

*Mean Bad Birds versus Kind
Friendly Chickens: Group
Selection and the Evolution
of Cooperation*

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Individual vs Group Selection

Motivation

- ICCS06: Edward O Wilson, David Sloan Wilson and Charles Goodnight
- *Marketing Theory* "Towards a Normative Theory of Normative Marketing Theory"
December 2005
 - Complexity and Strategy
 - Requisite Variety (Ashby)
 - Extended self (Andy Clark)
 - Extended phenotype (Richard Dawkins)
 - Soft Assembled Strategies

*Really, it's all about "mean
bad birds" (MBB) versus
"kind friendly chickens"
(KFC)*

The Chicken Experiment (Muir 1996)



Individual Selection



Group Selection

Some strategies Muir observed when observing the KFCs

Goood egg, Daisy!

Here, make way for the
great egger

Don't you worry matess,
I'll clean that up

Think about this folks!

- Selfishness beats Altruism within groups
- Altruism beats Selfishness between groups

Groups in Business and Life

- People live in groups to live, reproduce, work and play (theories of psychology and sociology)
- People work in teams, departments and larger units up to whole firm
- Firms live in relations, networks, locales and industries

Group vs Individual Outcomes

- Groups co-produce outcomes through action and interaction over time
 - Direct and indirect effects
 - Short run and long run effects
 - E.g. TFT induces cooperation from others
- Group outcomes not traceable to individual actions (strategies)
 - Ask James March!

Selecting best performing
individuals from within groups
ignores interaction effects

Basic Hypothesis

IPD with group selection evolves more cooperative strategies within groups and better performing groups than does individual selection

Here is what we did....

Individual Selection

Start with g groups of size s

1. Iterated game within groups for all pairs for i rounds
2. Determine **individuals' fitness in a group**
3. GAs and mutation to form g new groups
 - o **Mate randomly among fittest (and weakest) individuals** to produce g new groups of size s
 - o m = probability of mutation
4. Go back to step 1 and do this for x generations

Group Selection

Start with g groups of size s

1. Iterated game within groups for all pairs for i rounds
2. Determine each **group's fitness**
3. p = probability of individuals **switching groups**
 - o p = fixed value
 - o p = function of relative group fitness
 - o Swaps vs. individual migration
4. **GAs** and mutation to form g new groups size s
 - o **Mate randomly within fittest (and weakest) groups** to produce groups which replace less fit (more fit groups)
 - o m = probability of mutation
5. Go back to step 1 and do this for x generations

Here's a strategy, or actor if
you like, in this simulated
"world"

