INSTITUTIONS AND INSTITUTIONAL ANALYSIS

Erling Berge

An introduction

NTNU, Trondheim

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Literature

- Ostrom, Elinor. 1998. A Behavioral Approach to the Rational Choice Theory of Collective Action. Presidential Address American Political Science Association 1997. American Political Science Review 92 (1):1-22.

- Ostrom, Elinor. 2005. Understanding Institutional Diversity. Princeton: Princeton University Press.

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Literature

- See also
  - Granovetter, Mark. 1985. Economic Action and Social Structure: The Problem of Embeddedness. American Journal of Sociology 91 (3):481.
  - Ostrom, Elinor. 1990. Governing the Commons. The Evolution of Institutions for Collective Action. Cambridge: Cambridge Univesity Press.

What is an institution?

In society - of course - there are disagreements and conflicts

- But most of our daily activities are unproblematic, taken for granted, and the results are seen as legitimate

- Why?

- The rules of the games we play in life we call institutions

Institutions are ...

- Institutions are the prescriptions that humans use to organise all forms of repetitive and structured interactions, including those within families, neighbourhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales
- Leading to
  - Great diversity of institutions
  - Great diversity of scientific approaches
- IAD framework (Institutional Analysis and Development)

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Previous institutional theories

1880-1950

Economics (Veblen, Commons, Schumpeter, Galbraith, Myrdal) -->

    Overtaken by neo-classical micro-economics

Political science (most, but Burgess, Wilson, Willoughby) -->

    Overtaken by behaviorism

Sociology (most, but Weber, Durkheim, Cooley, Meade, Hughes, Parsons) -->

    Dominated by conflict and class theory

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New or neo-institutional theory

1950-1990

Economics (Coase 1937, 1960, <u>Olson 1965</u>, Williamson 1975, <u>North 1990</u>)

Political Science (<u>March& Olsen 1984</u>, 1989, Buchanan& Tullock 1962, Skocpol 1985, Shepsle& Weingast 1987, <u>Ostrom 1990</u>)

Sociology (Goffmann, 1961, Schutz 1962, <u>Berger& Luckmann 1967</u>, Silvermann 1971, Meyer& Rowan 1977, Zucker 1977, DiMaggio& Powell 1983, <u>Stinchcombe 1983</u>, Hechter 1987, Coleman 1990)

New or neo-institutional theory

Anthropology (<u>Godelier 1984, Douglas 1986</u>)
Philosophy (<u>Searle 1995</u>)

Institutions and organisations

What is the difference?

- Organisations play the games
- Institutions supplies the rules and their enforcement
- Co-evolution of institutions and organisations
- Embeddedness of institutions and organisations
- **Focus on rules**
    - Usage of operational rules in action situations
    - Collective-choice of rules for action situations
    - Constitutional choice of rules for how collective choice should be done
    - Meta-rules

Rule systems

- Rules are based on values
    - Cultural, social, economic
- Rules are based on knowledge
    - "Brute" facts and Institutional facts
- Rules are based on needs for coordination
    - Solving social dilemmas
- Persons have knowledge and values: usually in the form of a world view shaping their perceptions of facts and interpretation of rules

Sources of variation in institutions

- Governance (market vs hierarchy)
- Incentives (rights and duties)
- Processes (by types of goods)
- Transaction costs
- Externalities

Institutional change

- Because accidents happen (historical conjunctures)
- Because they evolve according to an internal dynamic (path dependence)
- Because of intentional activities aimed at changing them (politics)
- In general: Driving forces are found in culture, personal identities, and distributional outcomes

A more comprehensive definition of institutions

Institutions comprise
- a substantive area of operation (field)
- a system of legitimate **rules**
- a group of **actors** pursuing their goals within the substantive area constrained by the system of rules
- a group of persons with legitimate interest in the interpretation and application of the rules (enforcement)

Current topics for development of the theory

Actors and their activities:
- Rationality - bounded or?
- Trust - Opportunism
- Credible commitment - contract enforcement
- Transaction costs vs Production costs
- Preferences - from where do they come?, and to what do they apply?

A core area for theoretical development

- Collective action situations
  - "**Social dilemmas** occur whenever individuals in interdependent situations face choices in which the maximization of short-term self-interest yields outcomes leaving all participants worse off than feasible alternatives." (Ostrom 1998:1)
  - **Social Traps**
- Theory (anno 1997) says this or that collective undertaking will fail (commons, international peace talks, climate deals)
- In many cases empirical investigations disproves the prediction.

- The research frontier today tries to understand how people can avoid failure in collective action
- In this work Elinor Ostrom has been a central figure for more than 20 years. Her book from 1990 was within 10 years accepted across both political science and economics as a classic investigation of collective action

Ostrom 1997
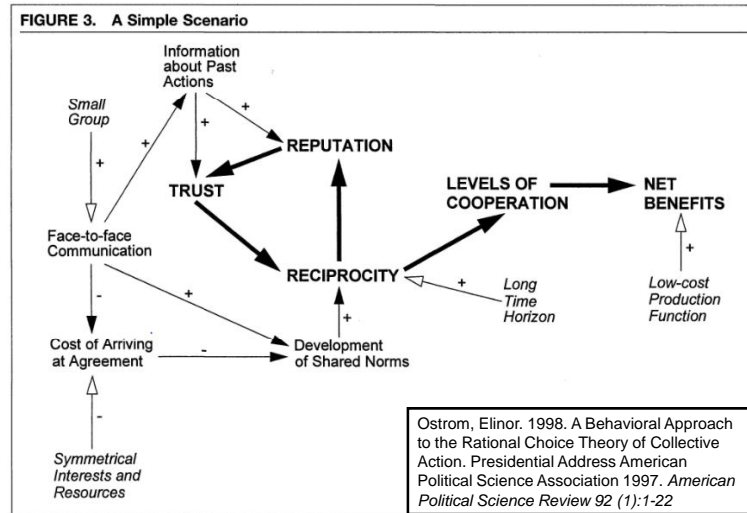
Her approach can be summed up in

Lex Ostrom:

- What works in practice should work in theory!

