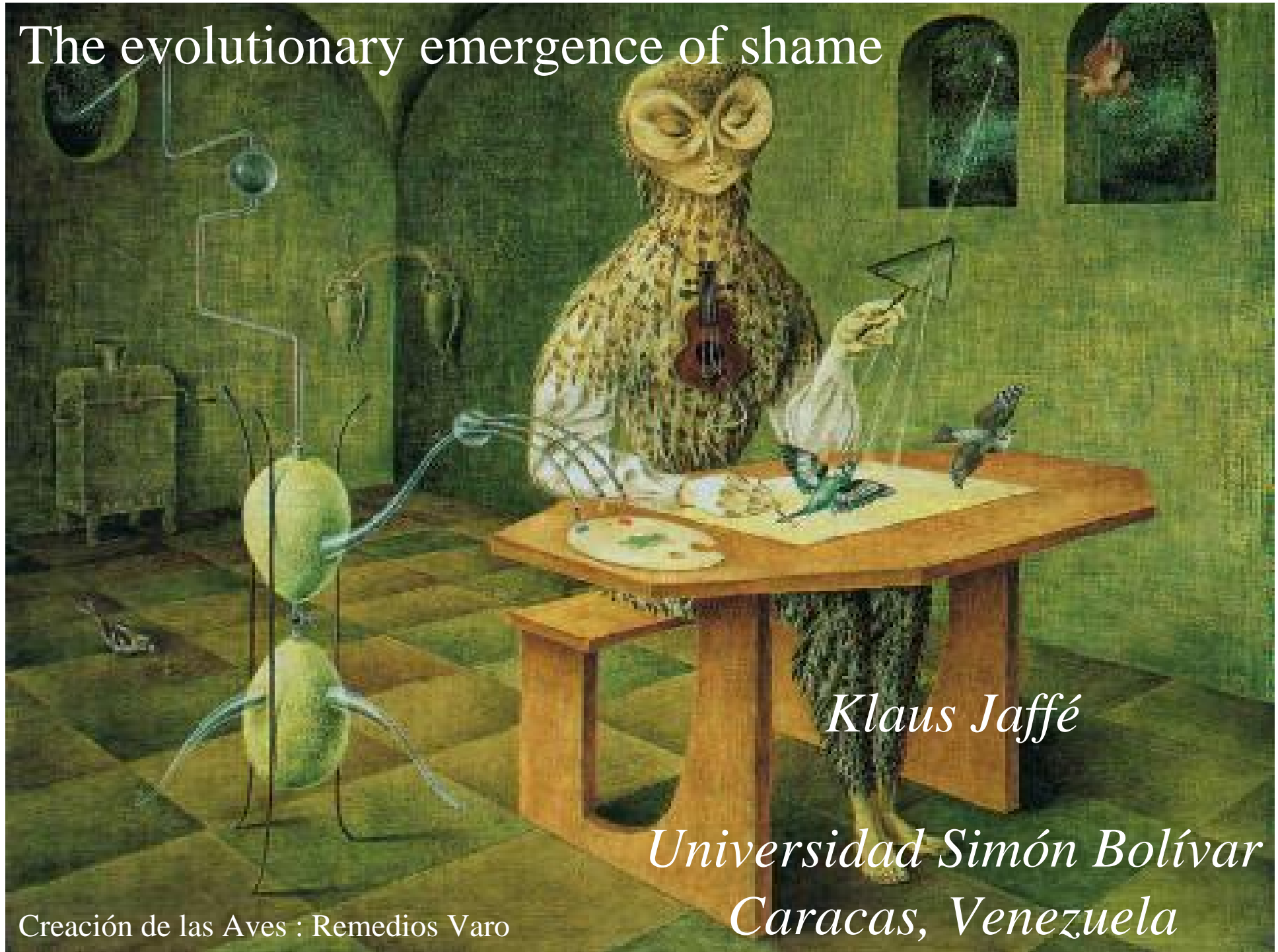


# The evolutionary emergence of shame

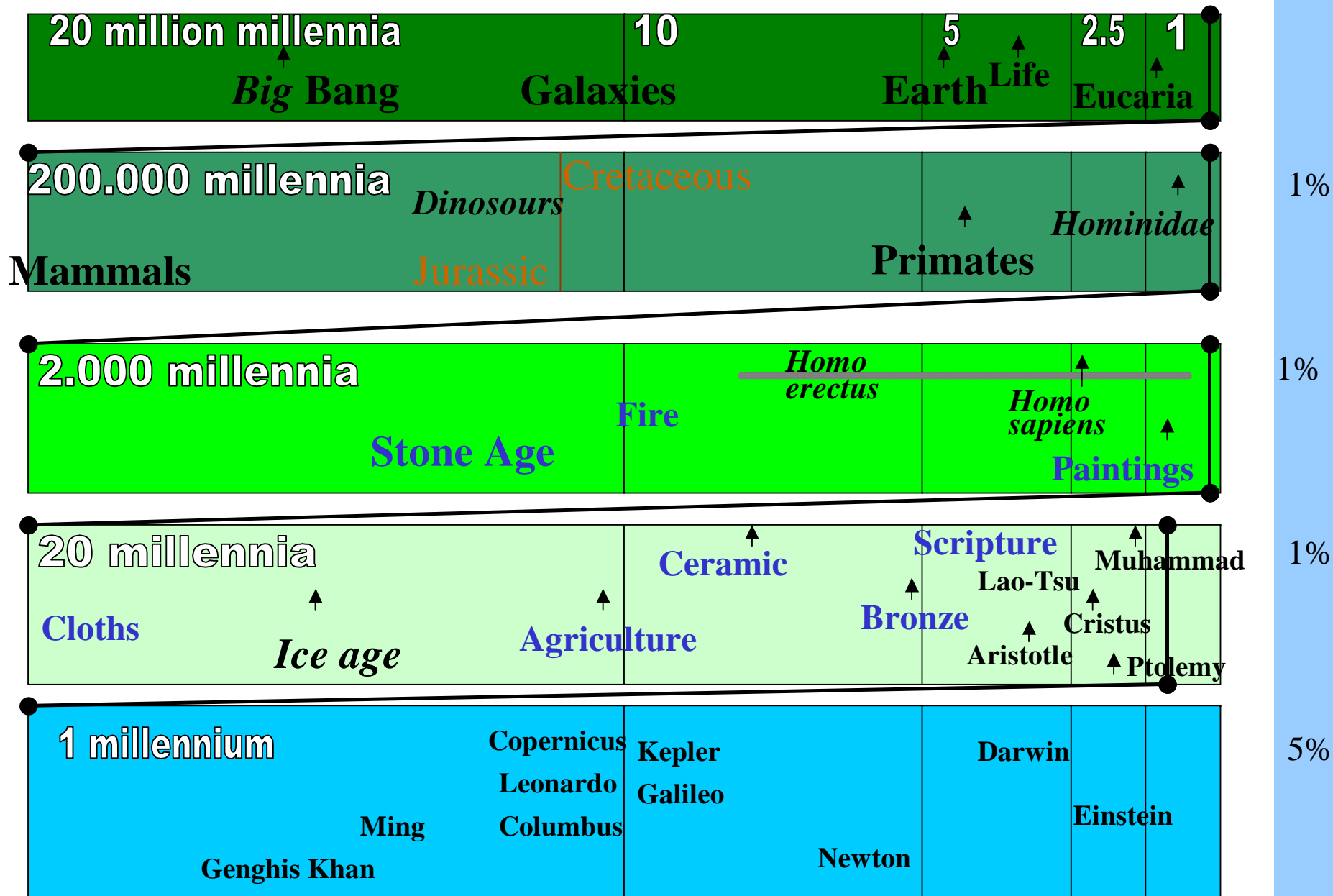


*Klaus Jaffé*

*Universidad Simón Bolívar*

*Caracas, Venezuela*

Creación de las Aves : Remedios Varo



**400**

**200**

**100**

**50**

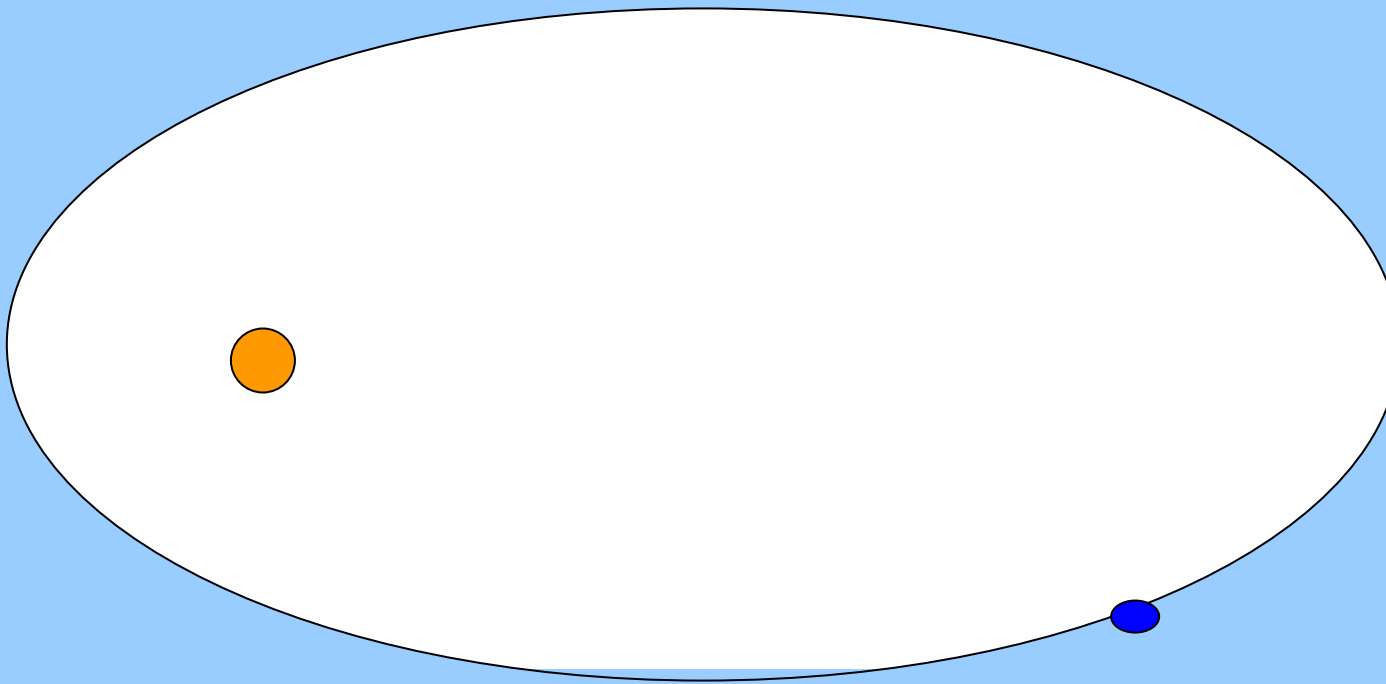
**40**

**20**

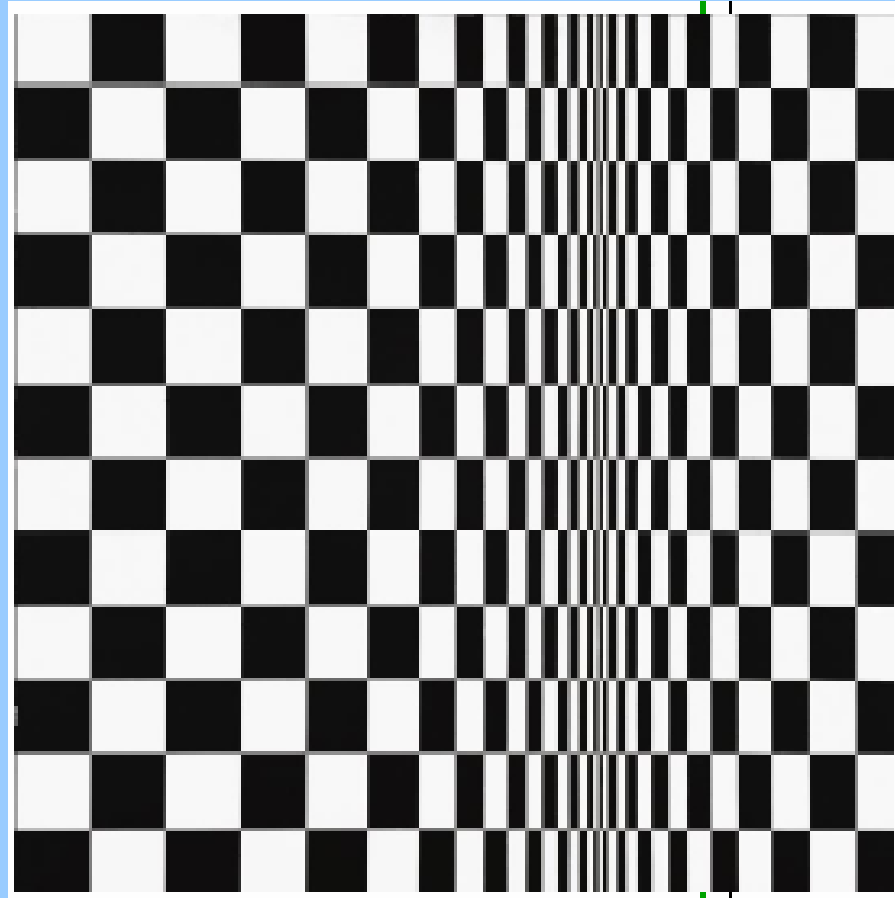
**10**

**5**

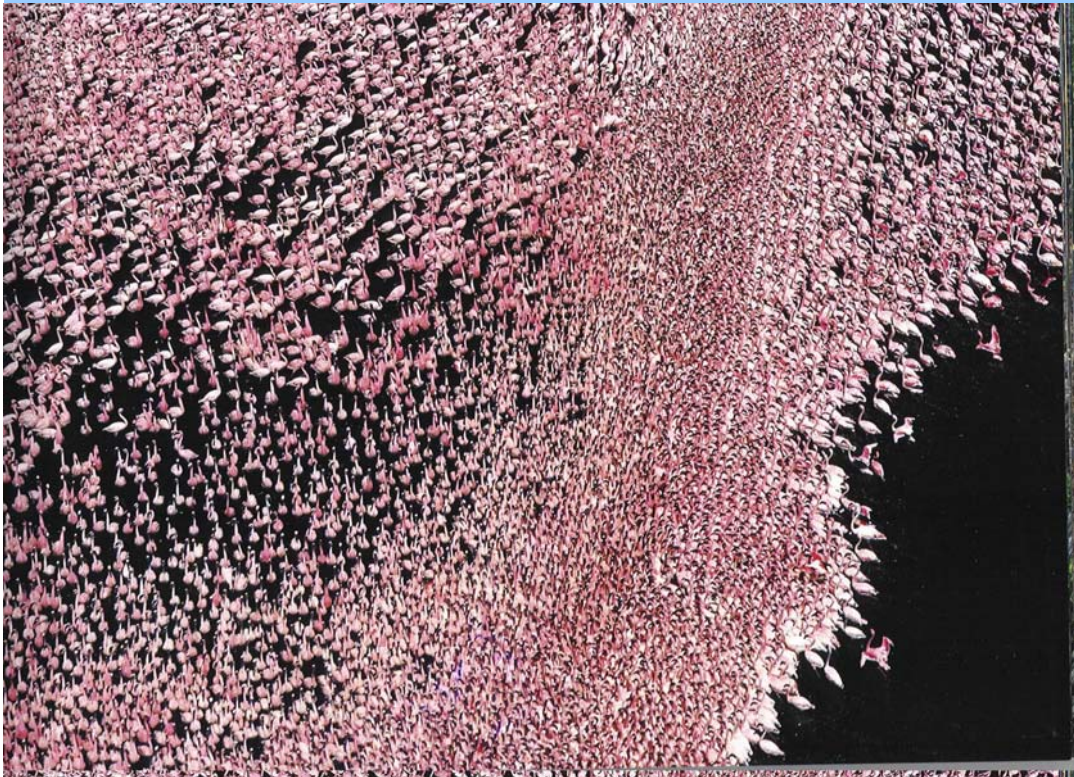
**One year**



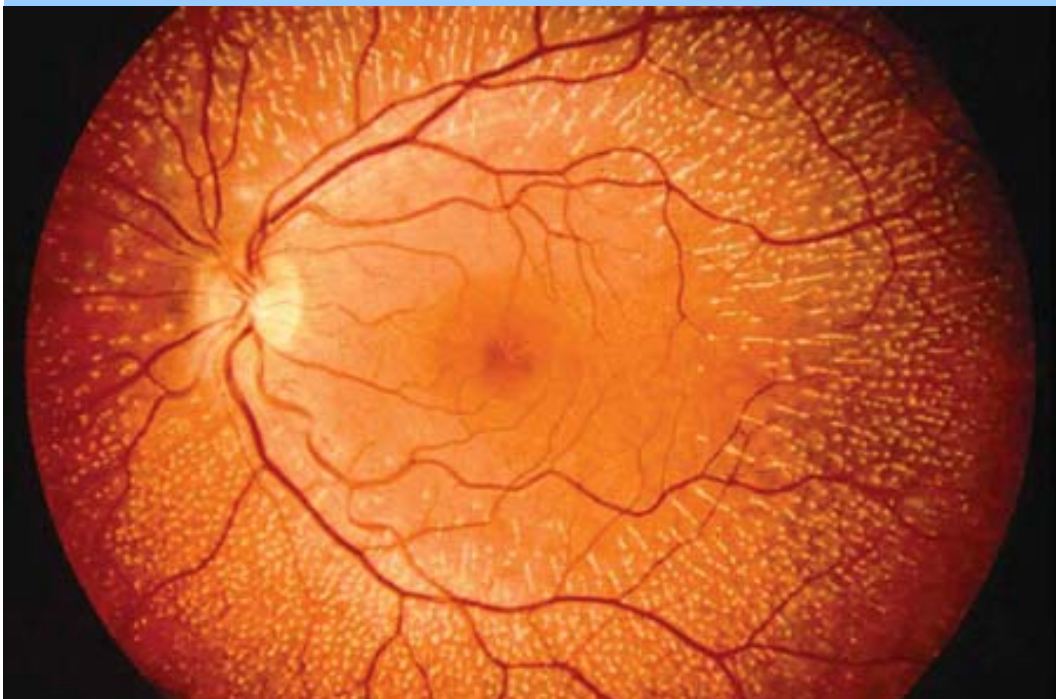