Memory 2 Strategies

2 period memory

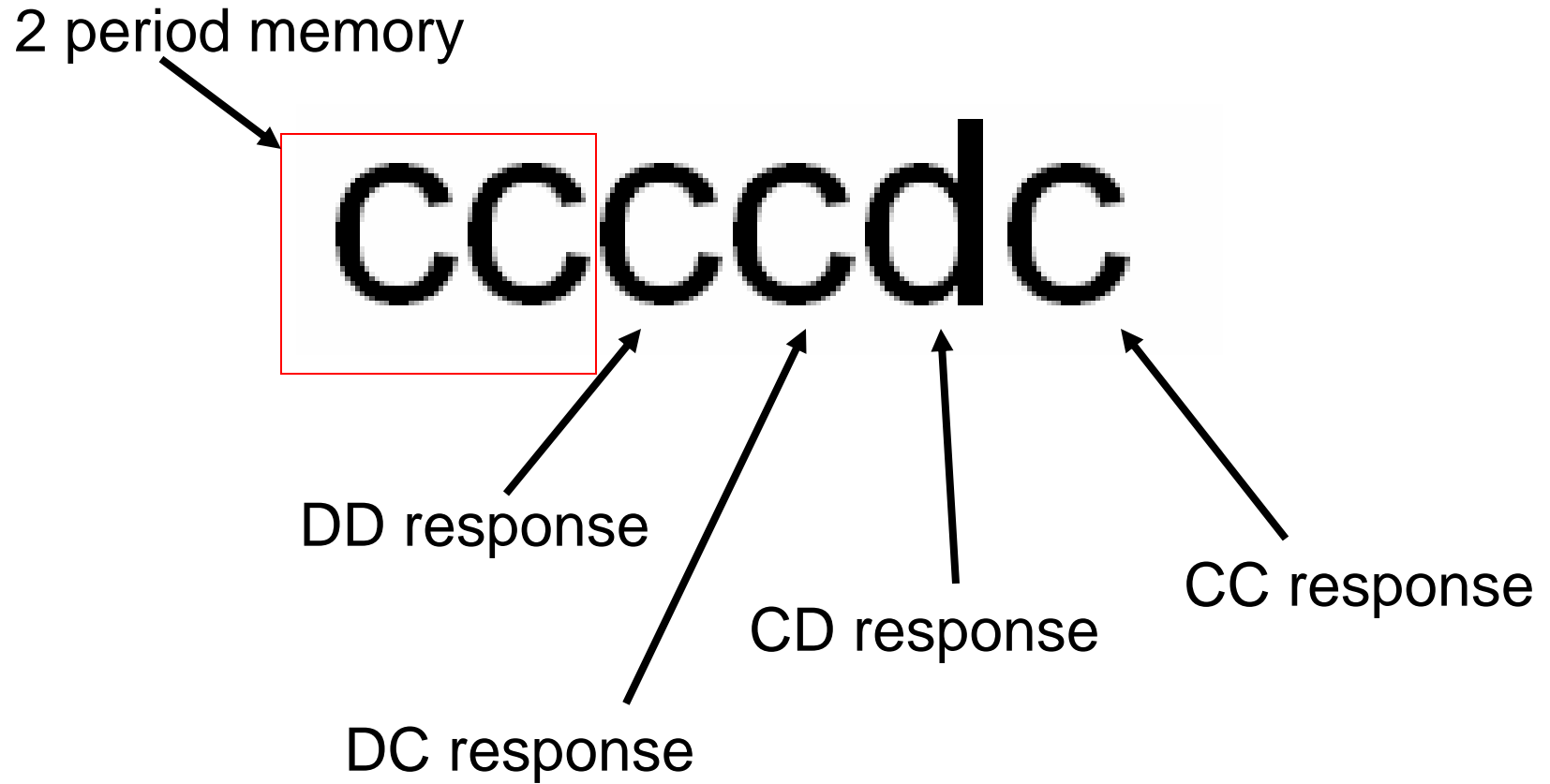
ccccdc

DD response

CD response

CC response

DC response



Some of the games we play

Prisoners' Dilemma

	C	D
C	4,4	1,5
D	5,1	2,2

Chicken

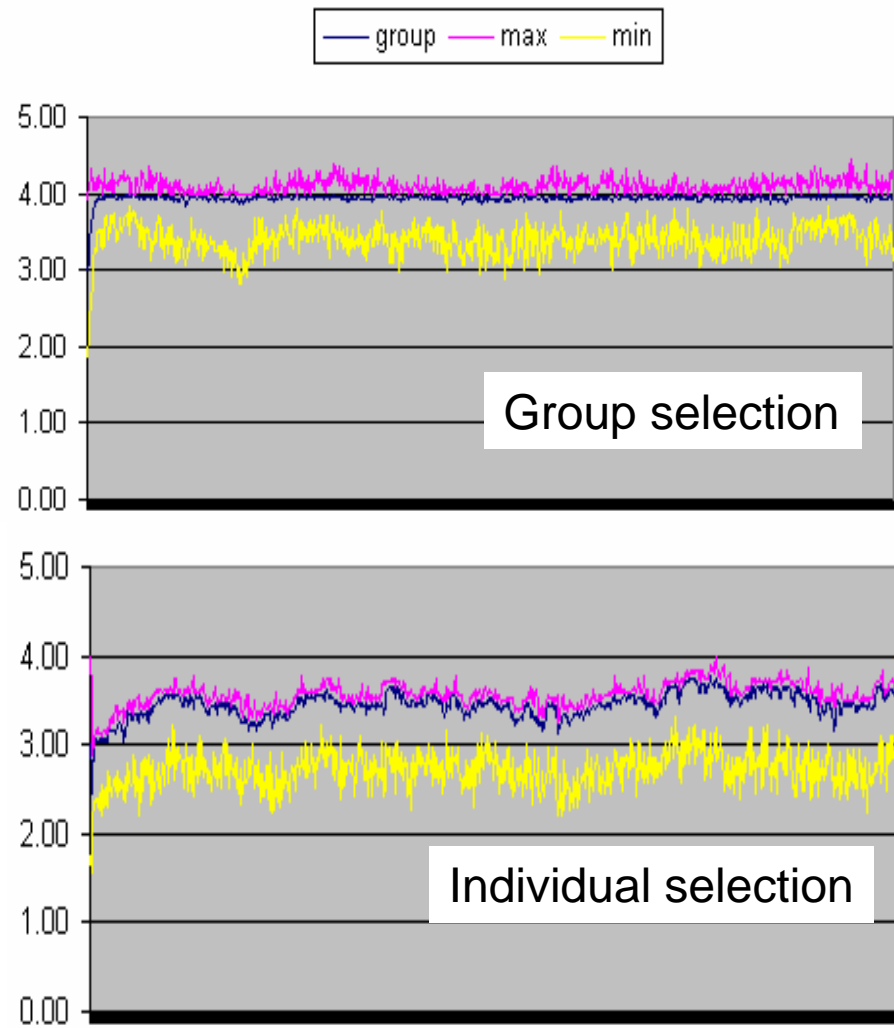
