Behavioral Economics
Part 2

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Do You Save?

What Percentage of Retired Individuals Feel They are Not Saving Enough?

Country/ Region	Percentage	Country/ Region	Percentage
South Korea	100%*	Australia	73%
Thailand	98%	USA	68%
Hong Kong, China	95%	Italy	59%
Taiwan, China	95%	Portugal	59%
Mainland China	94%	Belgium	59%
Indonesia	93%	Canada	58%
India	92%	Switzerland	56%
Chile	89%	Denmark	51%
Russia	88%*	Sweden	50%
Singapore	86%	France	50%
South Africa	85%	Netherlands	46%
Poland	81%	Austria	44%
Brazil	78%	Germany	43%
Spain	76%	UK	42%
Japan	76%	Source: Schroders Global Investor Study 2017	

Question

- Suppose I am going to give you $100 at this moment
- Suppose I can instead give you money after two weeks. How much money would it takes for you to not take this $100 now?
- What is the effective interest rate of your choice?

Discounting

- We got an median of ____
- That works out as δ = ____ using two weeks as the time period
- If the standard model is true, the median individual should be indifferent between $100 now and $100/ ___^{26} = _____ in one year

Real World Example: Scheme $6000

- A one-time stimulus measure announced in the 2011-2012 Budget
- $6,000 cash transfer for every permanent resident of Hong Kong
- A choice of receiving an additional $200 by delaying the application for ~6 months
- What is the effective interest rate?
- How many of you chose to wait?

Real World Example
Payday Loan

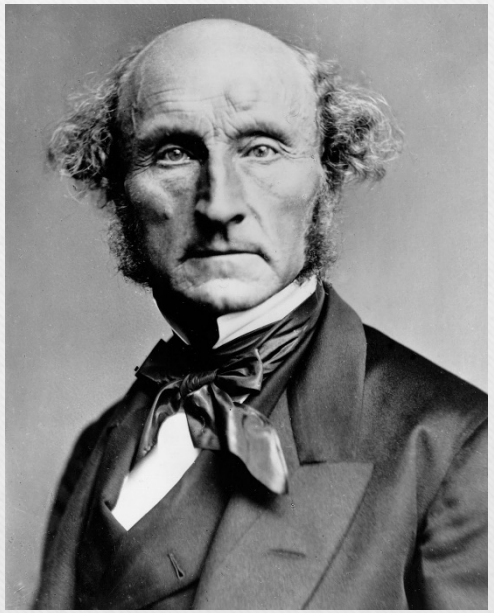
- Short term—usually 2 weeks or less
- Intended to be paid back at payday, thus the name
- Very high effective interest rate
  - e.g. 10% interest for a two-week loan
  - Effectively $(1.1^{26} - 1) =$ **1001%**
  - Could go up to 7000% in reality

Impatience

Maybe people are just very impatient, and what's wrong with that after all?

"It makes entire abstraction of every other human passion or motive; except those which may be regarded as perpetually antagonizing principles to the desire of wealth, namely, aversion to labor, and desire of the present enjoyment of costly indulgences."

John Stuart Mill
Essays on Some Unsettled Questions of Political Economy

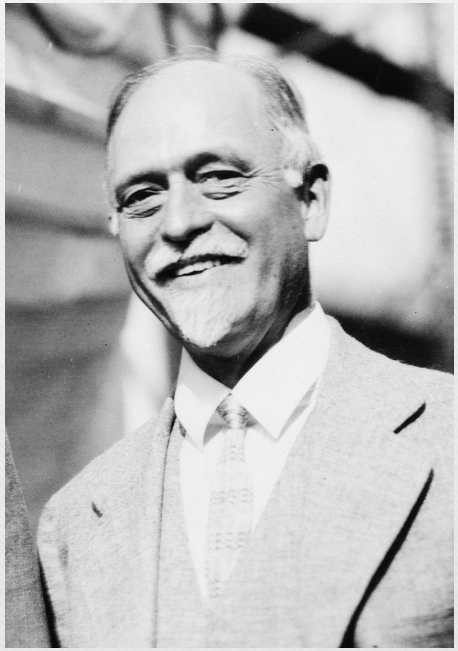


Impatience

Maybe people are just very impatient, and what's wrong with that after all?