## The spatial dimension



Bridget Riley (Nature 424: 133, 2003)









Rob Gonsalves

A constraint  
for the evolution of  
social phenomena is:

Entropy

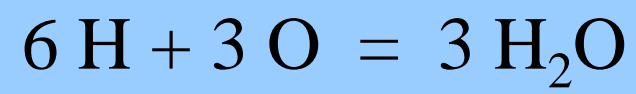
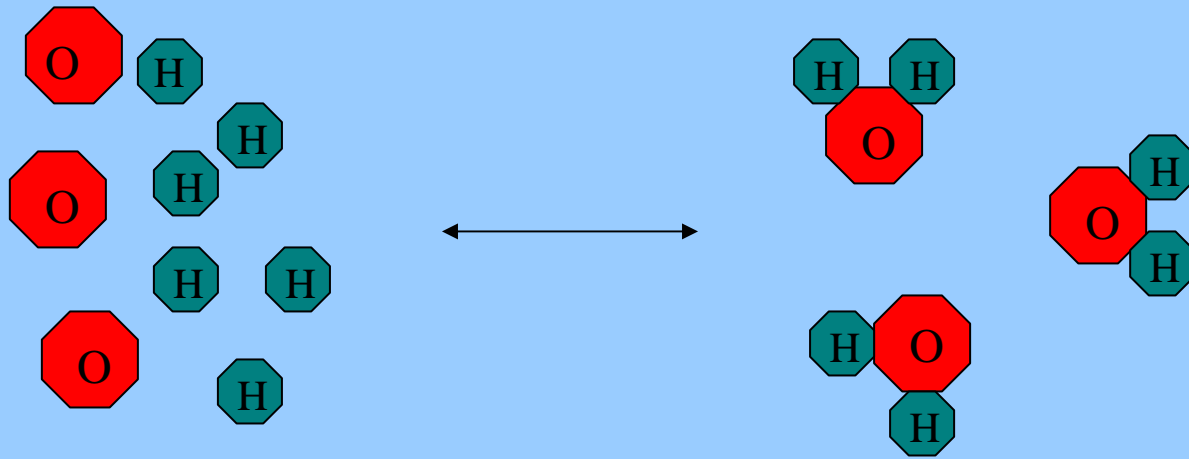




Tikal, Guatemala 2001

The higher level properties of interactions  
or of combinations of systems  
are called

**Emergent Properties**



## Dimensión temporal



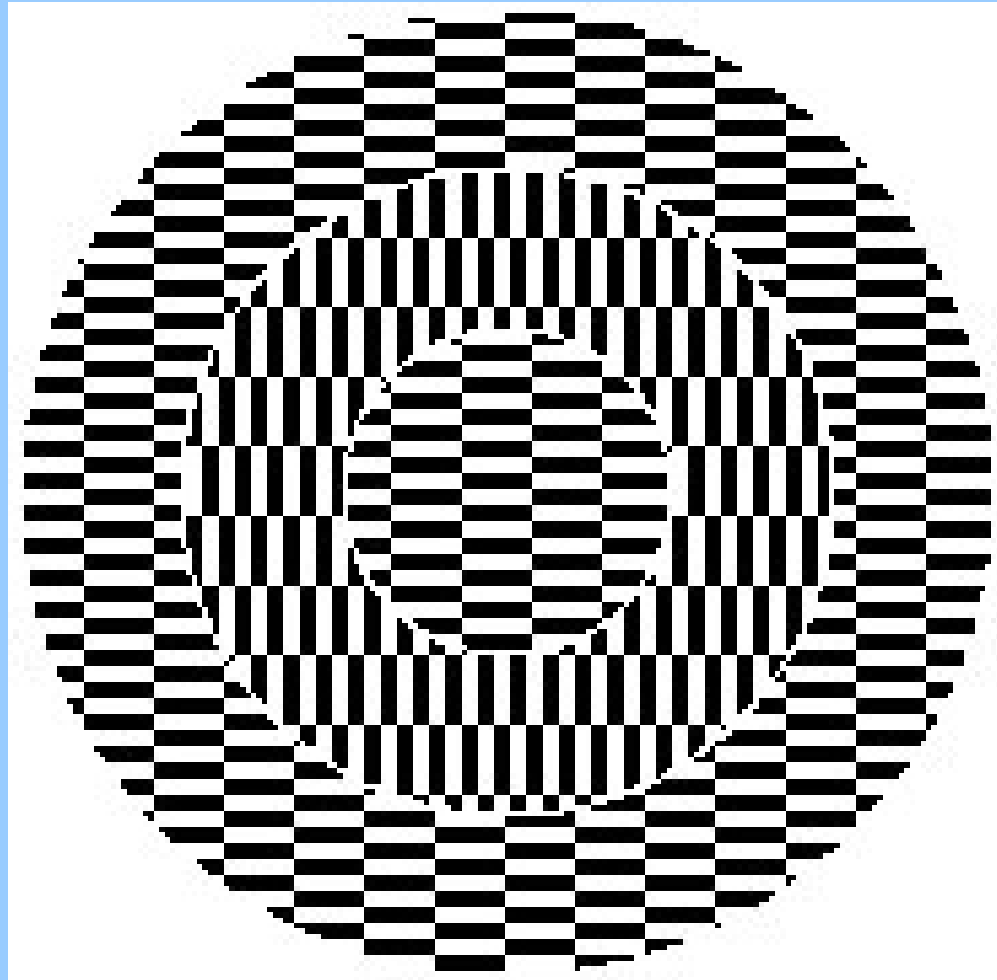


A dynamic process  
for which our mind  
has no representative abilities is:

