Az együttérzés és a szeretet evolúciója - cikkismertető

Csörgő T.
MTA Wigner FK, Budapest és EKE KRC, Gyöngyös

10. BerzeTÖK Tábor

Visznek, 2017

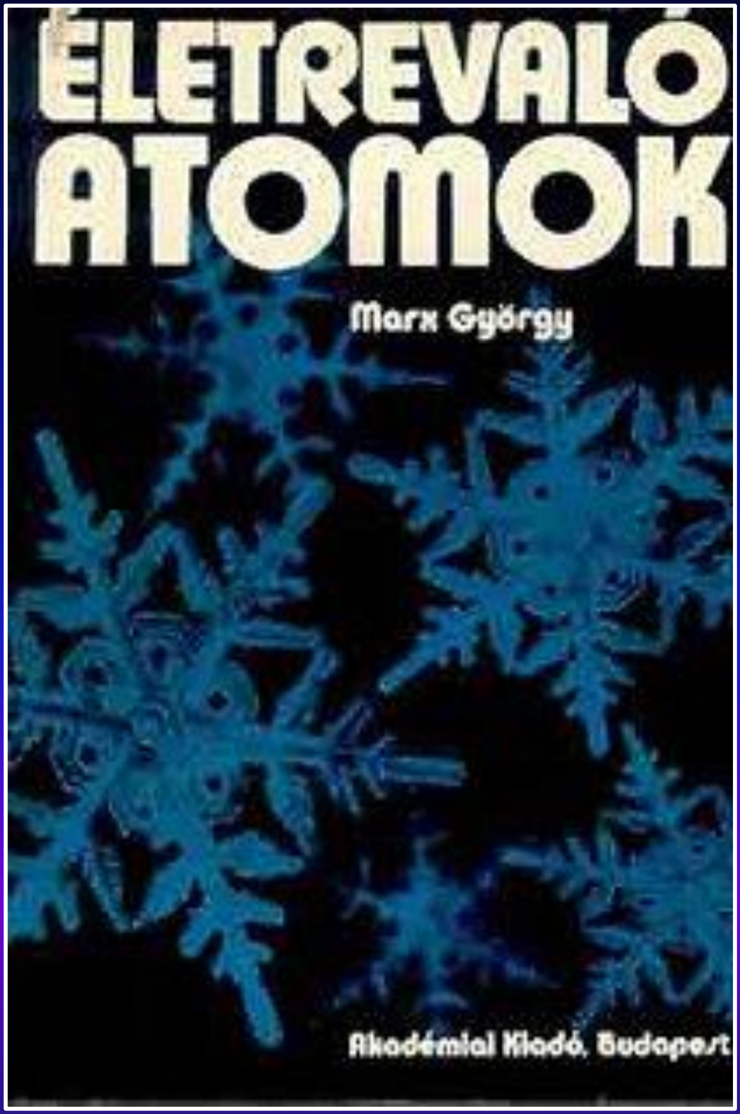
MODELLEZÉS ÉS A MARSLAKÓK

A fény néha
golyóként viselkedik,
de nem golyó;
hullámként terjed,
de nem hullám;
Egyszerre golyó is és hullám is,
Egyszerre egyik sem.
Akkor mi is a fény?

A fény:
ÉPPEN OLYAN = THATAGATA,
mint a fény

Értelmezés /Marx György/:
Marslakó a Földön

Matematika:
Függvény =
Értelmezési tartomány + leképezés



A SEMMELWEIS-REFLEX

Nem fiziológiai értelemben

de reflex-szerű, automatikus emberi magatartás

- Új információk, tények
- Nem illeszthető be a jelenlegi képbe
- Statisztikailag bizonyított eredmény, bizonyításra törekvő kreatív, progresszív kutatók
- Automatikusan, érdemi vizsgálat nélkül elutasítják az ortodoxiát képviselő kutatók
- Rögzült normák, hiedelmek, paradigmák alapján
- Üldöztetés: Kigúnyolás, fenyegetés, állásvesztés, bántalmazás, halál
- Minimális segítségkérés elutasítása a hivatalos tudomány ortodox képviselői részéről
- Hivatali procedúrák hangsúlyozása <-> kreatív kutatás

Főleg az angolszász világban ismert fogalom

Magyarul: A FELISMERÉS megelőzte a korát

USA: törekvés a reflex elkerülésére

SZEMÉLYES MOTIVÁCIÓ

VÉDEKEZÉS A SEMMELWEIS REFLEX ELLEN

Semmelweis-reflex elleni védekezés: tudatosítani, hogy

1) LÉTEZIK az S-Reflex (pl. Varga Dombi előadása)

2) NYITOTTSÁG

3) AZ ISMERETLEN TÖBB, MINT AZ ISMERT

4) PÉLDÁK

5) ELVAKULTSÁG helyett a SZELLEM NAPVILÁGA

5) Vizsgálat nélküli elutasítás megkérdőjelezése:

vajon S-reflex van-e a háttérben ?