	C	D
C	4,4	1,7
D	7,1	0,0

KF Chicken

	C	D
C	4,4	1,10
D	10,1	0,0

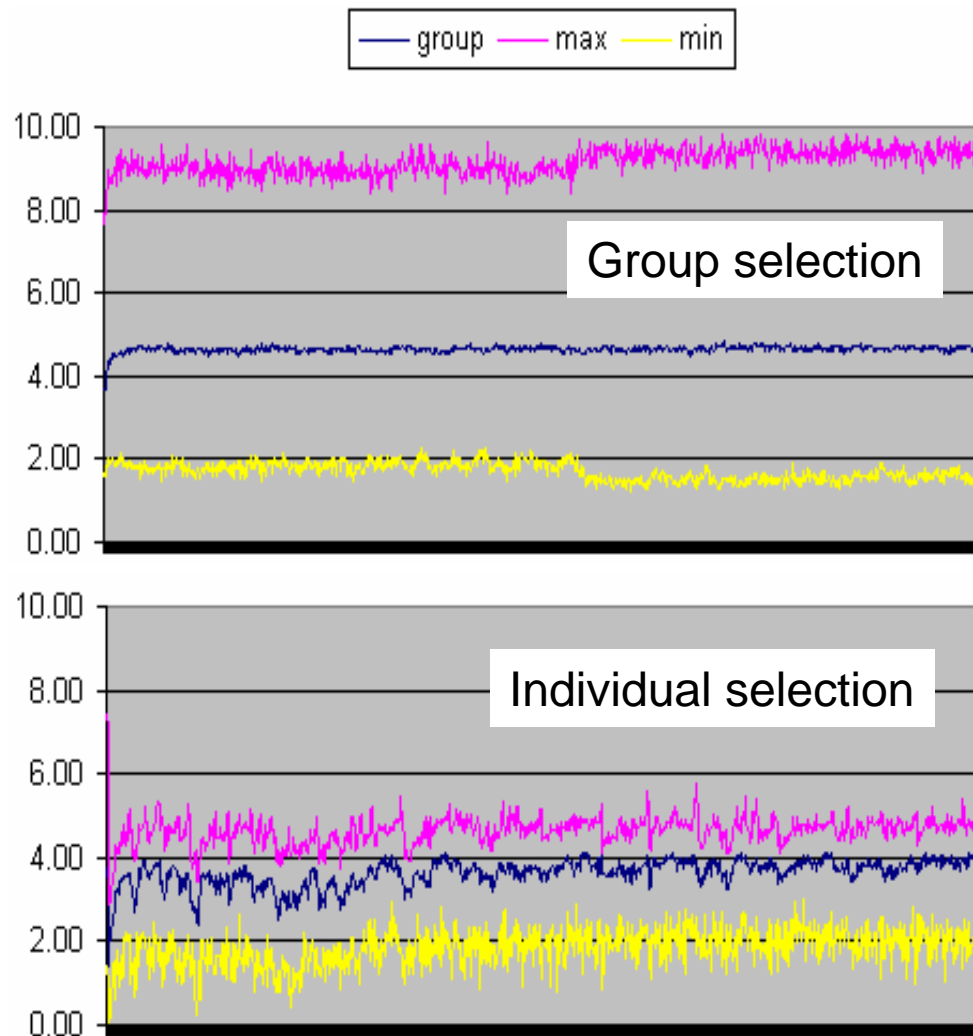
Some Results

IPD



Memory 2

KF Chicken



Memory 2

What are the strategy mixes in groups and how do they evolve over time?

