

**A neuroscientist's view of the  
retraction notice:  
Is self-reported motivation reliable?**

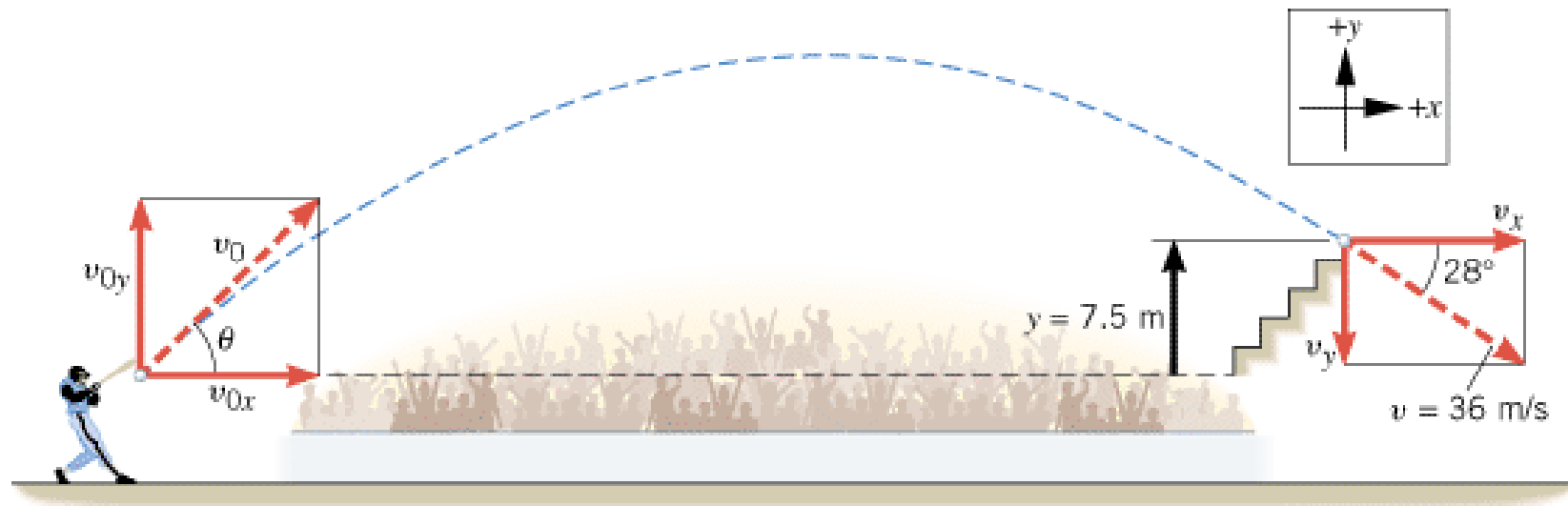
Peggy Mason  
University of Chicago

# The cognition of why

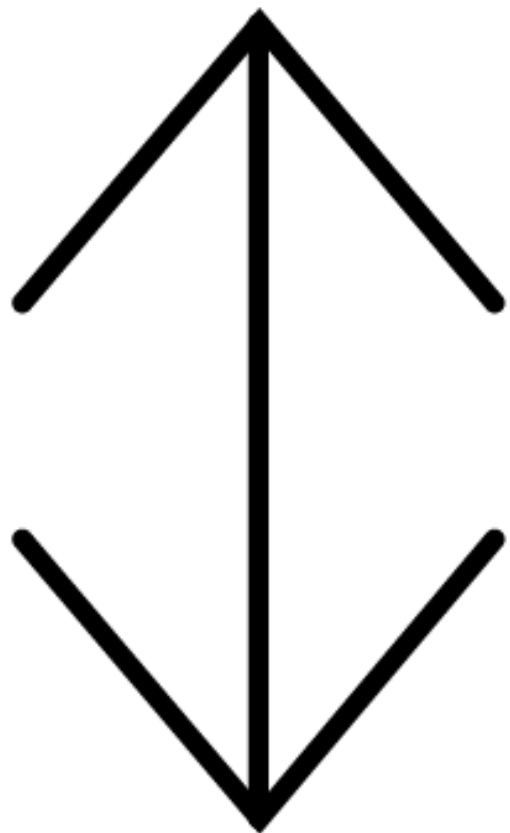
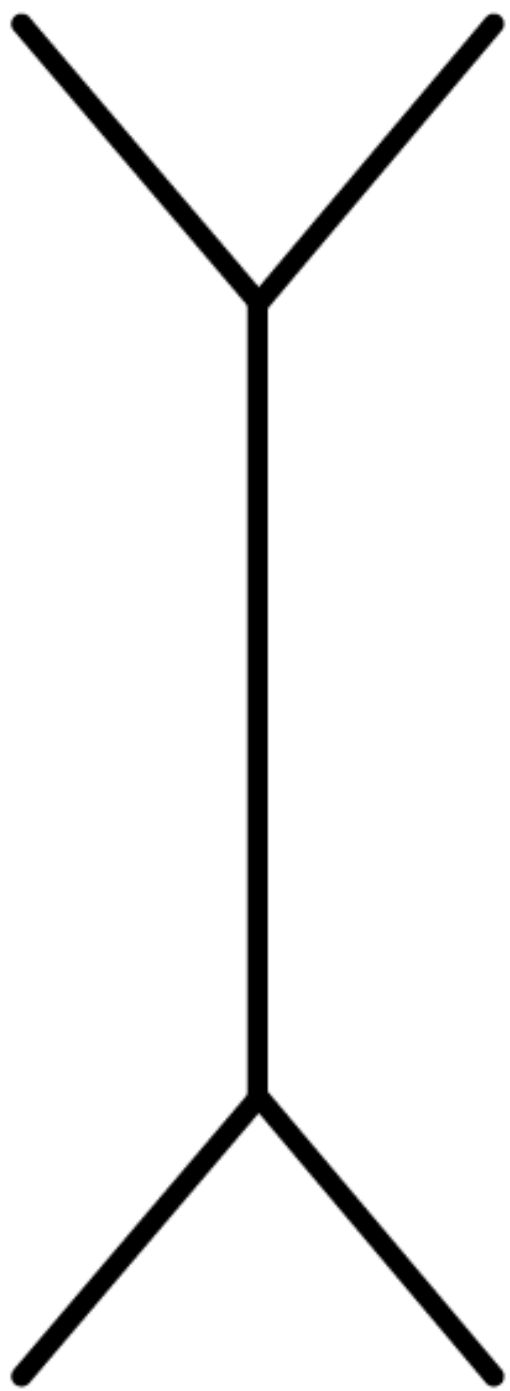
- The brain's skills and weaknesses
- Perception is faulty
- Memory is faulty
- Explanations of self-generated actions are faulty
  - In a myriad of experimental setups
  - And even when it counts

