

Good and Evil



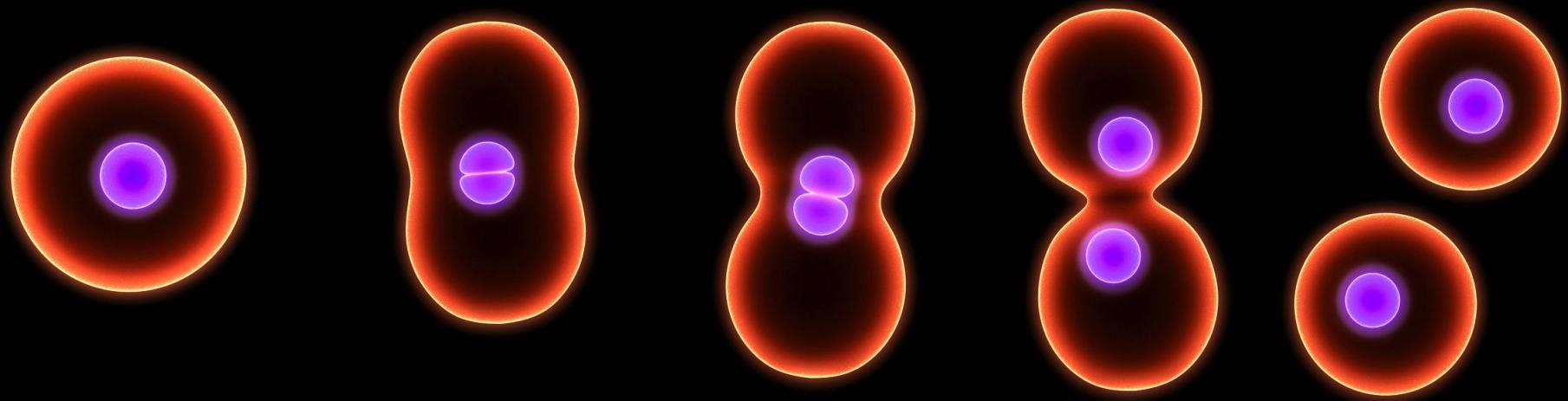




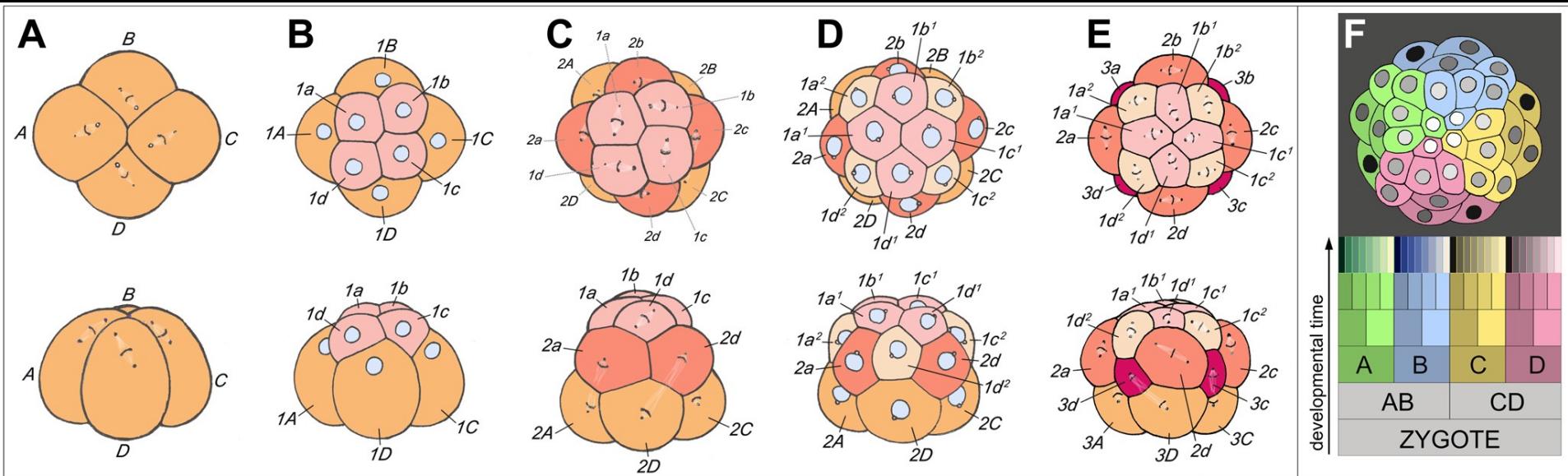
Corals cooperate repairing damaged bits



Some cyanobacteria sacrifice themselves for the their neighbours



Cell division unicellular



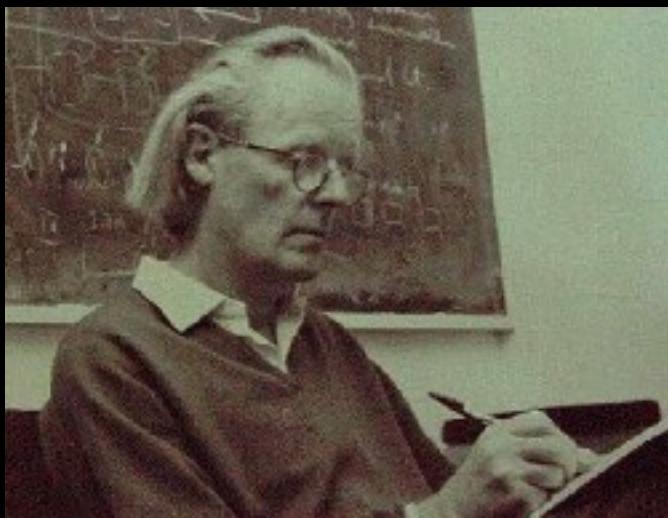
Labour division through multicellularity



Labour division leaf-cutter ant



Labour division leaf-cutter ant



John Maynard Smith



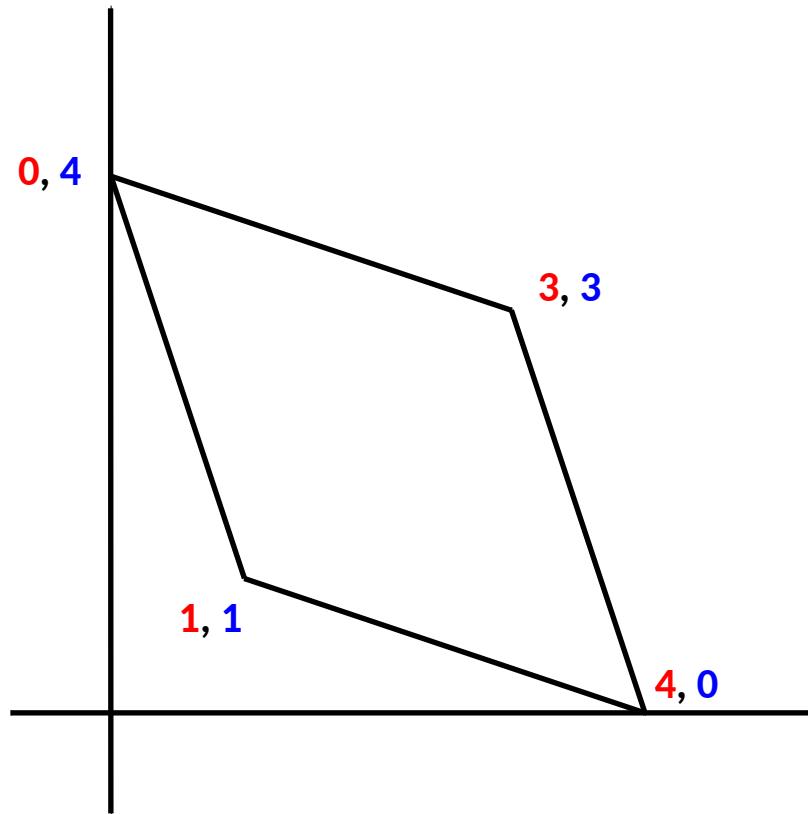
Eörs Szathmáry



Fruits of labour division in humans

Prisoners' dilemma

	Cooperate	Defect
Cooperate	3, 3	0, 4
Defect	4, 0	1, 1





Felix Warneken



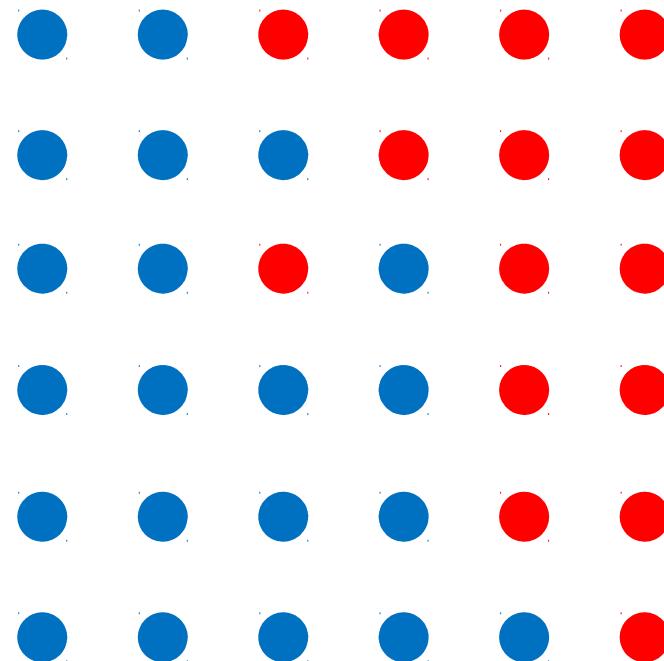
© Warneken & Tomasello

Kinderen helpen al op heel jonge leeftijd

1. *Population structure*
2. *Repetition*
3. *Signaling / Partner choice*

1. Population structure

Population structure





J. B. S. Haldane

*I would jump into a river to save two
brothers, but not one, or to save eight
cousins, but not seven.*