Memory 2 Strategies

2 period memory

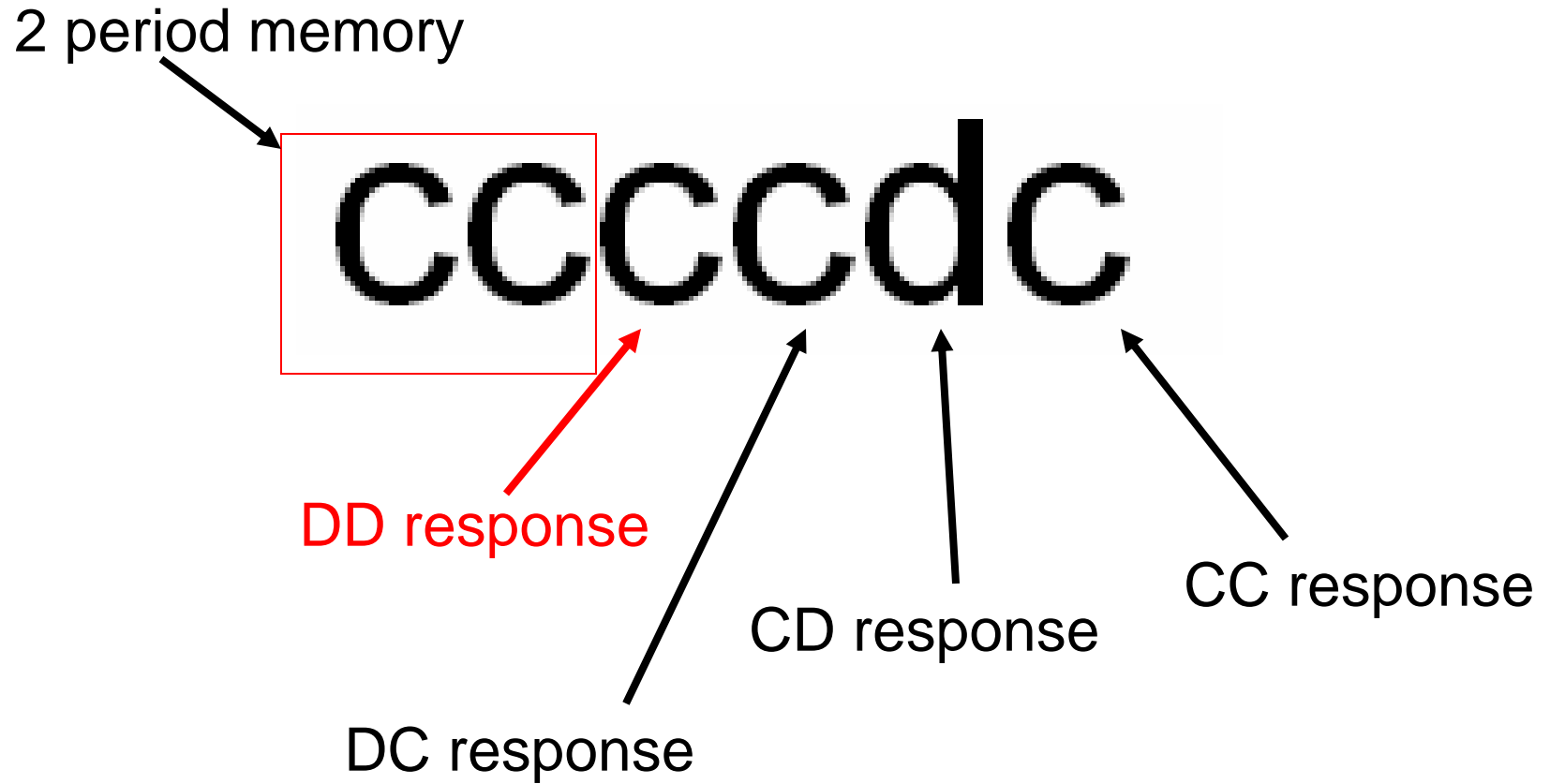
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DD response

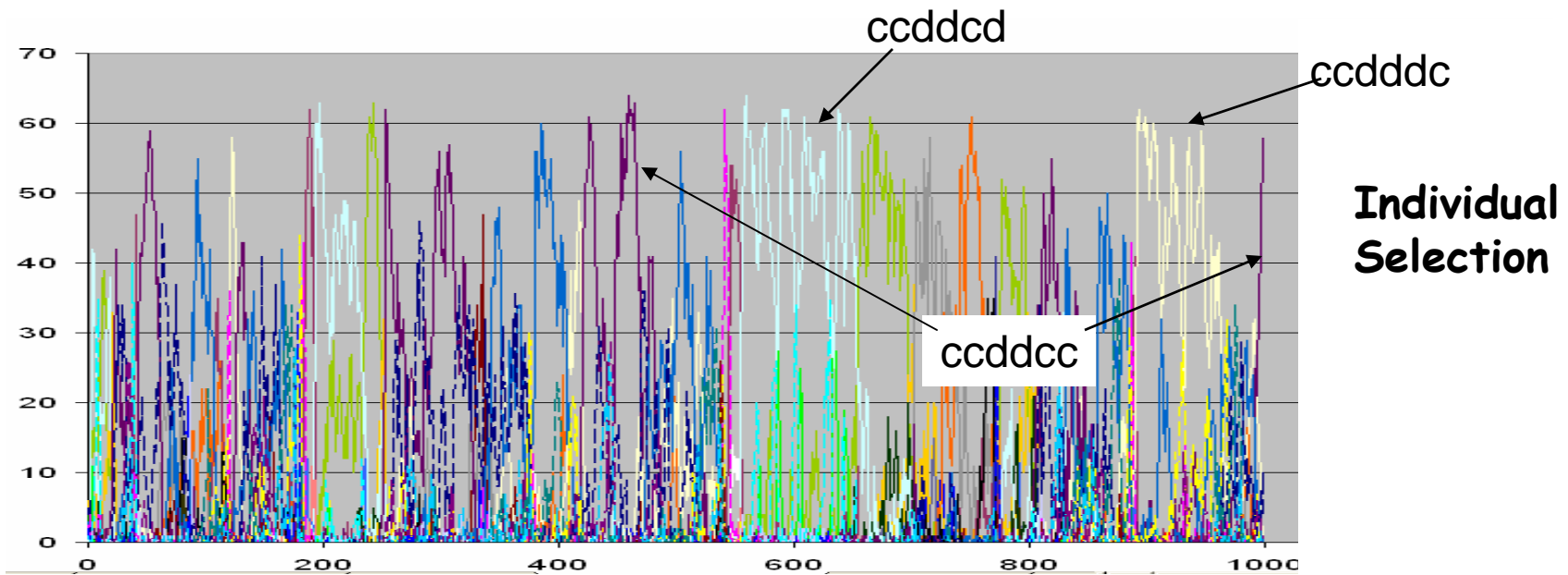
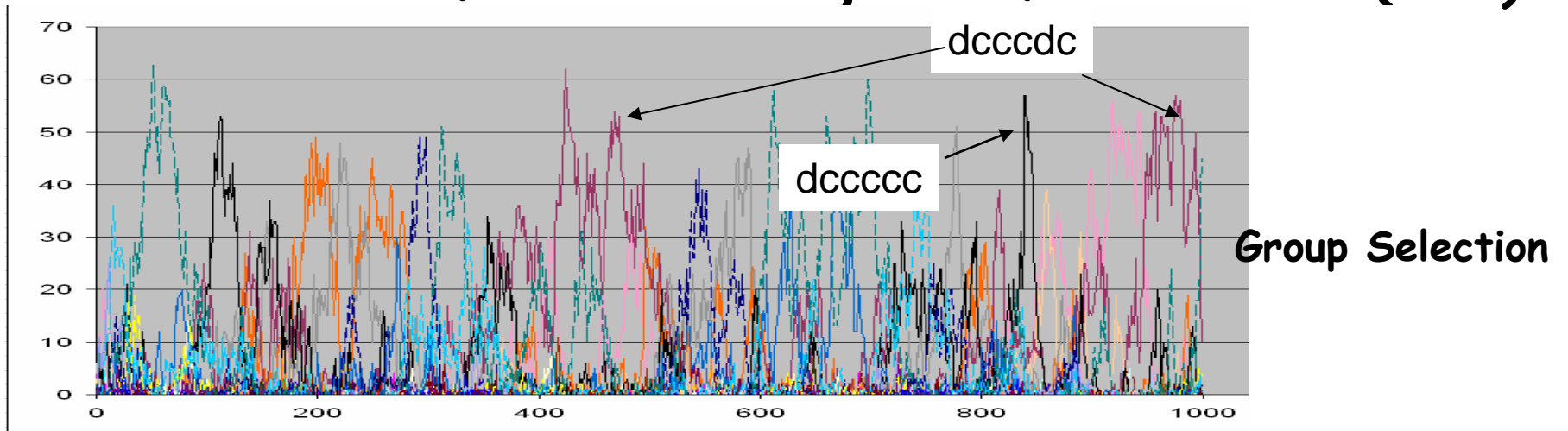
CD response

