The Nature of Exploitation[1]

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Outline

Abstract

1. In modern economics the notion of exploitation is ambiguous and has limited utility
2. In the *natural world* certain types of interactions among organisms of *different species* can be related to exploitation
   - But in this context no clear ethical connotation
3. Ethical / rhetorical value of exploitation may be rooted in an emotional nexus associated with
   - Coalition formation by low-ranking individuals in a dominance hierarchy to overthrow high-ranking members
   - Evolved mechanisms of cheater-detection in cooperative interactions based on contingent reciprocity (tit-for-tat strategy)
     - Including detection of “cheating” in species with facultative paternal investment such as humans

Semantics of *Exploitation*

- From *American Heritage Dictionary*:
  ex · **ploi** · **ta** · **tion** 1. The act of employing to the greatest possible advantage: *exploitation of copper deposits.* 2. Utilization of another person or group for selfish purposes: *exploitation of unwary consumers.* 3. An advertising or a publicity program.

Semantics of *Exploitation* (cont'd)

- For Marx *rate of exploitation* = *rate of surplus value* = proportion of unpaid, surplus labour a worker performs for his/her employer to the necessary labor the worker performs, producing the value equivalent of the wage he/she is paid.
  - *Exploitation* intended to be an ethically neutral concept used in scientific analysis of capitalism in *Capital*
  - But Marx and followers also use *exploitation* in its ethical meaning connoting *injustice*

Exploitation in Mainstream Economics

- *Exploitation* in Marxist sense not used – associated with deprecated labor theory of value
- *Exploitation* = deviation from Pareto optimal equilibrium due to market failure such as:
  1. *Monopoly* – one seller, many buyers: unique seller has *market power* (can manipulate price / quantity for excess profit)
  2. *Monopsony* – many sellers, one buyer: unique buyer (e.g., company town) has market power
  3. *Principal agent problem* – exploitation of employer by employee through shirking or embezzling (due to asymmetric information)
  4. *Free-rider problem* – benefiting from public good without paying the cost; can produce *exploitation of the great by the small* (Olson 1971)

Exploitation in Nature – Cross-Species

- Exploitation in modern economics
  - Not a central mechanism; used to describe the result of economic mechanisms (e.g., supply & demand)
  - Seems to imply interpersonal comparison of utilities, an implausible assumption (Pareto).
- Look for interactions in the natural world that represent exploitation
  - Assuming the human species and human society are continuous with the rest of nature
- Criterion of *reproductive fitness* potentially more comparable across individuals
  - Fitness is sometimes measured indirectly as an ingredient of fitness (resources, nesting sites, mating opportunities, etc.)

Exploitation in Nature (cont'd)

Types of Ecological Interactions

- Interactions categorized according to effects of the interaction on the two species involved

Effect on X	Effect on Y	Type of interaction	Example
0	0	Neutralism	(Interaction insignificant)
$-$	0	Amensalism	Bacteria, bread mold (*Penicillium*)
$+$	0	Commensalism	Remoras (eat leftovers), sharks
$-$	$-$	Competition	Cheetahs, lions
$+$	$+$	Mutualism or Symbiosis	Cleaner fish, host
$+$	$-$	Predation or Parasitism	Lion, wildebeest

- Symbols represent the effect of the interaction on each protagonist. '0' is no effect, '$-$' is detrimental, and '$+$' is beneficial.

Exploitation in Nature (cont'd)

Where does exploitation take place?

- *Predation / Parasitism* is most clearly exploitation
- *Commensalism* – "benign" exploitation (victim does not suffer)?
- *Competition* is antagonistic, but not exploitative
- But *Mutualism / Symbiosis* can conceal exploitation if benefits to X and to Y are unequal, e.g.:
  - Domesticated animals and domesticators: domination relation
  - But hard to compare benefits to X (e.g., cleaning fish) and to Y (the host), even though reproductive fitness is a common metric

Parental Investment Theory

- Evolutionary explanations of sexual strategies are based *Parental Investment Theory* (Trivers 1972, 1985; Roughgarden 2004).
  - *Parental investment:* "any investment by the parent in an individual offspring that increases the offspring's chance of surviving (and hence reproductive success) at the cost of the parent's ability to invest in other offspring"
  - *Prediction:* Sex investing the most constitutes limiting resource for other sex, so that "whichever is the sex with greater parental investment will be the sex that is courted, that competes less, and that survives better" (Daly and Wilson 1983)
- In nature the sex that invests most is most often (but *not always*) the female.

