risky business
dopamine and rewards

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We face risk everyday.

- Which class to take?
- Who to date?
- What’s my major?
- What to do this summer?
We rarely know **in advance** and with certainty what the **outcome** of our decision will be.

We are forced to make tradeoffs between the pros and cons of the potential outcomes and their probability of happening.

- Which class to take?
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The *many* definitions of risk

Lay person associates *risk* with hazards and lack of familiarity.
The many definitions of risk

Business person associates risk as a challenge to overcome.
The *many* definitions of risk

Medical clinicians associates *risk* as exposure to loss or harm.
The *many* definitions of *risk*

Decision economists associate *risk* as increasing with variance in the probability distribution.
Decision economists associate risk as increasing with variance in the probability distribution.

Regardless of whether a potential loss is involved.
Which is considered more risky?

Heads: $100

Tails: $0

$50
Decisions under risk

Decision maker knows with precision the probability distribution of possible outcomes.

Decisions under uncertainty

Decision maker must assess the probabilities of potential outcomes that are vague.
prospect theory

Models what people actually choose versus what they should choose.
reference dependence

1. What does it mean?
2. Why is it important?
3. How does it influence D-M?
SHAPEs HOW WE THINK!

Reference dependence

Probability weighting

decision

bias

decisions

BIG DECISIONS
Law of Diminishing Marginal Utility

traditional economics

\[ n = \# \text{ of apples} \]
The perceived value of, or satisfaction gained from, a good to a consumer declines with each additional unit acquired or consumed. 

... if consumption continues, sickness (disutility) will result.
LAW HOLDS ONLY UNDER THE FOLLOWING CONDITIONS:

1. Homogeneous Units
2. No Change in Tastes
3. Continuity
4. Suitable Size Units
5. Constant Prices
6. Indivisible Goods
7. Rational Consumers
8. Ordinary Goods
9. Marginal Utility of Money not Constant
(1) Homogeneous Units

All units of the commodity should be of the same weight and quality.
(2) **No Change in Tastes**

There should be no change in the tastes, habits, customs, fashions and income of the consumer.

A change in any one of them will increase rather than diminish utility.
(3) Continuity

There should be continuity in the consumption of the commodity.

Units of the commodity should be consumed in succession at one particular time.
Units of the commodity should be of a suitable size.

Giving tiny apples to a hungry person would increase the utility of the subsequent apple!
**(5) Constant Prices**

Prices of the different units and of the substitutes of the commodity should remain the same.
(6) **Indivisible Goods**

- The commodity should not be indivisible.
The consumer should be one who acts rationally. Not intoxicated or under the influence of a drug.
(8) Ordinary Goods

- Goods should be of an ordinary type.
- If they are commodities, like diamonds and jewels, or hobby goods like stamps, coins or paintings, the law does not apply.

http://www.economicsdiscussion.net
Marginal utility of money changes as a person acquires more and more money.
Which one feels subjectively greater?

$1,000

$101,000
The “value” of an additional $1,000 increment is influenced both the intrinsic value of the extra $1,000 and by how many $1,000’s of dollars the decision-maker has.

1. The graph shows the value of any given number of $1,000. Note, that as the total number of $1,000 dollars possessed increases, the value of an additional $1,000 diminishes.

2. Thus if a person possesses no money at all, a $1000 is of tremendous value. If a person possesses tens of thousands of dollars, then the value to them, of an additional $1,000 would be low.
We don’t process information in **absolute terms**.