



Are you rational?

The perfectly rational person of economics against a real brain: fast answers, predictable mistakes, and the rule to check them.

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Two people

model · reality

- **Homo economicus** (Latin “economic man”) = person of the Micro course → compares **costs** and **benefits** · never forgets · never tires
- **You** → busy, hurried → often takes the **first answer** that comes
- **Daniel Kahneman** (Israeli-American psychologist, Nobel 2002) + **Amos Tversky** → we think in two ways ↓

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Fast · slow

thinking · the check

- **FAST** instant, automatic (System 1) → first answer **feels right** · **SLOW** deliberate check (System 2) → takes effort → often **skipped**
- **Bat + ball** = \$1.10, bat \$1 more → quick **10¢ X** · right **5¢** (bat \$1.05)
- **Sanity check** = put the answer back into the story → does it give the total?
- Same trap: banana + bagel 37¢, 13¢ more → bagel **12¢** (not 24¢) · pen + notebook \$2.40, \$2.00 more → pen **20¢** (not 40¢): $(\text{total} - \text{extra}) \div 2$
- More quick answers: 5 machines, 5 cases, 5 min → 100 machines, 100 cases = **5 min** (not 100) · weeds double daily, pond full day 48 → half on day **47** (not 24)

BALL	BAT	TOTAL	\$1.10?
10¢	\$1.10	\$1.20	no
5¢	\$1.05	\$1.10	yes

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Bias

a mistake with a direction

- **Bias**: “a mistake most people make in the same direction, so it can be predicted”
- Predictable → **measurable** → **usable** by sellers · ≠ random slip (one tired person, 37 + 13 = 51)
- **Behavioral economics** = economics of predictable mistakes · **Richard Thaler** (American economist, Nobel 2017)

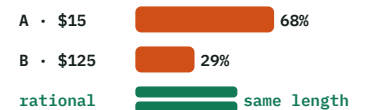
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The two trips

% over \$ · 1981

- Tversky + Kahneman, ≈ 180 students · drive **20 min** to save **\$5**?
- Trip A: \$5 off a **\$15** calculator (**33%**) → **68%** yes · Trip B: \$5 off **\$125** (**4%**) → **29%** yes
- Same \$5, same 20 min ⇒ rational: **same** answer (both trips or neither) · gap = **39 points**
- **% over \$** = judging a saving by its percent, not its dollars · Sam: \$10 off \$30 shoes yes, off \$900 laptop no

% WHO WOULD DRIVE 20 MIN FOR \$5

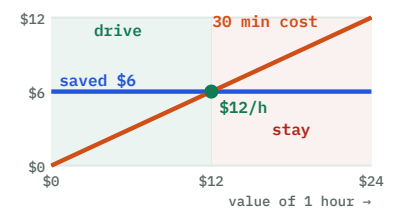


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Rational rule

gain vs give up

- **Opportunity cost** = what you give up (Micro Lesson 1) → here: your **time**
- **drive if \$ saved > value of your time** → the item's **price** appears nowhere
- 20 min worth \$8, save \$5 → **stay** (−\$3) · \$15 or \$125 item: same answer
- **Break-even** (gain = give up): save \$6, trip 30 min → **\$12 an hour** · below: drive · above: stay · \$24 lamp or \$300 bed: same
- Rational ≠ one answer for all: Leo (\$15/h) drives 30 min for \$20 ✓ · Ana (\$12/h) skips 1 h for \$5 ✓



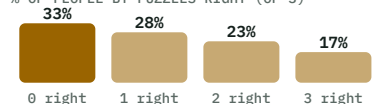
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Evidence

Frederick 2005

- **Shane Frederick** (American researcher): 3 puzzles (bat + ball among them) · **3,428** people, mostly university students
- Average **1.24** right out of 3 · none **33%** · one 28% · two 23% · all three only **17%**
- ≈ half at Harvard, MIT, Princeton said 10¢ ⇒ fast thinking = the **default**, not a flaw of a few

% OF PEOPLE BY PUZZLES RIGHT (OF 3)



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So what

who uses it · defense

- **Who uses it**: sellers → pick the version that **sounds bigger** · “33% off” on cheap items, “\$ off” on expensive ones
- Bike shop, \$10 off: **\$20 light** (50%) vs \$400 bike (2.5%) → light ad ≈ **2x** shoppers (68 vs 29)
- Chain: sign “Save 33%!” → fast thinking grabs the % → saving feels big → more shoppers → seller repeats
- **Your defense**: say the **dollars** out loud (“is \$5 worth my 20 min?”) → then check the answer · breaks the chain at step 2

Watch out: a percent buys nothing → 33% of \$15 = 4% of \$125 = **\$5** · and a quick answer is not a checked answer