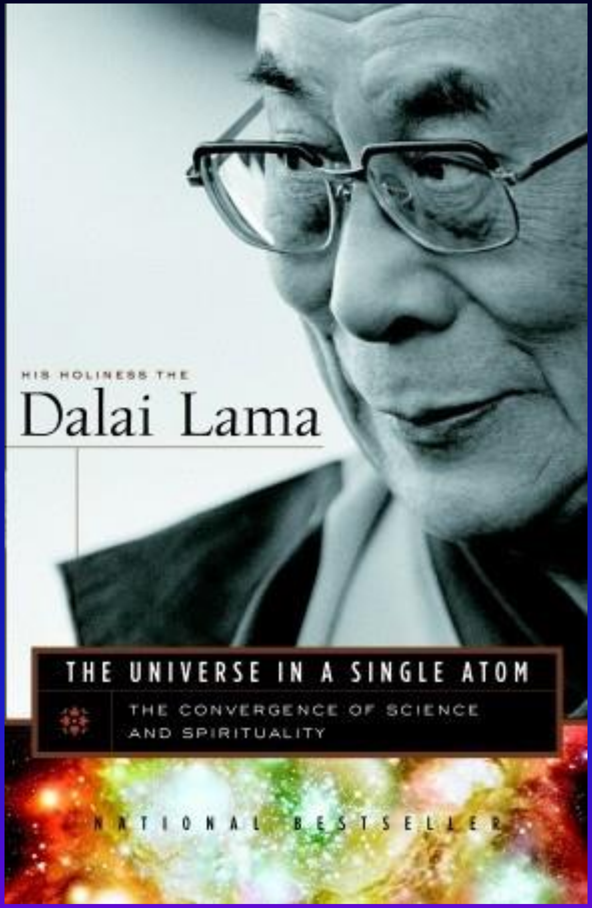
ÉRTELMES ÉS JÓ SZÍVVEL ÍRT

His Holiness the Dalai Lama:

The Universe in a Single Atom:

The Convergence of Science and Spirituality

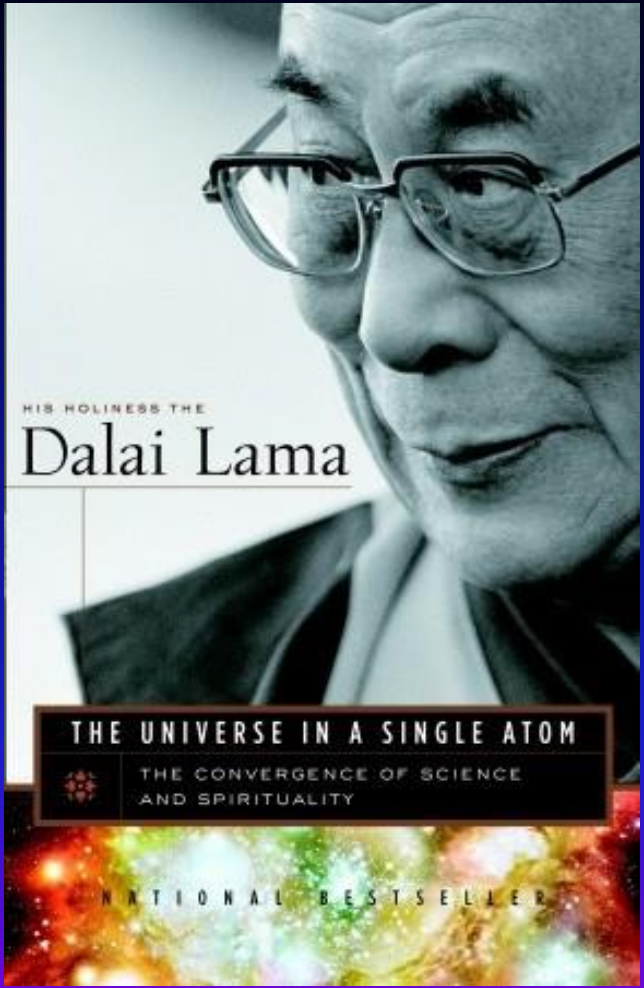
Morgan Road Books, New York, 2006



„I have often wondered about the interface of key Buddhist concepts and major scientific ideas. This book is the result of that long period of thinking and the intellectual journey of a Buddhist monk from Tibet to the world of bubble chambers, particle accelerators and fMRI. … Science and spirituality have the potential to be closer than ever, to help humanity… May each of us, as a member of human family, respond to the moral obligation to make this collaboration possible. This is my heartful plea."

