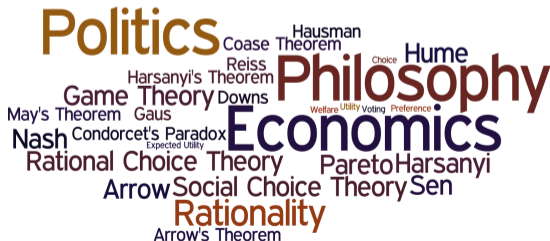


PHPE 400

Individual and Group Decision Making

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Important Games

Chicken



		Column	
		a	b
Row	a	2, 2	<u>1</u> , <u>3</u>
	b	<u>3</u> , <u>1</u>	0, 0

- ▶ Both (a, b) and (b, a) are Nash equilibria
- ▶ All profiles except (b, b) are Pareto optimal
- ▶ Also called the “hawk-dove game”

Stag-Hunt



		Column	
		a	b
Row	a	<u>3</u> , <u>3</u>	0, 2
	b	2, 0	<u>1</u> , <u>1</u>

- ▶ (a, a) and (b, b) are the Nash equilibria
- ▶ (a, a) Pareto dominates (b, b)
- ▶ Choosing a may lead to a better outcome, but it is riskier.

Stag-Hunt



B. Skyrms (2004). *The Stag Hunt and the Evolution of Social Structure*. Cambridge University Press.

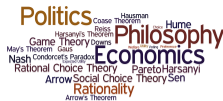
Prisoner's Dilemma



		Column	
		a	b
Row	a	3, 3	0, <u>4</u>
	b	<u>4</u> , 0	<u>1</u> , <u>1</u>

- ▶ (b, b) is the only Nash equilibrium
- ▶ (a, a) Pareto dominates (b, b)
- ▶ Typically, a is the “cooperate” action and b is the “defect” action.
- ▶ Often used to represent conflicts between individual rationality and cooperative behavior.

Prisoner's Dilemma



- ▶ Athletes using performance-enhancing drugs
- ▶ Two competing companies deciding advertising budgets
- ▶ Nation-states deciding to restrict CO2 emissions
- ▶ Two people meet and exchange closed bags, with the understanding that one of them contains money, and the other contains a purchase. Either player can choose to honor the deal by putting into his or her bag what he or she agreed, or he or she can defect by handing over an empty bag.
- ▶ <http://www.radiolab.org/story/golden-rule/>

Prisoner's Dilemma



“Game theorists think it just plain wrong to claim that the Prisoners’ Dilemma embodies the essence of the problem of human cooperation. On the contrary, it represents a situation in which the dice are as loaded against the emergence of cooperation as they could possibly be. If the great game of life played by the human species were the Prisoner’s Dilemma, we wouldn’t have evolved as social animals! . . . No paradox of rationality exists. Rational players don’t cooperate in the Prisoners’ Dilemma, because the conditions necessary for rational cooperation are absent in this game.” (Binmore, p. 63)