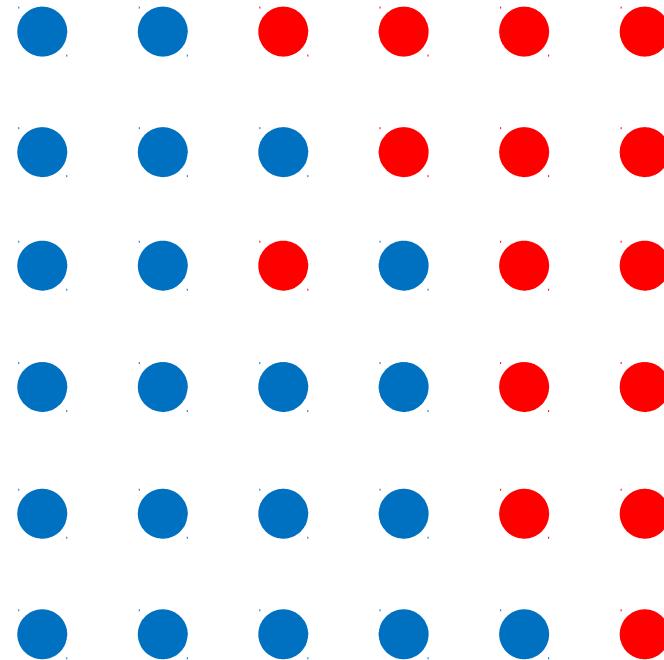


William D Hamilton

$$rb>c$$

Wilson, Pollock, Dugatkin, 1992.

Cancellation effect



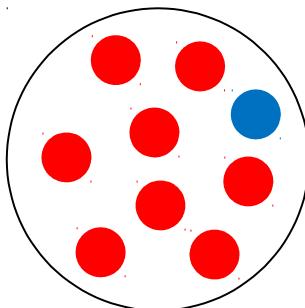
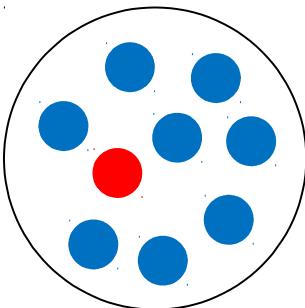
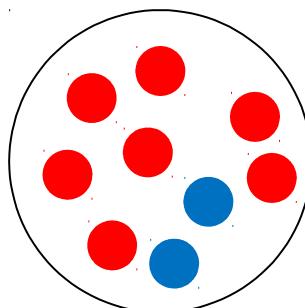
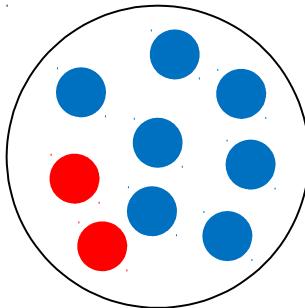
Selfishness beats altruism within groups.

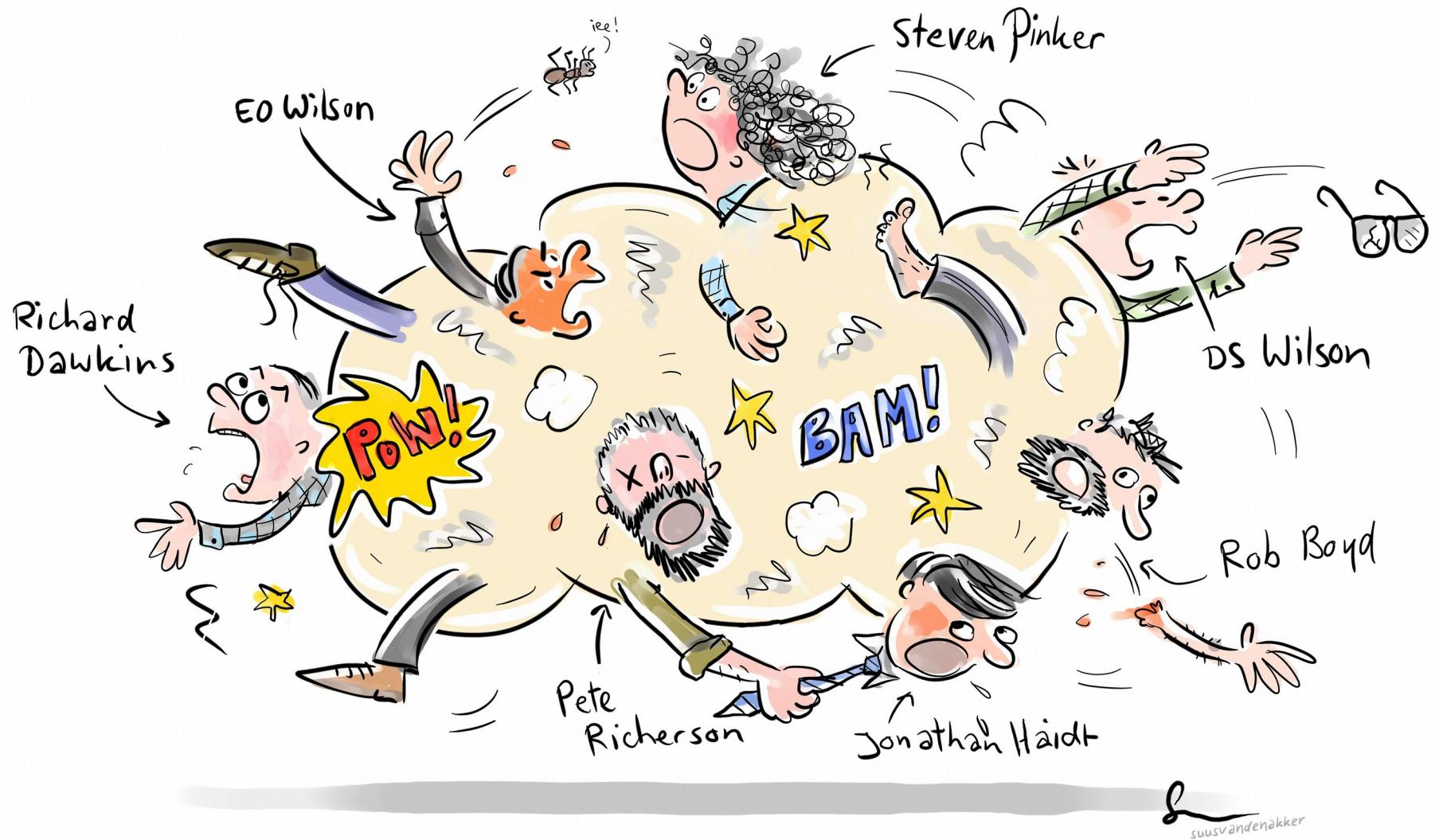
Altruistic groups beat selfish groups.

Everything else is commentary.