„Ha tökéletesen meg szeretnénk ismerni akár egyetlen atomot is, akkor ismernünk kellene valamennyi összefüggést, ami ezt az atomot a Világegyetem valamennyi jelenségével összekapcsolja"

TARTALOMJEGYZÉK



Ötödik fejezet:
Evolúció, karma
és az érző lények világa
- Értelmes kritika

CIKKEK ÉS KÖNYVEK

M. Nowak: Why We Help – Scientific American, November 1 (2012)

THE SCIENCES

Why We Help

Far from being a nagging exception to the r
primar

Noven

R. Axelrod: The Evolution of Coo

CHAPTER 2

The Success of

M. Nowak:
Science 31

Five Rules for the Evolution of Cooperation

Martin A. Nowak

Cooperation is needed for evolution to construct new levels of organization. Genomes, cells, multicellular organisms, social insects, and human society are all based on cooperation. Cooperation means that selfish replicators forgo some of their reproductive potential to help one another. But natural selection implies competition and therefore opposes cooperation unless a specific mechanism is at work. Here I discuss five mechanisms for the evolution of cooperation: kin selection, direct reciprocity, indirect reciprocity, network reciprocity, and group selection. For each mechanism, a simple rule is derived that specifies whether natural selection can lead to cooperation.

CIKKEK ÉS KÖNYVEK

O. P. Hauser et al: Cooperating with the future, Nature 511, p 222 (2014)

LETTER

doi:10.1038/nature13530

Cooperating with the future

Oliver P. Hauser[1,2]*, David G. Rand[3,4]*, Alexander Peysakhovich[1,3] & Martin A. Nowak[1,2,5]

M. Nowak: Evolving cooperation, J Theor. Biology 299 (2012) 1-8

Journal of Theoretical Biology 299 (2012) 1–8

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Evolving cooperation

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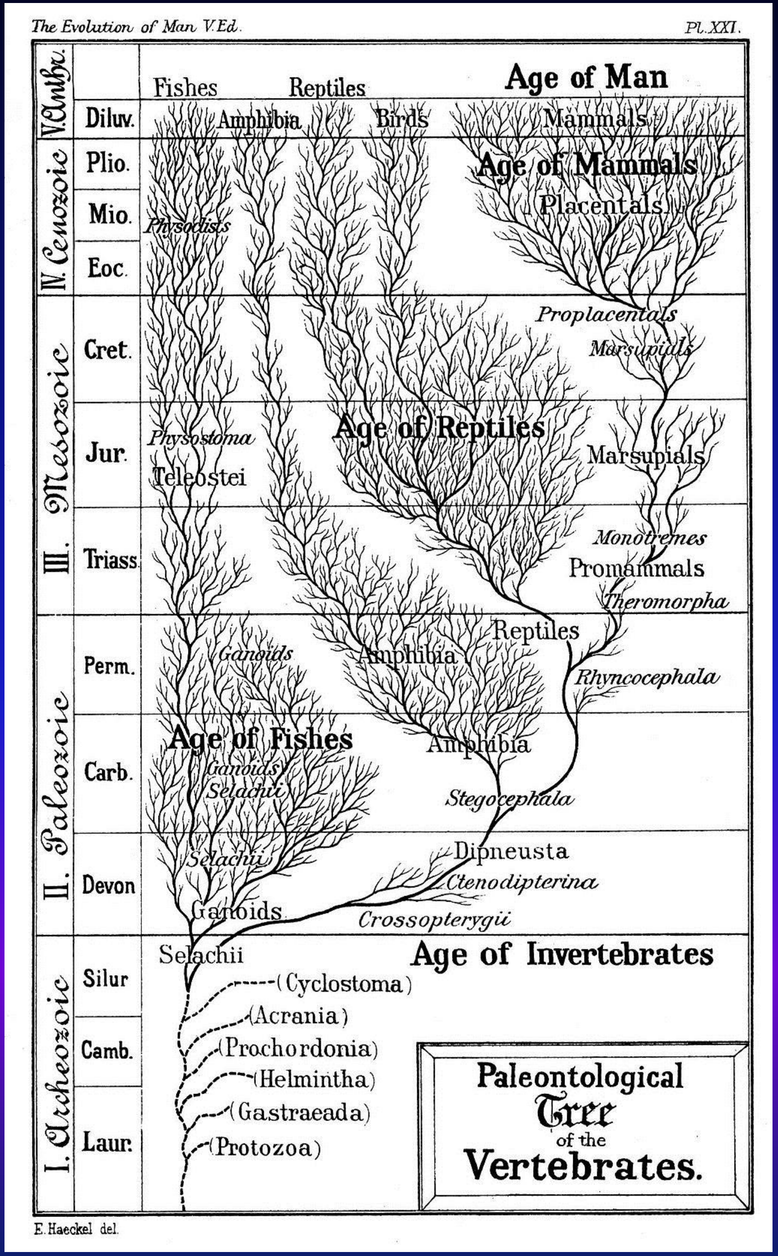
[c] Department of Organismic and Evolutionary Biology, Harvard University, Cambridge, MA 02138, USA