Chaos

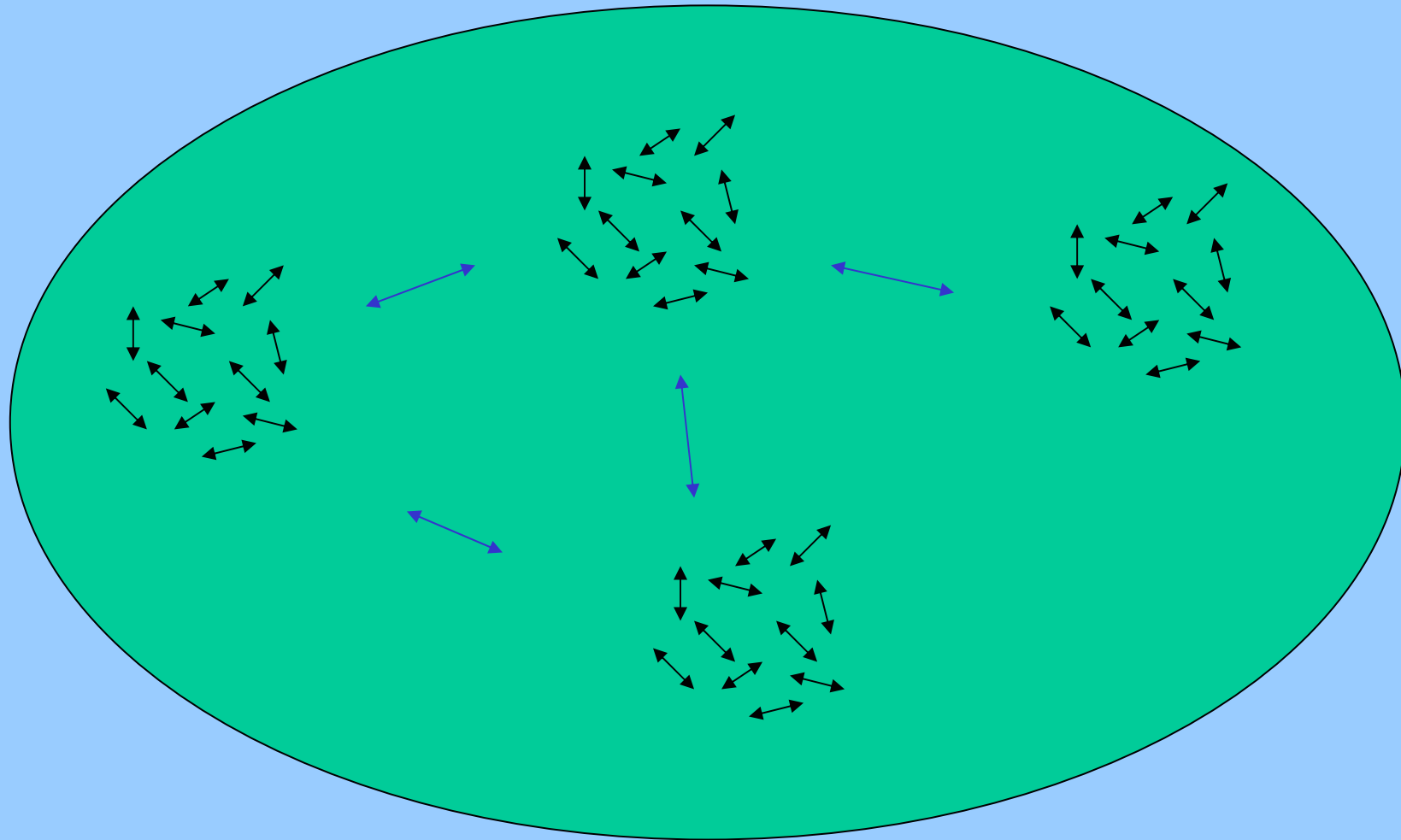


Atitlan, Guatemala 2001



Thank you for your attention  
[kjaffe@usb.ve](mailto:kjaffe@usb.ve)

# Gene, Gamete, Individual, Group, Species selection



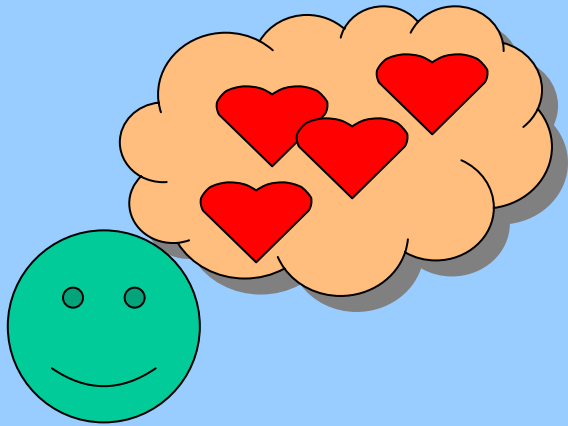


Evolution is about  
the survival of the luckiest  
rather than  
the survival of the fittest

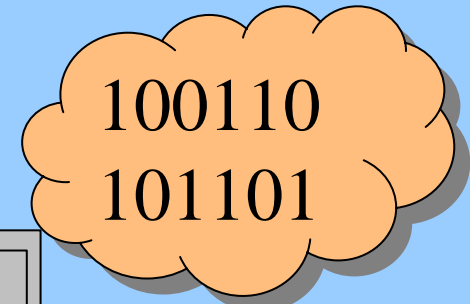
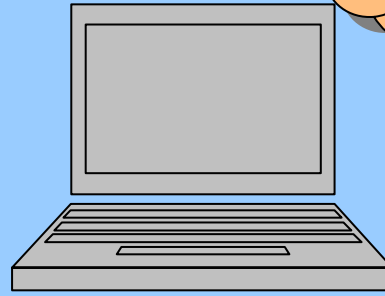
Chance & Necessity



