

# How We Decide

(or: being wrong about the future)



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PRESENT

PAST

FUTURE

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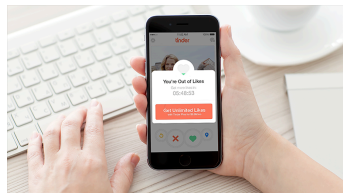
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Should  
**How We Decide?**

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## Expected Value

odds of gain  
x  
value of gain

**\$18** if you  
call it right!



Would you pay  
**\$4** to play?

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Odds of gain: **1/2**

Value of gain: **\$18**

Expected Value: **\$9**

Greater than  
**\$4**, so let's play!



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# Expected Value

odds of gain  
x  
value of gain

**\$18** if you  
call it right!



Would you pay  
**\$4** to play?

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Odds of gain: **1/6**

Value of gain: **\$18**

Expected Value: **\$3**

Less than \$4, so  
let's not...



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# Expected Value

odds of gain  
x  
value of gain

**end of story?**

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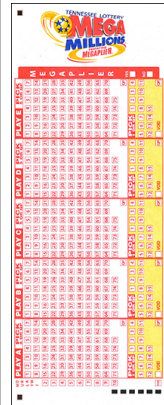
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Pay \$1

Pick 6 #s between 1-75

Get 5 right, win \$1,000,000!

Odds: 1 in >18,000,000

Expected Value

\$1 million / 18 million = ~\$0.05  
(a bit more with secondary prizes)

**But we still play!**

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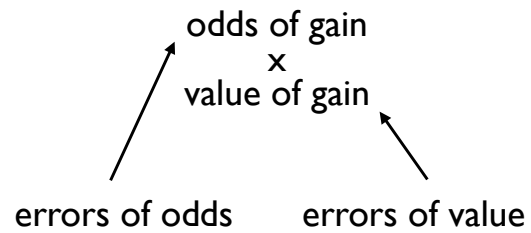
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## Expected Value



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**Daniel  
Kahneman**



**Amos  
Tversky**

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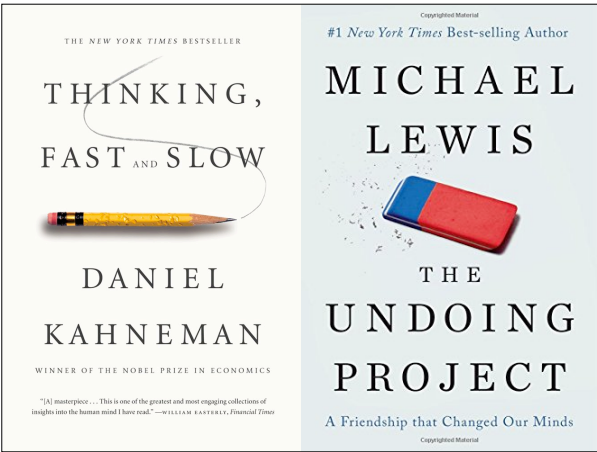
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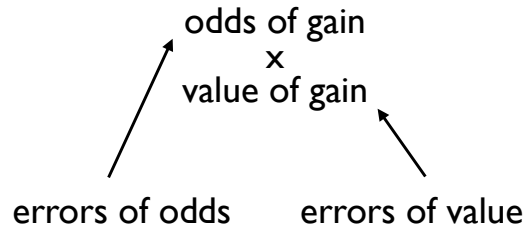
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# Expected Value



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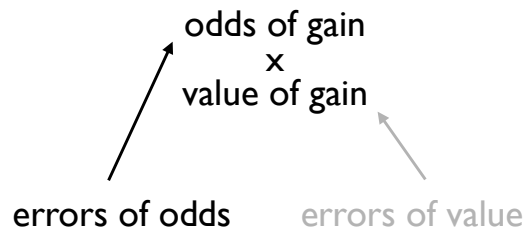
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# Expected Value



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400 babies are born each day in a large hospital, and 40 babies are born each day in a small hospital. For any day in which more than 60% of the births at a hospital are girls, that hospital hands out free girl scout cookies.

**Which hospital will have more free-cookie days?**

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**Which hospital will have more free-cookie days?**

<b>A</b>	<b>B</b>	<b>C</b>
400	40	Same

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**Which hospital will have more free-cookie days?**

~~“They’ll be the same!”~~

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## Errors of Odds

Sample Size Neglect

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# Law of Small Numbers

smaller #s of observations:  
greater chance of "weird" results

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## Coin flips

40 flips	400 flips	4000 flips	40000 flips
44%	48%	50%	50%
65%	47%	48%	50%
48%	54%	50%	50%
53%	46%	50%	50%
55%	52%	51%	50%
39%	47%	50%	50%
61%	48%	49%	50%
50%	50%	50%	50%

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## Coin flips

40 flips	400 flips	4000 flips	40000 flips
44%	48%	50%	50%
65%	47%	48%	50%
48%	54%	50%	50%
53%	46%	50%	50%
55%	52%	51%	50%
39%	47%	50%	50%
61%	48%	49%	50%
50%	50%	50%	50%

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400 babies are born each day in a large hospital, and 40 babies are born each day in a small hospital. For any day in which more than 60% of the births at a hospital are girls, that hospital hands out free girl scout cookies.