BIOLÓGIAI EVOLÚCIÓ

Evolution is the process of change in all forms of life over generations, and evolutionary biology is the study of how evolution occurs. Biological populations evolve through genetic changes that correspond to changes in the organisms' observable traits. Genetic changes include mutations, which are caused by damage or replication errors in an organism's DNA. As the genetic variation of a population drifts randomly over generations, natural selection gradually leads traits to become more or less common based on the relative reproductive success of organisms with those traits.

Értelmezési tartomány:
Élőlények generációi
Hozzárendelés:
Véletlen mutáció
Természetes szelekció



EVOLÚCIÓS BIOLÓGIA

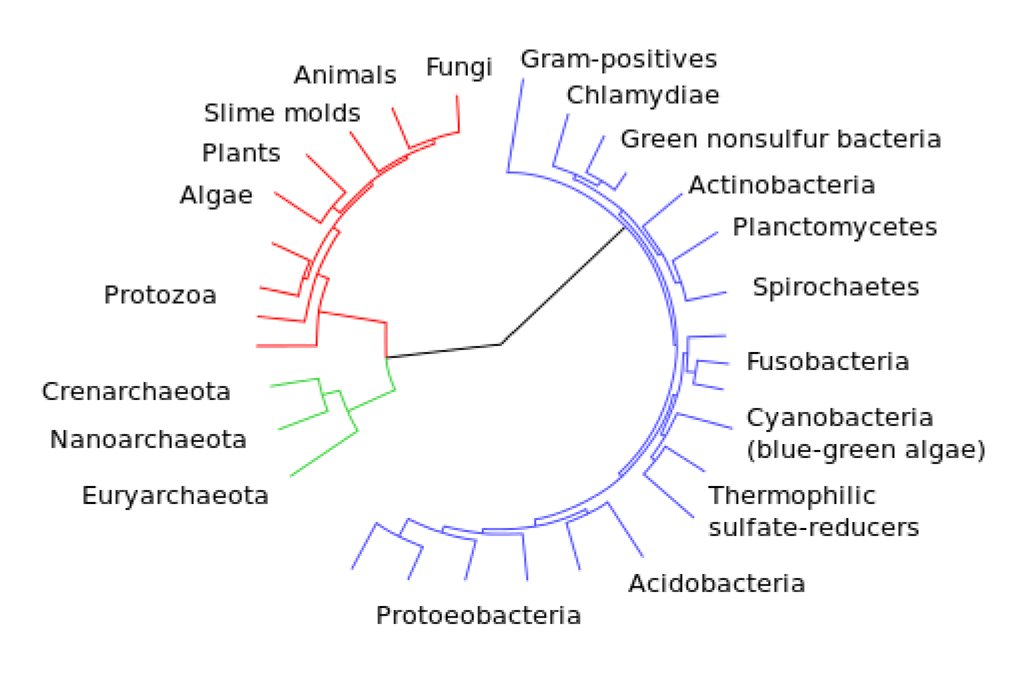
Kulcsszavak:

Változás
Öröklődés
DNS
Biodiverzitás
Fajok
Organizmusok
Molekulák

LUCA
3,5-3.8 milliárd éve
355 ősgén

Fajok keletkezése
Fajok kihalása (+99 %)
Fajok átalakulása
Morfológiai, biokémiai

Ch. Darwin: A fajok eredete
Mutáció és
természetes szelekció



Kritika:

Kiterjesztése az emberi
társadalomra: fajelmélet
Véletlen mutáció?
Szerelem, ősvarázslat?
Természetes szelekció?
Társadalmi szelekció?
Együttérzés, szeretet?
Emberi társadalom: fordított!

EGYÜTTMŰKÖDÉS

Kulcsszavak:
Rabok dilemmája
Együttműködés ára
Árulás bére

$$\begin{array}{c c} & \begin{array}{cc} C & D \end{array} \\ \begin{array}{c} C \\ D \end{array} & \begin{pmatrix} R & S \\ T & P \end{pmatrix} \end{array}$$

When does it make sense to call strategy C 'cooperation' and strategy D 'defection'? In other words when is the game a 'cooperative dilemma'?