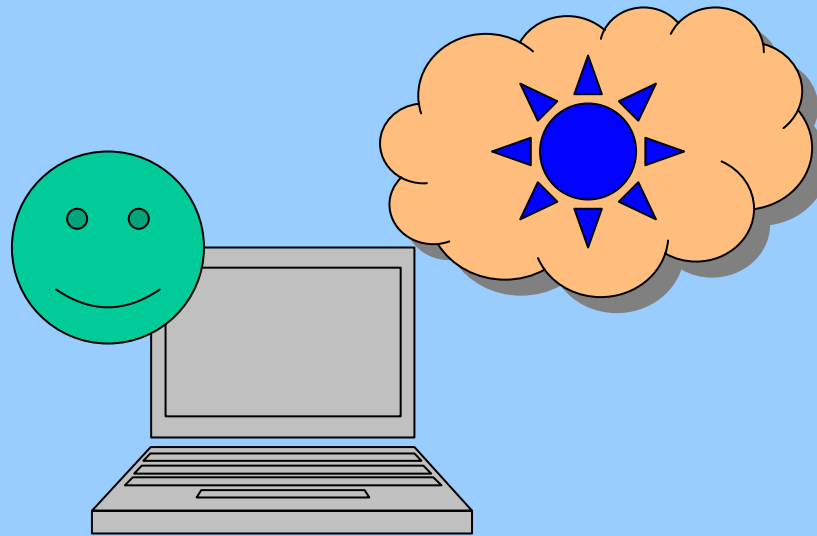
Antigua, Guatemala 2001

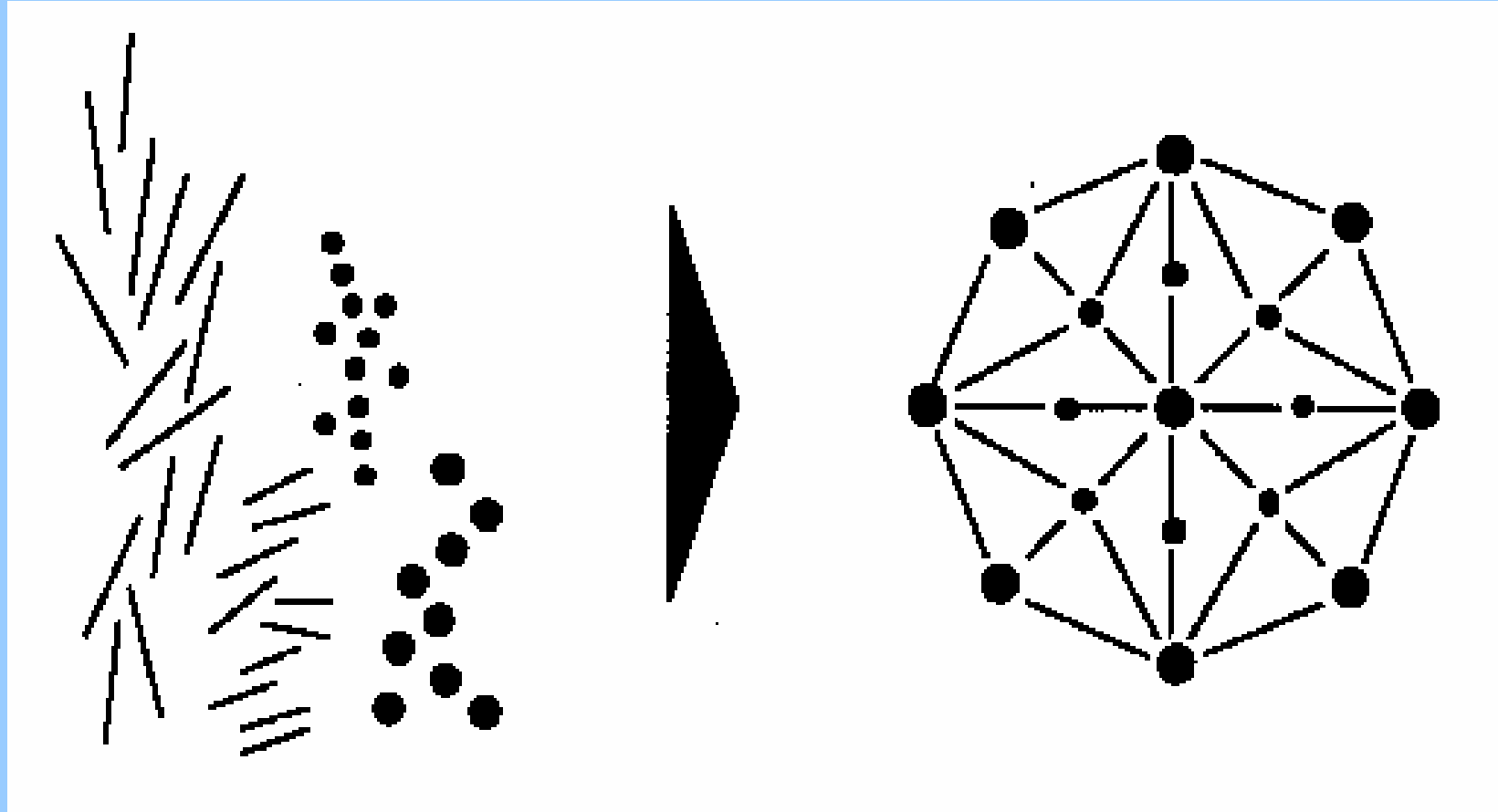


+



=

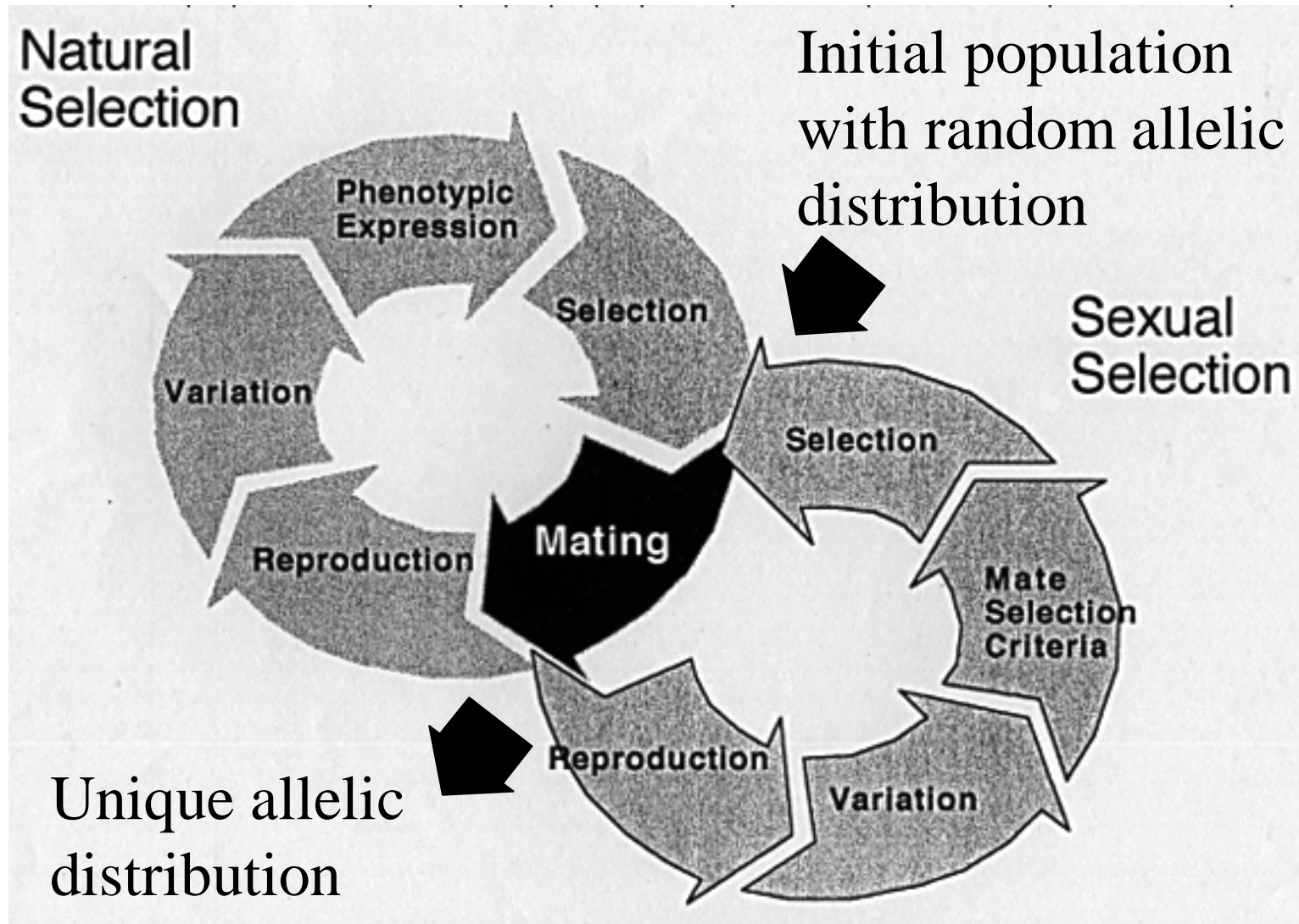






# **Biodynamica**

<http://atta.labb.usb.ve/klaus/klaus.htm>



# Synergy

$$\text{●} + \text{●} = \text{●} \quad <1$$

$$\text{●} + \text{●} = \text{●} \text{●} \quad =1$$

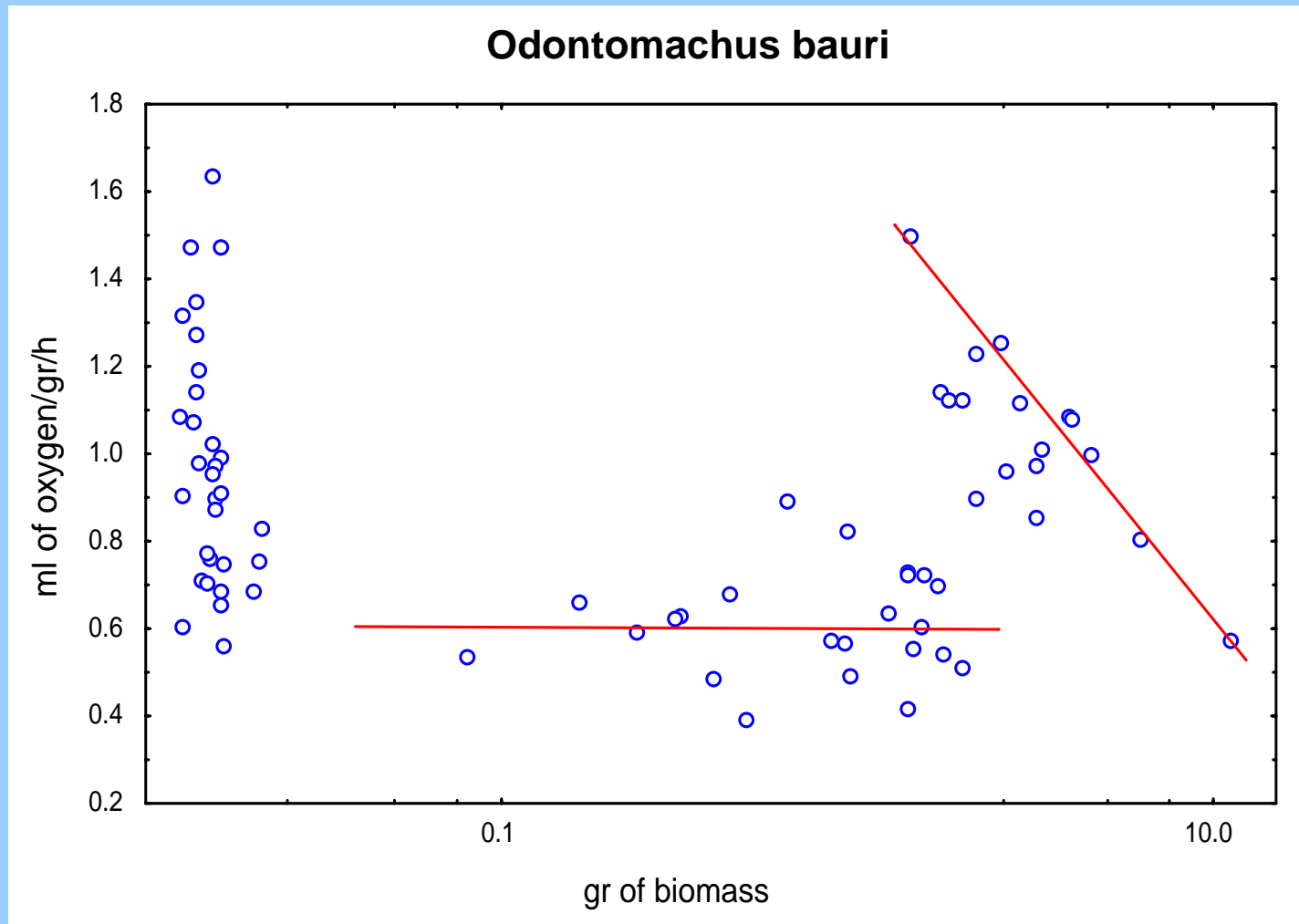
$$\text{●} + \text{●} = \text{●} \quad >1$$