CC response

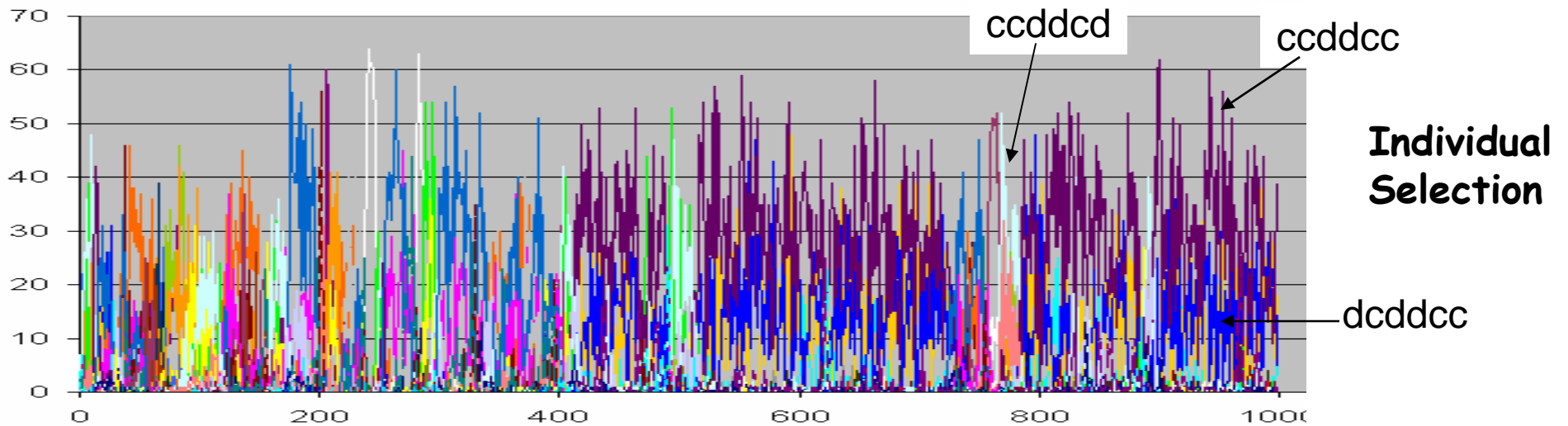
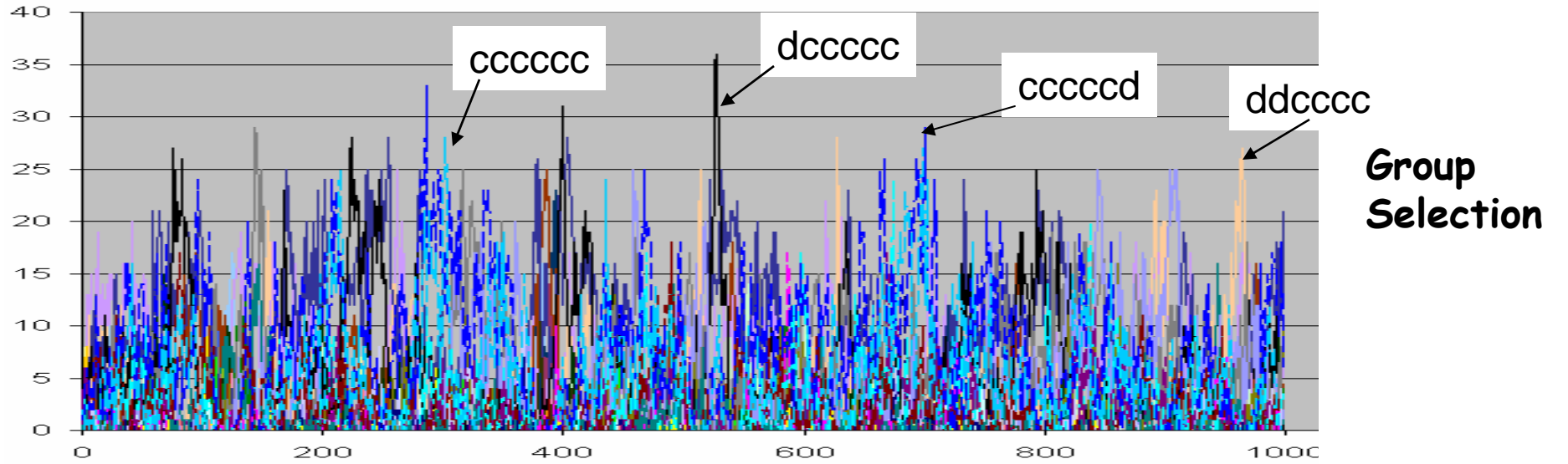
DC response