We can consider the following definition (see also Hauert et al., 2006): the game is a cooperative dilemma if (i) two cooperators get a higher payoff than two defectors, $R > P$, and (ii) yet there is an incentive to defect. This incentive can arise in three different ways: (iia) if $T > R$ then it is better to defect when playing against a cooperator; (iib) if $P > S$ then it is better to defect when playing against a defector; and (iic) if $T > S$ then it is better to be the defector in an encounter between a cooperator and a defector. If at least one of those three conditions hold, then we have a cooperative dilemma. If none hold, then there is no dilemma and C is simply better than D. If all three conditions hold, then we have a Prisoner's Dilemma, which is defined by $T > R > P > S$ (Rapoport and Chammah, 1965).

EGYÜTTMŰKÖDÉS EVOLÚCIÓJA

$$\begin{array}{cc} & \begin{array}{cc} C & D \end{array} \\ \begin{array}{c} C \\ D \end{array} & \begin{pmatrix} R & S \\ T & P \end{pmatrix} \end{array}$$

The Prisoner's Dilemma is the most stringent cooperative dilemma. Here defectors dominate cooperators. Thus, in a well-mixed population natural selection always favors defectors over cooperators. For cooperation to arise in the Prisoner's Dilemma we need a mechanism for the evolution of cooperation (Nowak, 2006).

Cooperative dilemmas which are not the Prisoner's Dilemma could be called 'relaxed cooperative dilemmas'. In these games it is possible to evolve some level of cooperation even if no mechanism is at work. One such example is the snow-drift game, given by $T > R > S > P$. Here we find a stable equilibrium between cooperators and defectors even in a well-mixed population.

EGYÜTTMŰKÖDÉS EVOLÚCIÓJA

Az együttműködés evolúciója nélkül leromlik a populáció (társadalom), az együttműködők (C) helyett elszaporodnak a defektorok (csalók/árulók) (D).

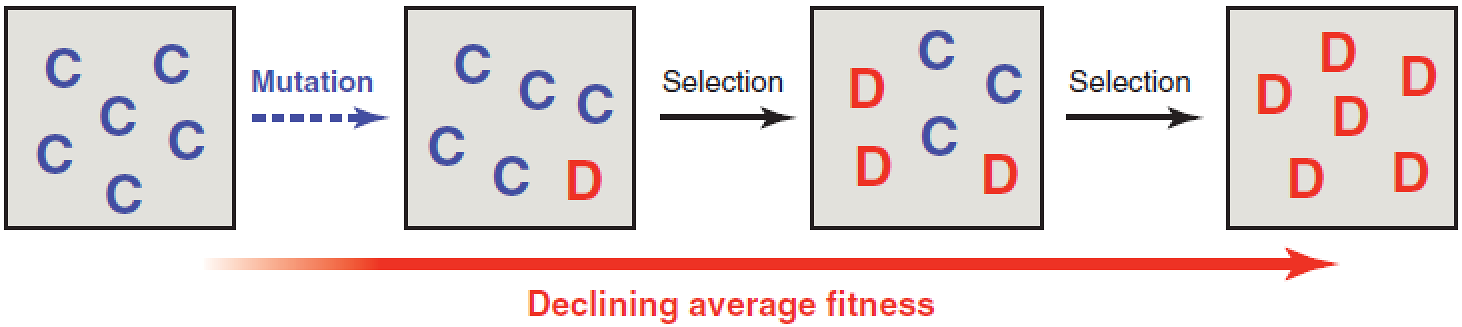


Fig. 1. Without any mechanism for the evolution of cooperation, natural selection favors defectors. In a mixed population, defectors, *D*, have a higher payoff (= fitness) than cooperators, *C*. Therefore, natural selection continuously reduces the abundance, *i*, of cooperators until they are extinct. The average fitness of the population also declines under natural selection. The total population size is given by *N*. If there are *i* cooperators and $N - i$ defectors, then the fitness of cooperators and defectors, respectively, is given by $f_C = [b(i - 1)/(N - 1)] - c$ and $f_D = bi/(N - 1)$. The average fitness of the population is given by $\bar{f} = (b - c)i/N$.

EGYÜTTMŰKÖDÉS EVOLÚCIÓJA 1-2.

