Re-working Economics from the Ground Up

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Standard Economics

- P makes a decision: what to buy?
  - Buy 3 apples + 2 oranges, or 2 apples + 3 fountain pens
- How does P decide?
  - ➢ Calculate value of each “basket” (to P)
  - ➢ Choose basket with greatest value for cost

“Maximize expected value”

- Outcome 1: value v1, probability p1
- Outcome 2: value v2, probability p2
- Expected value: p1*v1
- Ex: The August 15 jackpot on the Illinois Megamillions lottery was $24,000,000
- Odds of winning: One chance in 175,711,536
- So expected value = 24,000,000/175,711,536 = $0.13.

“Tax on those who can’t do math”

- So: spend $1, expect to get back 13¢
- Dumb, right?
- But: people play the lottery.
- This “proves” people are irrational:
  - They do things they know are not in their interest
  - If I ask you to give me $1 in exchange for 13¢, you’d refuse
  - But you do that in the lottery for “emotional” reasons

Rationality and irrationality

- Standard assumption 1: you are choosing the thing (the outcome)
- Standard assumption 2:The only rational basis for decisions is the expected (prudential) value of the outcome
- Mathematical theory: assume 4 axioms:
  - Cancellation, transitivity, dominance, and invariance

Rationality axioms 1 & 2

- Cancellation:
  - You can win 4 apples + 2 oranges, or 4 apples + 1 orange. Apples don't figure in your choice.
- Transitivity:
  - If you'd rather have A than B, and rather have B than C, then you'd rather have A than C

Rationality axiom 3

- Dominance:
  - The Illinois lottery: 25% chance of $10, 75% of 0
  - The Colorado lottery: 25% change of $20, 75% 0
  - You'd rather play the Colorado lottery

  - "The Colorado lottery *dominates* the Illinois lottery"

Rationality axiom 4

- Invariance: alternative descriptions of the same problem should lead to the same choice
  - Example:
    - You find $10 on the street; you take it
    - Your neighbor child has $10; you take it
    - Both result in you having $10
    - Only difference is the description
- (Remember: what is being chosen is the outcome)
  - So, it just makes sense that how the outcome is presented shouldn't matter

The promise

- Mathematical theory of human decisions
- What's not to like?

The reality

- None of these axioms apply to actual people
- Result: a beautiful mathematical theory of economics for non-humans

Problem 1: Value

- Every axiom assumes you can *compare* options, on a "number line" – the value of an orange is $1
  a. BUT: "Value", to persons, is one of 4 kinds: hedonic, prudential, ethical, esthetic
  b. So you need 4 numbers to represent the value of a state of affairs to a person.
  c. 4-numbered things can't be put in order
     - Basket A: an expensive home addition (H, P)
     - Basket B: our daughter goes to MIT (E, P)
     - Nonsense to say A > B or B > A

Problem 2: Probability

- People don't use (let alone calculate) probabilities, except in special circumstances *even if asked a question using that language*
  - Ex: What are the chances that the US will have a second recession?
  - Ex: "Steve is very shy and withdrawn, invariably helpful, but with little interest in people or the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail. Is Steve more likely to be a librarian or a fighter pilot?"

Problem 3: Choice is choice of outcome

- Entire field (since 1738) assumes people choose *outcomes.*
  - But, they don't.
    - Recall: choice *is deliberate action*: choice of what to *do*
      - (and one aspect of an action is its outcome)
      - IA = (I, W, K, Kh, P, A, PC, S)
    - Sometimes, all other things being equal, this reduces to choice of outcomes
    - "All other things" = all the other parameters

Result of those problems

- Accepted view: people are irrational
  - People should act to maximize their self interest
  - They do not, because an individual's actions are at the whim of "hidden forces" outside their control (or knowledge)
- Doing something not in your own interest is defined as irrational

What’s wrong with this guy?

Possible causes of this person's distortions

- Genetics
- Nutritional deficiencies
- Injuries
- Other
  - Let's find the causes of this guy's deviations from the norm!