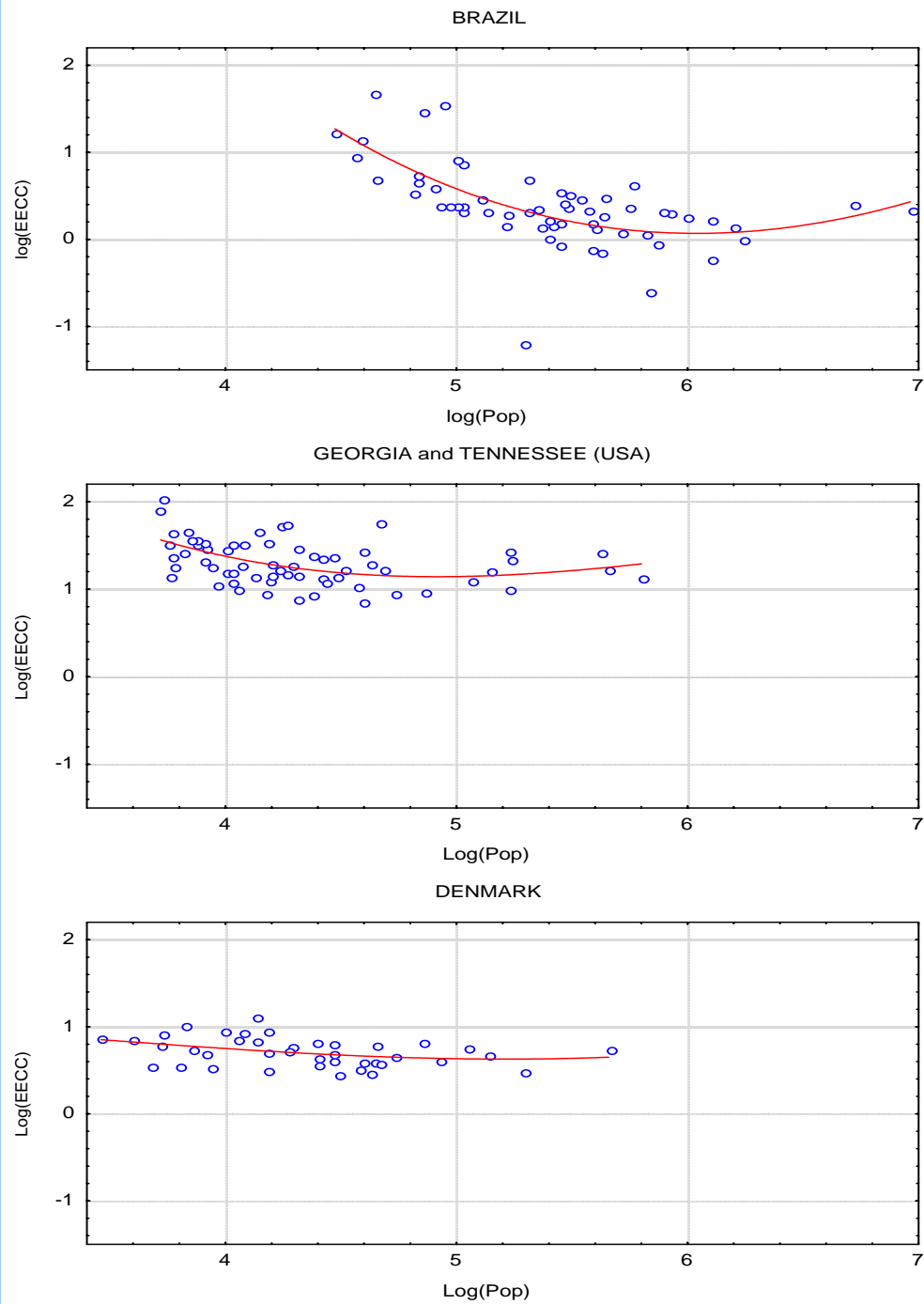
1/2

Antigua, Guatemala 2001



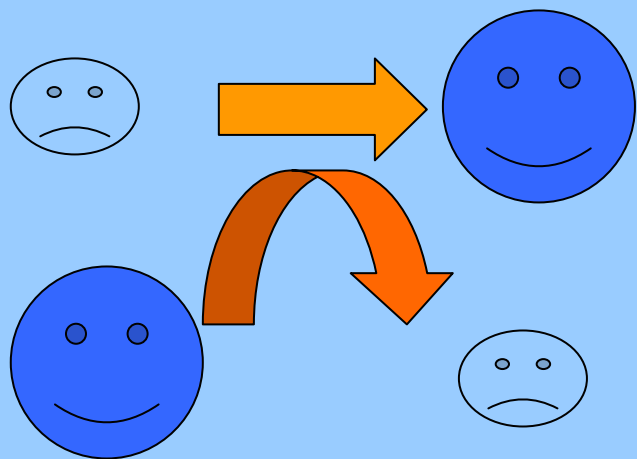


FONCK C and JAFFE K: On the energetic cost of sociality. *Physiology and Behavior*. 59: 713-719, 1996.

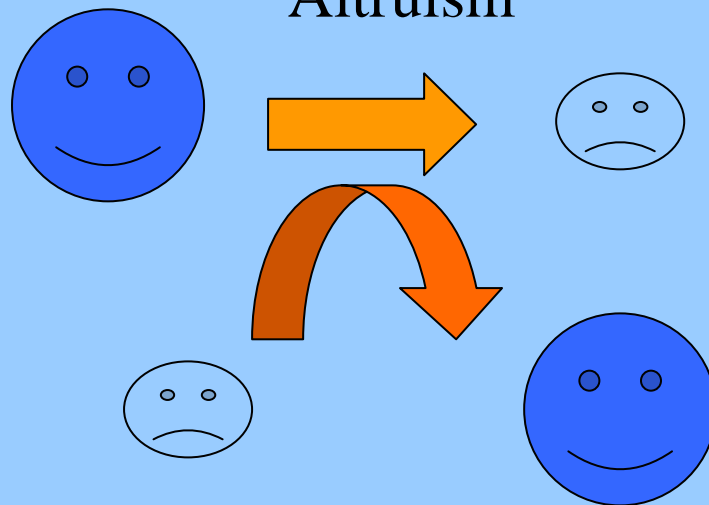


CABRERA S and JAFFE K  
On the energetic cost  
of human societies:  
energy consumption  
as an econometric index.  
*Interciencia* 23: 350-354,  
1998

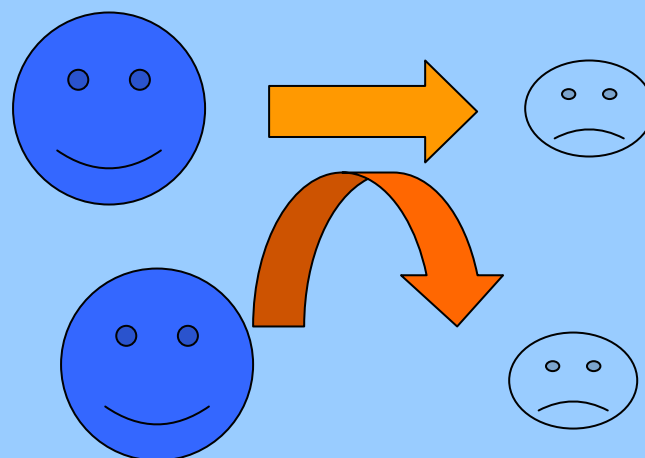
Exploitation or Parasitism



Altruism



Altruistic punishment



<b>Action</b>	<b>Effect</b>	<b>Interaction</b>	<b>Benefits</b>
Wise	$S > 0$ and $I > 0$	Social investment	Group and actor
Egoist	$S < 0$ and $I > 0$	Destructive egoism	Actor at a cost to group
Altruist	$S > 0$ and $I < 0$	True altruism	Group at a cost to actor
Stupid	$S < 0$ and $I < 0$	Destructive behavior	Neither group nor actor

*JASSS 2002*  
*Acta Biotheor 2004*



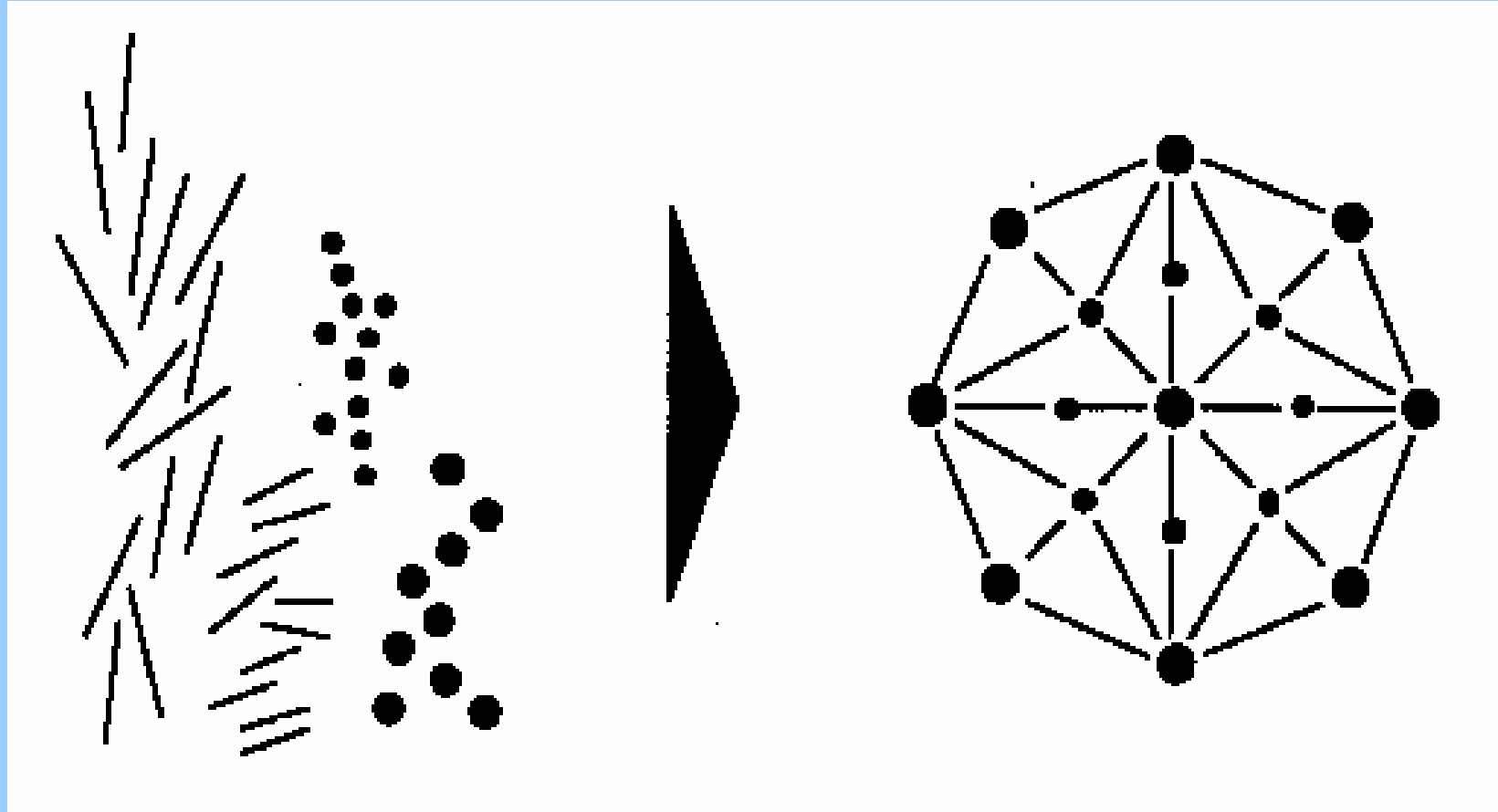
Atitlan, Guatemala 2001

# Altruistic punishment

Fehr E. & S. Gächter 2002. Altruistic punishment in humans, *Nature* 415, 137 - 140.

Rawlings EI.1968. Witnessing harm to other: a reassessment of the role of guilt in altruistic behavior. *J Pers Soc Psychol* 10:377-80