"The Premium on the Exchange between present and future goods is based on a subjective element, namely the marginal preference for present over future goods. This preference has been called time preference, or *human impatience*."

Irving Fisher
Theory of Interest



Impatience

- Another thought experiment
  - $100 in ten years, and $120 in ten years and two weeks
  - Which one would you choose?
- People are not just impatient; they are particularly impatient when you ask them to wait **now**
- This behavior is called **present-biased**

Time Preference Modeling

Standard economics assumes that a decision maker discounts future by a constant fraction each time period—δ, which is called the **discount factor**

Overall utility = utility in t=1
+ $\delta \times$ utility in t=2
+ $\delta^2 \times$ utility in t=3 + …

Estimates of δ

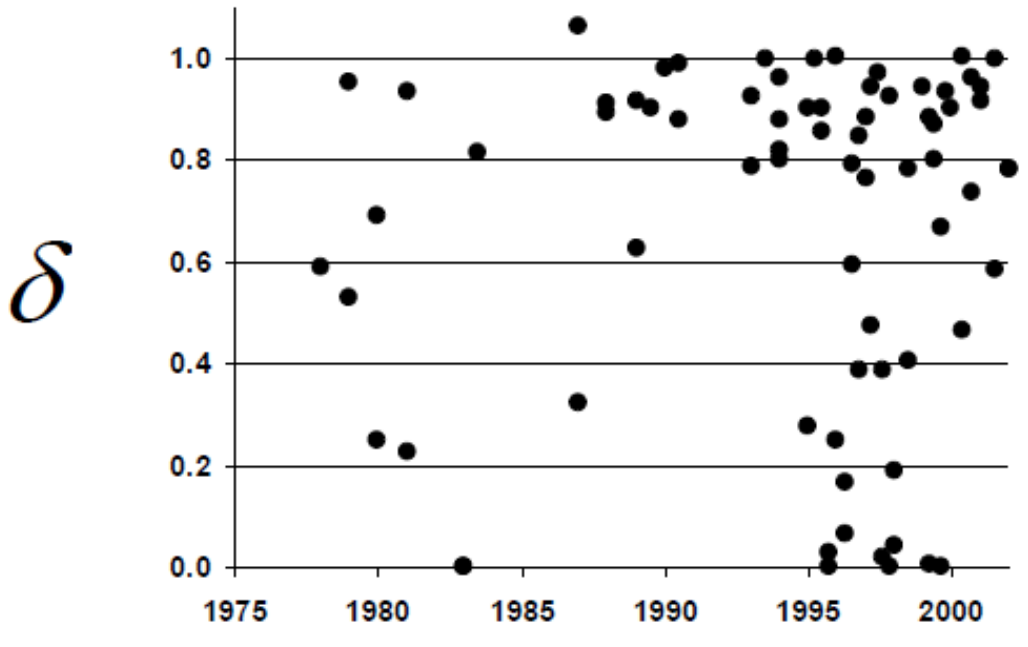
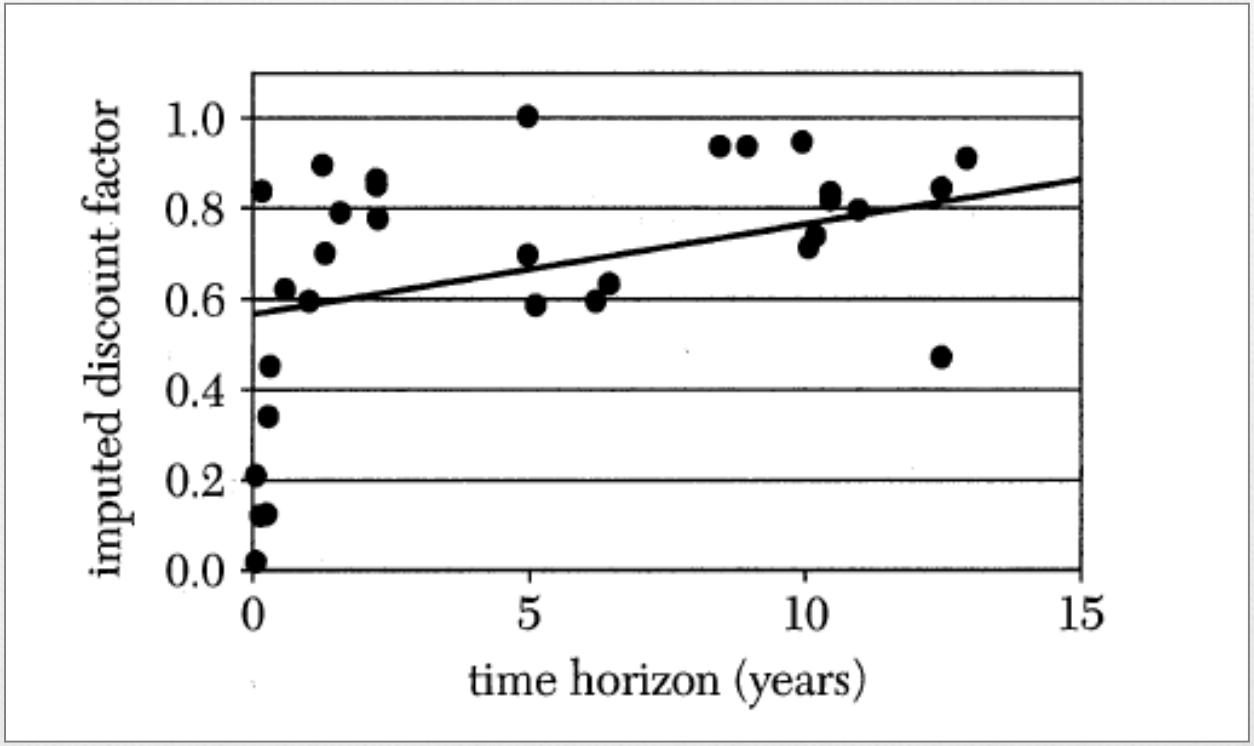