Parental Investment Theory

- Evolutionary biologist Robert Trivers (left) developed parental investment theory
- Q – Who is the other man?

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- Evolutionary biologist Robert Trivers (left) developed parental investment theory
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- Huey Newton (1942–1989)

Generic Female Strategies

- One can distinguish three generic female sexual strategies in the natural world:
  1. *Domestic Bliss Strategy:* In species where male invests parentally, choose male who shows signs of domesticity and controls resources relevant for reproductive success
  2. *He-Man Strategy:* In species where male does not invest parentally, choose a male with "good genes"
  3. *Madame Bovary Strategy:* In some situations it may be advantageous to have both a "husband" (for parental investment) and a "lover" (for good genes). May have been important in human evolution.

Generic Male Strategies

- Species-typical male strategies can be located on a continuum between:
  1. *Dad Strategy:* Maximize paternal investment, at the cost of mating effort.
     - Do, however, seize opportunity for costless insemination.
  2. *Cad Strategy:* Maximize mating effort (chances of inseminating multiple females), at the cost of paternal investment.
- Roughgarden (2004) in *Evolutionary Rainbows* presents a more complex account of reproductive strategies that goes beyond the generic male / female opposition that is useful in explaining homosexuality, transgender, etc.

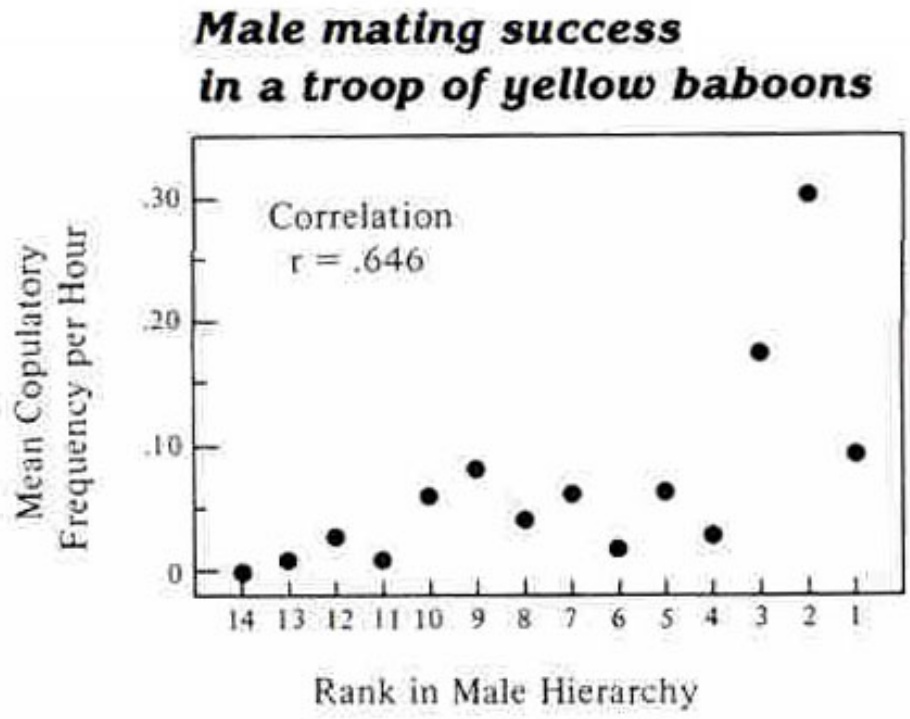
Sexual Exploitation in the Natural World

- Exploitation can be identified with:
  - The male, as exploiting the greater parental investment of the female – especially in mammals due to internal gestation and suckling.
  - The female, in "cheating" in exchange of paternal investment against paternity of the offspring (Madame Bovary strategy).
- Qualifications:
  1. A sex is not a species – evolution keeps the sex ratio near equality (Fisher 1918, 1930).
  2. Over the generations any gene has an equal chance of being in a male body or a female body. Thus any gene influencing a behavior is selected to have an (conditional) expression that is equally advantageous in the contexts of a male or female strategy.
  3. There are cases of "role reversals" (e.g. sea horse), where males make larger parental investment than females
     - males exhibit "feminine" behavior
     - females exhibit "masculine" behavior

Dominance Hierarchies

- Many animal species have dominance hierarchies (single or double, e.g., chimpanzees).
- Rank in the hierarchy is correlated with:
  1. For males: access to fertile females (e.g., yellow baboon; preindustrial human societies)
     - can produce considerable inequality in the reproductive success of males
  2. For males and females: access to resources other than mating opportunities, e.g. shelter, food, safety (self and offspring)