**Which hospital will have more free-cookie days?**

~~“They’ll be the same!”~~

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## Law of Small Numbers

smaller #s of observations:  
greater chance of “weird” results

Counties with the **lowest** incidence of kidney cancer  
*rural, sparsely populated, religious*

Counties with the **highest** incidence of kidney cancer  
*rural, sparsely populated, religious*

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## Errors of Odds

Sample Size Neglect

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Ron is an opera buff who enjoys touring art museums when on vacation. Growing up, he loved listening to classical music and playing chess with friends and family.

**Which is more likely?**

- Ron plays trumpet in a major symphony orchestra
- Ron is a farmer

Trumpeters in major symphony orchestras: ~**300**

Farmers: ~**2,000,000**

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Ron is 6'7" tall.

**Which is more likely?**

- Ron starts for an NBA team
- Ron is a teacher

NBA starters: **150**

Teachers: ~**3,200,000**

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## Errors of Odds

Sample Size Neglect

Base Rate Neglect

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Ron is an opera buff who enjoys touring art museums when on vacation. Growing up, he loved listening to classical music and playing chess with friends and family.

**Which is more likely?**

- Ron plays trumpet in a major symphony orchestra
- Ron is a farmer

The **representativeness** heuristic

the description seems more representative of a classical musician than a farmer

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## Errors of Odds

Sample Size Neglect

Base Rate Neglect

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## Which has More?

Are there more English words with "r" as the first letter, or with "r" as the third letter?

A r \_ \_ \_ ...

B \_ \_ r \_ ...

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## Which is More Likely?



### The **availability** heuristic

a dog on a leash comes to mind more easily than  
a pig on a leash, so it's probably more likely

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## Which has More?

Are there more English words with "r" as the first letter,  
or with "r" as the third letter?

A r \_ \_ \_ ...

B \_ \_ r \_ ...

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## Which has More?

Are there more English words with "r" as the first letter,  
or with "r" as the third letter?

A r \_ \_ \_ ... 2370

easy to think of ring, rope, road  
hard to think of bare, dirt, tire

B \_ \_ r \_ ... 5580

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# Errors of Odds

Sample Size Neglect

Base Rate Neglect

Availability Bias

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It's happened so many times...why not me?

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# Errors of Odds

Sample Size Neglect

Base Rate Neglect

Availability Bias

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Pres. Daniels plays LeBron James in a one-on-one game of basketball. What are the odds that:

**The first scoring play of the game is a layup by President Daniels**

**The first scoring play of the game is a layup by President Daniels, but then King James takes over and crushes President Daniels**

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**Prez Daniels scores first**

**Prez Daniels scores first, but then King James takes over and crushes the Prez**

**A**

**A & B**

Probability of A & B can't be **greater** than the probability of A!

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# Errors of Odds

Sample Size Neglect

Base Rate Neglect

Availability Bias

Conjunction Fallacy

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**Prez Daniels scores first**

**Prez Daniels scores first, but then King James takes over and crushes the Prez**



doesn't feel **representative**

does feel **representative**

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**Prez Daniels scores first**

**Prez Daniels scores first, but then King James takes over and crushes the Prez**

**A**

**A & B**

Probability of A & B can't be **greater** than the probability of A!

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# Errors of Odds

Sample Size Neglect

Base Rate Neglect

Availability Bias

Conjunction Fallacy

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Set to begin construction in spring 2022 and to be completed by fall 2024, the new Hopkins Student Center, received overwhelmingly positive reviews from students, staff, and alumni, who contributed to the selection process. BIG's third academic building in the United States -following the Isenberg School of Management Business Innovation Hub for the University of Massachusetts Amherst and The Heights Building for Arlington Public Schools, both completed in 2019- is in collaboration with Shepley Bulfinch as Architect of Record, along with Rockwell Group for interior design and Michael Van Valkenburg Associates for landscape design.

## SGA announces updates on the Hopkins Student Center's construction

By AIMEE CHO and KRISTEN GALL | September 17, 2023



### EDITOR'S PICKS

Department heads all fall with annual student activities

News Review Board on research remaining at the Hopkins Wilson research laboratory and environmentalism of AMU's energy

Hopkins Magazine features a collection of stories of fall, present and only "Senior" issue

Photo in two halves

Sally Rooney's latest novel: Read or skip it?