Figure 3.2: Estimated Annual δ's from Economics Research

Source: Frederick, Loewenstein and O'Donoghue. 2002. "Time Discounting and Time Reference: A Critical Review." *Journal of Economic Literature.*

Implied Discount Rate from Experiment



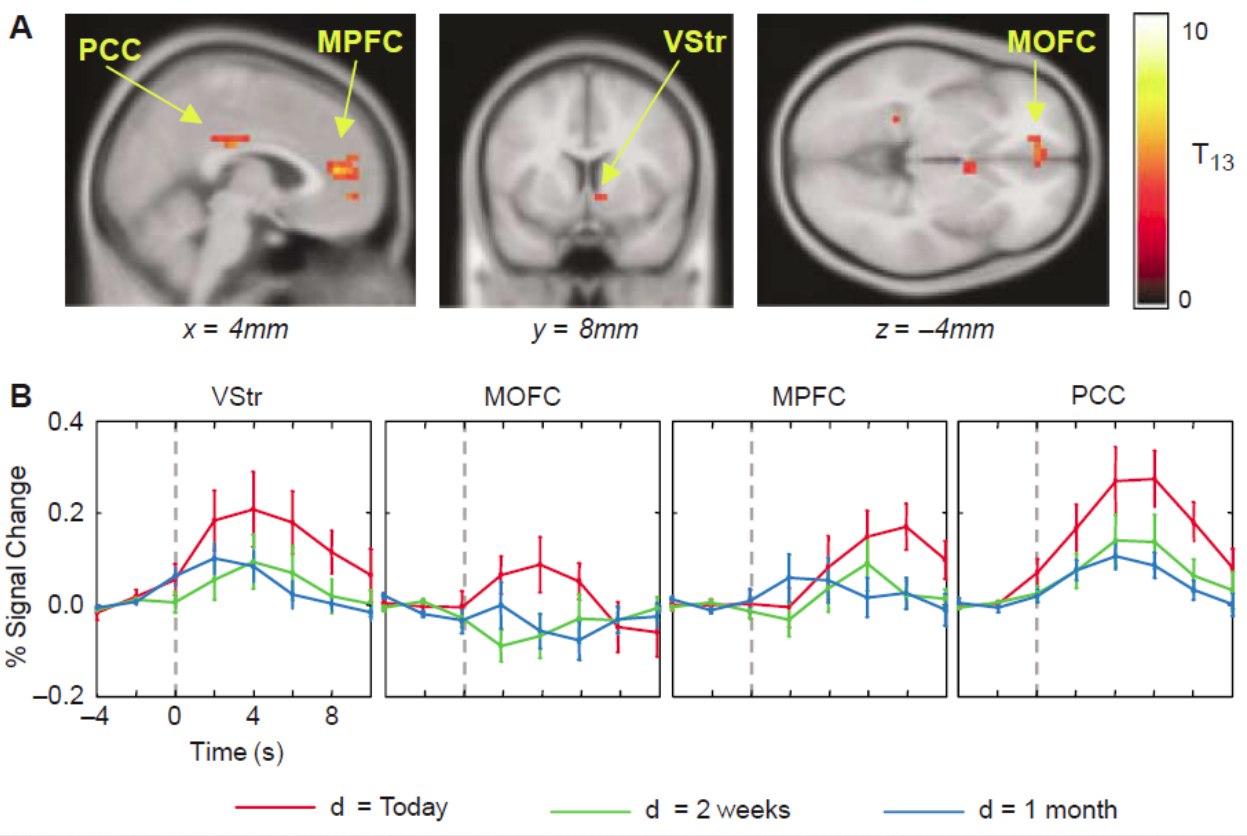
Source: Frederick, Loewenstein and O'Donoghue. 2002. "Time Discounting and Time Reference: A Critical Review." *Journal of Economic Literature.*