- (See first paragraph in Ostrom 1998)

See and listen to Ostrom's Nobel lecture at http://nobelprize.org/nobel_prizes/economics/laureates/2009/ostrom-lecture.html

Levels of cooperation
From simple to complex models

FIGURE 3. A Simple Scenario

Ostrom, Elinor. 1998. A Behavioral Approach to the Rational Choice Theory of Collective Action. Presidential Address American Political Science Association 1997. *American Political Science Review 92 (1):1-22*

Ostrom 2005

Ostrom, Elinor 2005, *Understanding Institutional Diversity*, Princeton University Press, Princeton, Ch 1-4

- Understanding the Diversity of Structured Human Interactions
- Zooming in and Linking Action Situations
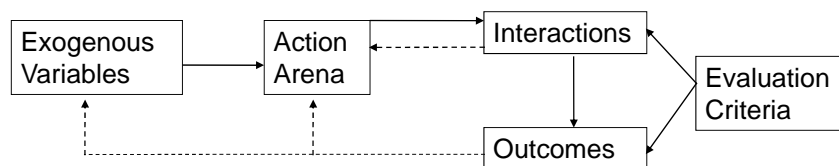- Studying Action Situations in the Lab
- Animating Institutional Analysis

Holons

- The term holon may be applied to any stable sub-whole in an organism or social hierarchy, which displays rule-governed behaviour and/ or structural Gestalt constancy
  - Environment
  - System
  - Sub-system

In repeated layers: multilevel complex systems

Holon: The action arena

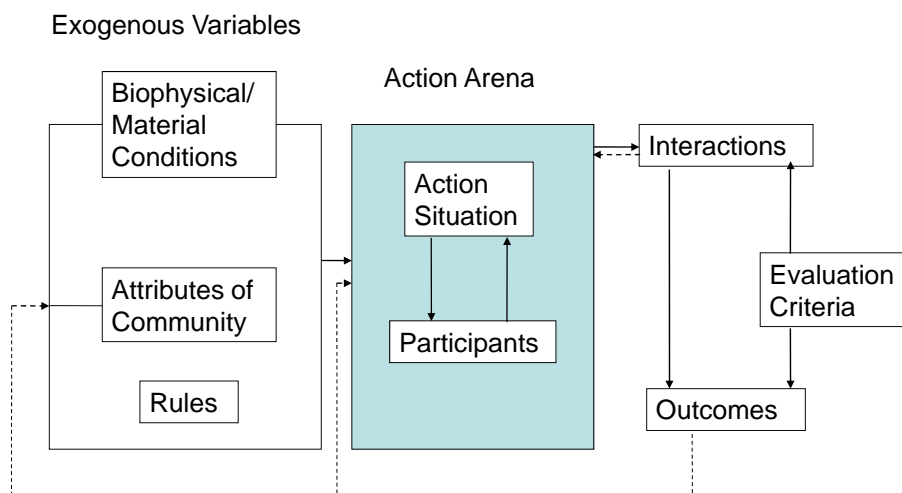The action arena will be the focal unit for our discussion

Examples of evaluation criteria:
- **Positive utility of outcome**
- **Outcome seen as unfair or inappropriate**
- **Other feasible procedures will give more utility**
- **Procedures used seen as unfair**

IAD institutional analysis and development (a framework)

- IAD is the general assemblage of theoretical elements that Ostrom and her collaborators use
- A kind of checklist for the fieldwork and data interpretation
- Its focus today is the action arena and its environment

The environment of action situations

Exogenous Variables

Action Arena

| Biophysical/ Material Conditions |
| Attributes of Community |
| Rules |

| Action Situation |
| Participants |

| Interactions |
| Evaluation Criteria |
| Outcomes |

The action arena

The action situation:
- Positions
- Potential outcomes
- Available actions and action-outcomes linkages
- Control over outcomes
- Information generated in the situation
- Cost-benefit attached to actions and outcomes

The participant (individual or corporate unit)
- Preferences
- Status/ command of resources
- Individual attributes
  - Age, sex, education, culture, etc
- # participants in the situation

An action situation

- Two or more individuals facing a set of actions that jointly produce outcomes
- The situation can be evaluated empirically by observation of interactions and outcomes (use of implicit models)
- The situation can be evaluated theoretically by predicting interactions and outcomes (use of theory)

Rules I

- Rules, written or unwritten, may be used about
    1. Regulations (prescriptions, prohibitions, permissions)
    2. Instructions/ recipes/ strategies
    3. Precepts/ advice for moral behaviour (norms)
    4. Principles/ laws of nature
- Regulations provide the participants with a shared understanding of what actions/ outcomes are prescribed/ prohibited or permitted

Rules II

- Rules are the result of explicit or implicit efforts to create order and predictability among humans by
- Creating positions who are required, permitted or forbidden to take classes of
- Actions in relation to outcomes that are required, permitted or forbidden, or face the likelihood of being
- Monitored and sanctioned in a predictable fashion

Rules III

- Origin of rules
  - Self-organised groups
  - Externally imposed rules
  - Evolution (from problem solving to designed rules)
- Working rules
  - Rules justifies actions
- Predictability of rules
  - Depends on shared meanings since rules are not self-formulating, self-determining, or self-enforcing
  - System of enforcement
  - System of creation

Biophysical and material conditions

Attributes of goods produced, distributed or consumed
  - Excludability of outcomes
    - Free riders
- Divisibility of outcomes (subtractability)
- Transferability of utility

Classification of goods (bads), entities that people want to obtain (or avoid)

- **Subtractability**
  - Intrinsic
  - Technology dependent
  - Depletable or reproducible
- **Excludability**
  - Intrinsic
  - Technology
  - Political choice