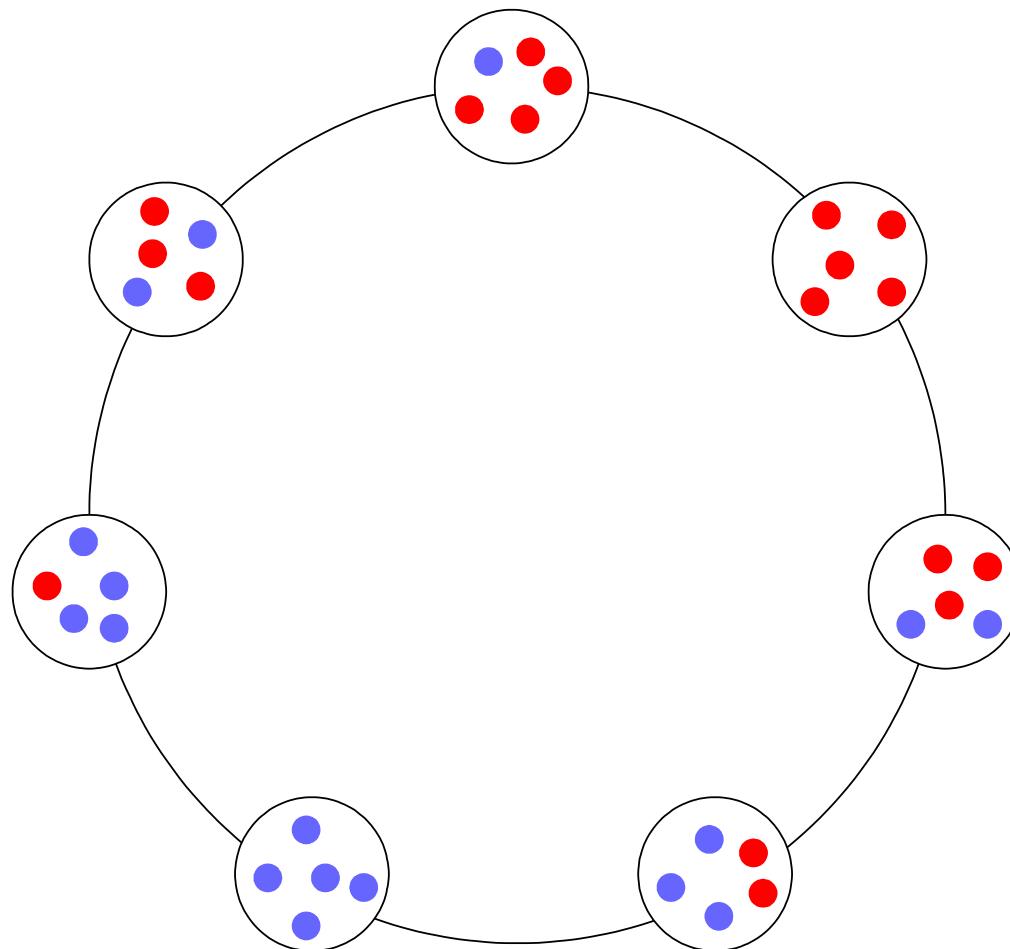
D. S. Wilson & E. O Wilson

Group selection





Cancellation effect at the group level



Aslı Akdeniz



2. Repetition

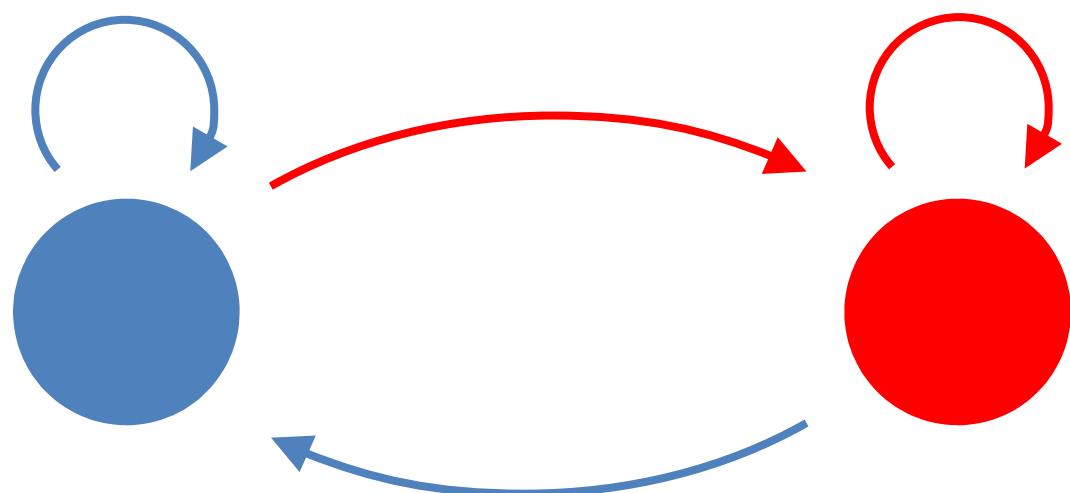


The shadow of the future

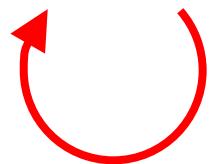
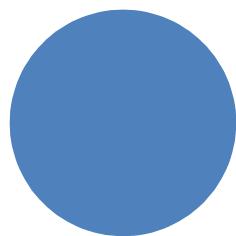


The shadow of the future

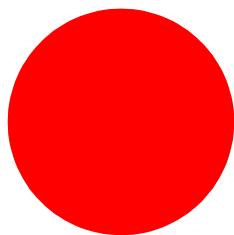
Tit-for-Tat



All C

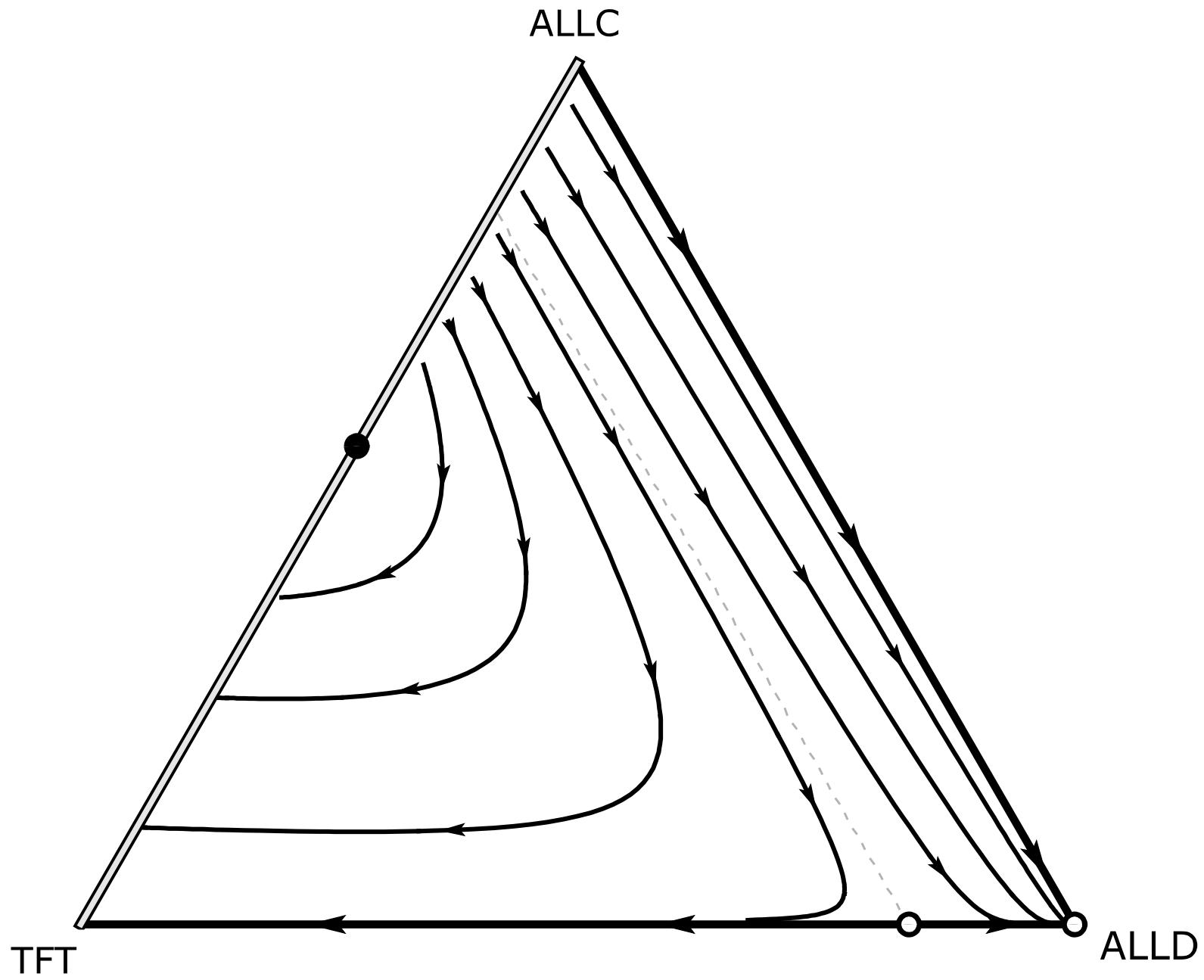


All D



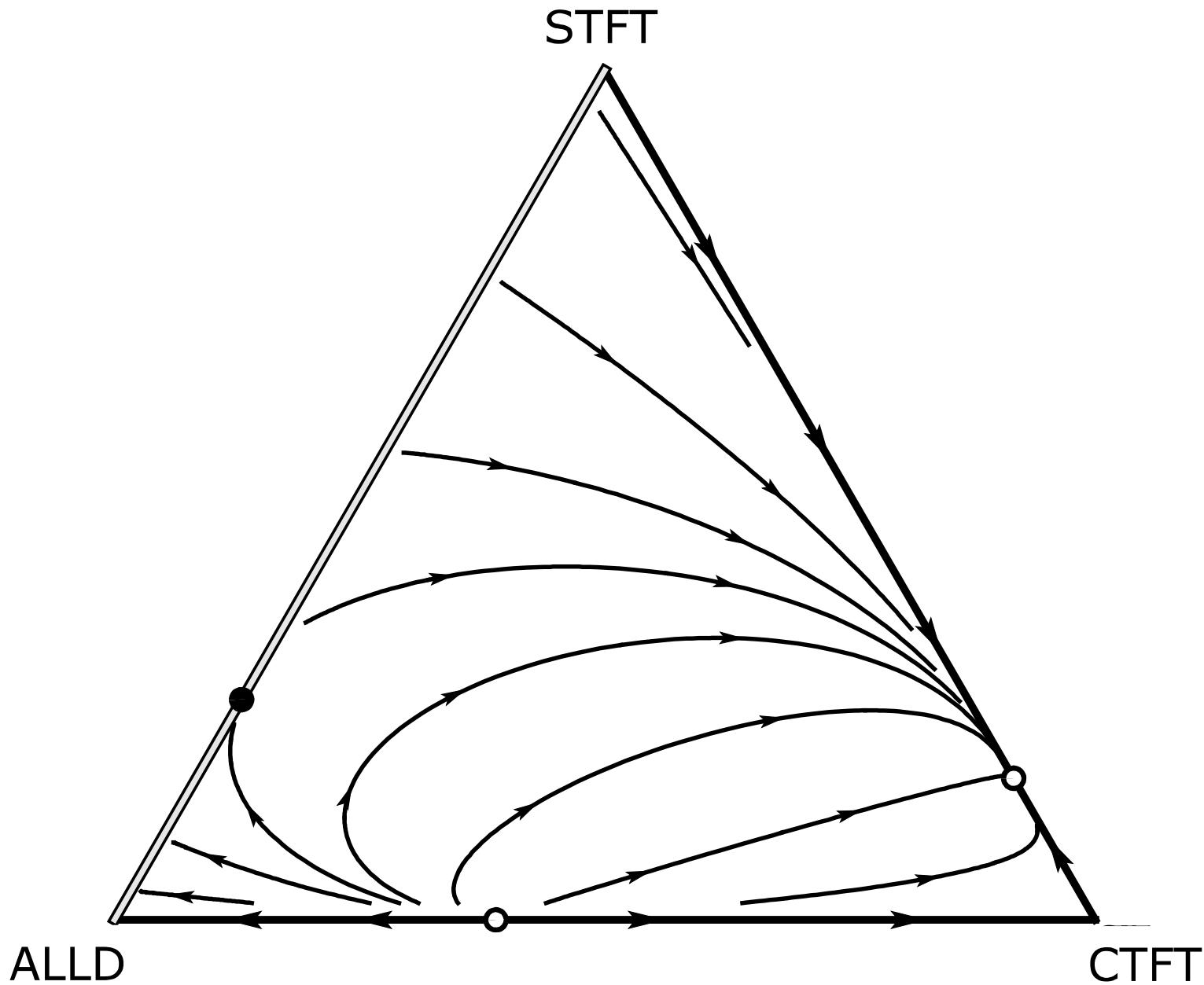
	TFT	All D
TFT	3	δ
All D	$4 - 3\delta$	1