What’s wrong? The mirror, not the person

Nothing’s wrong with the person

- Apparent distortions are an illusion
- Resulting from using a distorted mirror

The traditional economics lens

- Behavior = the physical process
  - Input-process-output
    - Physical inputs, physical outputs
  - Buy oranges, buy a Ferrari, etc. (physical things)
- Only ask about & measure the result (A parameter)
- Measure value by $
- Expected value: probability x $-value

Incomplete achievement descriptions

- IA = (I, W, K, Kh, P, A, PC, S)
- Achievement desription: (I, W, K, Kh, P, A, PC, S)
- Incomplete AD: only some of A included
  - Example: he poisoned the well
    - Economists: “What is the probability of well-poisonings” – an “objective” result
    - Poisoned wells are not in his interest
    - He had an emotional, irrational reason for poisoning the well
    - Ignoring: what larger SA being accomplished (like saving the country)

Economists know the problem

- Economists acknowledge expected value does not work
  - John Stuart Mill (1844): **"[Political economy] does not treat of the whole of man's nature as modified by the social state, nor of the whole conduct of man in society."**
- So why do they use it?

The only game in town

- It makes possible complex and beautiful mathematical models
- It *does* give a lot of what they want: predictive power
- **It's the only thing they have**
  - Maxim 5
  - "We know it's crooked but…"
  - Before Descriptive, *there was no* complete, systematic, precise description of "the whole of man's nature … [and] … the whole conduct of man in society."

Attempted fixes: behavioral economics

- Additions to the expected-value model, to account for its failures
- Using: cognitive processes that affect the probability or value calculation
  - Cognitive processes distort calculation of p and v
  - "Instead of p x v, use f(p) x g(v)" – **Prospect Theory**
- Examples:
  1. Framing effect
  2. Endowment effect
  3. Loss aversion

Framing effects – a classic experiment

1. An epidemic is expected to kill 600 people. Two treatments are available:
   - If Program A is adopted, **200 people will be saved**.
   - If Program B is adopted, there is a **1/3 probability that all 600 will be saved**, and a 2/3 probability that none will be saved

   ➢ Which of the two programs do you favor?

2. An epidemic is expected to kill 600 people. Two treatments are available:
   - If Program A is adopted, **400 people will die**.
   - If Program B is adopted, there is a 1/3 probability that no one will die, and a **2/3 probability that all 600 will die**

   ➢ Which of the two programs do you favor?

Experimental results

- Case 1: Program A is chosen by 72% of the subjects,
- Case2: Program B is chosen by 78%
  - **Even though in both cases A means 200 certain dead and B means 1/3 probability none dead**
- This calls for explanation. Why does it matter how you couch the question, if the question is, "How many people will die?
- Traditional explanation: cognitive processes influenced by the language of the problem statement and associated biases and emotions

Framing effects in a custody decision

Parent A	Parent B:
Average income	Above-average income
Average health	Minor health problems
Reasonable rapport with the child	Very close relationship with the child
Relatively stable social life	Extremely active social life
Average working hours	Lots of work-related travel

- Question 1: Which parent should be awarded custody?
- Question 2: Which parent should be denied custody?

➢ If Question 1 asked: **64% would *award*** custody to B.

➢ If Question 2 asked: **55% said it *deny*** custody to B.

Endowment effect

1. Class of advanced undergrad econ students at Cornell
2. Give half of them a Cornell coffee mug (bookstore cost: $6), other half nothing
3. Mug owners: on average demanded $7 for their mugs
4. Mug non-owners: willing to pay $3 on average

Loss aversion

- You have $1000. You can accept $500, or flip a coin and if heads you get $1000, tails $0.
  - **Both choices give the same result ($1500), but overwhelmingly, people choose the $500**

- You have $2000. You can give up $500, or flip a coin and if heads you give up $1000, tails $5000.
  - **Again, both choices give same result ($1500), but now people choose the coin flip.**

Loss aversion

- People make different choices if the very same thing is presented as a gain than if it is presented as a loss.