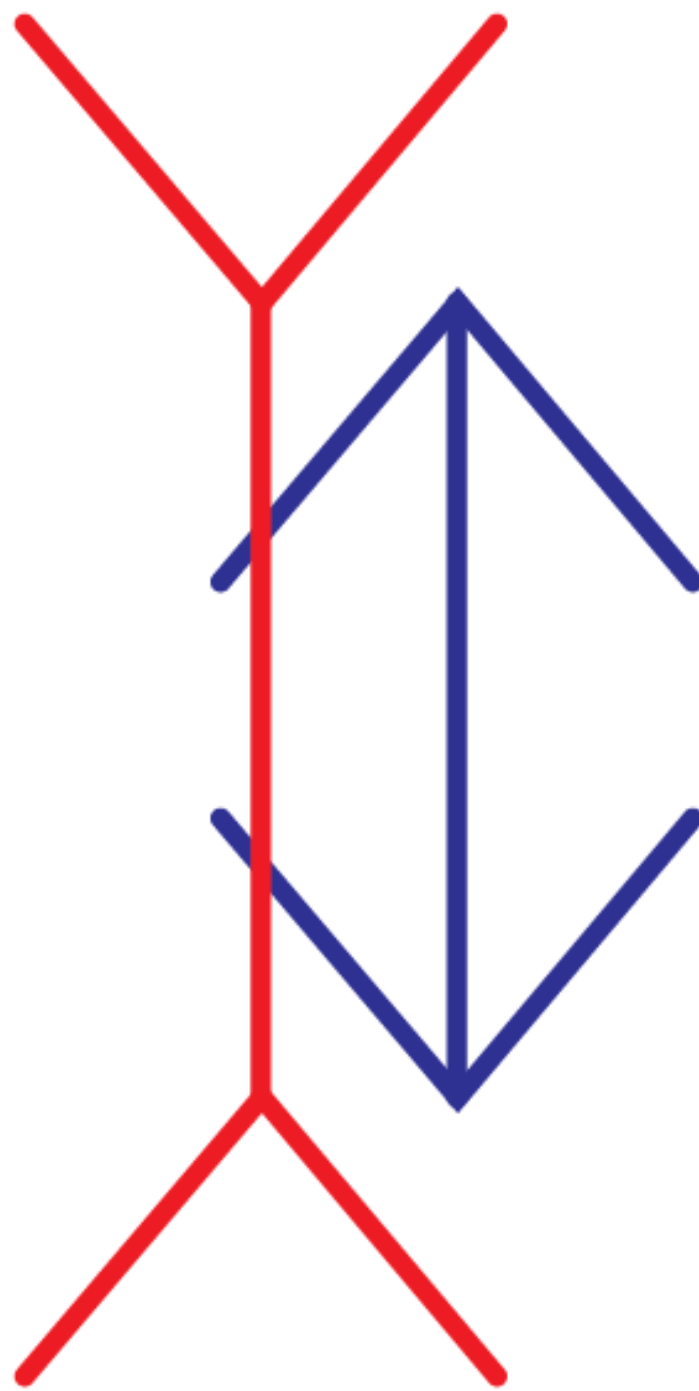


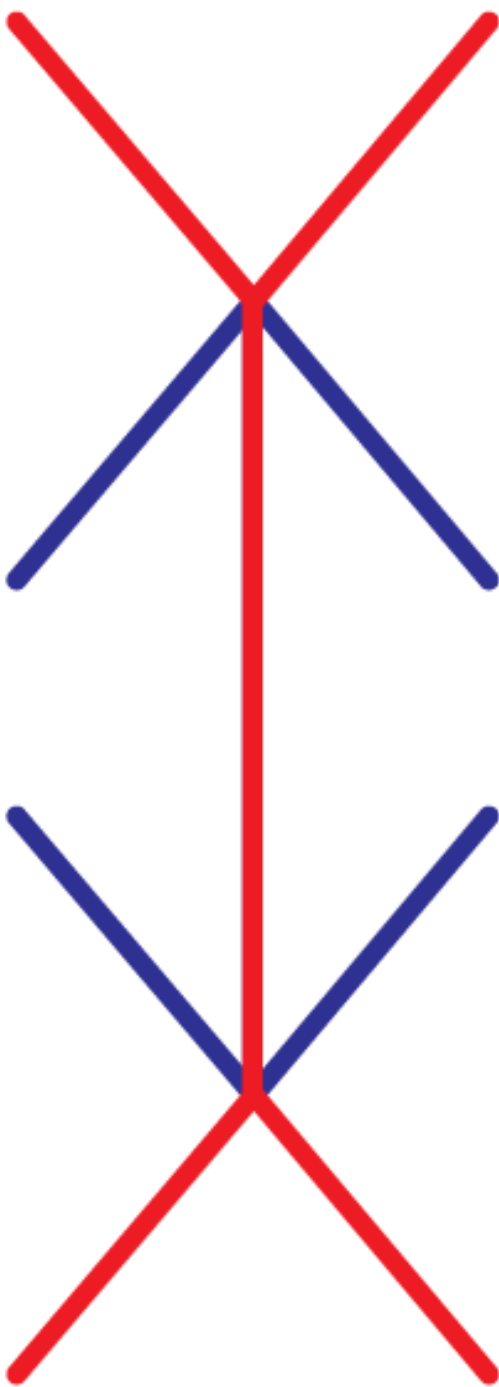
# Parabolic vs look-up table

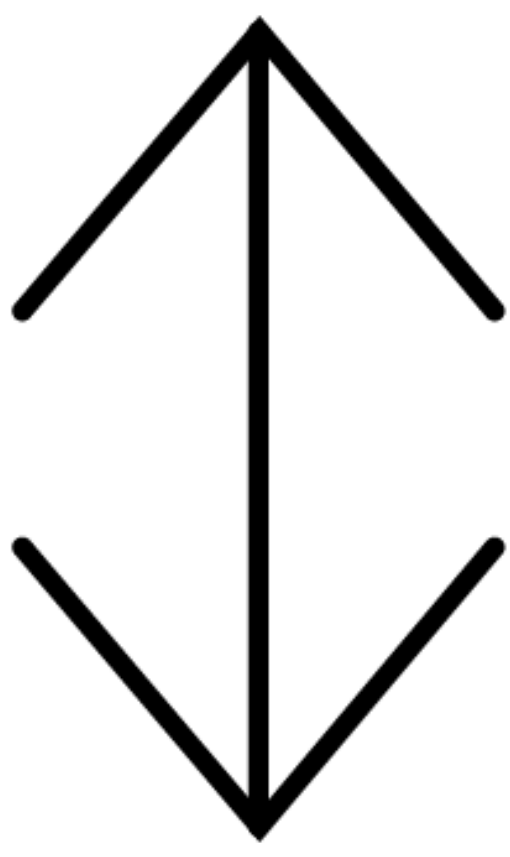
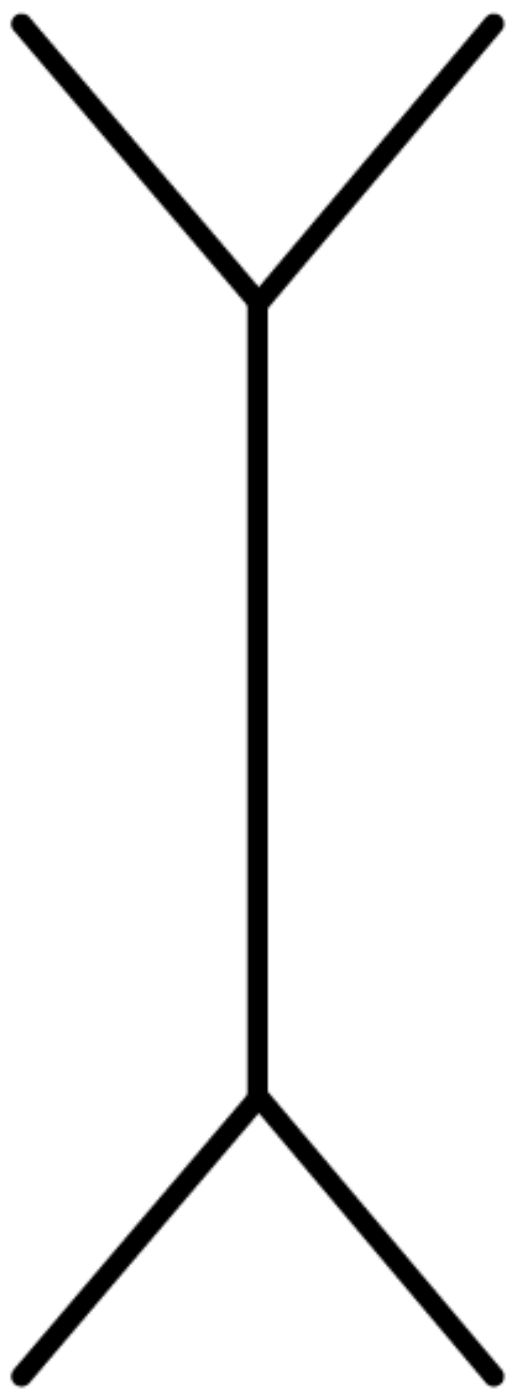