The Hopkins Magazine (October) opens the season with a display of various events

### WEEKLY HIGHLIGHT

To watch and watch for: Week of Oct. 17

Release news to review: Oct. 23

Episode Sports in Review (Oct. 16-20)

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easy to imagine what it will be like to do the work  
(availability!)

hard to imagine all the distractions

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## Errors of Odds

Sample Size Neglect

Base Rate Neglect

Availability Bias

Conjunction Fallacy

Planning Fallacy

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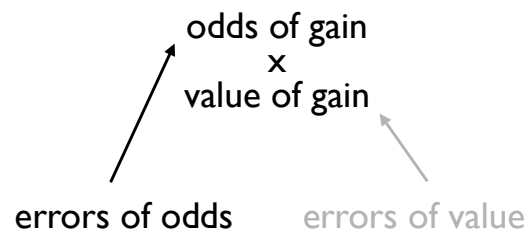
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## Expected Value



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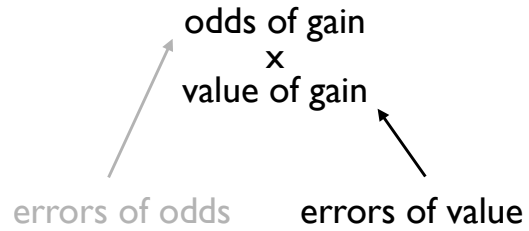
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# Expected Value



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You want to buy a **car stereo**.  
You can buy one near your house for \$248,  
or you can go to DC to get the same exact  
stereo for just \$48.

**Would you spend two  
hours to save \$200?**



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You want to buy a **car**.  
You can buy one near your house for \$30,348,  
or you can go to DC to get the same exact car  
for just \$30,148.

**Would you spend two  
hours to save \$200?**



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This mug is for sale at the JHU Barnes & Noble.

**What is it worth?**



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This mug is for sale at the JHU Barnes & Noble.

**What would you pay for it?**



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This mug belongs to you.

**What would you sell it for?**



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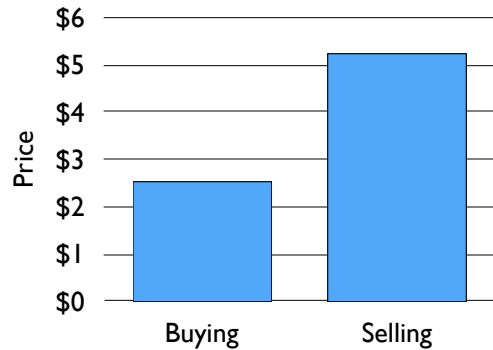
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## Anomalies The Endowment Effect, Loss Aversion, and Status Quo Bias

Daniel Kahneman, Jack L. Knetsch,  
and Richard H. Thaler

Economics can be distinguished from other social sciences by the belief that most (all) behavior can be explained by assuming that agents have stable, well-defined preferences and make rational choices consistent with those preferences in markets that (eventually) clear. An empirical result qualifies as an anomaly if it is difficult to "rationalize," or if implausible assumptions are necessary to explain it within the paradigm. This column presents a series of such anomalies. Readers are invited to suggest topics for future columns by sending a note with some reference to foot letters yet copies of the relevant research. Comments on anomalies printed here are also welcome. The address is: Richard Thaler, c/o Journal of Economic Perspectives, Johnson Graduate School of Management, Main Hall, Cornell University, Ithaca, NY 14853.

Экономика может быть distinguished от других социальных наук тем, что большинство (все) поведение может быть объяснено, предполагая, что агенты имеют стабильные, хорошо определенные предпочтения и делают рациональные выборы, соответствующие этим предпочтениям на рынках, которые (в конечном итоге) очищаются. Эмпирический результат квалифицируется как аномалия, если он трудно "рационализуется", или если необходимы нереалистичные предположения для его объяснения в рамках парадигмы. Этот столбец представляет серию таких аномалий. Читатели приглашаются предлагать темы для будущих столбцов, отправив сообщение со ссылкой на буквы в подвале, но копии соответствующего исследования. Комментарии к аномалиям, напечатанным здесь, также приветствуются. Адрес: Ричард Талер, с/о Журнал Экономических Перспектив, Высшая Школа Менеджмента, Главный Зал, Университет Корнелл, Итака, Нью-Йорк 14853.