- In this case: “the very same thing” is having $1500

Traditional explanations

- Framing effect: framing the problem differently changes the internal processing of the outcome
- Endowment: a possession is processed differently than a non-possession
- People are averse to loss, so their evaluation function deviates from what it should be.
- **These effects are irrational**:
  - Persons deviate from expected value predictions
  - Cause of the deviations is unconscious processes person has no control over but that control what they do

Ptolemy revisited

- "We know the planets follow circular orbits"
- But we observe that they don't go in circles
- Conclusion: the planets are wrong
- **The problem wasn't the planets; it was the paradigm**
- Similarly with persons:
  - "We know persons should choose the maximum expected value option."
  - "Since they don't, we know there must be internal processes that distort their choices."

Irrationality is an illusion

- Deviations from self-interest are not irrational; they are persons choosing what they value
- People do not choose outcomes; they choose *actions* (from the available opportunities to act)
- The outcome of a possible action is *one* of the circumstances that give the person grounds (reasons) to act one way or another

The fun-house mirror of economics

- Persons choose outcomes
- Persons value outcomes based on their self-interest
- The proper choice is the one that gives the greatest expected value (greatest self-interest)

➢ **Using *this* mirror, the picture of persons is that they are irrational.**

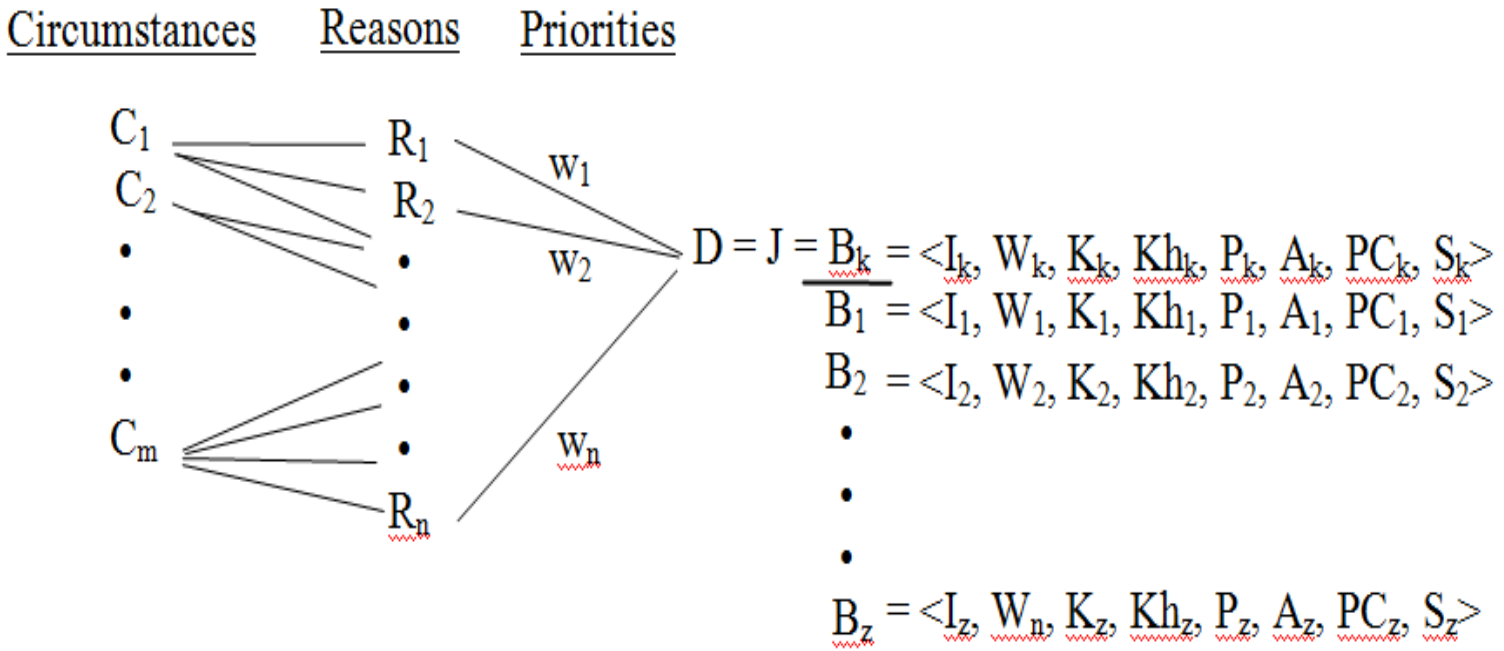
The person lens

1. Choice is choice of behavior (not outcome)
2. "Behavior" means *intentional action*.
3. The paradigm case of human behavior is *deliberate action.*
4. Behavior choices are made in light of all the individual's reasons to engage in one behavior or another (not just the prudential ones).
5. People choose what matters to them (individually)
6. Every behavior is an instance of engaging in a social practice of a community (whose choice principles matter to the person).
7. For any person, a particular state of affairs may be real, actually possible, or merely possible, and are valued accordingly. (Is X real to P? Or merely possible?)

Understanding choices

1. Find out what *actions* are being chosen among (NOT what outcomes).
2. Find out the K, Kh, and especially S of each of them
3. Find out what Community these people are part of
   - Undergrads? MBA students? Traders in a kind of security?
   - What if there *is no* community with this practice?
4. Find out what the relationships, practices, and choice principles in that community

Use the C-R-J diagram



Choices through a non-distorting lens

- How do framing effects, the endowment effect, and loss aversion look through the person lens?

1. Framing effects through the person lens

- **The choice is not how many to kill; it's what to *do***
  - Case 1 (200 will be saved): subjects are **choosing ways of saving lives**