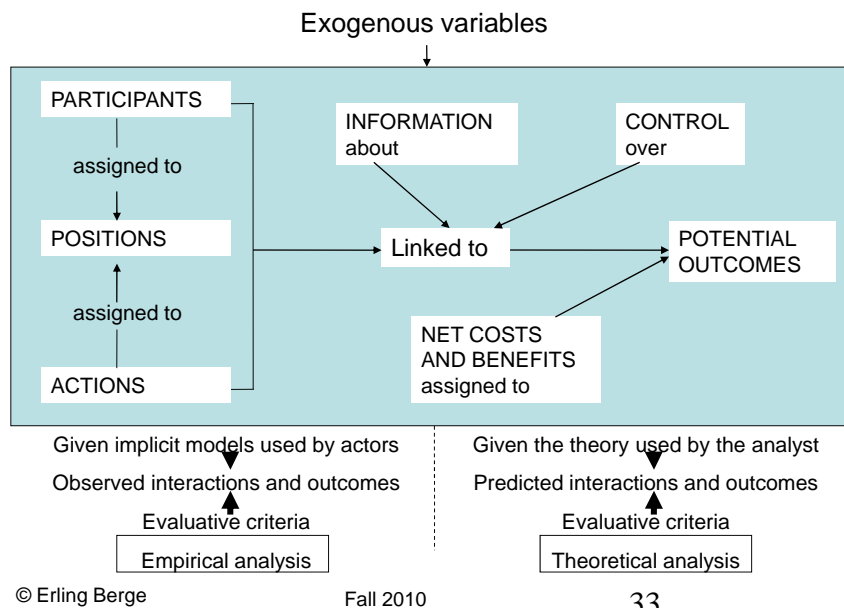|		Subtractability	
		Low	High
Excludability	Low	Public	? CPR
	High	? Club	Private

Community and culture

COMMUNITY
- Size and composition of population
- Values in the local culture
- Common knowledge and understanding of various action situations
- Degree of homogeneity of preferences

CULTURE
- Affects costs of interaction
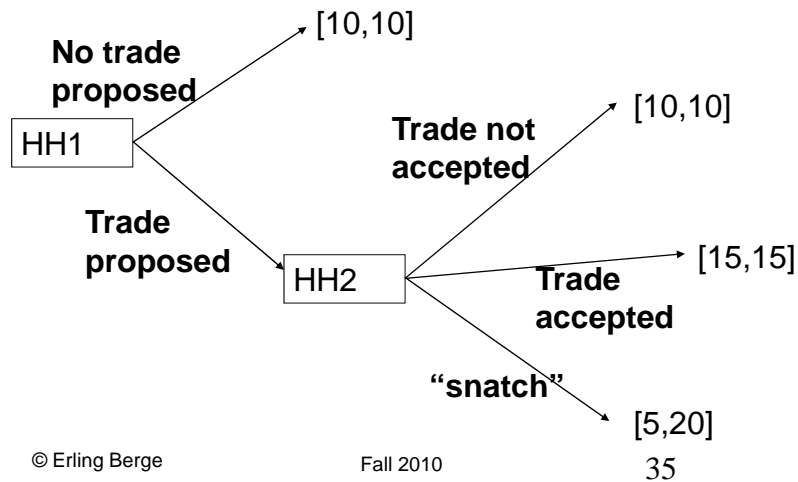- Reputation, trust, etc

LANGUAGE

The internal structure of action situations

Exogenous variables

Given implicit models used by actors

Observed interactions and outcomes

Evaluative criteria

Empirical analysis

Given the theory used by the analyst

Predicted interactions and outcomes

Evaluative criteria

Theoretical analysis

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The "snatch" game

- "state-of-nature" = no rules apply, no common understanding or norms
- Household 1 (HH1) produce 10 bags of potatoes
- Household 2 (HH2) produce 10 chickens
- Both HH1 and HH2 prefer to eat chicken and potatoes
- In the "state-of-nature" they have a social dilemma:
  – That is a situation where the private return to an optimal strategy based on the assumption that all follow their optimal strategy without regard to what others do is greater than a share from the joint product of a cooperative strategy

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The "snatch" game: illustration of action situation

[10,10]

No trade proposed

HH1

Trade not accepted → [10,10]

Trade proposed

HH2

Trade accepted → [15,15]

"snatch" → [5,20]

The working parts I

- **Participants**
  - Numbers, individuals or teams
    - A team require collective action, members intend a joint product or have a common purpose
  - Groups, aggregates of individuals or teams
    - If there is variable strength of interest we may get frequency dependent behaviour
  - Attributes: sex, age, education, ...
- **Positions authorise actions**
  - Roles: participants may have more than one
  - Roles allow, prescribe or prohibit actions
  - Participants may or may not choose entry or exit from positions

The working parts II

- Potential outcomes
  - Status quo outcome
  - Biophysical outcomes, external payoffs, internal valuations may have to be assessed separately
  - The opportunity of a situation: range of value in outcomes
- Control over outcomes
  - Power = control * opportunity

The working parts III

- Available actions and action-outcomes linkages
  - Actions: actors choose one from the set of possible actions. The choice of no action is an option
  - Action-outcome linkages: action(s) will "produce" the outcome to some degree (transformation function), control variables
  - Certainty, link is known
  - Risk, probability distribution of outcomes are known
  - Uncertainty, the relation between action and outcome is indeterminate (interdependent actions, number of possible outcomes too large)
  - Uncertainty, risk and certainty are structural characteristics of the situation (not dependent on information)

The working parts IV

- Information generated in the situation
  - Complete
    - Perfect: all actions known to all participants
    - Imperfect: the complete situation but not the decisions of other participants
- Incomplete "Who knows what at what juncture"
  - Opportunistic behaviour: deceitful behaviour to improve ones own outcome to the detriment of others
  - Asymmetric information problems
    - Principal — agent problems when the boss do not know completely what his agent does
    - Moral hazard — whenever risk is to be shared based on asymmetric information

Principal-agent problem

- The principal-agent problem or agency dilemma arise under conditions of incomplete and asymmetric information when a principal hires an agent,
- The two may not have the same interests. While the principal is, presumably, hiring the agent to pursue the interests of the former, the agent may shirk some duties to pursue his/her own interests

What is moral hazard?