	TFT	All C	All D
TFT	3	3	δ
All C	3	3	0
All D	$4 - 3\delta$	4	1



Mutual cooperation is unstable

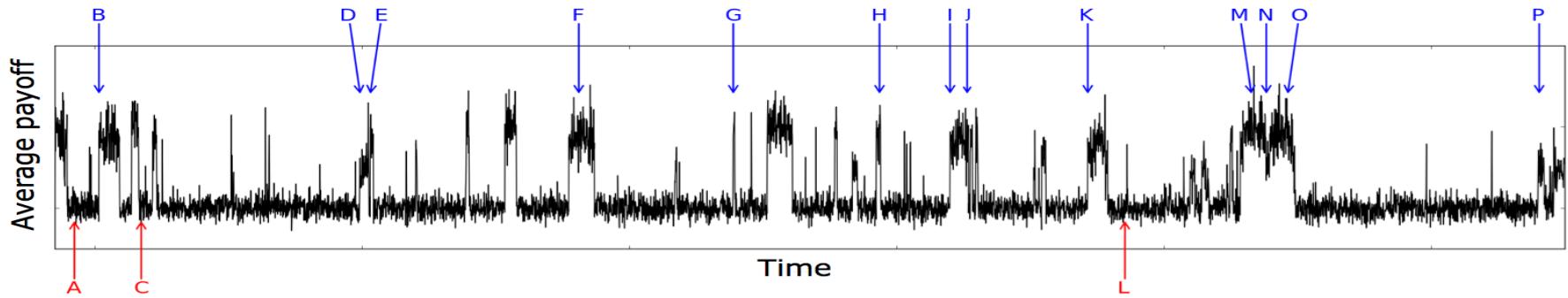
(any positive level of cooperation can be undermined by an indirect invasion)

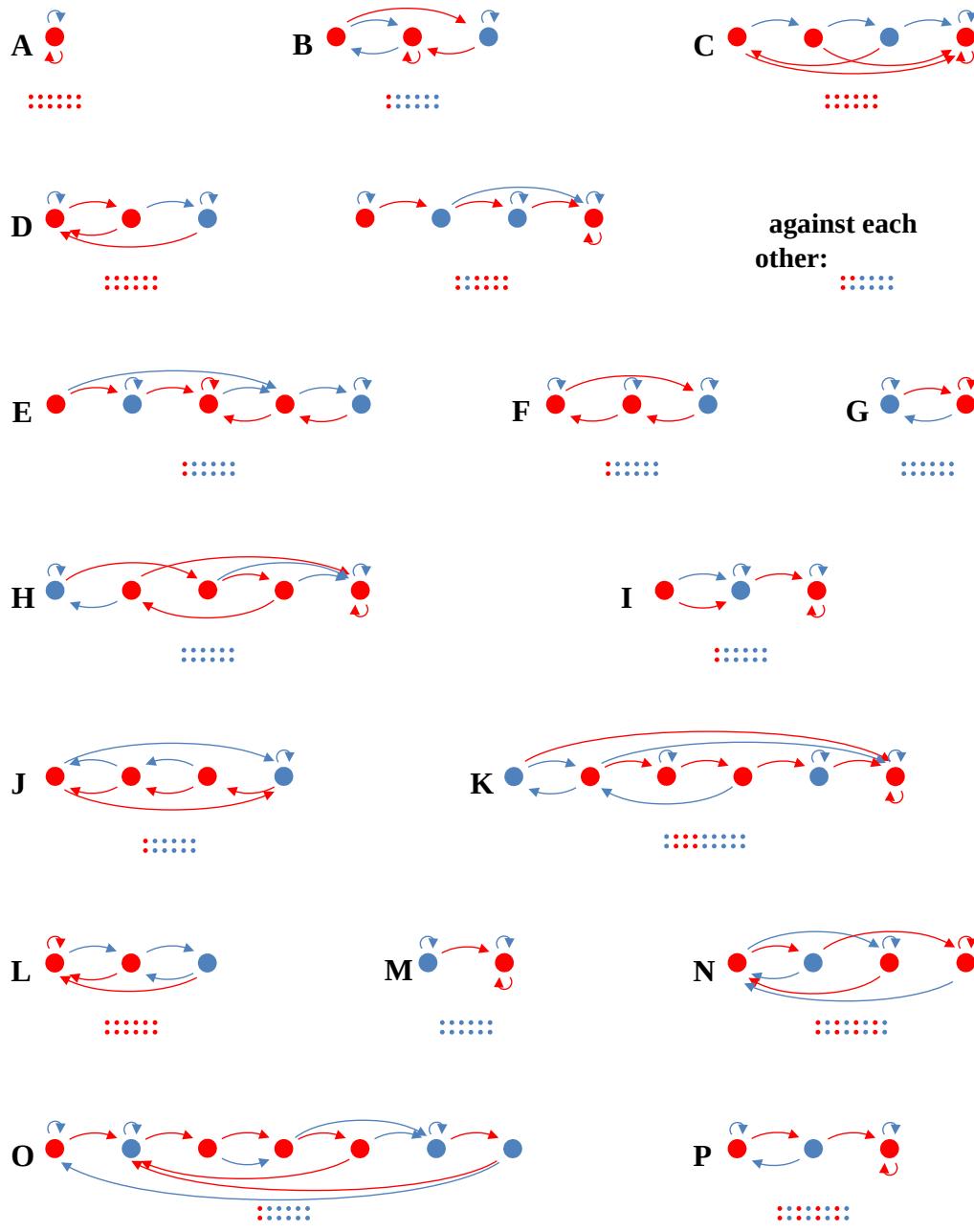


Mutual defection is also unstable

(any *lack* of cooperation can be also undermined by an indirect invasion, if
 δ is high enough)

Repetition





against each
other:



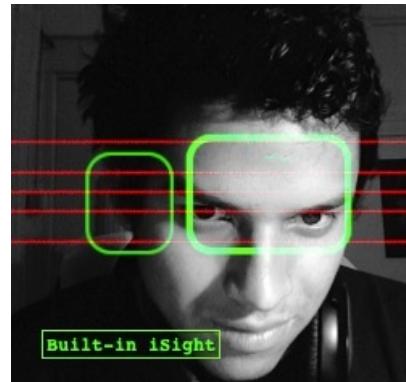
Everything changes,
nothing remains the same