M. Nowak az együttműködés evolúciójának 5 főbb kategóriáját különbözteti meg:

1. Szemet szemért, fogat fogért, hajlammal a megbocsájtásra (direkt reciprocitás, TIT for TAT)

There are repeated encounters between the same two individuals, who can use conditional strategies that depend on previous outcomes. Direct reciprocity is based on the concept of repeated games (Trivers, 1971; Axelrod, 1984; Fudenberg and Maskin,

2. Haverok összefogása, kaláka és tekintélyelv (indirekt reciprocitás)

A strategy for indirect reciprocity consists of a social norm and an action rule. The social norm specifies how to evaluate interactions between individuals. The action rule specifies whether or not to cooperate given the reputation of the other individual. Indirect reciprocity can lead to cooperation if the probability to know someone's reputation is sufficiently high.

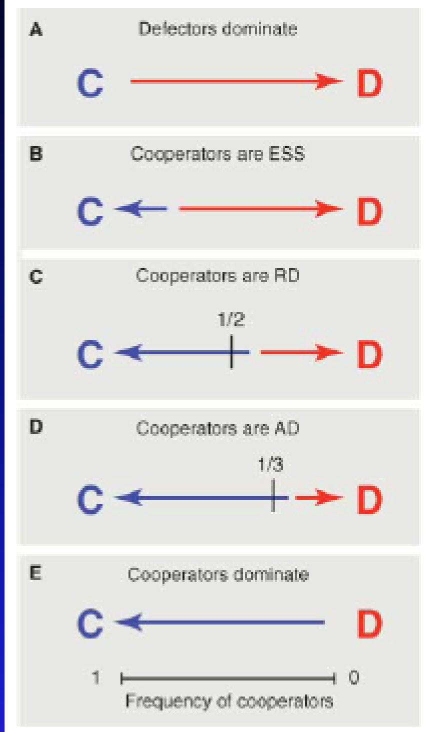


Fig. 2. Evolutionary dynamics of cooperators and defectors. The red and blue arrows indicate selection favoring defectors and cooperators, respectively. (**A**) Without any mechanism for the evolution of cooperation, defectors dominate. A mechanism for the evolution of cooperation can allow cooperators to be the evolutionarily stable strategy (ESS), risk-dominant (RD), or advantageous (AD) in comparison with defectors. (**B**) Cooperators are ESS if they can resist invasion by defectors. (**C**) Cooperators are RD if the basin of attraction of defectors is less than 1/2. (**D**) Cooperators are AD if the basin of attraction of defectors is less than 1/3. In this case, the fixation probability of a single cooperator in a finite population of defectors is greater than the inverse of the population size (for weak selection). (**E**) Some mechanisms allow cooperators to dominate defectors.

EGYÜTTMŰKÖDÉS EVOLÚCIÓJA 3 -4 .

3. Térbeli elkülönülés

Rong et al., 2010; Szabó et al., 2010). Strategies that are successful in a well-mixed population, where everyone interacts with everyone else equally likely, may not win in a structured population and vice versa. The population structure specifies who interacts with whom to accumulate payoff and who competes with whom for reproduction. The interaction and replacement structures need not be identical (Ohtsuki et al., 2007).

4. Többszintű (csoport) szelekció

Multi-level selection can promote evolution of cooperation. In a simple scenario, defectors dominate cooperators within groups, but groups of cooperators outcompete groups of defectors. Multi-level (or group) selection is a powerful mechanism for the evolution of cooperation especially if there are many small groups and if the migration rate between groups is not too large (Traulsen and Nowak, 2006).

EGYÜTTMŰKÖDÉS EVOLÚCIÓJA 5.

5. Rokonok szelekciója

Kin selection is a mechanism for the evolution of cooperation if properly formulated. Kin selection arises if individuals use conditional strategies based on kin recognition. For example, I will jump into the river to save two brothers, eight cousins, but not a stranger. Therefore the essence of kin selection is kin recognition and conditional behavior. It is a form of nepotism where closer relatives are favored over distant ones and over strangers. The key parameter that arises in kin selection is genetic relatedness (Hamilton, 1964; Grafen, 1979, 1985, 2006; Taylor, 1992; Frank, 1998; Michod, 1999; Rousset, 2004).

Együttműködés mérlegelés nélkül: miért törődünk mások gondolkozásmódjával is, és nem csupán a cselekedeteikkel?

6. Azonos értékrend

Hoffman, Moshe, Erez Yoeli, and Martin A. Nowak. 2015. "Cooperate Without Looking: Why We Care What People Think and Not Just What They Do." Proceedings of the National Academy of Sciences (January 26): 201417904.

Significance

Why do we trust people more when they do good without considering in detail the cost to themselves? People who avoid "looking" at the costs of good acts can be trusted to cooperate in important situations, whereas those who look cannot. We find that evolutionary dynamics can lead to cooperation without looking at costs. Our results illuminate why we attend closely to people's motivations for doing good, as prescribed by deontological ethicists such as Kant, and, also, why we admire principled people, adhere to taboos, and fall in love.