Evolution of Strategies for IDP (m2)



Evolution of Strategies for KFC ($m=2$)



Final Generation Strategies for
one of the 10 simulation runs

Spot the Differences?

NB. Rows = groups

Group Selection

cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc
cccdcc	cccdcc	dcccdcc	dcccdcc	cccdcc	dcccdcc	dcccdcc	cccdcc
cccdcc	dcccdcc	cccdcc	cccdcc	dcccdcc	cccdcc	cccdcc	dcccdcc
cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc
cccdcc	dcccdcc	cccdcc	cccdcc	cccdcc	dcccdcc	dcccdcc	cccdcc
cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc
cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc
cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc	cccdcc

Individual Selection

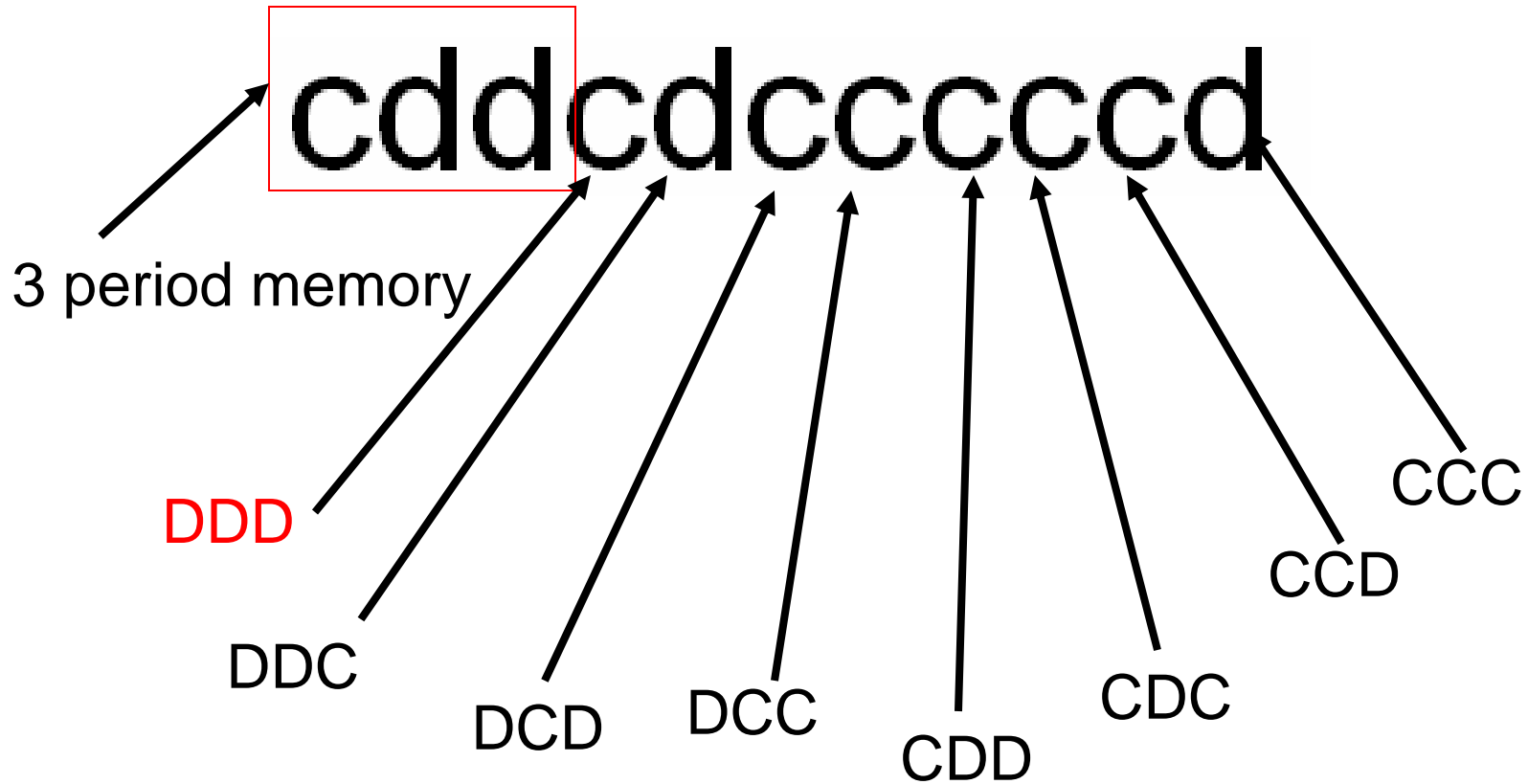
ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc
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ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc
ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc
ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc	ccddcc