Buddha

Everything changes,
nothing remains the same

Buddha

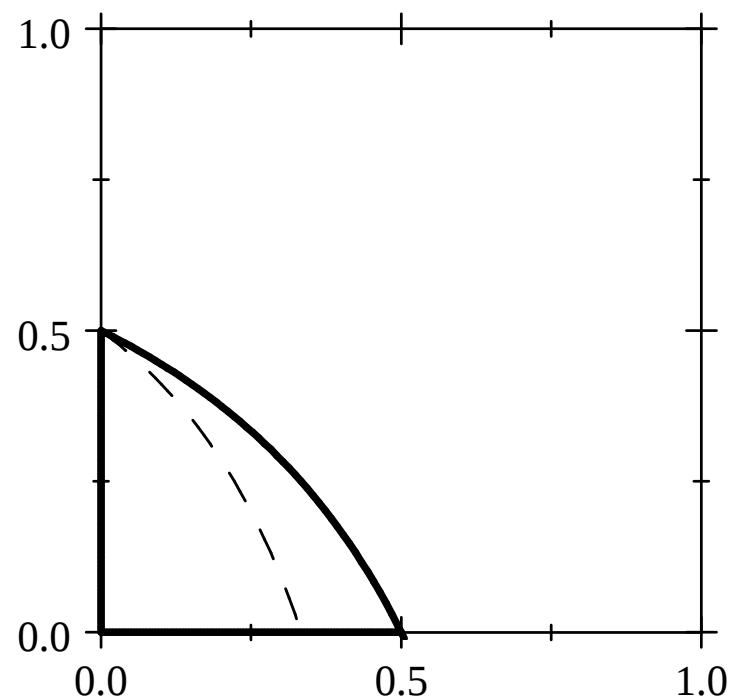
Julián García



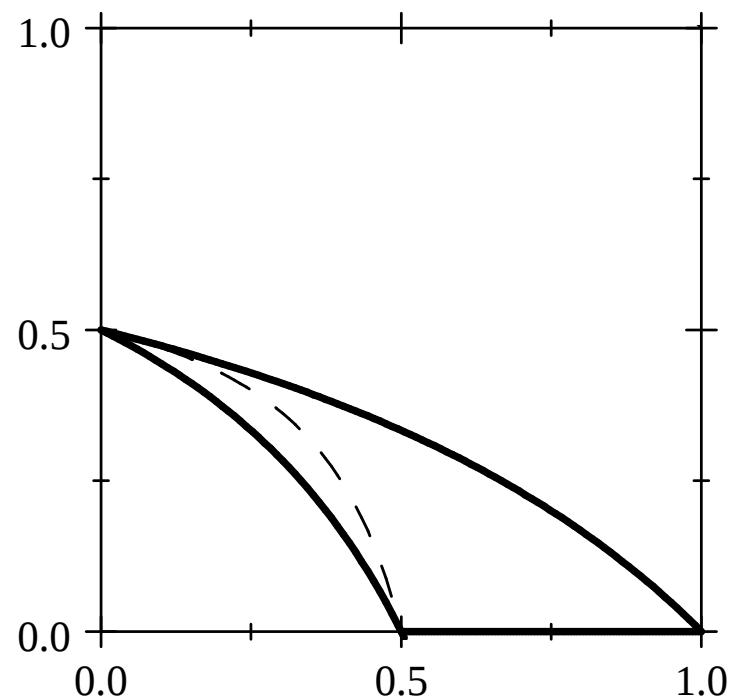
1. Population structure

2. Repetition

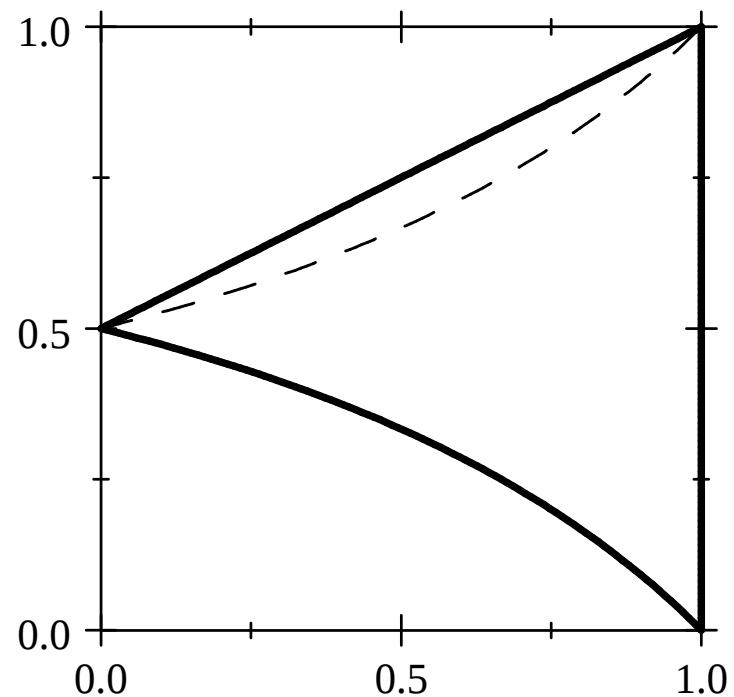
no cooperation



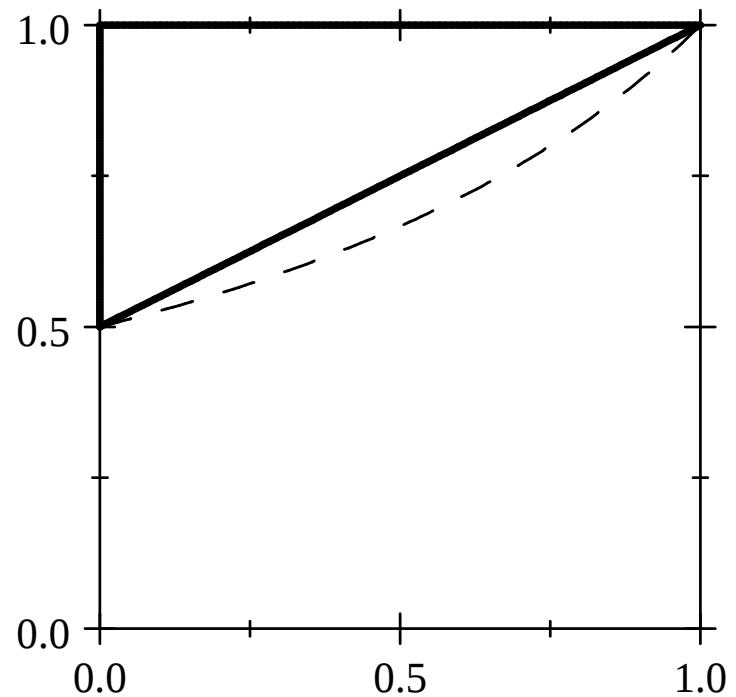
multiple equilibria



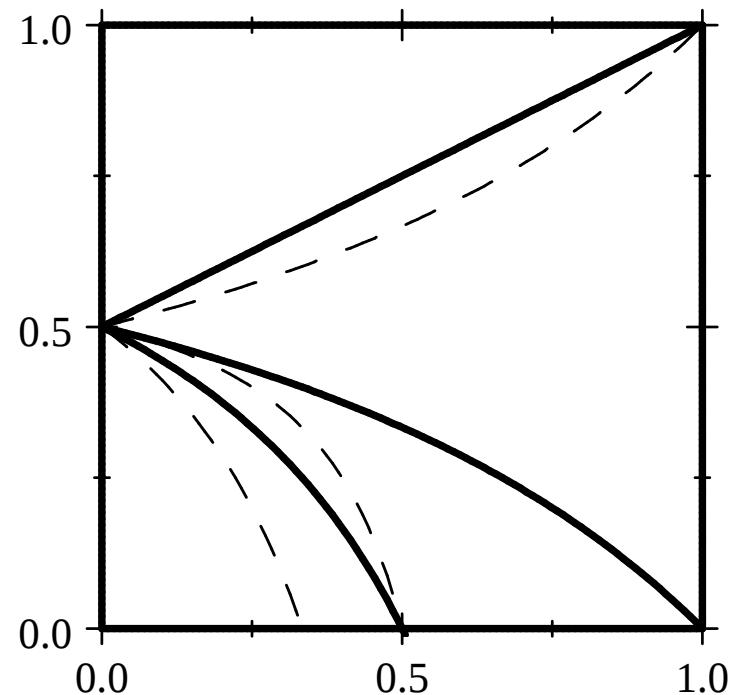
multiple equilibria, but none
without any cooperation