**Is shame an  
evolutionary stable strategy?**

# **Assessment of aggregate economic benefits of behavior**

**Sociodynamica**



Rich and glut

Poor and glut



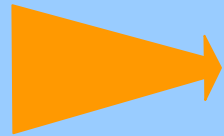
Rich and hungry

Poor and hungry

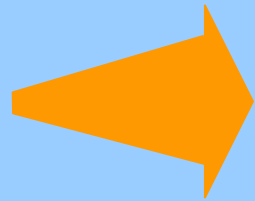




Efficient Donation

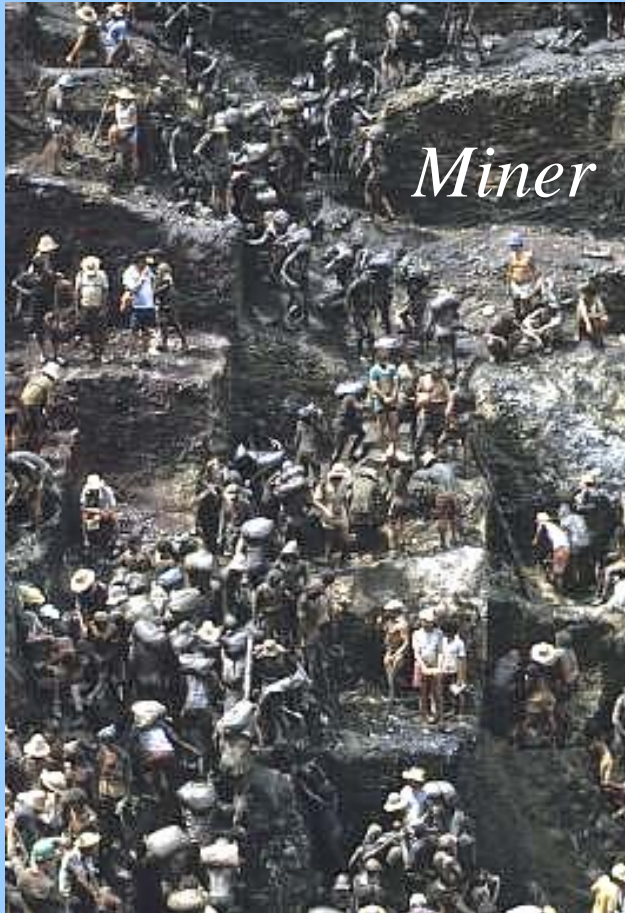


Dissipative Donation



Synergistic Donation

# Division of labor



*Miner*

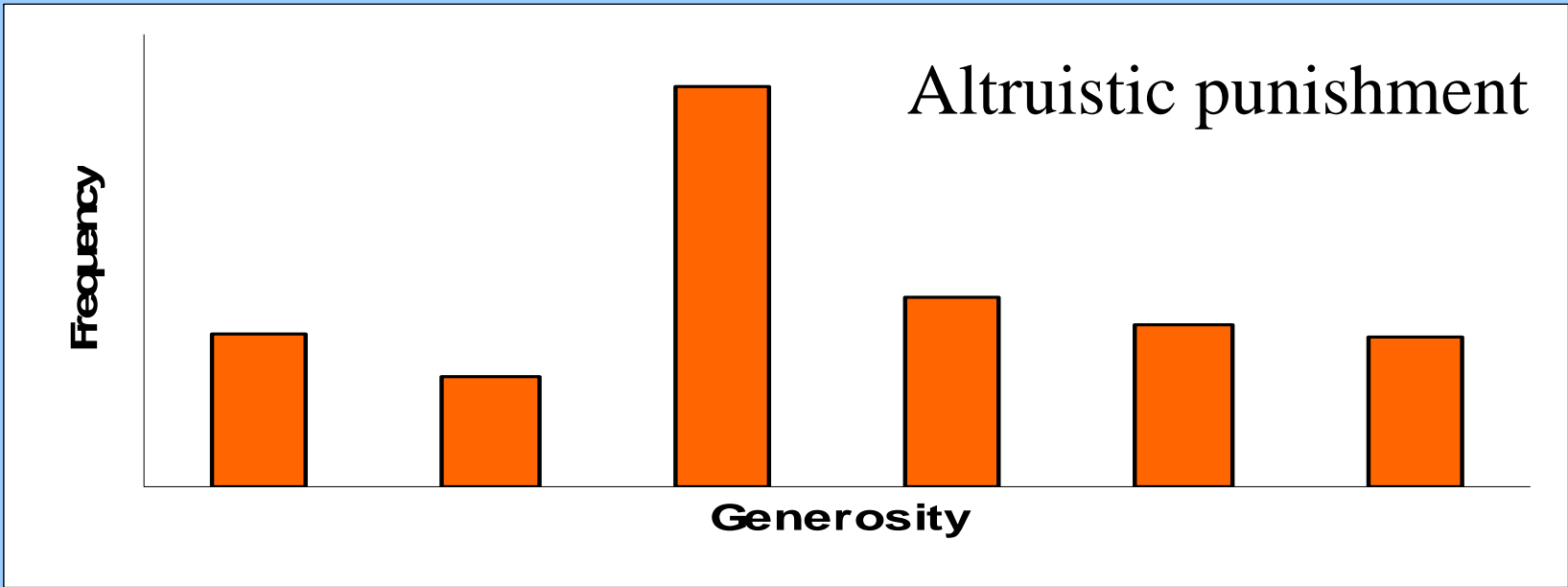
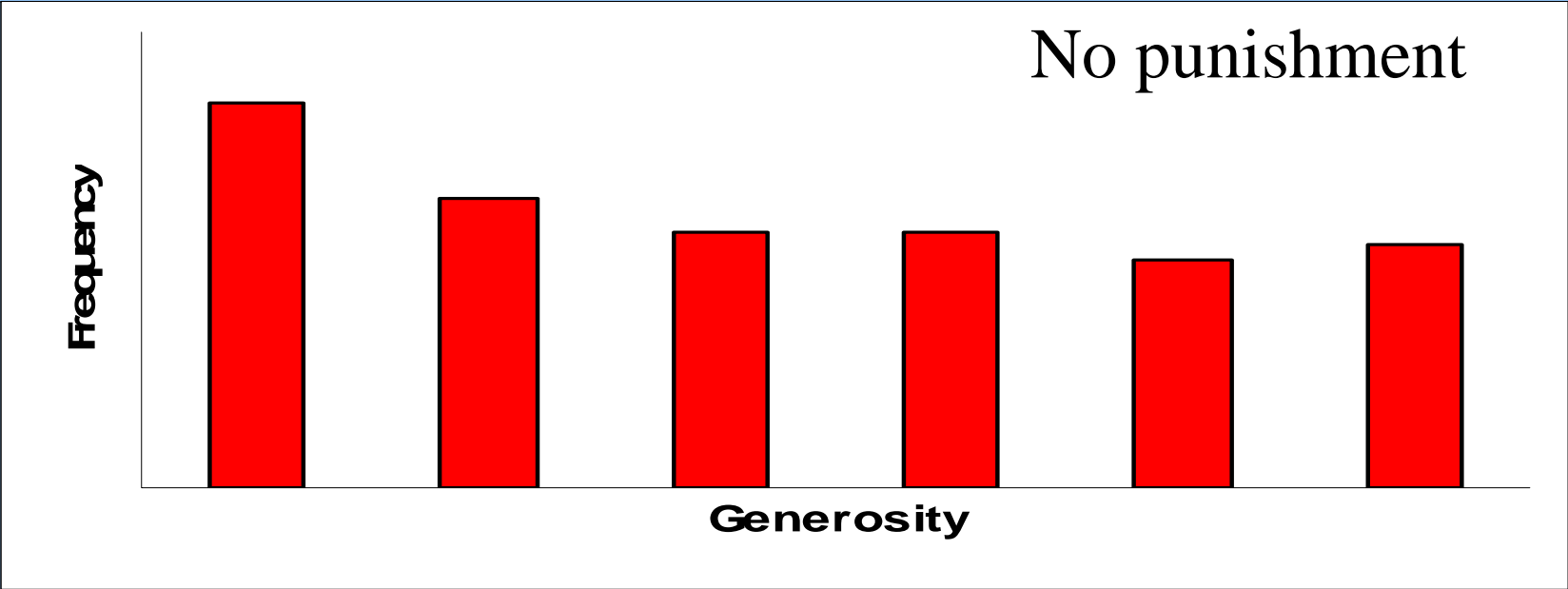