Final Generation (IPD memory 2)

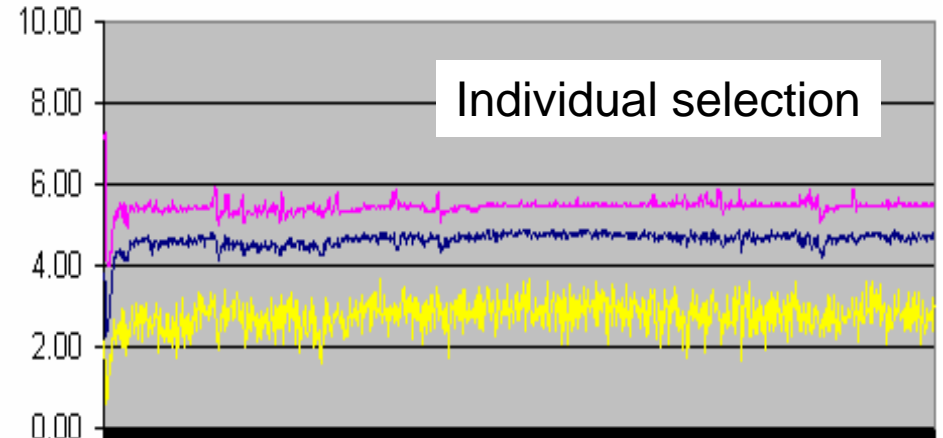
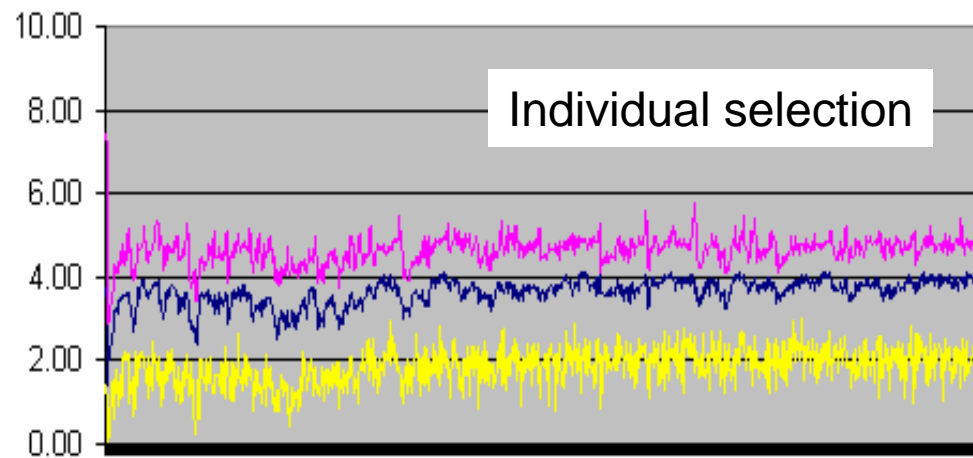
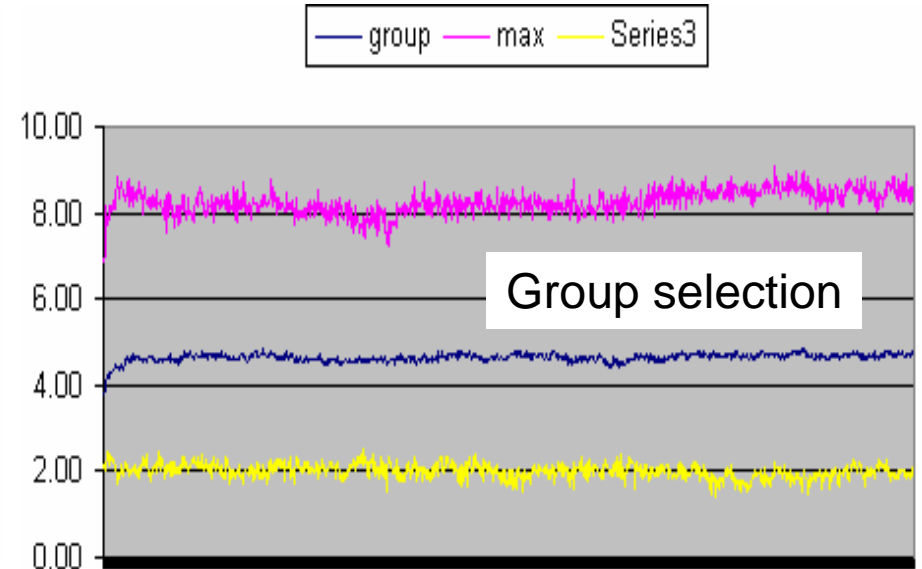
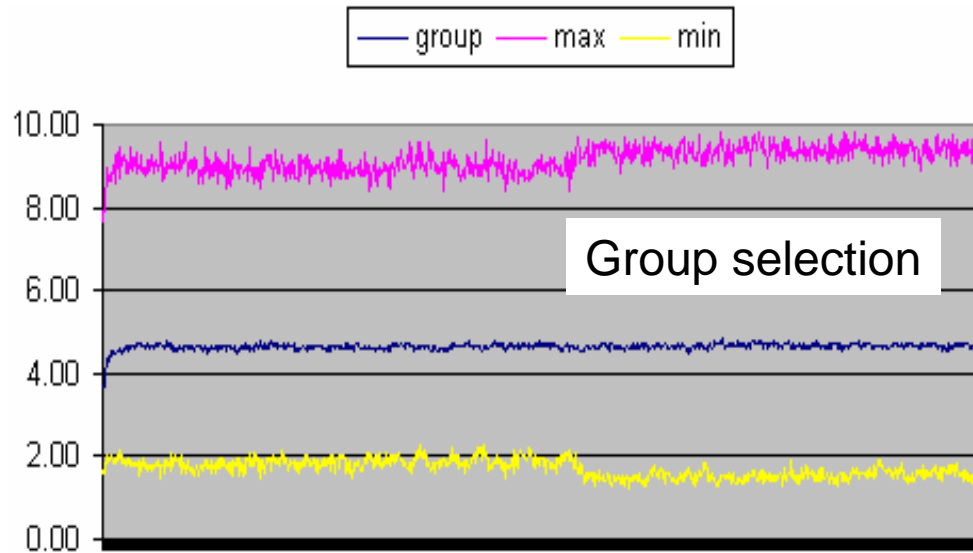
Getting out of the trap of DD

