Transforming 2 X 2 Games

Game Column payoffs **Graph**

Row payoffs

Nash Equilibrium

Pd **Prisoner's Dilemma**

Pareto-deficient

Pareto-optimal outcomes in **bold**

Incentives & externalities

Payoff swaps change one ordinal game into another

Adjacent games are neighbors by payoff swaps

1↔2 swaps form tiles of 4 games

2↔3 swaps join tiles into 4 layers

3↔4 swaps link four layers

Layers differ by alignment of 4s

Each layer is a torus, table is a torus

Layers scrolled to center Prisoner's Dilemma

Tile

4 Layers 1

Left Discord

Win-win Right

3 **2**

Families

1. **Win-win** 4,4
2. **Biased** 4,3
3. **Second Best** 3,3
4. **Unfair** 4,2
5. **Dilemma** Tragic 3,2 Prisoner's D. 2,2 Alibi 3,2
6. **Cyclic** (2.5,2.5)

Symmetric Pure Cooperation | Pure Conflict | Fixed Sum | Jekyll-Hyde Type

L **Chart** *A map of relationships between the 2x2 games* **D**

Hegemony	Samaritan's D	SamaritanType	Biased Cycle	Inferior Cycle	Endless Cycle	Called Bluff	Bully	Unfair Type	Skewed Battle	Asym Battle	**Chicken**	
Samson	Generous		Quasi Cycle	Tragic Cycle	Inspector Cycle	Patron	Protector		Quasi Battle	**Leader**	Asym Battle	
Delilah			Pursuit Cycle	Zero Sum	Crisis Cycle				**Hero**	Quasi Battle	Skewed Battle	
Hostage	Biased		Second Best		Big Bully	Tragedy	Asym Lock	**Delight**	Protector		Unfair Type	
Blackmail Type	Biased Type				Hamlet	Total Conflict	**Deadlock**	Asym Lock			Bully	
Hegemon Type	Altruist Type	Impure Altruist	Revelation	Alibi	Asym Dilemma	**Prisoner's D**	Total Conflict	Tragedy	Patron		Called Bluff	
Privileged Hunt	Aligned	Pure Aligned	Asym Coord.	Asym Assur.	**Stag Hunt**	Asym Dilemma	Hamlet	Big Bully	Crisis Cycle	InspectorCycle	Endless Cycle	
Mutual	Privileged		Pure Coord.	**Assurance**	Asym Assur.	Alibi	Second Best		Zero Sum	Tragic Cycle	Inferior Cycle	
			Coordination	*Pure Coord.*	Asym Coord.	Revelation			Pursuit Cycle	Quasi Cycle	Biased Cycle	
Aligned	AsymHarmony	**Resolution**	Privileged		Pure Aligned	Impure Altruist	Biased		Generous		Samaritan Type	
Pure Aligned	**Harmony**	AsymHarmony			Aligned	Altruist Type	Biased Type				Samaritan's D	
No Conflict	Pure Aligned	Aligned	Mutual		Privileged Hunt	Hegemon Type	Blackmail Type	Hostage	Delilah	Samson	Hegemony	

W 3 →4 1 →2 | 2 →4 1 →3 | 1 →4 2 →3 | 1 →4 3 ←2 | 2 →4 3 ←1 | 3 →4 2 ←1 | 4 ←3 2 ←1 | 4 ←2 3 ←1 | 4 ←1 3 ←2 | 4 ←1 2 →3 | 4 ←2 1 →3 | 4 ←3 1 →2 **R**

To find a game: Make ordinal 4>3>2>1. Put column with Row's 4 right, row with Column's 4 up. Find layer by alignment of 4s; then intersection of Row & Column payoffs.

see Robinson & Goforth 2005 *The Topology of the 2x2 Games: A New Periodic Table* www.cs.laurentian.ca/dgoforth/home.html

© CC-BY-SA ß2012.01.15 www.bryanbruns.com/2x2chart