- Moral hazard is a special case of information asymmetry, a situation in which one party in a transaction has more information than another.
- The party that is insulated from risk generally has more information about its actions and intentions than the party paying for the negative consequences of the risk.
- More broadly, moral hazard occurs when the party with more information about its actions or intentions has a tendency or incentive to behave inappropriately from the perspective of the party with less information.

The working parts V

- Cost-benefit attached to actions and outcomes
    - Material costs from choosing particular actions
    - Internal valuations of particular actions
    - Material rewards from particular outcomes
    - Internal valuations of particular outcomes
    - Material or internal valuations of the action path chosen
  - Internal valuations: shame, regret, joy, guilt
  - Decisions based on net value (utility)
- Number of repetitions of action situation
  - One time, finite number of times, indefinite repetition
  - Tit-for-tat in symmetric social dilemmas
  - Heuristics for asymmetric social dilemmas

Linking Action Arenas

- Sequential linkages of arenas
  - Facilitates building of reputation for reciprocity
- Simultaneous arenas
- Organisational links, (appears as trees or lattices) long complex chains where output from one arena is input to another
- Competitive links
  - Adaptations to other participants
  - Market interactions (rule governed competition)
- Levels of action arenas: rules at deeper levels are part of the structure of action arenas at a given level
  - Operational — interpreting rules
  - Collective-choice — making rules
  - Constitutional choice — making rules about rules making
  - Meta constitutional choice — procedures for making rules about rule-making

Levels of rule analysis

Environmental characteristics that directly affects the situation

For level 1-3:
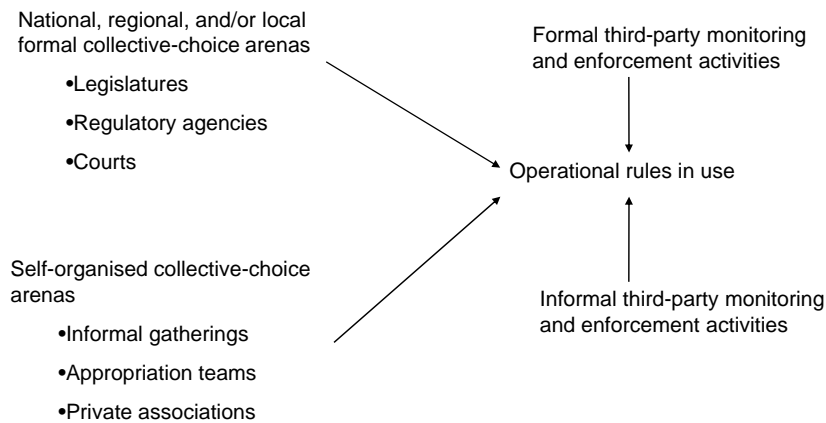- RULES IN USE
- BIOPHYSICAL WORLD
- COMMUNITY

For level 4:
- BIOPHYSICAL WORLD
- COMMUNITY

At each level: Individual actions taken that directly affects state variables in the world or the situation:

1. OPERATIONAL SITUATION
   - Interpreting rules
2. COLLECTIVE CHOICE SITUATION
   - Making rules
3. CONSTITUTIONAL CHOICE SITUATION
   - Making rules about making rules

4. METACONSTITUTIONAL CHOICE SITUATION (no rules in use)
   - Values informing the making of the rules for making rules

Formal and informal collective-choice arenas

National, regional, and/or local
formal collective-choice arenas

- •Legislatures
- •Regulatory agencies
- •Courts

Formal third-party monitoring
and enforcement activities

Operational rules in use

Self-organised collective-choice
arenas

- •Informal gatherings
- •Appropriation teams
- •Private associations

Informal third-party monitoring
and enforcement activities

Level shifting strategies

- Contemplating changes in the rules defining permitted, prohibited and proscribed actions in operational situations
- The cost (including transaction costs) of actually changing the rules varies dramatically from arena to arena
  - Costly formal requirements may lead to informal de facto changes at the operational level

Predicting and evaluating outcomes

- Predicting
  - Only very simple situations allow strong predictions
  - Interdependent decisions, linked arenas, communication, learning, changes in strategy: all make it difficult to predict
- Evaluating
  - Economic efficiency, benefits from reallocation of resources
  - Equity, matching ability and requirements, equality of outcomes
  - Adaptability, resilience (from ecosystem), and robustness (from engineering)
  - Accountability
  - Conformance to general morality
  - Needs for trade-offs

Experimental studies of action situations

- Using social dilemma games to illustrate action situations
  - Showing that small changes in the action situation can produce big differences in outcomes
  - Illustrate how experimental results challenge the presumption that all use the same internal rationality to make decisions
  - Will use the trust game (similar to the snatch game) and
  - The commons dilemma game
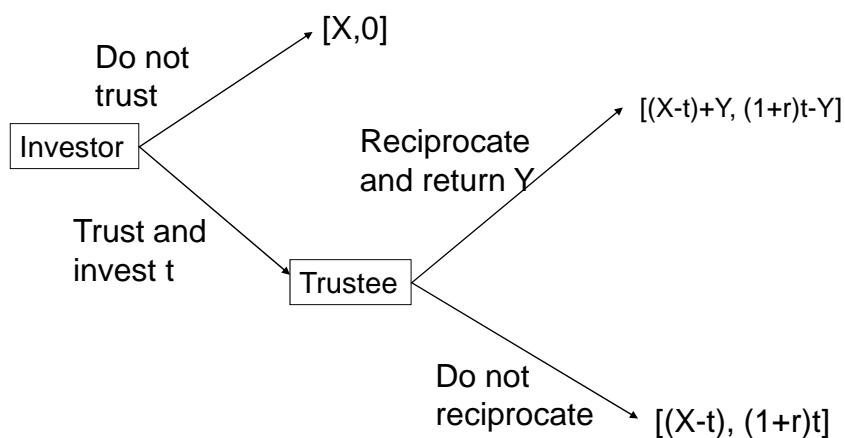
The trust game: the baseline