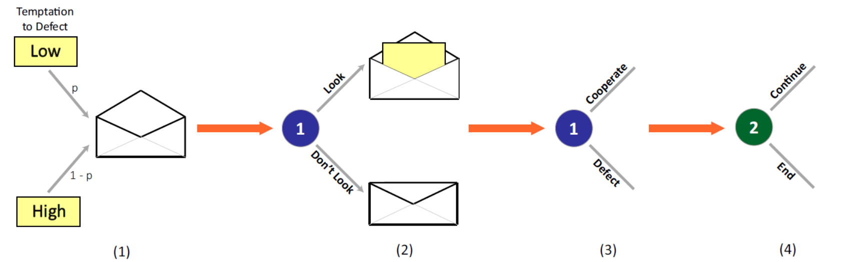
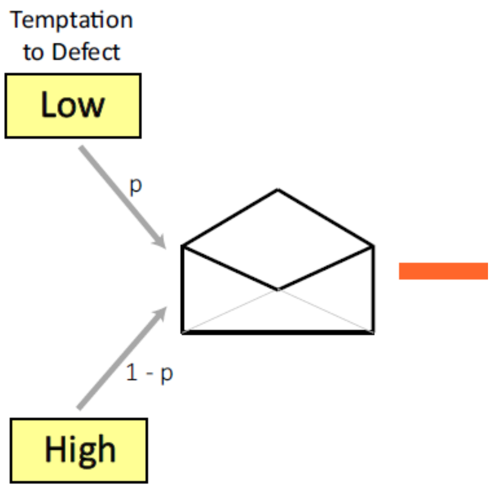


Fig. 1. The envelope game. (1) The game begins when the temptation to defect is randomly chosen, as indicated by a notice being placed in the envelope. The temptation to defect is low with probability p and high with probability $1-p$. (2) Player 1 receives the envelope and chooses whether to look (open the envelope). (3) Player 1 decides whether to cooperate or defect. Player 1 can only condition her action on the realized temptation if she has looked. Each time that player 1 cooperates, regardless of whether player 1 looked, both players benefit from the interaction: player 1 gets $a>0$, and player 2 gets $b>0$. Player 1 gains even more if she defects. If the temptation is low, player 1 gets $c_l>a$, and if it is high, player 1 gets $c_h>c_l$. In either case, each time that player 1 defects, player 2 is harmed and gets a negative payoff ($d<0$). Moreover, we assume that the harm is substantial [$d<-bp/(1-p)$], and therefore, player 2 prefers not to interact with a player 1 who only cooperates when the temptation is low. (4) Player 2, having observed both of player 1's choices, decides whether to continue or end. If player 2 continues, there is another round with probability w.

Részletek: Scheuring István

Együttműködés mérlegelés nélkül: miért törődünk mások gondolkozásmódjával is, és nem csupán a cselekedeteikkel?



(1)