  - Case 2 (400 will die): subjects are **choosing ways of condemning people to death**
- *Of course* subjects make different choices cases!
- There's nothing to explain here

The epidemic experiment re-stated

1. An epidemic is expected to kill 600 people. Two actions are available:
   - Action A: **Save 200 people** by adopting Program A.
   - Action B: **Attempt to save all 600**, knowing there is a 2/3 chance all may die, by adopting Program B

   ➢ Which of action do you favor?

2. An epidemic is expected to kill 600 people. Two actions are available:
   - Action A: **Condemn 400 people to death**, by adopting Program A.
   - Action B: **Take a 2/3 chance that all 600 will die**, knowing there is a 1/3 chance none may die, by adopting Program B

   ➢ Which action do you favor?

Status effects in the epidemic experiment

- A military commander who condemns 400 soldiers to death is a commander who sentences his people to death
- A military commander who commands his troops to take on a dangerous but important mission is not – and may acquire that of “determined leader.”

- Similarly for the public health professional in the epidemic.

2. The endowment effect through the person lens

- Why do you demand $7 for the coffee mug?
  1. You have the mug; if you sell it, you have lost behavior potential
  2. A person values an actual state of affairs more than a possible one (Principle 7)

- No “unconscious emotional processes”

3. Loss aversion through the person lens

- Actual value vs. possible value
  - If you have $1000, the offer of $500 is **actual** value of gaining $500; the coin flip is the ***possibility*** of $1000
  - If you have $2000, the giving up $500 is **actual** loss, but the coin flip is the ***possibility*** of losing $1000 (or nothing).
- Nothing to explain; these are straightforward choices based on straightforward facts about what matters to persons.

Additional payoffs of the person lens: A. Measuring value numerically

- Better mathematical model of value:
- The value of state of affairs X to P is a 4-dimensional vector, not a single number

Additional payoffs of the person lens: B. Independent variables in experiments

- Reminder: dependent and independent variables
- The parameter of the situation are variables (dependent or independent)
- Missing parameters are uncontrolled variables
  1. Parameters: what can vary from case to case
  2. "Variables"
  3. **Unarticulated variables cannot be controlled**
  4. The funhouse mirror distortions: effects of uncontrolled variables
     - Parameters (aspects of behaviors or communities) omitted from experimenter's formulation

A K problem: V = <?, L, B>

1. “What is the probability John is a librarian” is NOT asking for probability!
2. It’s asking one or more of:
   - “Which statement is a better description of John?”
   - “Which statement best characterizes what kind of person John is?”
   - “Which statement best states what is most important about John?”
   - “Which statement is the most important thing to say about John?”
   - “Which statement is most like what you would say of John?”