- Participants: two subjects
- Positions: investor and trustee
- Actions:
    - Investor has X. Can choose between
        - Keeping X
        - Giving t to the trustee and keeping X-t
        - Give all X to the trustee (t=X)
    - Trustee can subsequently choose how much to return to investor (Y)
- Outcomes: size of funds resulting from actions
- Action-outcome linkages: rate of return on investment = (1+r)
- Information: all possibilities are known, assurance of anonymity both to players and experimenter
- Potential payoffs (possibilities) [(X-t)+Y] and [(1+r)t-Y]; t>0
    - Often r=2

The trust game: illustration of decisions and outcomes

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The trust game: Malawi 2007

- Participants: 30 subjects (15 pairs) in 18 villages
- Positions: investor and trustee
- Actions:
  - Trustee has 80. Investor has 80. Investor can choose between
    - Keeping 80
    - Giving t to the trustee and keeping 80-t
    - Give all 80 to the trustee (t=80)
  - Trustee can subsequently choose how much to return to investor (Y)
- Outcomes: size of funds resulting from actions
- Action-outcome linkages: rate of return on investment = 3
- Information: all possibilities are known, assurance of anonymity both to players and experimenter
- Potential payoffs (possibilities) $[(80-t)+Y]$ and $[3*t-Y]$; $t>0$

The trust game: variations

- Positions changing to worker-employer
- Participants from different cultures
- Number of repeated plays: building reputation?
- Information:
  - Investor stipulates minimum returns
  - Investor may apply or refrain from applying costly punishment tied to minimum returns. Applying punishment was found to reduce reciprocity.
  - Highest return when punishment was possible but not used: **external sanctions crowd out reciprocity**
- Small changes in conditions create large differences in outcomes (relative positions, information and sanctions available)
- Results challenge the self-interested actor model: high level of trust in situations where none should have been

Social Dilemmas/ Social Traps:
Prisoners dilemmas, Public goods games,
CPR games

Definition

- T>H
- H>L
- L>S

- T= temptation
- S= succer

Social dilemmas	Cooperate	Defect
Cooperate	H ; H	S ; T
Defect	T ; S	L ; L

Common-pool resources

- A common-pool resource is a natural or man-made resource from which it is difficult or very costly to exclude or limit users once the resource is provided by nature or produced by humans and removal of a resource unit makes that unit unavailable for others
  - Unregulated access leads to overuse and possibly destruction
  - Lack of exclusion leads to free-riders in provision

Basics of a commons dilemma I

- **Participants**: n symmetric subjects without any outside relations with each other
- **Positions**: appropriator
- **Actions**: each is endowed with e (=effort, or endowment) units (e.g. working hours) and have to decide on how much to spend on appropriation and how much on earning income from an external source (w = wage rate)
- **Outcomes**: actions affect the number of resource units that can be appropriated or the returns for working outside
- **Action-outcome linkages**: 1) wage*work hours 2) the resource function (F) is concave and depends on the total effort allocated to appropriation ($\Sigma_i x_i$): $F(\Sigma_i x_i)$

Basics of a commons dilemma II

- Information: participants know that they are all alike (symmetric) and they know the function linking aggregate effort to individual payoff
  - Information about outcomes are available after each round of allocation
  - No communication is allowed
- Potential payoff with n players
  - Payoff for individual i :   w*e   if $x_i = 0$
  - It is   w*(e - x_i) + r*($\Sigma_i x_i$)   if $x_i > 0$ and r<1<r*n
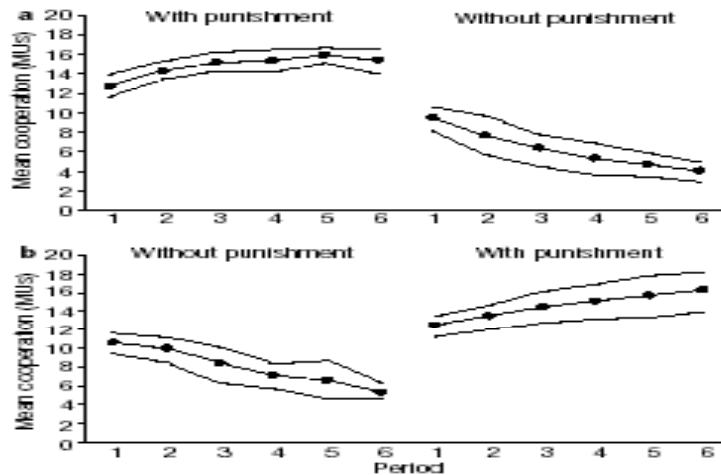
Behaviour in a basic commons dilemma

- Comparing two games with 10 or 25 tokens endowment
- **Overuse** of the resource is usually the case
- 25 token experiments do considerably worse than 10 token
- Observes an **unpredicted pulsing pattern** (increasing investment until declining returns, then reducing it)
- **No theoretically satisfactory explanation exist**
- Some **subjects say** they use CPR return over or below 0.05 as guide to investment in the next round (w=0.05)
- Results replicated by agent based simulation
- Social psychology suggests **cognitive processes** are important to outcomes
- **Subjects use heuristics in complex problems**

Variations on a basic commons dilemma I

- **Factors that should not affect outcomes but does increase compliance**
1. Allowing **face-to-face communication** before each session of investment
2. Allowing **costly sanctions**
3. **Allowing subjects to covenant** to determine investment levels and adopt sanctioning
- Communication improves outcomes where there is heterogeneity of endowments
  - If subjects are kept out of the communication much less compliance is observed for all

Experimental results: Monitoring and Sanctioning

Source: Fehr, E., and S. Gächter. 2002. Altruistic punishment in humans. Nature 415:137-140.