Evidence from Neuroscience

- Magnetic Resonance Imaging (MRI) scan while subjects choose between two rewards with different delays
- MRI measures blood flow in various part of the brain, which proxy for brain activity

Evidence from Neuroscience

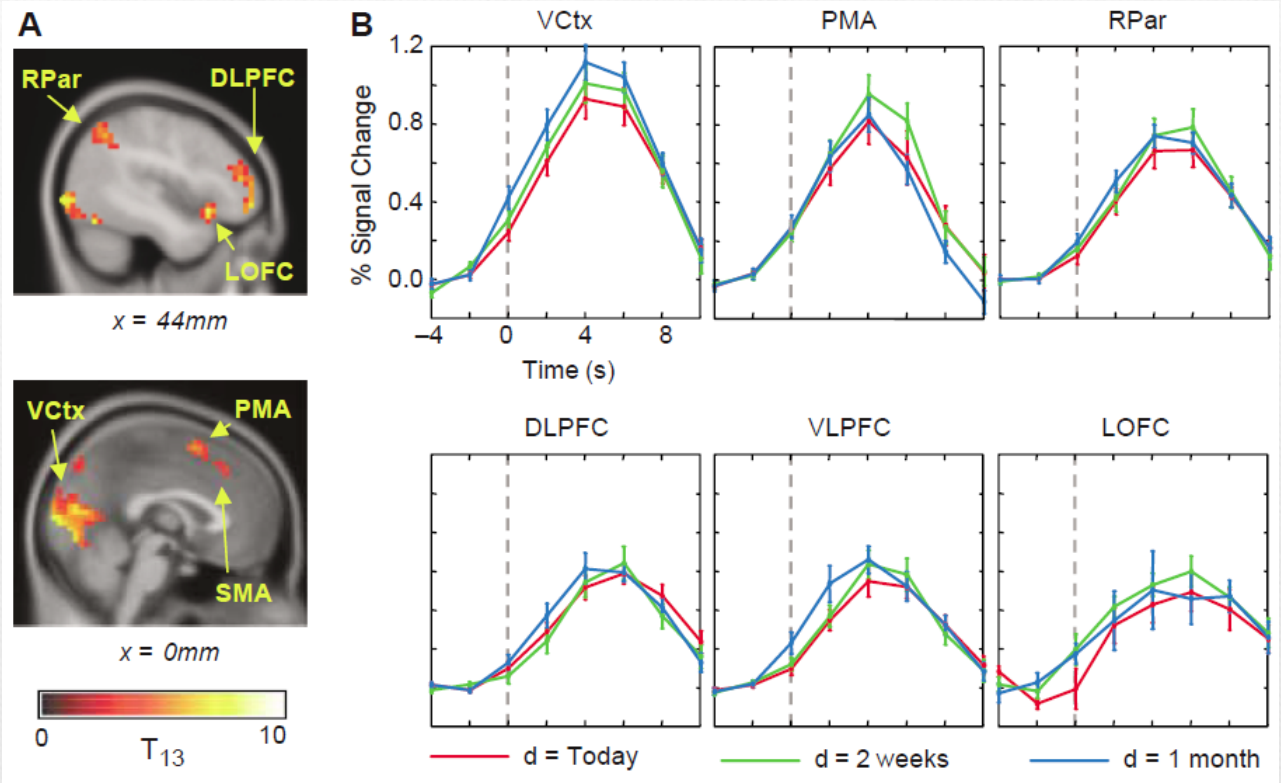
- Several regions in the brain are especially active when the reward is immediate