**The brain is very good at some  
(complicated) tasks and abysmal  
at others, including ones that are  
computationally simple**









ABC

12 13 14



A B C

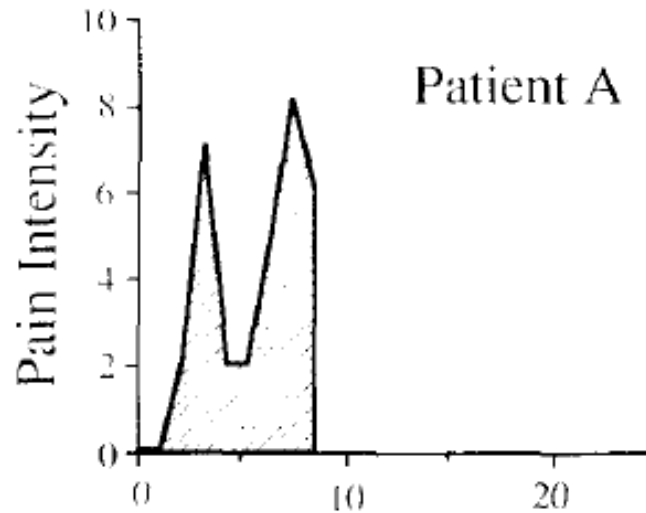
12 13 14