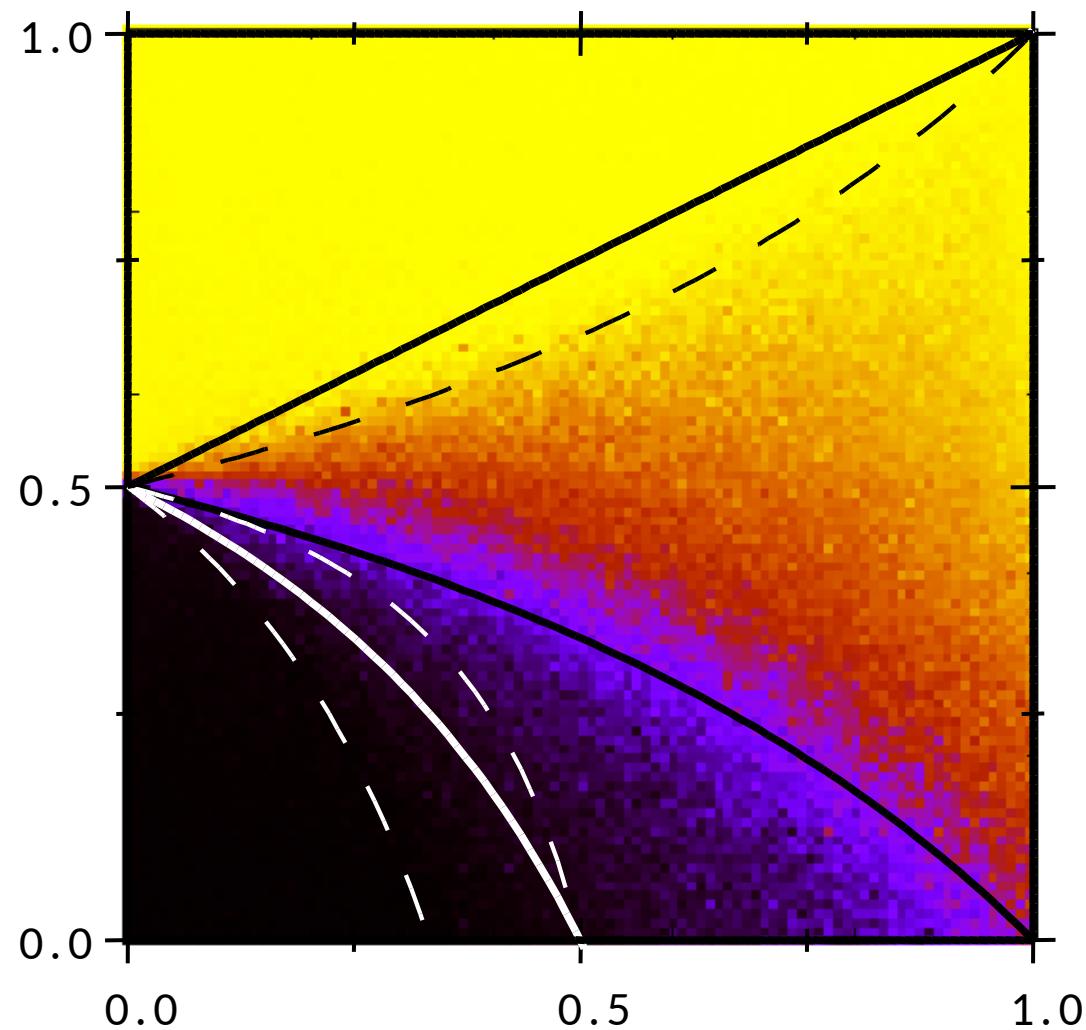


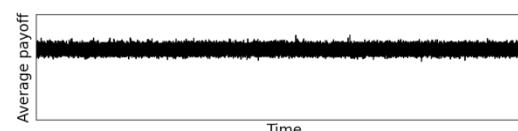
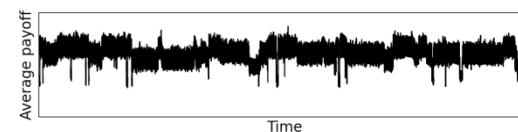
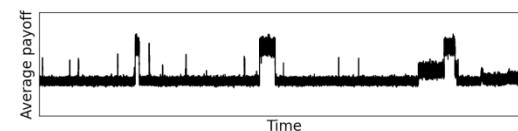
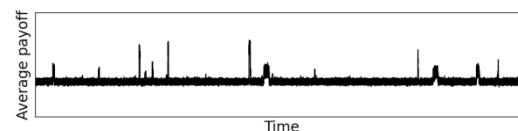
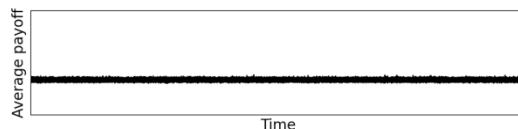
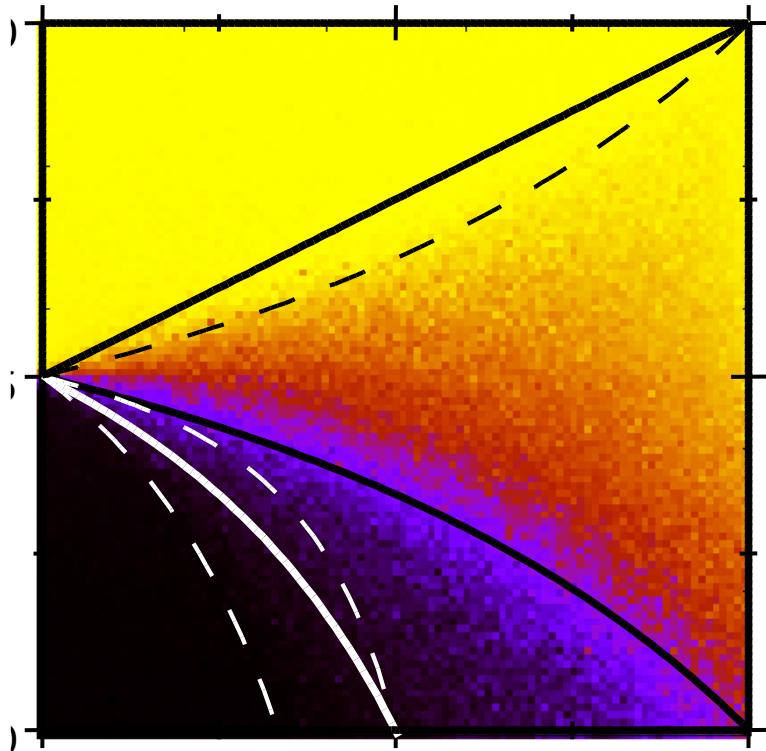
full cooperation



repetition + population structure

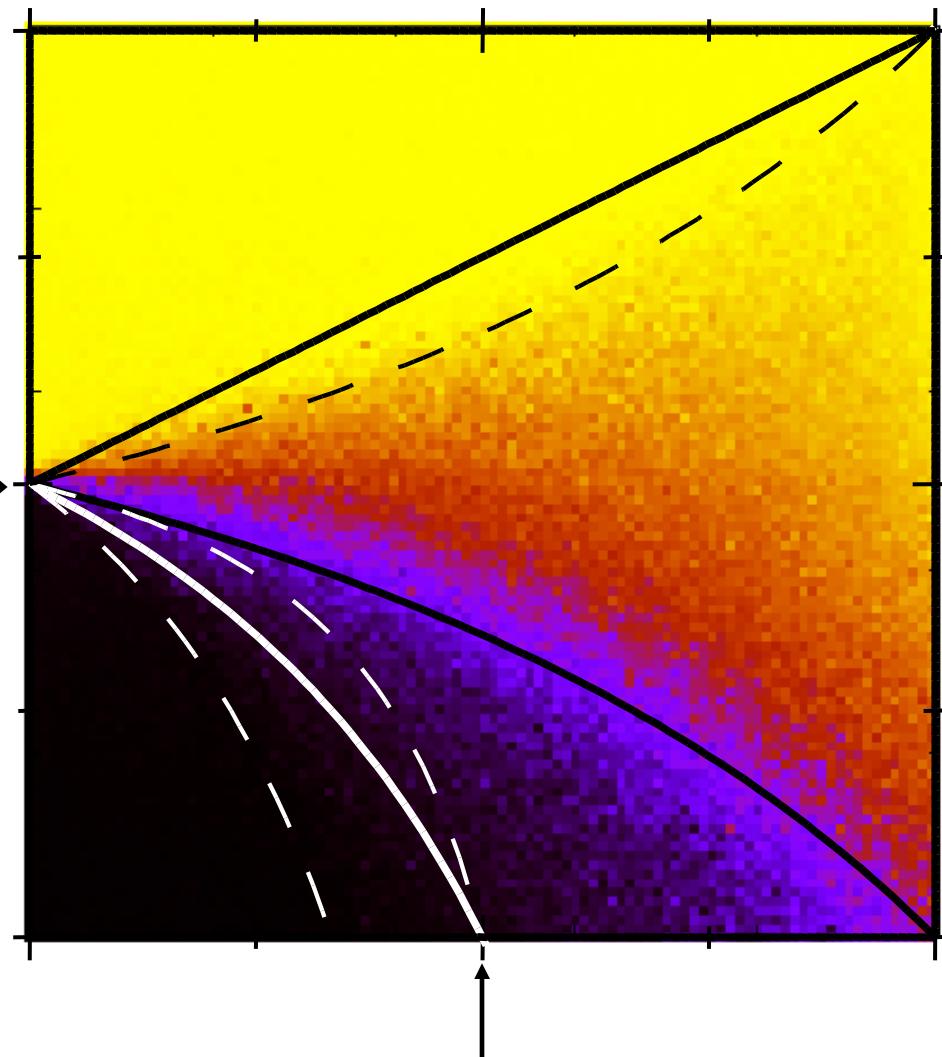






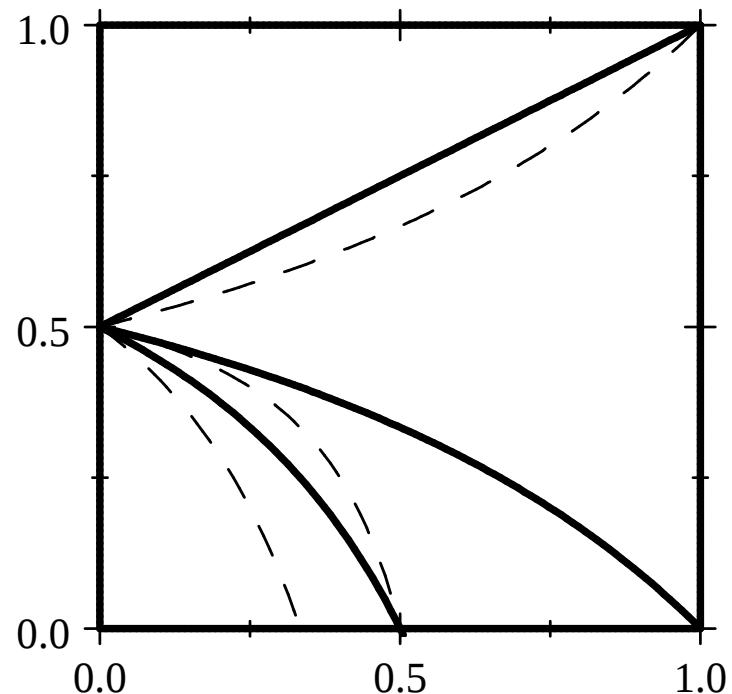
Van Veelen et al., PNAS, 2012

Hamilton's rule
(biology)

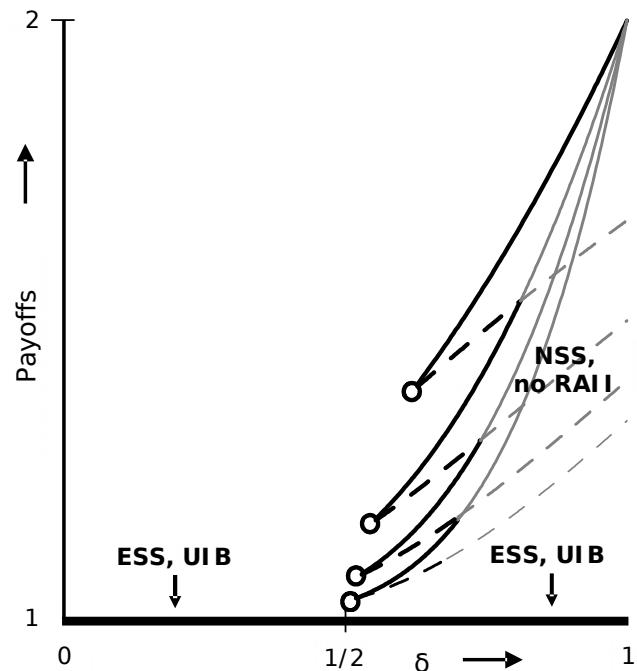


Folk theorem
(economics)