Source: McClure, Loewenstein and Laibson. 2004. "Separate Neural Systems Value Immediate and Delayed Monetary Rewards." *Science.*

Evidence from Neuroscience

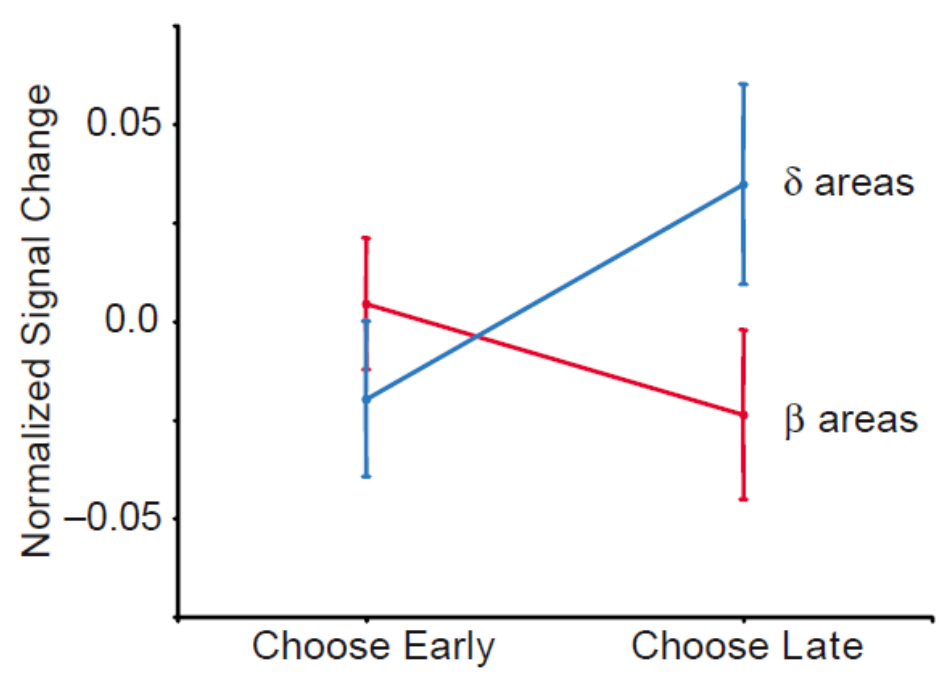
- Other regions are active regardless of the delay in reward



Source: McClure, Loewenstein and Laibson. 2004. "Separate Neural Systems Value Immediate and Delayed Monetary Rewards." *Science.*

Evidence from Neuroscience

- Decision seems to depend on the relative activity levels of the two groups of areas.



Source: McClure, Loewenstein and Laibson. 2004. "Separate Neural Systems Value Immediate and Delayed Monetary Rewards." *Science*.