K. Binmore (2005). *Natural Justice*. Oxford University Press.

Prisoner's Dilemma

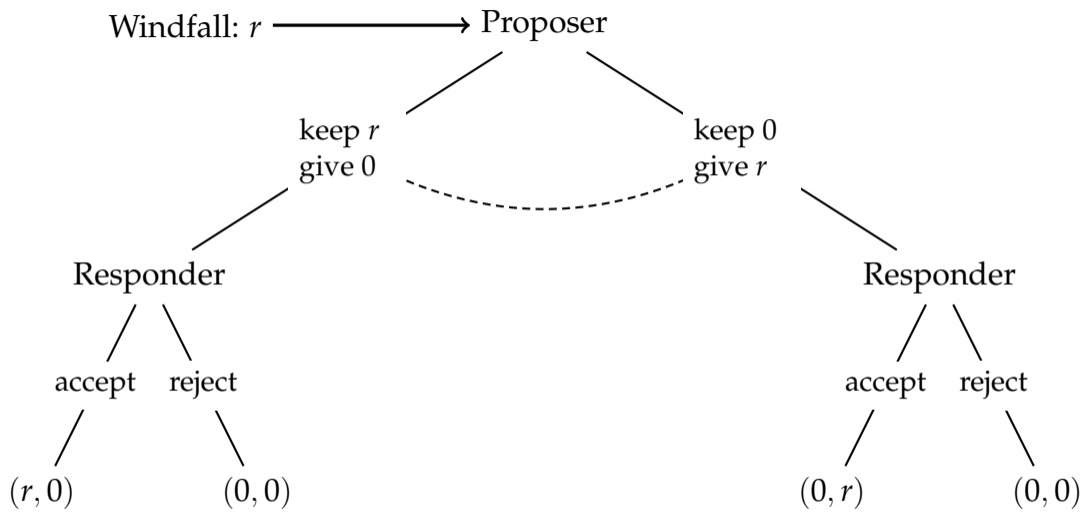


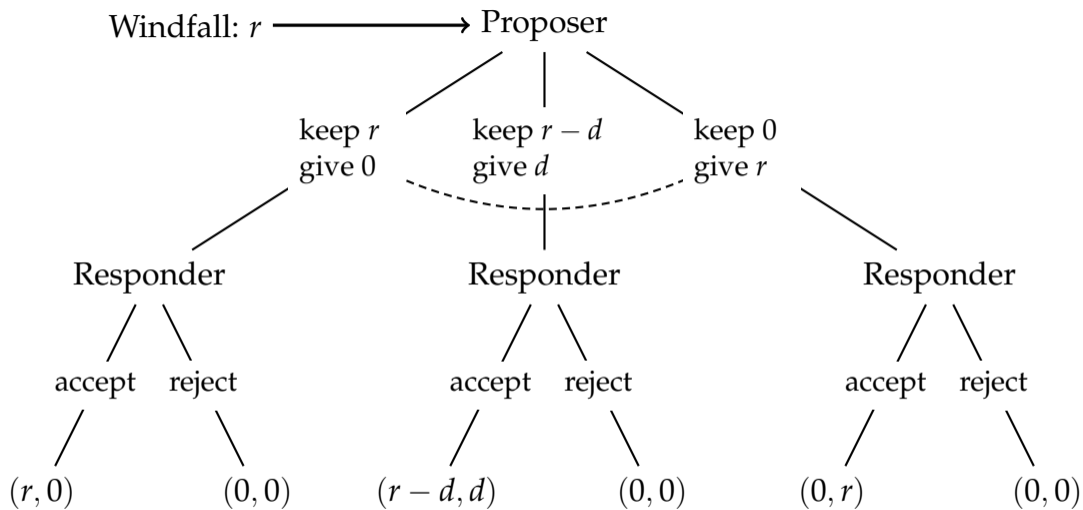
- ▶ S. Kuhn, Prisoner's Dilemma, Stanford Encyclopedia of Philosophy, plato.stanford.edu/entries/prisoner-dilemma/
- ▶ W. Poundstone, Prisoner's Dilemma, Anchor, 1993