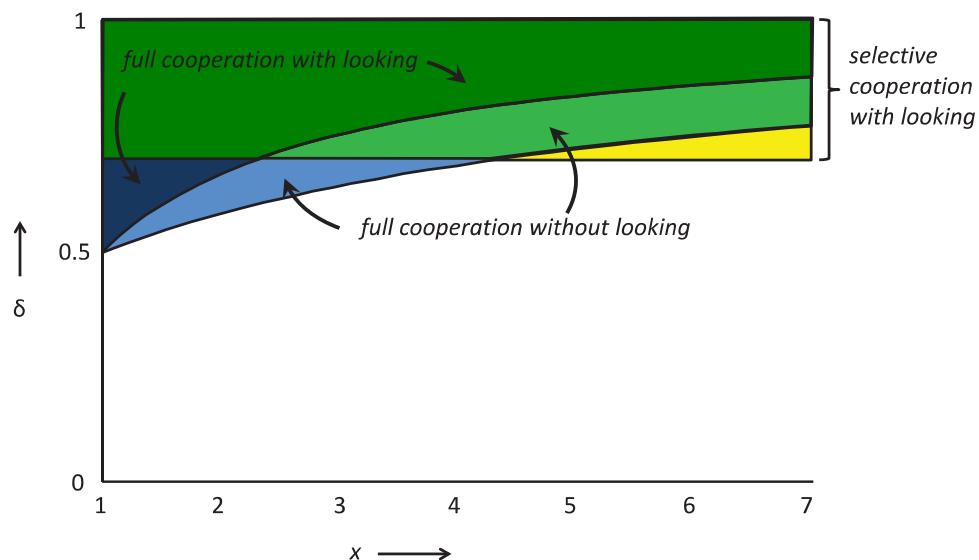
Repetition + population structure



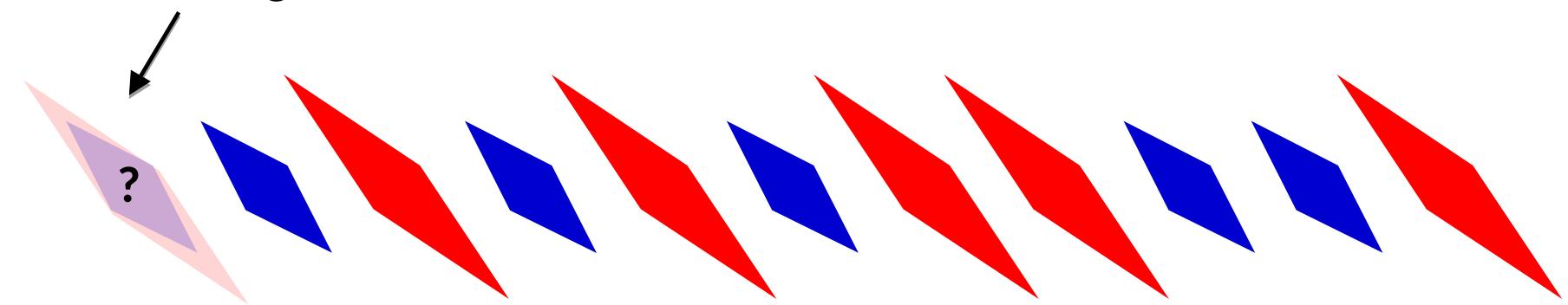
Repetition + complexity costs



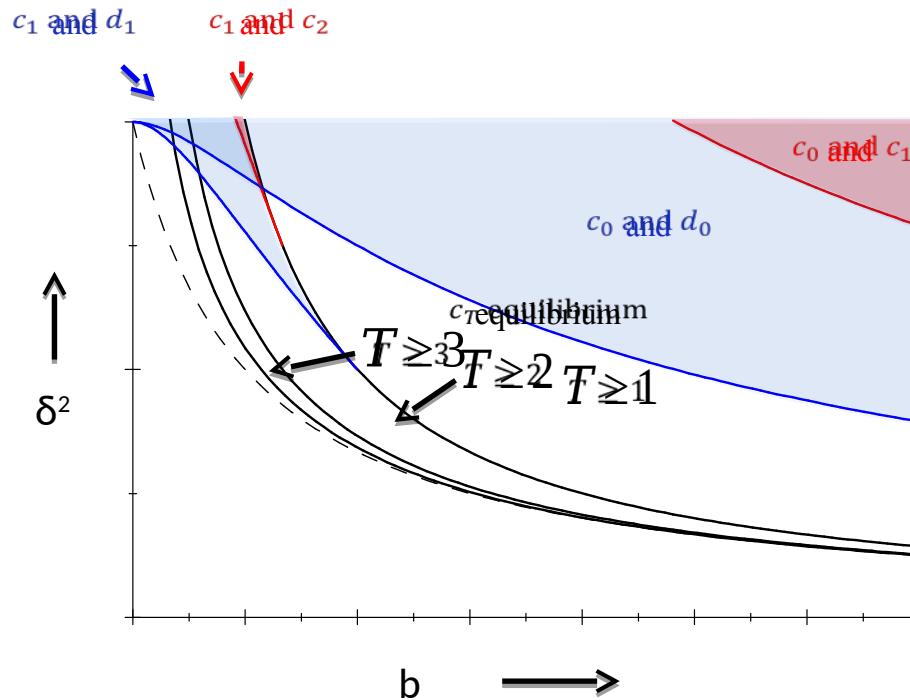
Repetition + endogenous information

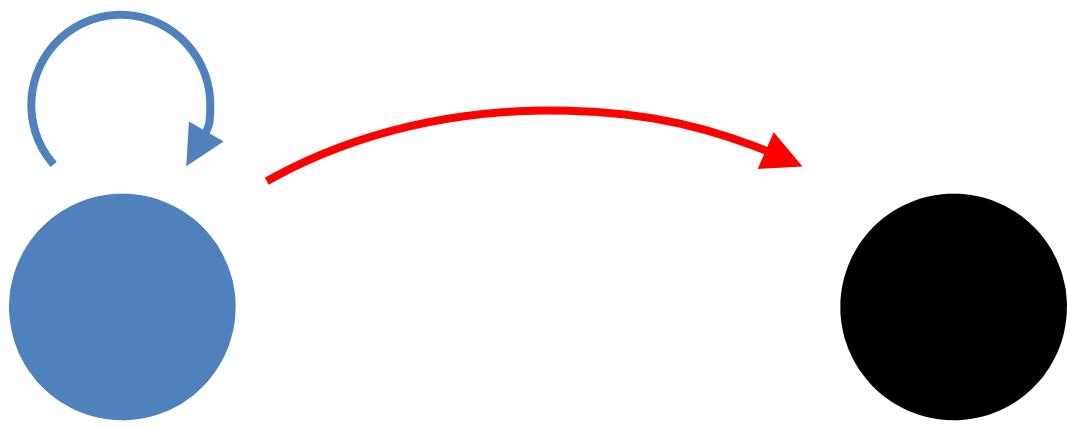


Future gains worth the costs



Repetition + partner choice

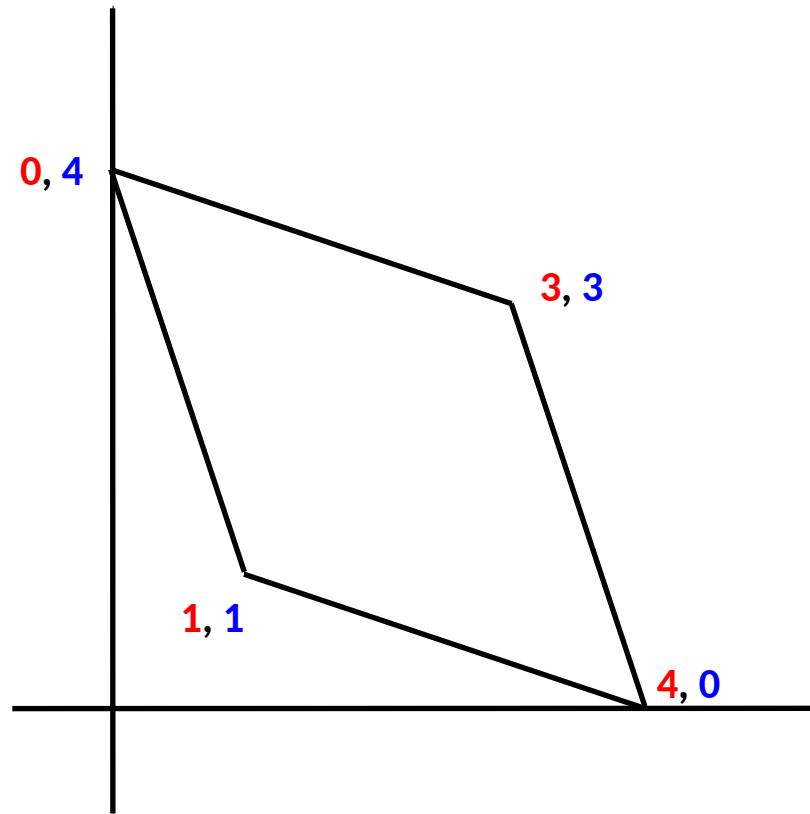




3. Signalling / Partner choice

Prisoners' dilemma

	Cooperate	Defect
Cooperate	3, 3	0, 4
Defect	4, 0	1, 1



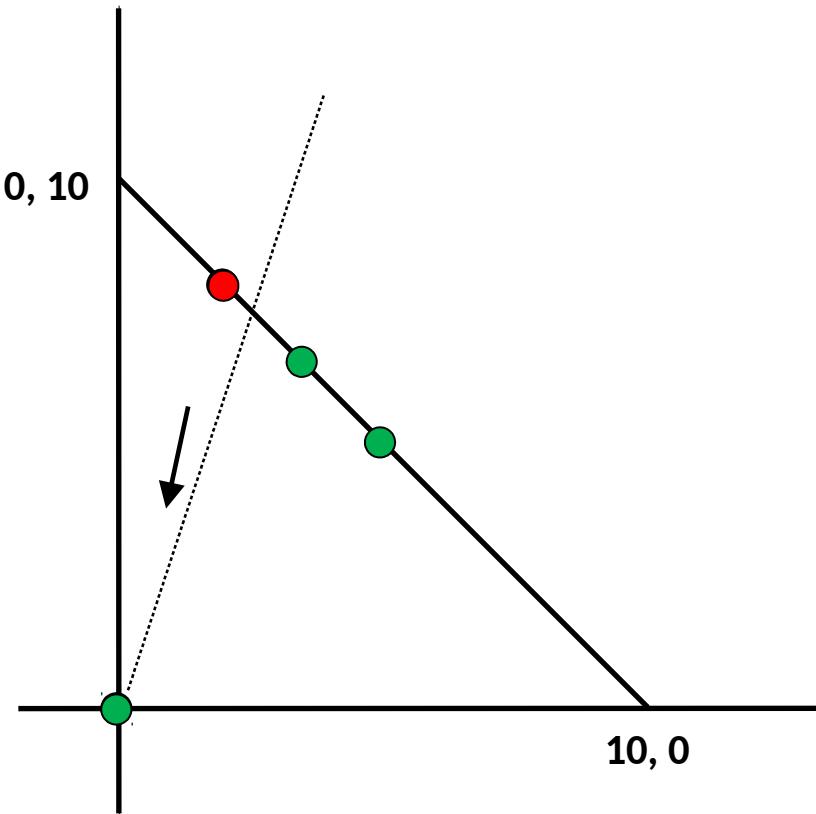
Ultimatum game

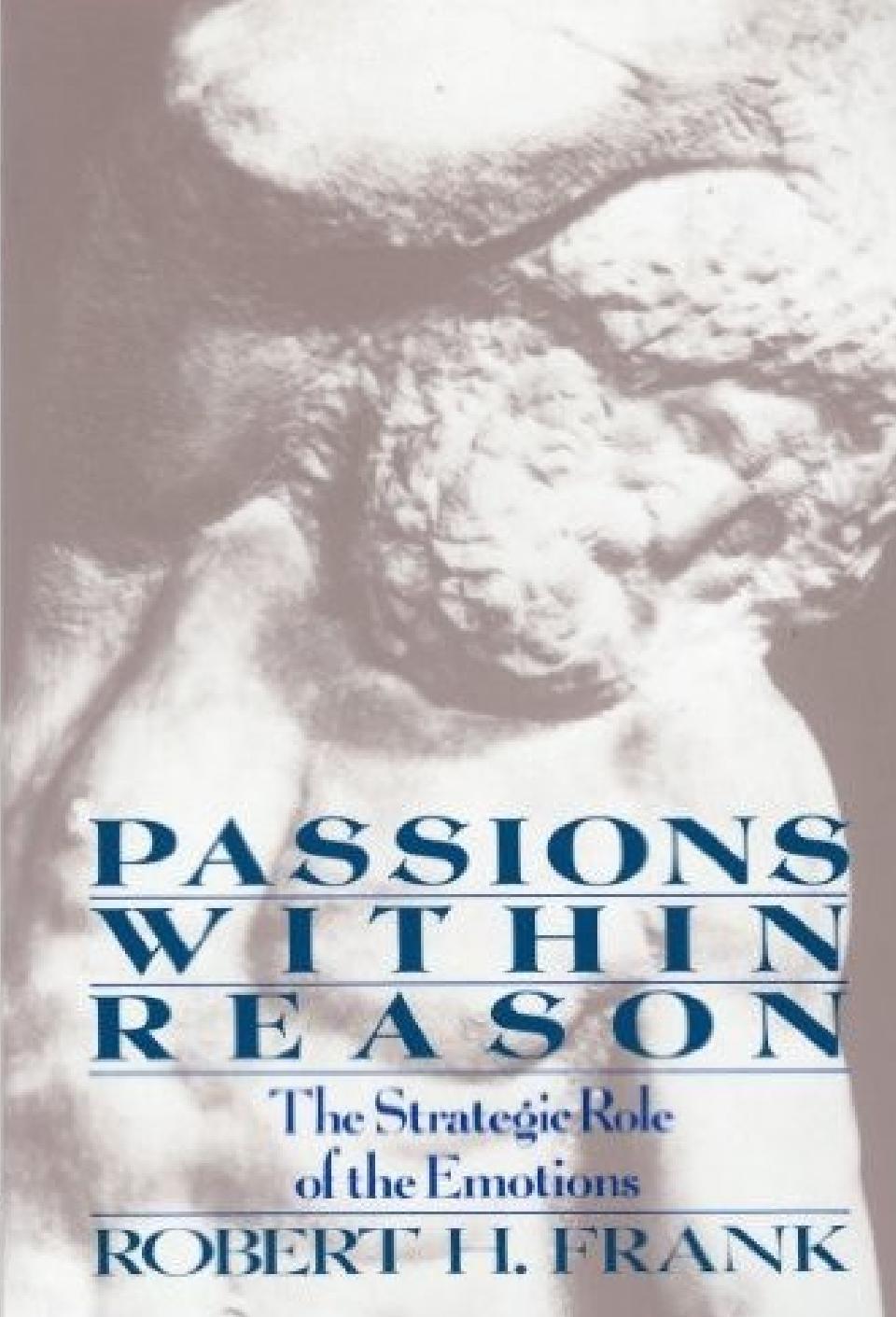
Player 1

propose division

Player 2

accept or reject





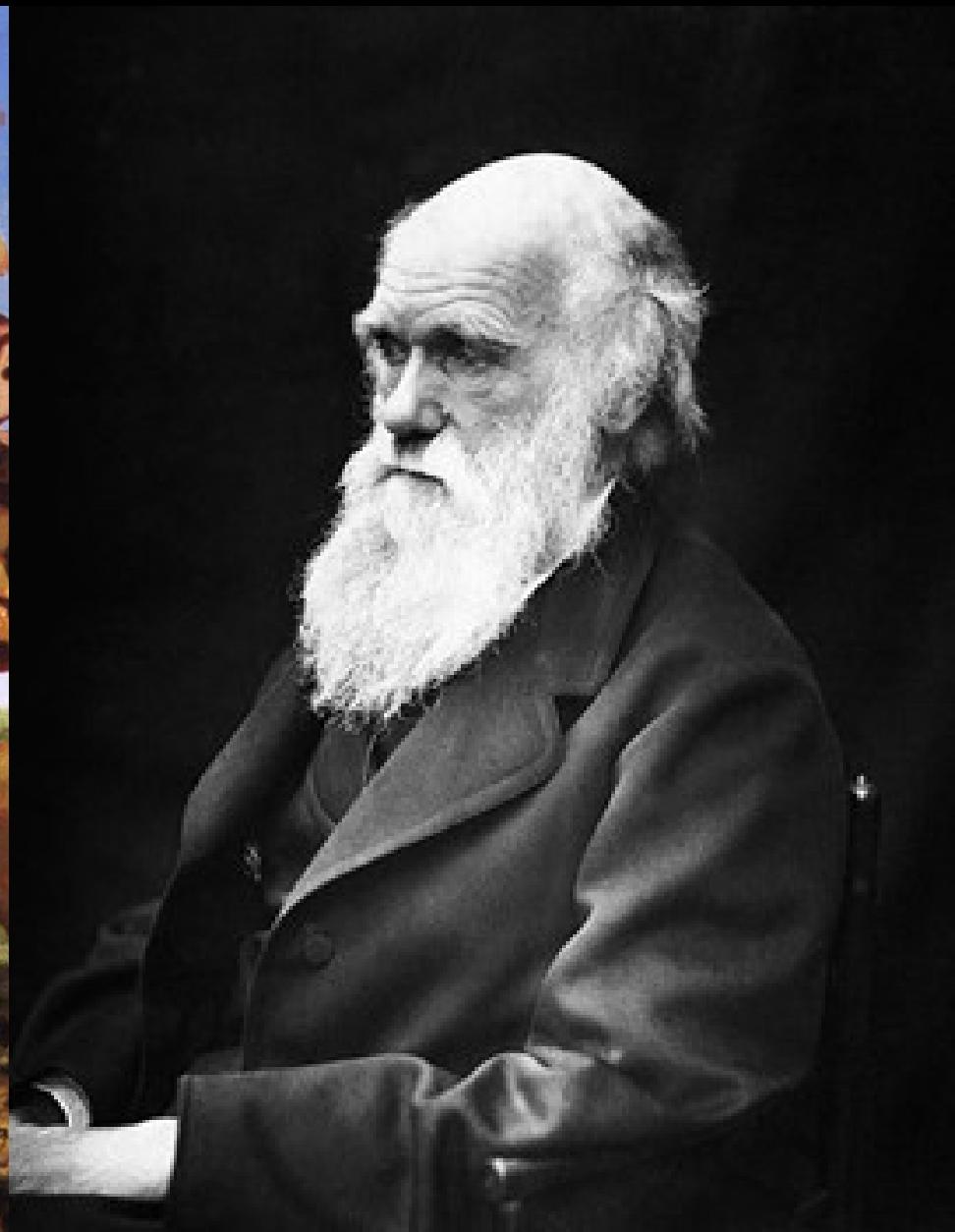
PASSIONS WITHIN REASON

The Strategic Role
of the Emotions

ROBERT H. FRANK

A photograph of a man and a woman sitting in a therapist's office. The man, wearing a blue shirt and dark trousers, is seated in a dark armchair on the right, looking towards the woman. The woman, wearing a light-colored blazer and trousers, is seated in a lighter-colored armchair on the left, also looking towards the man. They are positioned across from each other at a low, round, glass-top