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player 2 is harmed and gets a negative payo
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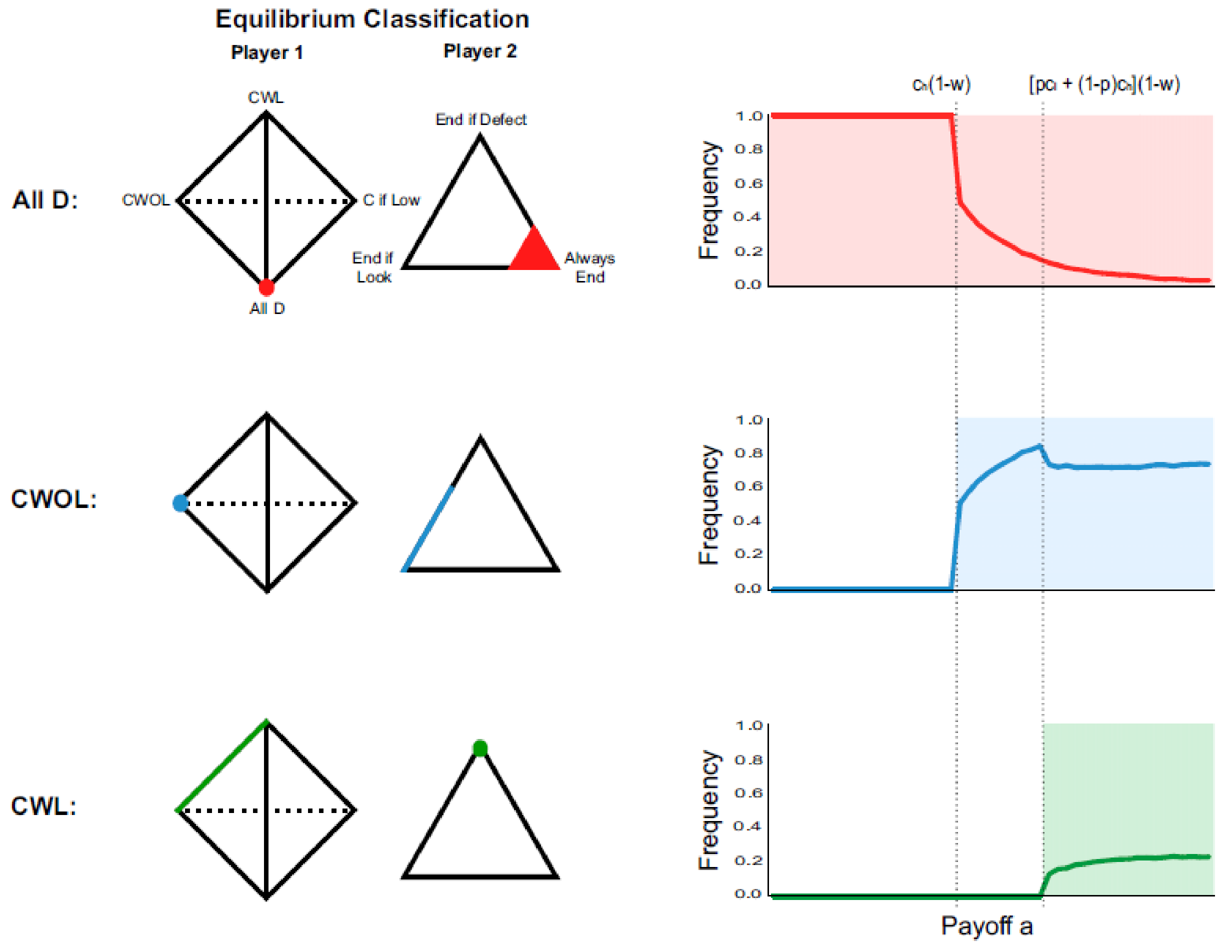


Fig. 2. Learning dynamics of the envelope game. We randomly seed the strategy frequencies 10,000 times for 50 values of the payoff value *a* and record the frequency of each strategy after 1,000 generations. We observe three possible outcomes that correspond to the Nash equilibria identified in Table 1. (*i*) Type 1 players converge to always defect, whereas type 2 players converge to a triangular region close to always end. (*ii*) Type 1 players converge to CWOL, whereas type 2 players converge to a mixture between end if player 1 looks and end if player 1 defects. For stability, this mixture must contain a minimum fraction of end if player 1 looks. (*iii*) Type 1 players converge to a mixture between CWOL and CWL, whereas type 2 players converge to end if player 1 defects. We vary the value of *a* along the *x* axis. The *y* axis represents frequencies, and each colored line presents the frequency of each outcome. The parameter region where the corresponding strategy pair is supported as an equilibrium is shaded. Additional details are in *SI Appendix*. All D, all defect; C, cooperate.

ÖSSZEFOGLALÁS: AZ EGYÜTTMŰKÖDÉS EVOLÚCIÓJA

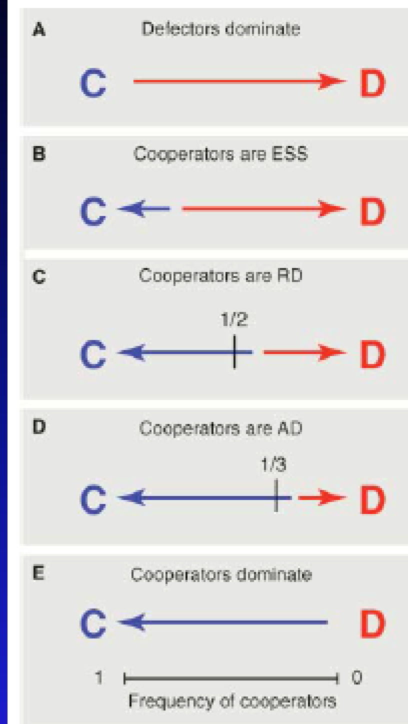
Az együttműködés evolúciója nélkül leromlik a populáció/társadalom, árulók/defektorok dominánsak.

Az együttműködés evolúciójának 5 fő módja van (M. Nowak szerint)

1. Szemet szemért, fogat fogért, megbocsájtás (direkt reciprocitás, TIT for TAT)
2. Haverok összefogása, kaláka és tekintélyelv (indirekt reciprocitás)
3. Térbeli elkülönülés
4. Többszintű (csoport) szelekció
5. Rokonok szelekciója

Legújabb vizsgálatok: van egy 6. lehetőség is

6. Azonos értékrend



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