Alternative Theories

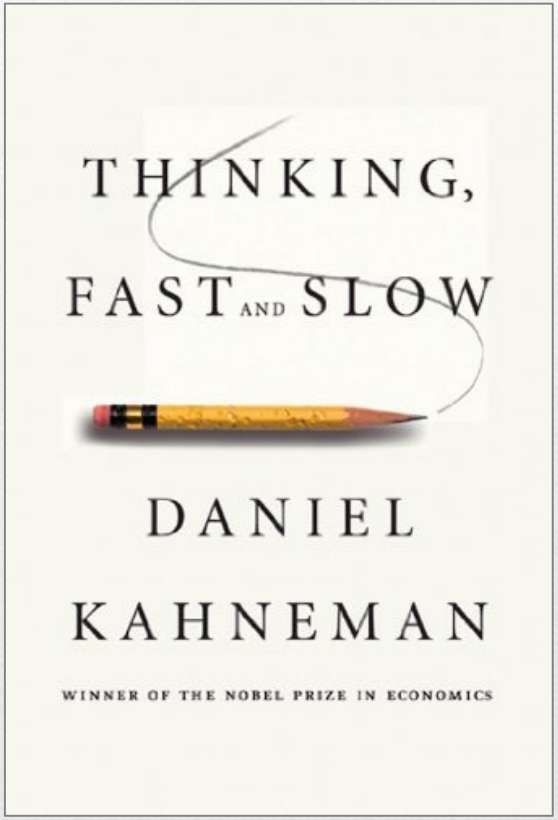
- Suppose your friend tells you earlier that she does not want to eat ice-cream, but now when she is in front of some ice-cream, she eats it

- One explanation is she is **present-biased**: eating ice-cream is unhealthy, but this mostly affect the future, while the enjoyment of eating ice-cream is immediate

Alternative Theories

- It is also possible that she is tempted by the presence of the ice-cream and knowingly choose to eat the ice-cream. This is modeled as **temptation utility**

- Finally, maybe she is not even thinking rationally. The presence of ice-cream causes her to enter a "hot" state, in which she acts by instinct. This is called **Cue Theory** or **Two-Self Model**



Does Commitment Really Help?

- Employees at Philips Electronics
- Test group subjects can choose to increase their savings by 1-3% automatically each year. Increase will stop once savings rate reach 10%
- Among those who choose to join the program, savings went up by ~1.5%

TABLE 4
AVERAGE SAVING RATES (%) FOR PHILIPS ELECTRONICS

DATE	EMPLOYEES WHO WERE ALREADY SAVING IN DECEMBER 2001: Joined SMarT	EMPLOYEES WHO WERE ALREADY SAVING IN DECEMBER 2001: Did Not Join SMarT	EMPLOYEES WHO WERE NOT SAVING IN DECEMBER 2001: Joined SMarT	EMPLOYEES WHO WERE NOT SAVING IN DECEMBER 2001: Did Not Join SMarT	ALL EMPLOYEES
			A. Control Group		
Observations		7,405		7,053	14,458
Pre-SMarT (December 2001)		5.65		.00	2.90
Post-SMarT (March 2002)		5.76		.70	3.29
			B. Test Group (Divisions A and O Combined)		
Observations	180	339	36	260	815
Pre-SMarT (December 2001)	5.26	5.38	.00	.00	3.40
Post-SMarT (March 2002)	6.83	5.72	5.03	1.55	4.61
			C. Division A		
Observations	66	190	10	163	449
Pre-SMarT (December 2001)	5.47	5.48	.00	.00	3.12
Post-SMarT (March 2002)	7.32	5.97	6.80	1.54	4.38
			D. Division O		
Observations	114	149	26	77	366
Pre-SMarT (December 2001)	5.14	5.25	.00	.00	3.74
Post-SMarT (March 2002)	6.55	5.41	4.35	1.58	4.89

NOTE.—The "test" group consists of individuals at Divisions A and O.

Source: Thaler, Richard H. and Shlomo Benartzi. 2004. "Save more Tomorrow: using Behavioral Economics to Increase Employee Saving." *Journal of Political Economy*.