Additional payoff of the person lens: C. The concept of probability

- Probability means, “Of all the cases, how many will be Z?”
  - Probability of pulling a blue ball from the urn
- Assumption: “What is the probability that John is a librarian” assumes subject is selecting an instance from a set of cases
- Mathematical probability is frequency-count
- No urn → no probability. Gibberish.
- But not just any old gibberish; misleading gibberish

How certain, not how probable

- "What are the odds the Yankees will win the World Series this year?"
- "What are the odds of a second recession?"
- "What are the chances this stock will go up 5% in the next 6 month"
  - ➢ Are NOT probability questions

- Each is asking, "How certain are you that…?"
- **Not the same as, "What is the probability that…?"**

Probability through the person lens: What are you willing to bet?

- Old paradigm: amount of bet = result of expected value (including probability) calculation
- This paradigm: fundamental question is, “What are you willing to bet?”
- C-R-J articulates what goes into that answer
  - Example:
    - What are you willing to bet that you will live to age 95?
    - What are you willing to bet that this stock will go up 5% in 6 months?
    - What are you willing to bet that you (not someone else) will get well with this cancer treatement?

Moral

- **Watch your language!**
- Probability locutions don’t mean probability concepts.

Pragmatic implications

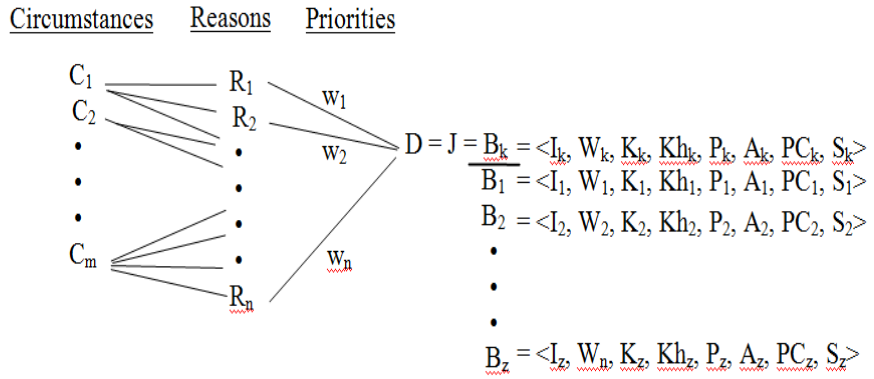
1. Give people choices of **actions, not outcomes**
2. **Make sure Significance is clear (to THEM)**
3. Teach people the Judgment Diagram
4. Remind people that they have 4 kinds of reasons, and they all count. (“Value is a 4-vector.”)
5. Be wary of probability language. (Certainty isn’t probability.)

Other uses of the person lens-1

- Explaining Descriptive Psychology
  - Principles 1-7 articulate the basics of Descriptive Psychology

1. Choice is choice of behavior.
2. "Behavior" means <I, W, K, Kh, P, A, PC, S>

3, 4, and 5:



6. Every behavior is an instance of engaging in a social practice of a community (whose choice principle matter to the person).
7. For any person, a particular state of affairs may be real, actually possible, or merely possible, and is valued accordingly.

From this starting point…

- Expand to
  - Reasons (emotions, relationships, relationship change formula)
  - More reasons: status (place in the world), degradation and accreditation, affirmation
  - Worlds, world destruction, world construction

Other uses of the person lens-2

- Health care choices
  - "What is the probability I will live to age 95?"
  - What is the probability a person will live to 95?"
  - ➢ **Not the same question!**
  - How to help individuals answer Question 1, not Question 2?
    - Possible initial move: "What reasons do you have to take it that you are not average?"

Other uses - 3

- Legal choices
  - "What is the probability P will be convicted?"
  - What is the probability the average defendant here will be convicted?"
  - ➢ **Not the same question!**
  - How to help individuals answer Question 1, not Question 2?
    - Possible initial move: "What reasons do you have to take it that you are not average?"

Other uses - 4

- Predicting future problematical behavior
  - "What is the probability P will engage in behavior B, if released?"
  - What is the probability the average patient will engage in behavior B, if released?"
  - ➢ **Not the same question!**
  - How to help individuals answer Question 1, not Question 2?
    - Possible initial move: "What reasons do you have to take it that P is not average?"