*Farmer*

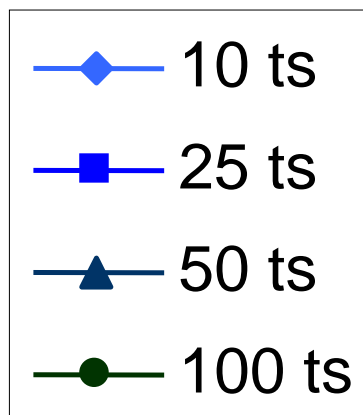


*Trader*





## Effect of punishment on aggregate generosity



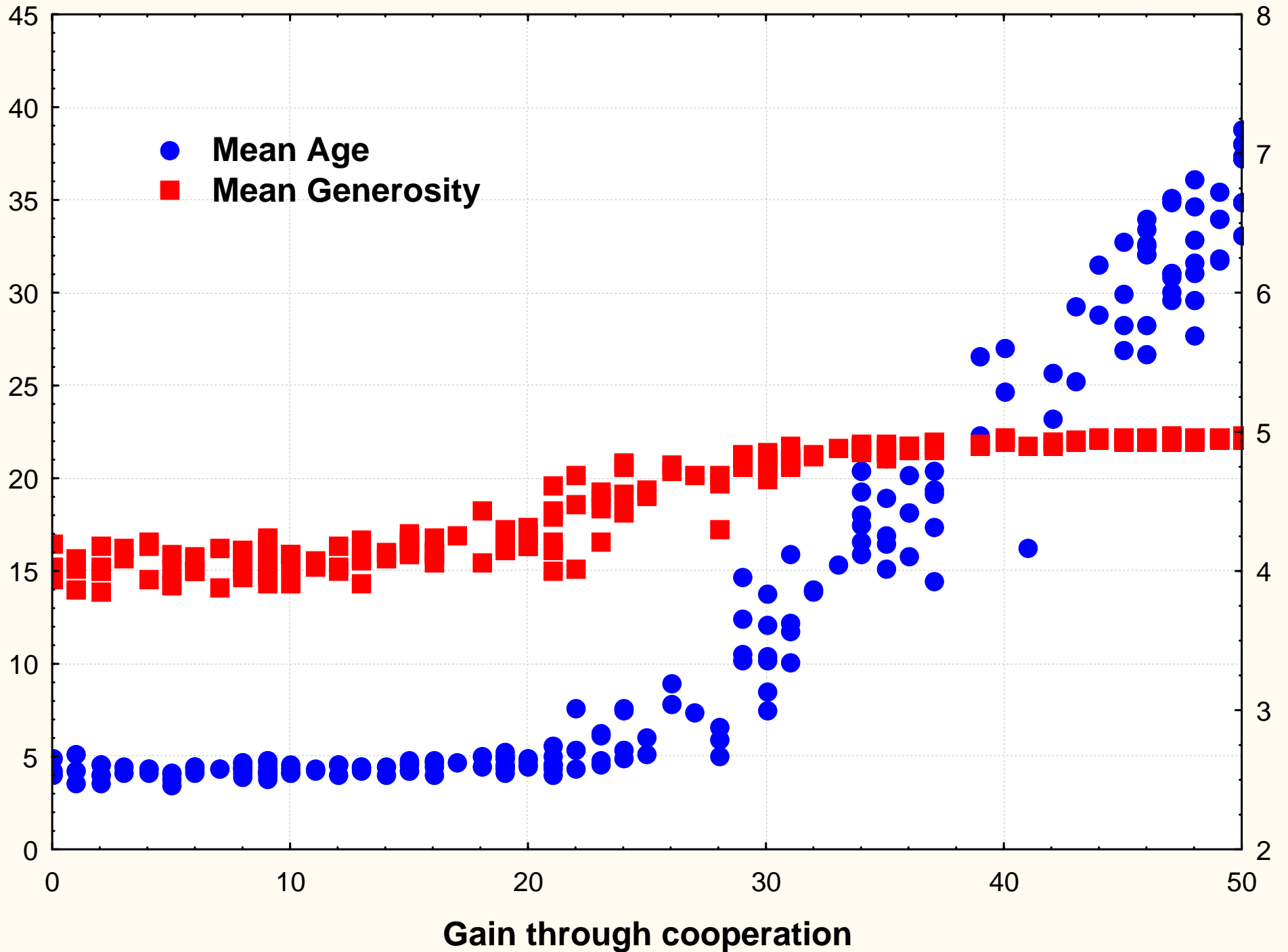
0.1

1

10

% Altruists

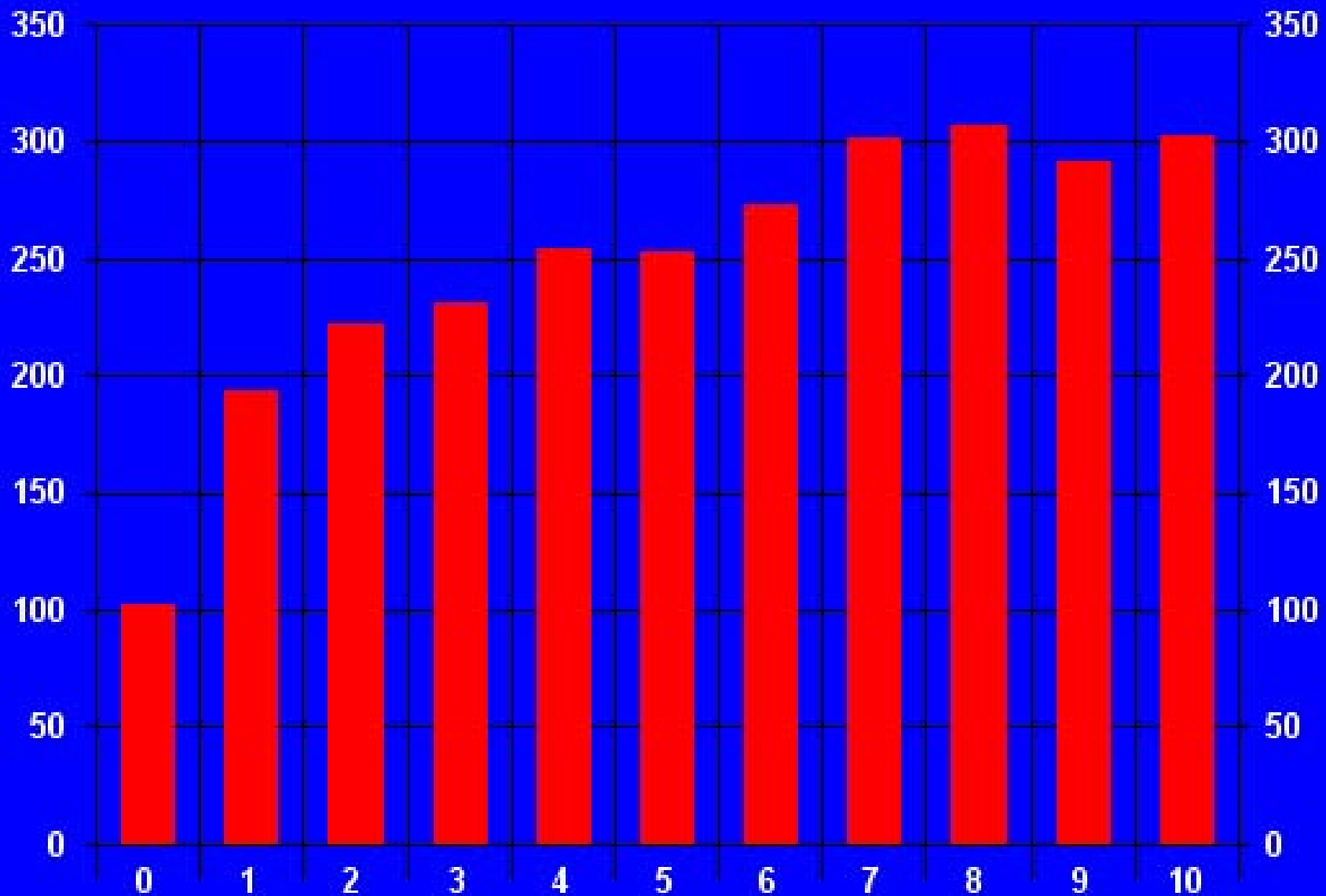
100

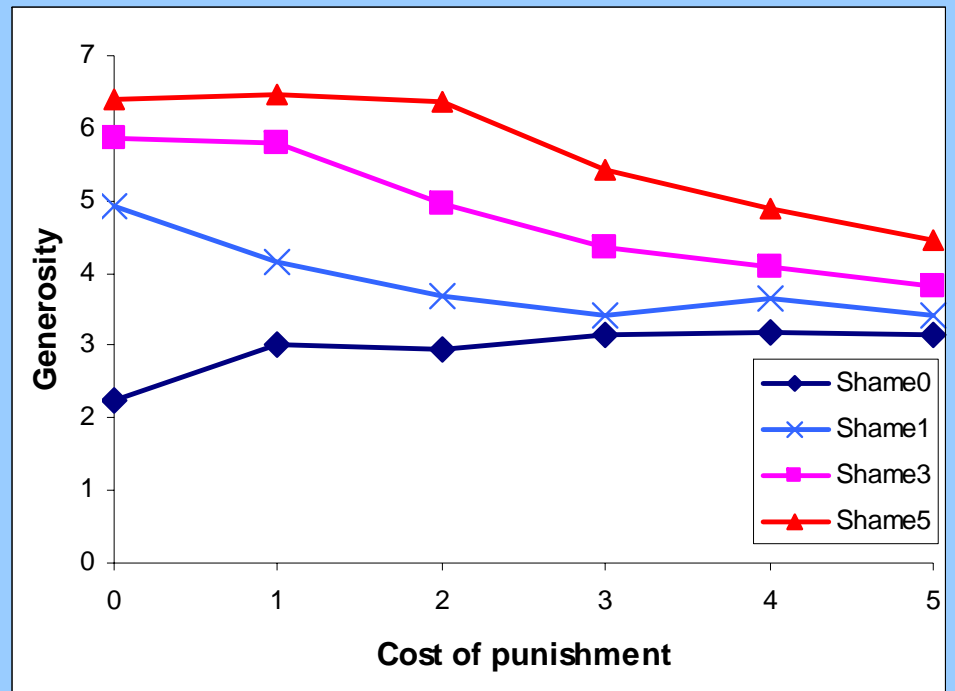
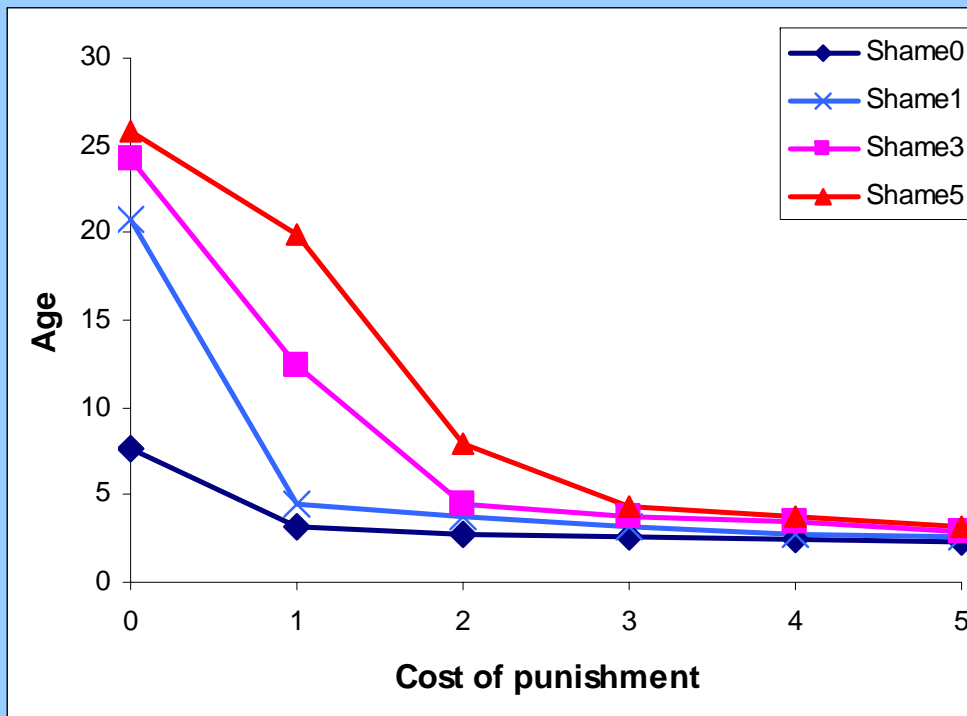


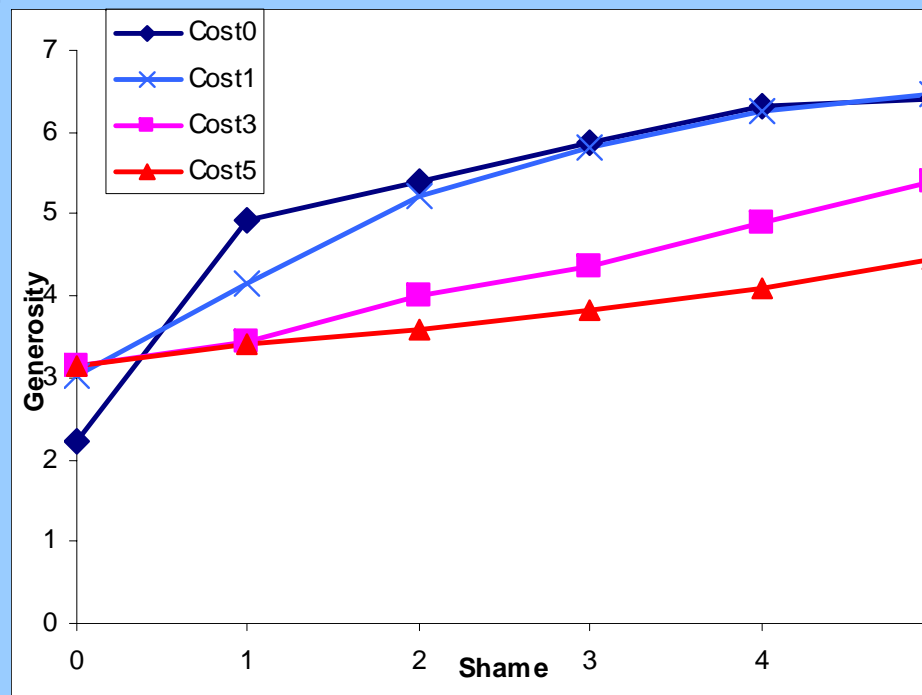
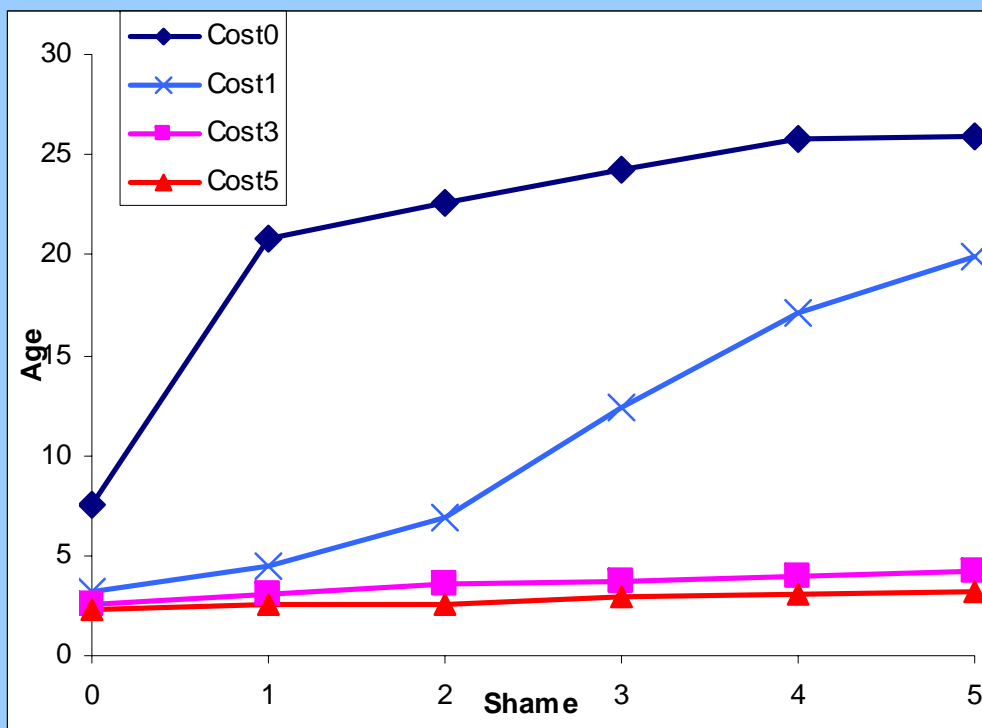
# Sociodynamica