# **Perception is not accurate**

- Objectively inaccurate
- Good enough for evolutionary survival
- Difficult to change (poor learning)

# Do you want what A got or what B got?

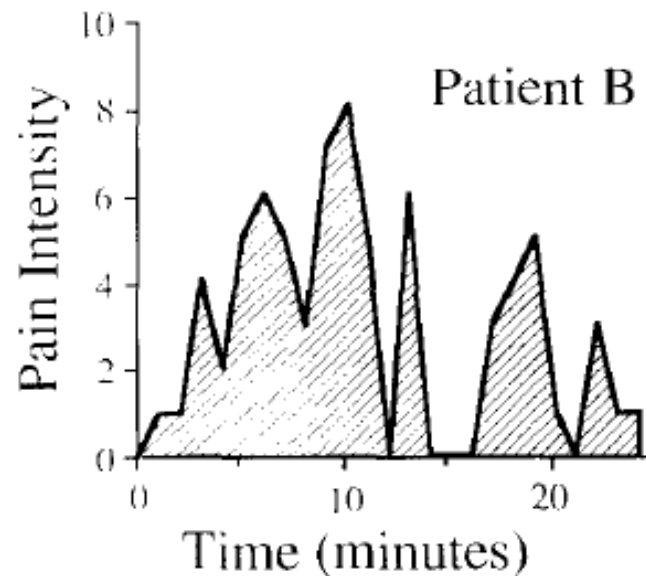
colonoscopy



Total pain:

