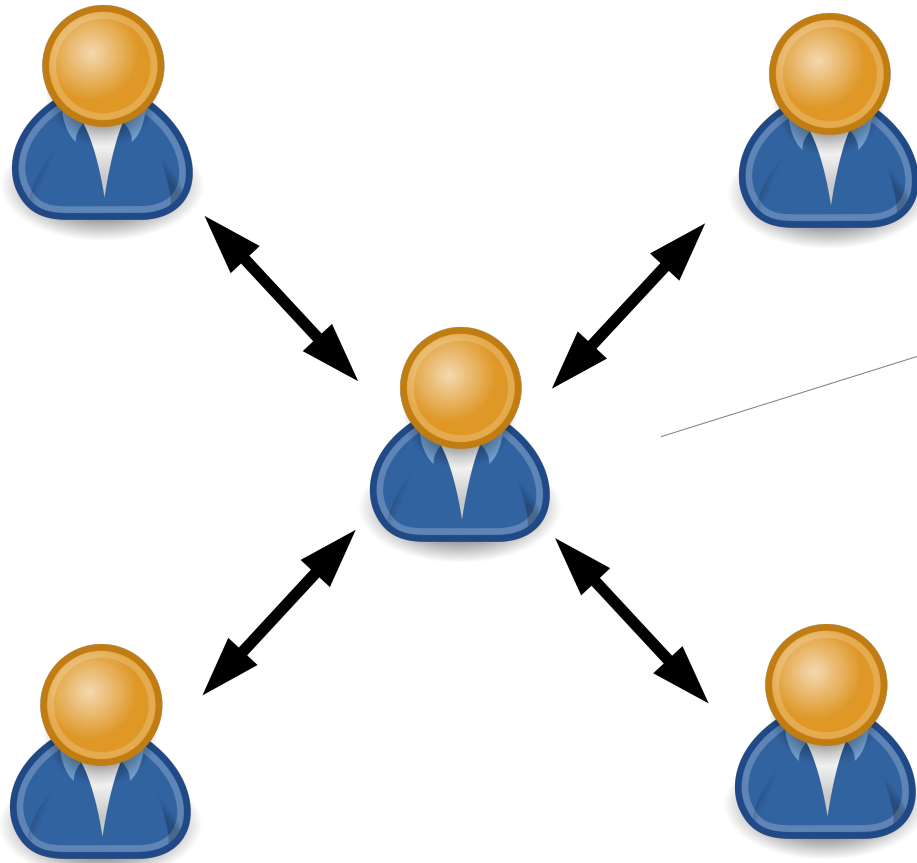
In particular

$$b(1) + (n - 2) b(2) / 2 > c > b(1)$$

Social dilemma



Social dilemma



$$4 b(1) - 4 c$$

Social dilemma



$$\cancel{4b(1) - 4c}$$

0

Social dilemmas



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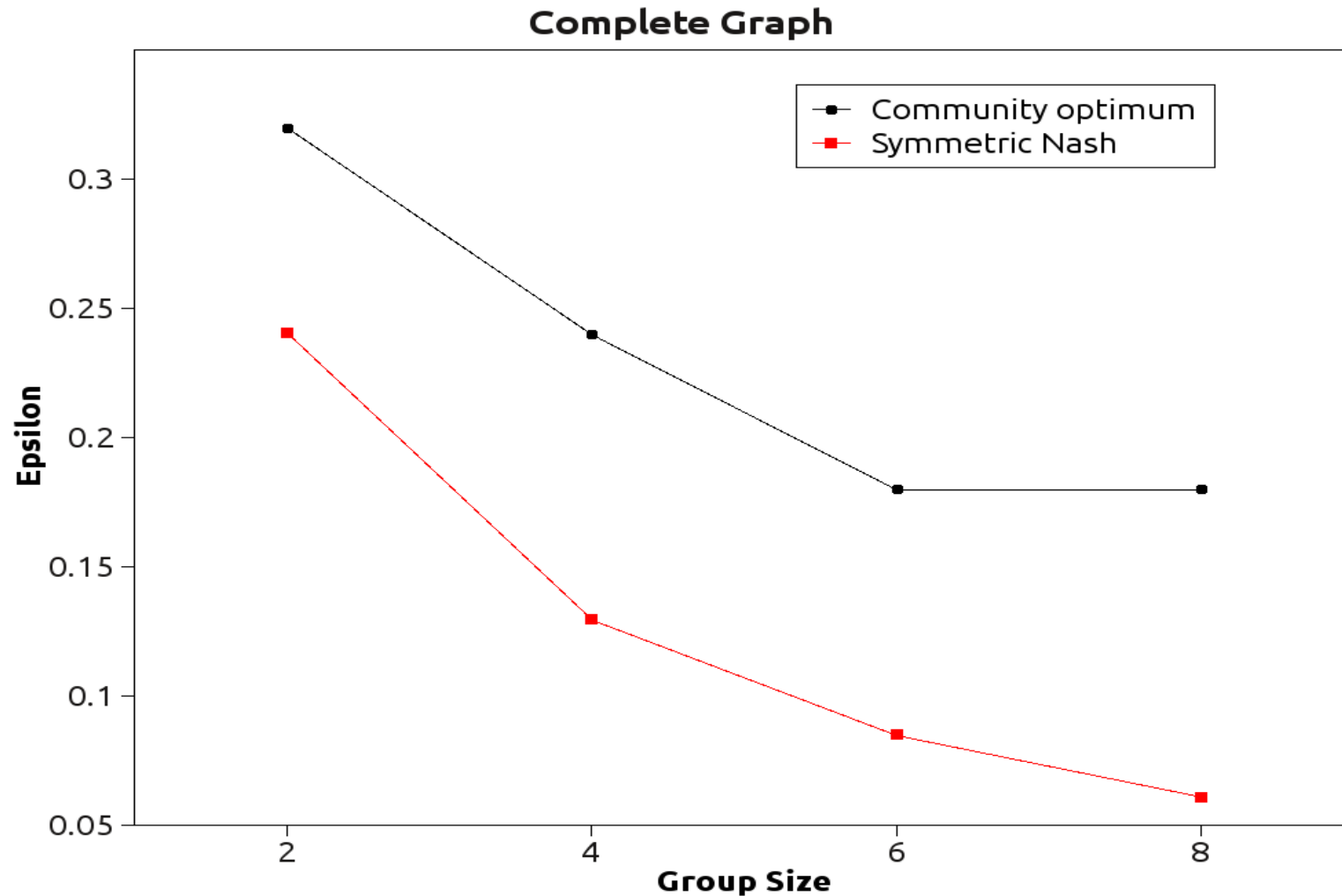
New problem

- Organization is fixed
- Only two potential solutions
- Investigating the solutions is noisy

New problem

- Each individual must choose a level of experimentation
- How much should an individual try the apparently inferior solution before abandoning it?

Optimality vs. individual choice



Kummerfeld, E., & Zollman, K. J. S. (2015). Conservatism and the Scientific State of Nature. *British Journal for the Philosophy of Science*, forthcoming.

Social dilemmas



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“Solutions” to social dilemmas

- Endogenous
 - Repetition
 - Punishment
- Exogenous
 - Changing the game via external punishment or reward

Conclusions

- Game theory is a tool for the social epistemologist
- The intrinsic benefit of social deliberation may not be sufficient to create the conditions necessary for deliberation