## 9. Sensitivity to Punishment

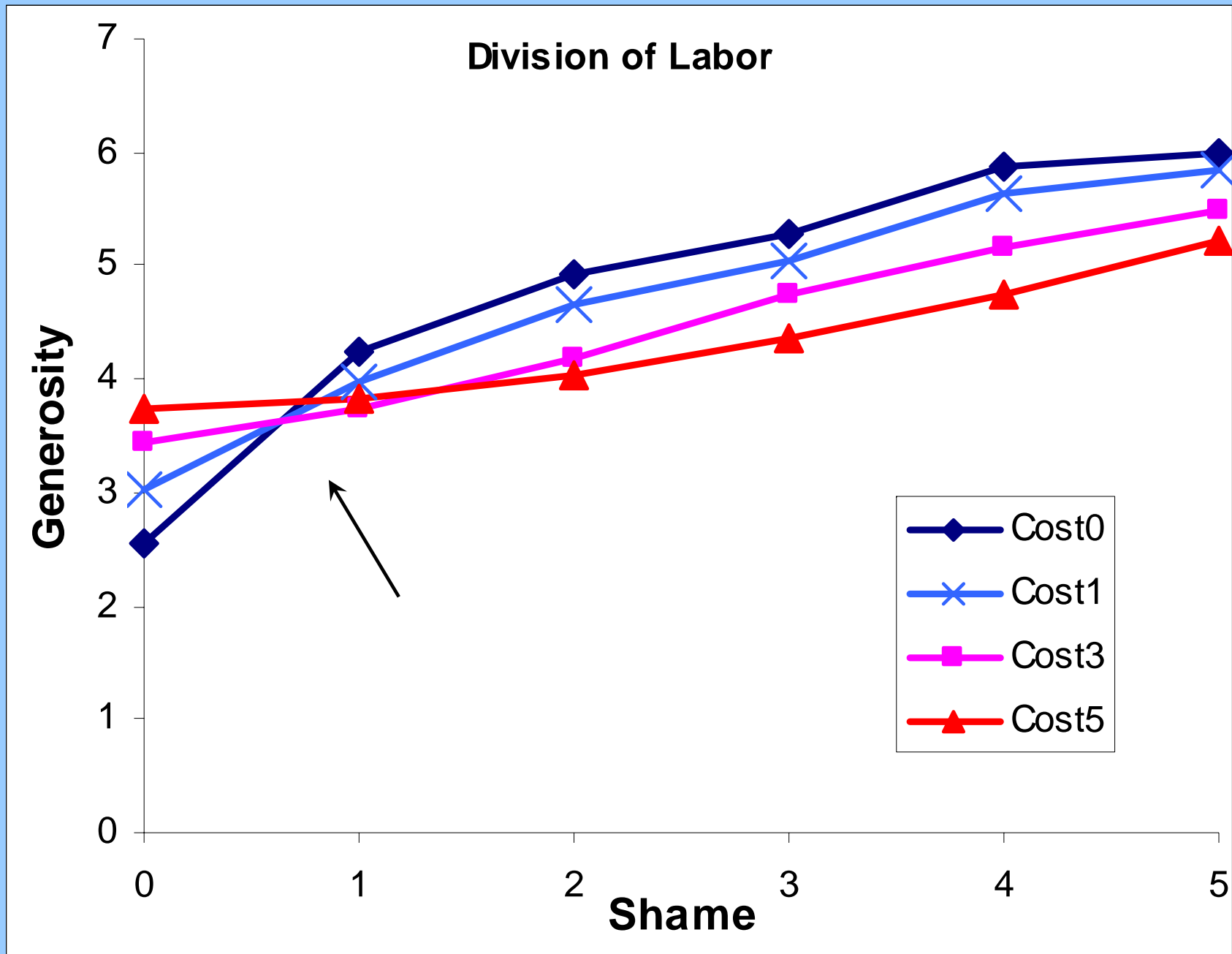
Print





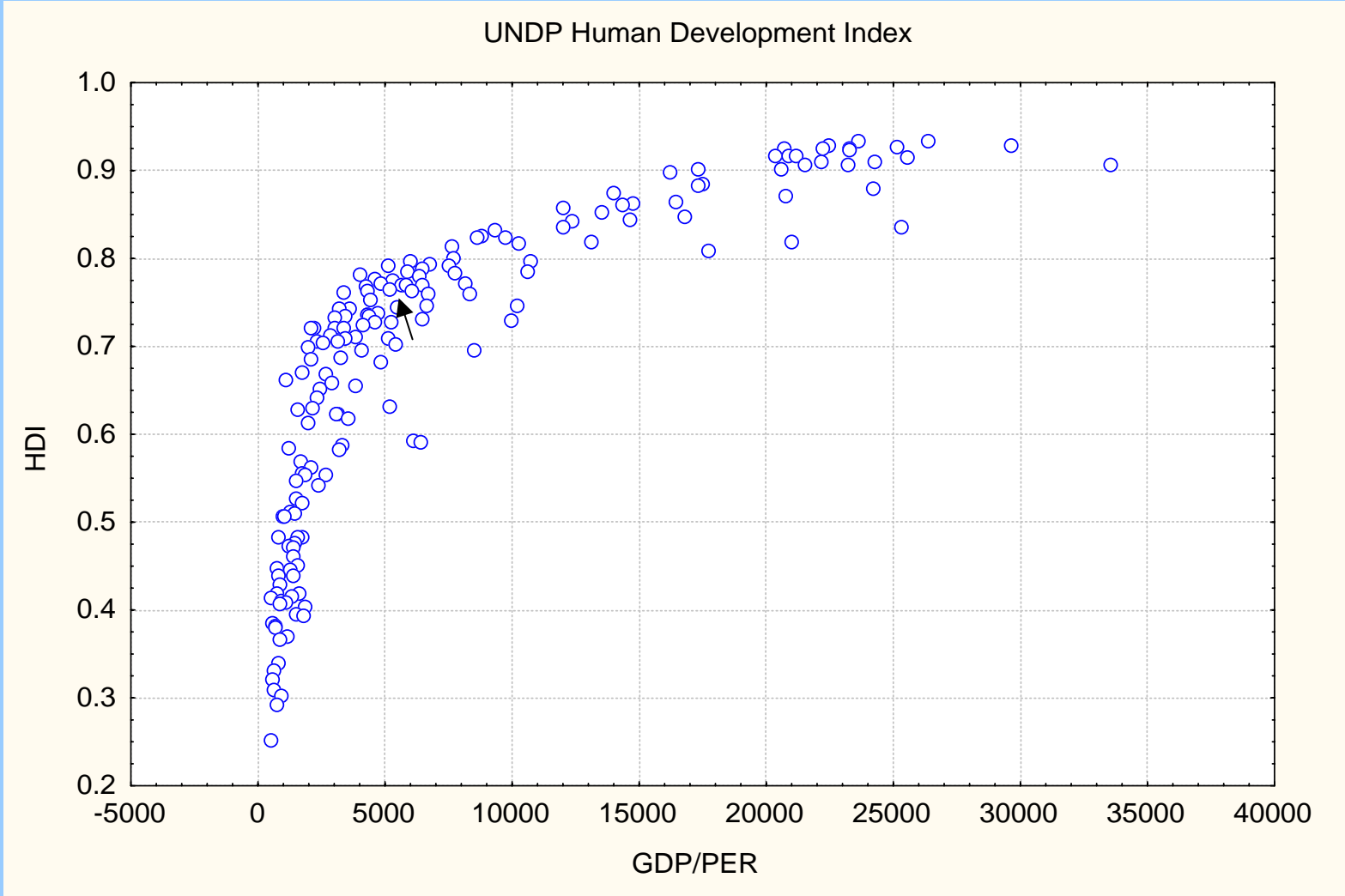




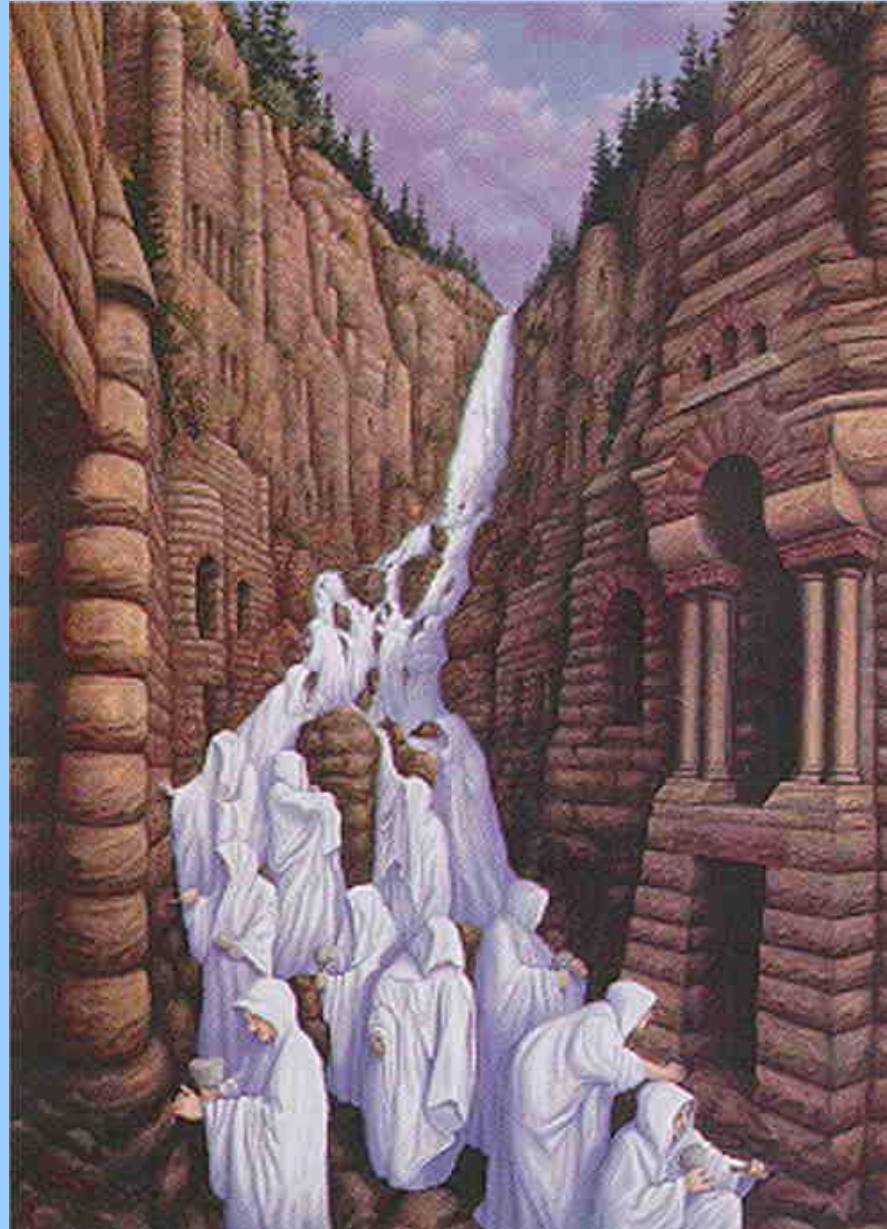




Rob Gonsalves



# Consilience



**Thank you for your attention**

[kjaffe@usb.ve](mailto:kjaffe@usb.ve)