Variations on a basic commons dilemma II

- Voluntary sanctions is chosen even if it is costly to the person proposing it, sanctioning and fines wipe out gains from better performance
- Crafting rules to solve commons dilemmas is costly (second order dilemma) but do <u>occur frequently</u>. Those who covenant do considerably better than those who do not
- Electronic communication do not do as well as face-to-face
- Experiments using real farmers replicate findings
- Experiments based on heterogeneous preferences giving incentives to inspect and punish deviations from covenants explained by a heterogeneous, linear other-regarding model

Animating institutional analysis

Rational choice:

- Starting with the full-information, rational behaviour focusing on material outcomes in open, competitive, posted price markets
- Adding complications
  - **Information processes**
  - **Valuation mechanisms used by individuals (preferences)**
  - **Selection processes used by individuals (choice of actions)**

Open competitive processes

- Repetitive situations where complete information and adequate models of the situation can be assumed
  - Explaining learning has proved very difficult
- Assumptions for a rational egoist
  1. Individuals possess as much information about the structure of a situation as is contained in the situation
  2. Internal valuations of outcomes are complete and consistent based on a monotonous mapping of external payoff
  3. Individuals choose actions to maximise expected net benefits based on what resources they have and the actions others are expected to take

Challenges

- It has been shown that it is the structure of the situation that produces efficient choices, not the internal calculations of individuals
- Social dilemmas evoke positive or negative internal valuations not conforming to assumption 2 above
- Imperfect information is rampant, including
  - Asymmetric information,
  - Risk and uncertainty
  - Repetitions and constancy of participants

Extending rational choice

- Modelling how participants acquire, process, represent, and use information
- Modelling how participants value actions and outcomes
- Modelling the processes participants use (maximizing, satisficing or using diverse heuristics) to select particular actions or strategic chains of actions in light of their resources
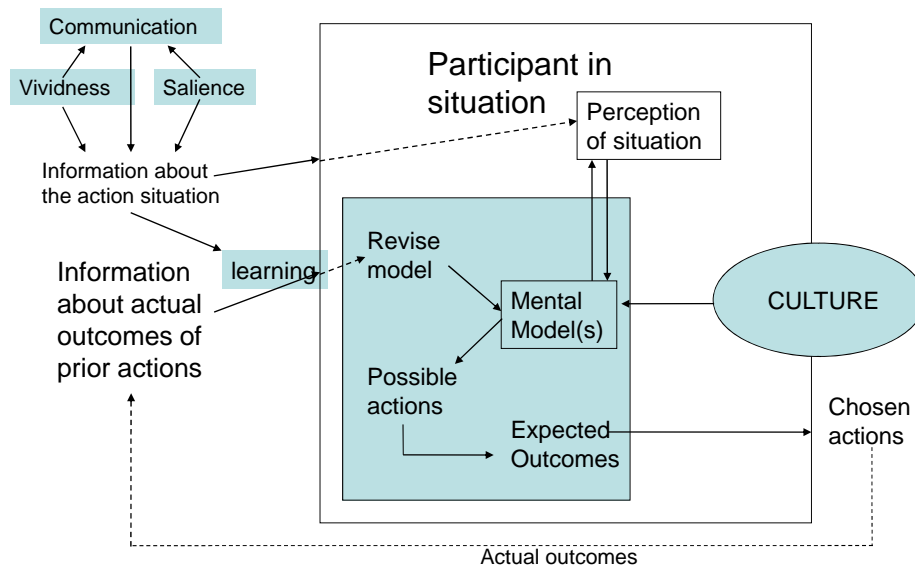
Information processing and mental models

- Due to individual limits on cognitive capacity in pursuing goals, analysts may have to assume bounded rationality rather than full information
- Mental models develop and change from
    - Feedback from the world
    - Shared culture/ belief system
    - ---
- See next slide

Information, action-outcome linkages, internal mental models
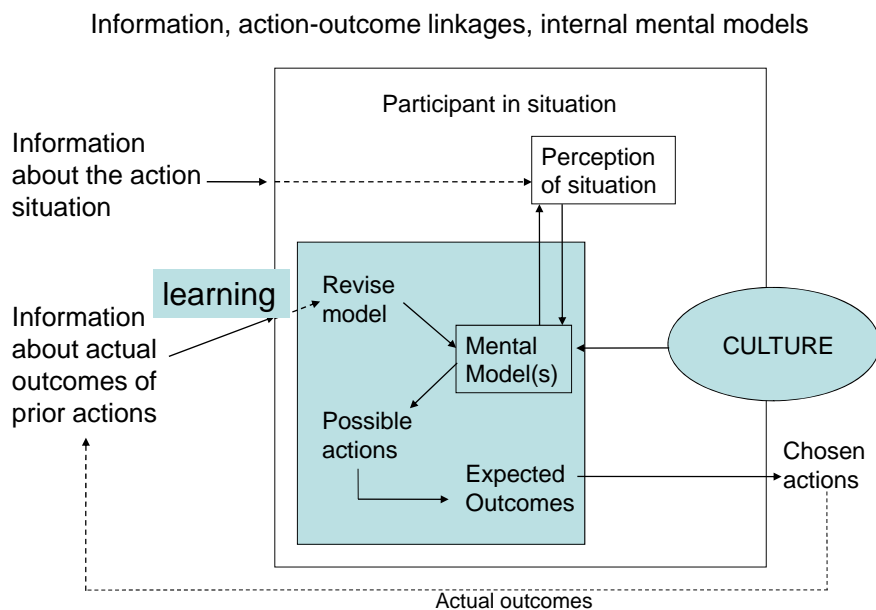
Differences in mental models

- Number of participants large
- Situation is complex
- Situation change frequently or participation is infrequent
- Externally induced need for increased performance
- Information is costly
- Information processing capabilities limited
- Errors of perception
- Errors in understanding a complex structure
- Errors in prediction
- Each participant may choose among several models of
- the situation
  - What determines the choice? Paying attention is costly.
  - See next slide

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Impact of communication, vividness and salience

Communication

Vividness   Salience

Participant in situation

Perception of situation

Information about the action situation

Information about actual outcomes of prior actions

learning

Revise model

Mental Model(s)