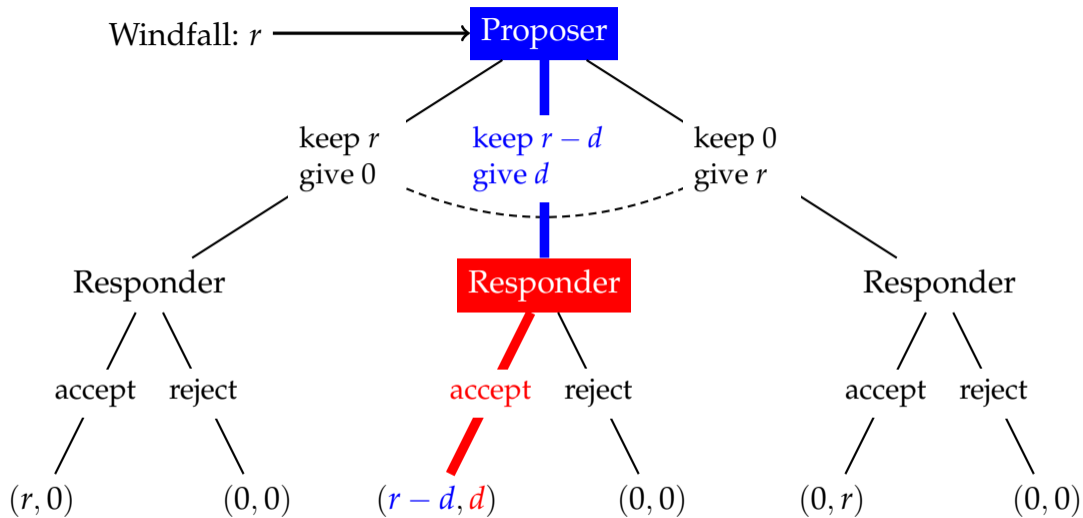
Ultimatum Game



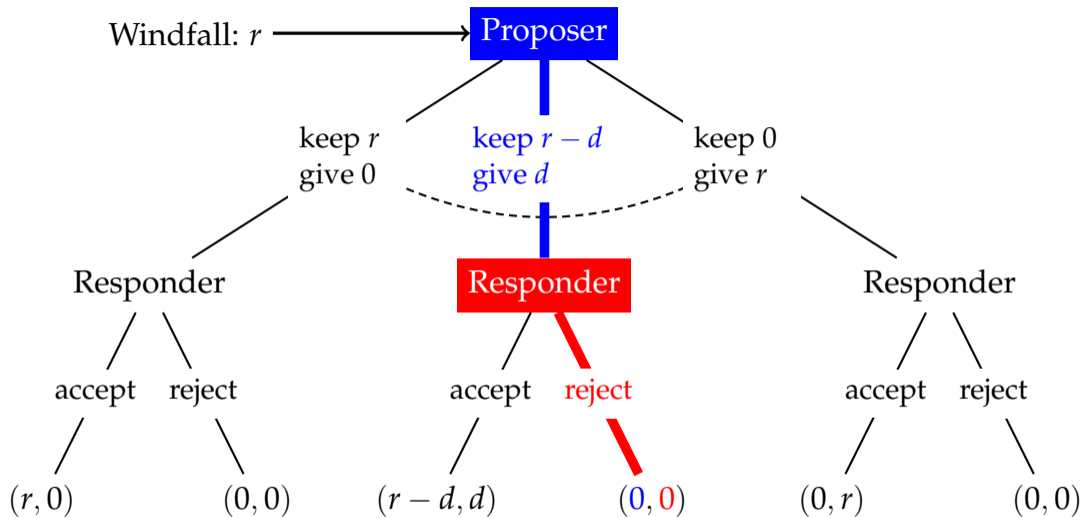
Ultimatum Game: Two players receive a windfall. One of the players suggests a division. After learning of the first player's proposal, the second must either accept or reject it. If the second accepts, both receive the amounts suggested by the first, otherwise they receive nothing.







Proposer gets $r - d$ and Responder gets d



Proposer gets 0 and Responder gets 0

Sequential Rationality



If the proposer offers a split which gives the second any positive amount, the second does strictly worse by refusing the offer. So, no rejection strategies are sequentially rational.

Knowing this, the first player ought to offer the smallest amount possible to the second player.

This is not what is observed:

...offers typically average about 30-40 percent of the total, with a 50-50 split often the mode. Offers of less than 20 percent are frequently rejected. These facts are not now in question. What remains controversial is how to interpret the facts and how best to incorporate what we have learned into a more descriptive version of game theory.

(p. 210, Camerer and Thaler)

C. Camerer and R. Thaler (1995). *Anomalies: Ultimatums, Dictators and Manners*. The Journal of Economic Perspectives, 9(2), pp. 209-219.

- ▶ Rejecting low offers is impossible to reconcile with a theory of *payoff maximization*.

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- ▶ Making a non-zero offer is consistent with payoff maximization, if a proposer believes that the responder will reject too low an offer.
 - ▶ However, offers are typically larger than the amount that proposers believe would result in acceptance.

Joseph Henrich, Robert Boyd, Samuel Bowles, Colin Camerer, Ernst Fehr, Herbert Gintis, and Richard McElreath (2001). *In search of homo economicus: Behavioral experiments in 15 small-scale societies*. *American Economic Review*, 91(2), pp. 73–78.