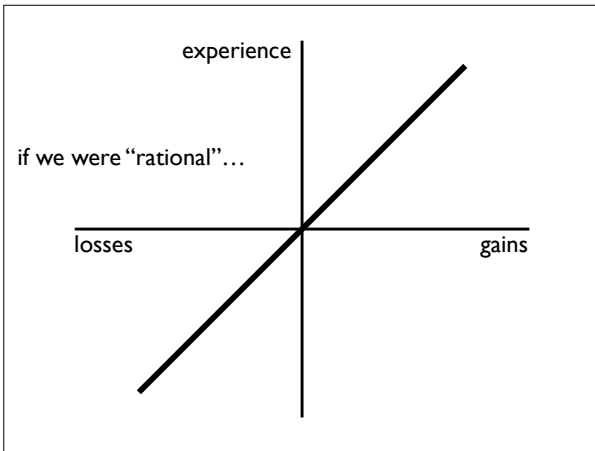
## Endowment Effect

*Nobel in Economics Is Awarded to Richard Thaler*

By BENJAMIN APPELBAUM OCT. 9, 2017



The economist Richard H. Thaler at his home in Chicago on Monday after winning the 2017 Nobel




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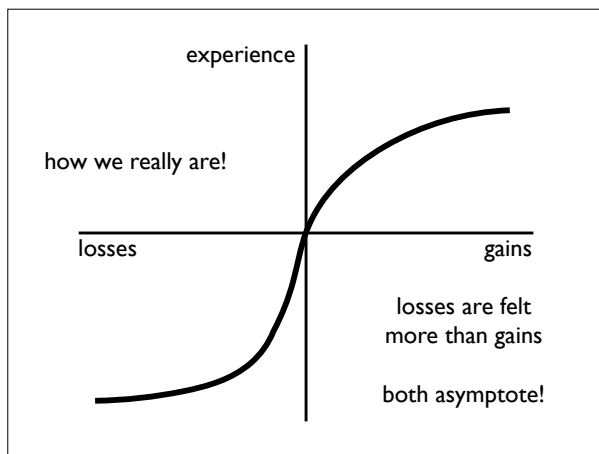
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**\$10 now** vs **\$12 in 2 weeks**

**Temporal Discounting**

**\$10 in 50 weeks** vs **\$12 in 52 weeks**

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# What can we do about this?

1. Try not to make these mistakes to begin with
2. **Exploit** these biases to improve society!

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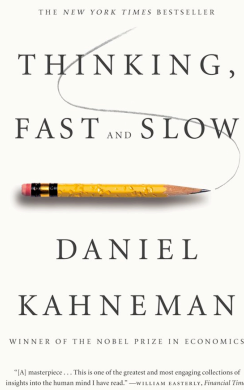
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think slower!



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Answer all three questions and you could win a prize! You don't even need to get them "right" – just answer!

Question 1. A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost? \_\_\_\_ cents

Your answer \_\_\_\_\_

Question 2. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? \_\_\_\_ minutes

Your answer \_\_\_\_\_

Question 3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? \_\_\_\_ days

Your answer \_\_\_\_\_

## Cognitive Reflection Test (CRT)

(Frederick, 2005)

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A bat and a ball cost \$1.10. The bat costs a dollar more than the ball.  
How much does the ball cost?

**5 cents!**

**But 10 cents "feels" like the right answer**  
(and 21% of you said it!)

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It takes 5 machines 5 minutes to make 5 widgets; how long will it take 100 machines to make 100 widgets?

**5 minutes!**

**But 100 minutes “feels” like the right answer**  
(and 18% of you said it!)

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In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake?

**47 days!**

**But 24 days “feels” like the right answer**  
(and 12% of you said it!)

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## **Scores on the CRT correlate with...**

...patience in general

...low temporal discounting

...better alignment with expected value

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## What can we do about this?

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## What can we do about this?

1. Try not to make these mistakes to begin with
2. **Exploit** these biases to improve society!

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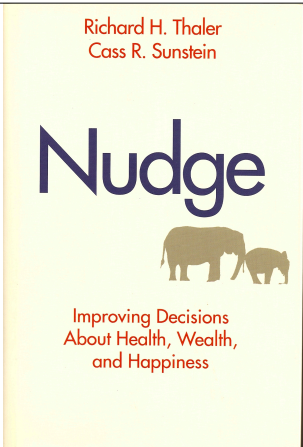
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What is a “nudge”?

bt  
bigthink.com/richardhaler

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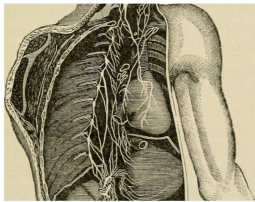
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### Why Don't More People Want to Donate Their Organs?

Around 21 Americans die each day waiting for transplants. What's behind the reluctance to posthumously save a life?



TIFFANIE WEN | NOV 10, 2014 | **HEALTH**  
LISVANE WEN | NOV 17, 2014 | **HEALTH**

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# How We Decide

(or: being wrong about the future)



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