coffee table with a metal frame. In the background, there is a large window covered by vertical blinds, through which some greenery is visible. On either side of the window, there is a small, dark sculpture of a bird or animal. To the right, a bookshelf is partially visible.

Anger management and
commitment issues





Ben Allen



Moshe Hoffman



Martin Nowak



Dave Rand



Carl Veller



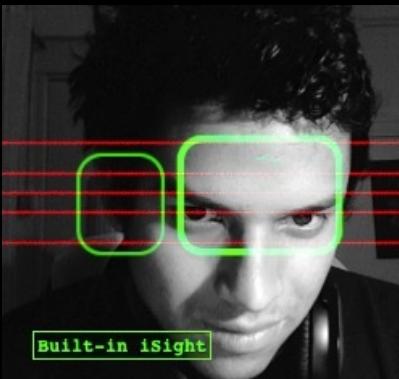
Burt Simon



Shishi Luo



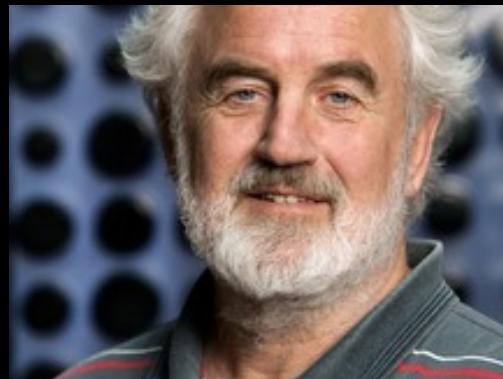
Arne Traulsen



Julián García



Martijn Egas



Maus Sabelis



Stephan
Jagau



Boris van
Leeuwen



Charles
Noussair



Theo
Offerman



Sigrid
Suetens



Jeroen van de
Ven



Luis Izquierdo



Segis Izquierdo



Aslı Akdeniz

A photograph of a field filled with small, bright yellow flowers, possibly buttercups or dandelions. In the center background, a tall, weathered wooden utility pole stands vertically. The sky above is a pale, hazy yellow, suggesting either sunrise or sunset. A faint, thin horizontal line, likely a wire, stretches across the frame from left to right, crossing in front of the pole.

LOVE PEACE UNDERSTANDING