CULTURE

Possible actions

Expected Outcomes

Chosen actions

Actual outcomes

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Change in mental models

- Disproportionate information processors (information and decision making) do not link directly to output
- Adaptive strategies and information do not match
- The inner cognitive and emotional architecture of the brain is "showing through" in responding to information
- Change in human institutions tends to be conservative but is subject to occasional large punctuations: "punctuated equilibrium"
- Internal models tend to be stable, until some event triggers a large change
- Rules and routines may help to structure a situation so as to increase the likelihood that individuals will share a mental model of the situation

Valuation processes

- Why trust and reciprocity?
- Why other-regarding preferences and norms backed by emotions (pride, guilt, shame, anger)?
- Why the consistent differences in response to the same conditions?
- Special neural/ emotional reactions to cooperative behaviour is documented

The dark side of trust

- The dark side of reciprocity, trust, and emotional actions: envy, vengeance, and desire to dominate
- Intrinsic motivations are increased if subjects feel self esteem and self determination is enhanced
  - External interventions crowd out intrinsic motivations if they are perceived as controlling
  - External interventions crowd in intrinsic motivations if they are perceived as supportive
- People must be expected to differ in the ways they value trust, reciprocity, the welfare of others, equity, etc.

The selection process

- Heuristics studied
  - Grim trigger (after discussions this was rejected)
  - Measured reaction: slow movement towards Nash equlibrium if others persisted in defecting (subjects seemed to follow this)
- Inherent problems of inference in studies of "black boxes" (heuristics) by observing external behaviour

Heuristics tested

- Eight heuristics tested with variable time constraints, based on cue-values
  - LEX the lexicographic strategy ("take the best")
  - LEX-semi (small differences are not ranked)
  - EBA elimination by aspects
  - FEATURES Take alternative with highest no of good features
  - ADD highest sum of cue values
  - LEX-ADD LEX-semi used to select two alternatives, ADD to choose one
  - PROS highest no of "pros" (as in pro&contra)
  - WADD weighted ADD
- LEX do very well compared to an optimised regression approach

Variety and complexity

- The diversity of assumptions must be consistent with deeper more general patterns of human behaviour
- Need to understand how specific situations trigger internal models for selecting actions and valuing outcomes
- Humans are fallible and learning
  - And have complex motivations including narrow self-interest, norms of proper behaviour and other-regarding preferences
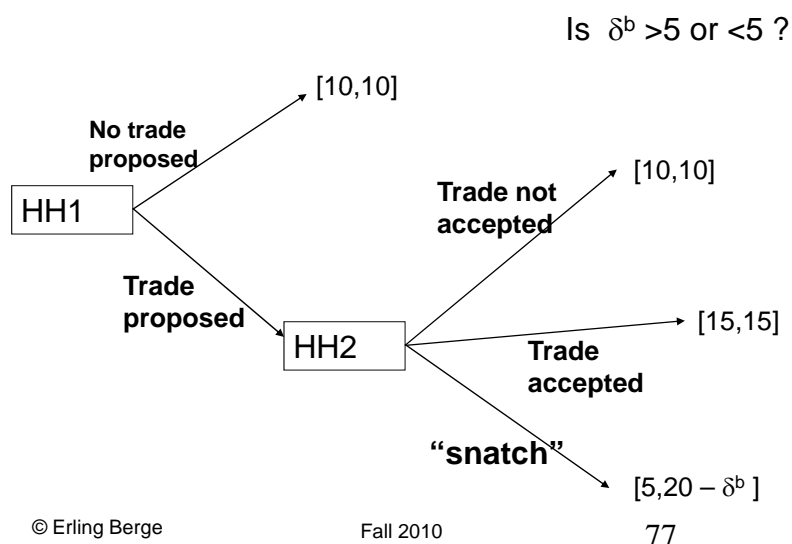- Institutions matter!

Collective action and social dilemmas

- Also outside the market there are highly competitive situations where rational choice theory applies (voting, legislative decisions)
- Engagement in collective action to overcome social dilemmas is not among these
- Behaviour in social dilemmas needs much better explanations
    - Evolution of norms for trust, other-regarding preferences
    - Rules regulating norms: e.g. backing good or counteracting bad reciprocity

Norms

- Norms in formal theory is currently problematic but not inherently impossible
- Norms are **individual beliefs** about permitted, prohibited or possible actions or outcomes in particular situations
- Snatch game with norms
    - Utility of HH2: $U_2 = \pi_2 - \delta^b$
    - π_2 = payoff obtained by HH2
    - δ^b = decrease in the value of π_2 due to breaking of norms
- This means that not only presence of norms but also strength matters to behaviour

The "snatch" game with norms

Is δ^b >5 or <5 ?

No trade proposed → [10,10]

HH1

Trade proposed → **HH2**

Trade not accepted → [10,10]

Trade accepted → [15,15]

"snatch" → $[5, 20 - \delta^b]$

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Heterogeneity

- Heterogeneity of norms
  - Individual variations
  - Situational variations
- Strength of norms
  - Socialization
  - Type of community
  - Institutional backing or counteracting
- Saints, conditional co-operators, sociopaths
  - Cooperators need to be able to find each others
  - Spatial and/ or institutional clustering
- Institutions matter!