Dominance Hierarchies (cont'd)



- Correlation of male RS (copulatory frequency) with rank in dominance hierarchy in yellow baboons (Daly & Wilson 1983, Figure 5-4 p. 86)

Dominance Hierarchies & Inequality

- Species / populations vary in the degree of *reproductive skew* (= reproductive inequality) due to the dominance hierarchy
  - as a function of relative fitness advantage of cooperative vs. single breeding, dispersal opportunities of subordinates, and degree of relatedness of dominant and subordinates (Vehrencamp 1983a, 1983b)
- Reproductive skew may be the closest counterpart in the natural world of social inequality in human societies

Evolutionary Roots of *Exploitation*

- Dominance hierarchies in primates (e.g., chimpanzees) are the theater of complex politics based on alliances
  - Male subordinates form alliance in a "climbing maneuver" to overthrow control on access to mating opportunities held by the dominant male(s) (Loprato & Crippen (2001)
  - Female hierarchy is also the theater of alliance-based politics related to provision of food and offspring safety
- Thus "chimpanzee politics" are characterized by a "circulation of elites" (de Waal 2000)
- *Exploitation* may relate to an emotional nexus serving as a mechanism of alliance formation ("mobilization") of subordinates
- Emotional loading of exploitation may have roots in our evolutionary past

Evolution of Cooperation by Tit-for-Tat

- Another root of the ethical charge of exploitation may be the evolution of cooperation through contingent reciprocity based on a strategy of tit-for-tat.
- The evolution of cooperation would have produce a “module” of emotions related to situations of reciprocity.
- The central model of the evolution of cooperation was formulated by (again) Trivers (1971, 1985).
  - Because of the *Prisoner’s Dilemma,* cooperation does not evolve spontaneously as the *dominant strategy* (maximizing individual reproductive fitness) is defection (non-cooperation).
  - When there are repeated interactions between individuals, cooperation can evolve through a *tit-for-tat strategy*: start by cooperating; then do the same (cooperate or defect) as your protagonist.
  - In repeated prisonner’s dilemma, the tit-for-tat strategy is dominant, i.e. will be selected in the course of evolution.
  - Repeated interactions characterize human evolution (due to low dispersal rate, long life span, recognition of individuals, life in small face-to-face groups)

Evolution of Cooperation by Tit-for-Tat

Prisoner's Dilemma (PD)

	D	C
D	2	4
C	1	3

PD Iterated 10 Times

	D	TFT
D	20	22
TFT	19	30

- In a single PD the dominant row strategy given the column strategy is Defection (D) rather than Cooperation (C)
- In the Iterated PD the dominant strategy is Tit-for-Tat (TFT): start by cooperating; then do the same (C or D) as your protagonist

Evolutionary Implementation of Tit-for-Tat

- Trivers (1971) conjectured that the tit-for-tat strategy is implemented in humans through an innate module of moral-emotional propensities to react adaptively to reciprocity-related contingencies, e.g.:
  - propensity for friendship
  - capacity for gratitude and sympathy
  - propensity for moralistic aggression against non-cooperation
  - capacity for guilt and reparative altruism
  - sense of justice
- The human reaction to exploitation (outrage) may derive from
  - Our innate sense of distributive justice
  - Our specialized capacity to detect cheaters in cooperative interactions

Conclusion & Discussion

Issues with Exploitation

- In economics concept of exploitation has limited utility:
  - Describes economic outcomes different from that resulting from perfect competition
  - Descriptive label rather than theoretically essential concept
  - Some situations of exploitation at odds with intuitive meaning of the term (e.g., in the free-rider context resourceful actors are viewed as exploited by less resourceful ones)
- In ecology exploitation may be used to describe some forms of ecological interactions between species, but:
  - Concept is unnecessary for describing consequences of interactions
  - Source of the ethical value of the concept is not identified

Conclusion & Discussion

Evolutionary Roots of Exploitation

- "Exploitation" may be the verbal manifestation of a set of emotions with roots in the evolutionary history of the human species (and perhaps social species other than humans) in relation to:
  1. Climbing maneuver of low-ranking individuals forming coalitions to overthrow incumbent high-ranking members in the dominance hierarchy.
  2. Evolved mechanisms of cheater-detection in cooperative interactions based on contingent reciprocity (tit-for-tat strategy).
  3. As a specific instance of (2), "cheating" in a marriage-like relationship in a species, such as humans, in which the male invests parentally but is concerned with issues of paternity.

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