- The response to DD
- In group selection is nearly always C
- In individual selection is always D

Memory 3 Strategies (real complex this)



KF Chicken



Memory 2

Memory 3

So, what does it all mean?

Group selection results in better performing individuals than individual selection

Picking winners

- Winning individual or group?
 - Publish more eggs!
 - Sack the teacher-only people!
 - Get rid of admin types!
- Winning firm, relationship, network or value chain?
 - In search of excellent firms?
 - Sustainable competitive advantage is a myth?
(Wiggins and Roelfi *Org Sci* 2002)
 - In search of excellent industries?

Hypothesis:

The fittest university research groups have more **least fit** individuals in them

or

Mean Bad Birds need Kind Friendly Chickens who like to play with MBB in order to be Really MBB!

Mean Bad Birds at Work



Article at a glance:

Building the **civilized workplace**

- It's a bigger problem than you might think—jerks and bullies in the workplace. Research shows that they not only hinder recruiting and retention but also raise levels of client churn, damage reputations, and diminish the confidence of investors.
- Companies that harbor jerks may also suffer from reduced levels of creativity and innovation, as well as impaired or dysfunctional cooperation, within and outside the organization. That is no small matter in an increasingly networked world.
- The author of this article, a Stanford University professor, argues that companies can take specific and interrelated steps to root out jerks and bullies and build a more civilized workplace.

Source: McKinsey Quarterly 3 April 2007

- Firms don't Innovate, Markets and Networks do
- Collective Minds and Bodies
 - Extended phenotype
 - The Embedded Mind and Soft Assembled Strategies
 - Wilkinson and Young *Marketing Theory* December 2005 (*go on, read it!*)

Some Research Issues I

- Quantifying Evolutionary Equations for strategies in business relations and networks
 - Direct and Indirect Effects of Strategies and Strategy Mix
- Quantifying transmission biases in business
- Identifying types and mechanisms of group selection in business

Some Research Issues II

- Mapping and Modeling evolution of collaborative advantage in firms, relations and networks
- Individual vs Group Selection in other contexts
 - Business Mating
 - Business Dancing