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Evolution of norms I

- Standard model: individuals inherit strategies, individuals with more successful strategies have a higher rate of reproduction and increase in frequency in the next generation.
- But we are
  - Good at face recognition
  - Good at detecting cheating
  - Keep internal accounts of goodwill and threats
  - In deontic reasoning (permitted, prohibited or proscribed) we look for cheating and violations
  - In reasoning about what is true or false we look for confirmation
  - Good at learning language

Evolution of norms II

- Language represents a new way of inheriting strategies: "genetic change ceases to be the main basis of change: history begins" (Maynard Smith and Harper 2003:140)
  - Good at learning norms and rules
  - Cultural and situational variations
- Norm of reciprocity is often (always?) present
  - Reward cooperation
  - Punish defectors and those who do not punish defectors

Indirect evolutionary approach to adaptation through experience

- Model: players receive objective payoffs but make decisions based on the transformation of these material rewards into their own intrinsic values. Over a generation the intrinsic values are adjusted in the direction of the objective payoff

Evidence suggest

- With full information or knowledge of past history of the players rational egoists will not survive in an indefinitely played game
- With no information and many players rational egoists will dominate
- Known probabilities of trustworthy players or a "noisy" signal (better than random) of trustworthiness (e.g. from face-to-face communication) may help *conditional cooperators* to survive in substantial proportions

More on informal institutions …

- The nature of informal institutions:
- Probably the most important aspects of institutions are in peoples heads and exist only because we believe them to be real
- Searle, John R. 1995, *The Construction of Social Reality*, The Free Press, New York

Informal Institutions

- Empirically the study of customary law ("sedvanerett") is the key link between anthropology and the theory of institutions

- "En skik er som en landevei, som anlagdes i fortiden, og som den nuværende slægt vandrer på."
  (Eilert Sundt i 1860 åra)

Ostrom, Elinor 2005

Chapters 5-9

- A grammar of institutions (with Sue Crawford)
- Why classify generic rules
- Classifying rules (with Sue Crawford)
- Using Rules As Tools to Cope with the Commons
- Robust Resource Governance in Polycentric Institutions

Design principles 2005 new evidence (1)

1. Well defined boundaries (avoids free riding)
   - Externally imposed boundaries does not work well compared to locally legitimised
   - Boundaries needs to be defendable by the users

   Rephrased: "The resource itself and the users of the resources are clearly defined, and the appropriators are able to effectively defend the resource from outsiders"

2. Equivalence of benefits and costs

   As sign of fairness supports participation and rule following among conditional co-operators

3. Collective choice arrangements

   Farmer designed rules work better than village elite designed rules that work better than central government designed rules

Design principles 2005 new evidence (2)

4. Monitoring
   - Monitoring by locals or on contract with locals work better than external monitoring
5. Graduated sanctions
   - Most self-governed groups rely on quasi-voluntary cooperation (the Ulysses technique) rather than voluntary or coercion
6. Conflict resolution mechanisms
   - May involve levels above the village to counteract elite capture
7. Minimum recognition of rights to organise
   - Making rules in the extra legal sector is more difficult (will usually require unanimity) than in the legal sector
   - Local rule makers can more efficiently take into account new knowledge
8. Nested enterprises, multiple layers, polycentricity

Starting a long conclusion:

- Since first published in 1990 many studies of Ostrom's design principles have been conducted. In general the principles have stood up to the tests very well.

- It was also a key work in rewriting the theory of collective action. A task that is still ongoing

Rewriting the theory of collective action

- In order to improve the theory of the commons the
- theory of collective action needed improvements:
- Investigating real world actors
- Investigating real world behaviour in social dilemmas
- Designing experiments to test impact of small changes in rules governing behaviour and differences in framing
- Taking the experiments out of classrooms to real commoners in a diversity of cultures

From game theory to laboratory

- Hardin's model
  - Made strong assumptions about motivation of actors: only self-regarding motives allowed
  - Did not allow any history, community or communication
  - It could not predict behaviour in real commons, nor in laboratory tests of CPR problems
  - To become useful as a model, the rationality assumption had to be divorced from pure egoistic behaviour
  - The model had to be expanded

Modelling a diversity of actors

- Different patterns of behaviour
  - The pure egoists: cooperate only if to ego's advantage
  - The saints: always cooperate
  - The rest: conditional co-operators. Reciprocate starting with cooperation
- Formalisation in game theory
  - Homo economicus (pure egoist)
  - Homo egualis (strong preference for equality of outcomes)
  - Homo reciprocans (conditional co-operators)
  - Homo parochius (strong preference for rewarding ego's group)

Institutions and emotions

- There are today good reasons to believe that there are some basic emotional dispositions that institutions can work with or against.
- The basic institutional problem is to ensure that conditional co-operators actually cooperate. To do so egoists need to be monitored and sanctioned.
- Reasons are found in experimental studies

Testing the model of economic man in experimental studies (1)

Factors that should not affect outcomes but does

1. Allowing **face-to-face communication** before each session of investment
2. Allowing **costly sanctions** increase compliance. Voluntary **sanctioning is chosen even if it is costly to the person proposing it** (sanctioning and fines wipe out gains from better performance)
3. Allowing subjects to covenant to determine investment levels and adopt sanctioning achieve close to optimal results

Testing the model of economic man in experimental studies (2)

- Communication is important:
- Anonymous decisions without communication results in more overharvesting than predicted
- Communication improves outcomes where there is heterogeneity of endowments
- If subjects are kept out of the communication much less compliance is observed for all
- Electronic communication do not do as well as face-to-face

Testing the model of economic man in experimental studies(3)

- Further results
- Crafting rules to solve commons dilemmas is costly (second order dilemma) but do occur frequently. Those who covenant do considerably better than those who do not

- Experiments using real farmers replicate laboratory findings using students

Conclusions about behaviour in social dilemmas

- Results show consistently the importance of
  - Form of communication
  - Reputation
  - Ability to monitor and sanction
  - Norms and values, in particular related to "trust"
  - Size of reward
- There is no society where experimental results are even roughly consistent with the classical model of economic man except modern commodity and financial markets
- The variation between groups and cultures is much larger than expected

The general lessons learned

The importance of

- distinguishing resources and management regimes
- monitoring and sanctioning for management regimes
- matching management system to resource system
- monitoring and interpreting complex social-ecological systems and variable local conditions
- the contradictory roles played by the state

Current developments in the theory of collective action

Involves modelling

- how participants acquire, process, represent, and use information
- how participants value actions and outcomes
- the processes participants use (maximizing, satisficing or diverse heuristics) to select particular actions or strategic chains of actions in light of their resources

Involves understanding the role of

- rules in regulating norms: e.g. backing good or counteracting bad reciprocity
- evolution of norms for trust, other-regarding preferences
- evolution of mechanisms for communicating trustworthiness (language, body language)