8 mins  
AUC: 35

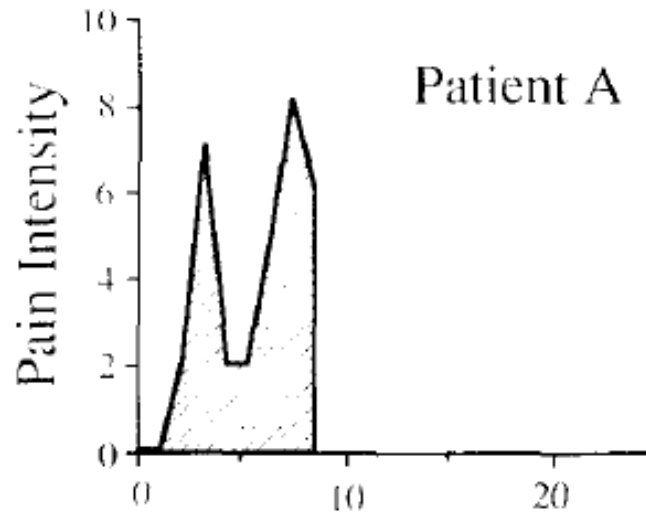
lithotripsy



24 mins  
AUC: 78

# Do you want what A got or what B got?

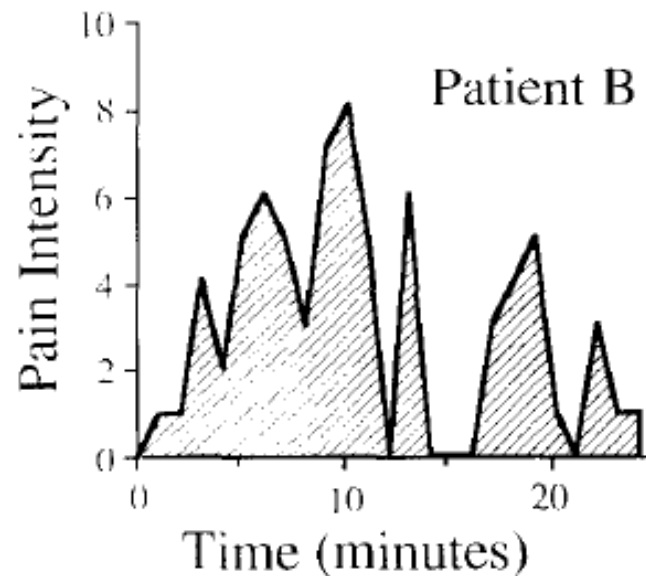
colonoscopy



Total pain:

8 mins  
AUC: 35

lithotripsy



24 mins  
AUC: 78



# For experienced pain: lithotripsy (126) > colonoscopy (72)

## Real-time assessments during procedure

Duration (min)

Peak Pain

Initial Pain

End Pain

Average Pain

Total Pain (area under the curve)

colonoscopy      lithotripsy

23 ± 13

33 ± 6

7.7 ± 2.7

6.4 ± 3.1

2.6 ± 2.5

1.6 ± 2.0

2.0 ± 2.7

4.4 ± 3.1

3.1 ± 2.0

3.8 ± 2.5

72 ± 61

126 ± 84

# Last week's pain: colonoscopy while lithotripsy

	Duration	Peak pain	End pain
Colonoscopy			
Patient's rating (immediate)	0.03	0.64*	0.43*
Patient's rating (follow-up)	0.12	0.61*	0.44*
Patient's relative ranking	0.14	0.51*	0.42*
Physician's rating	0.15	0.64*	0.44*
Anaesthetic judgment	0.05	0.35*	0.32*
Lithotripsy			
Patient's rating (immediate)	0.11	0.63*	0.56*
Patient's rating (follow-up)	0.04	0.46*	0.45*
Patient's relative ranking	0.02	0.36*	0.40*
Physician's rating	0.10	0.42*	0.33*
Anaesthetic judgment	0.02	0.23*	0.30*

Relation between retrospective assessments & selected real-time measures  
(Redelmeier & Kahneman 1993, *Pain* 66:3-8)

# **Our memories are labile and suggestible**

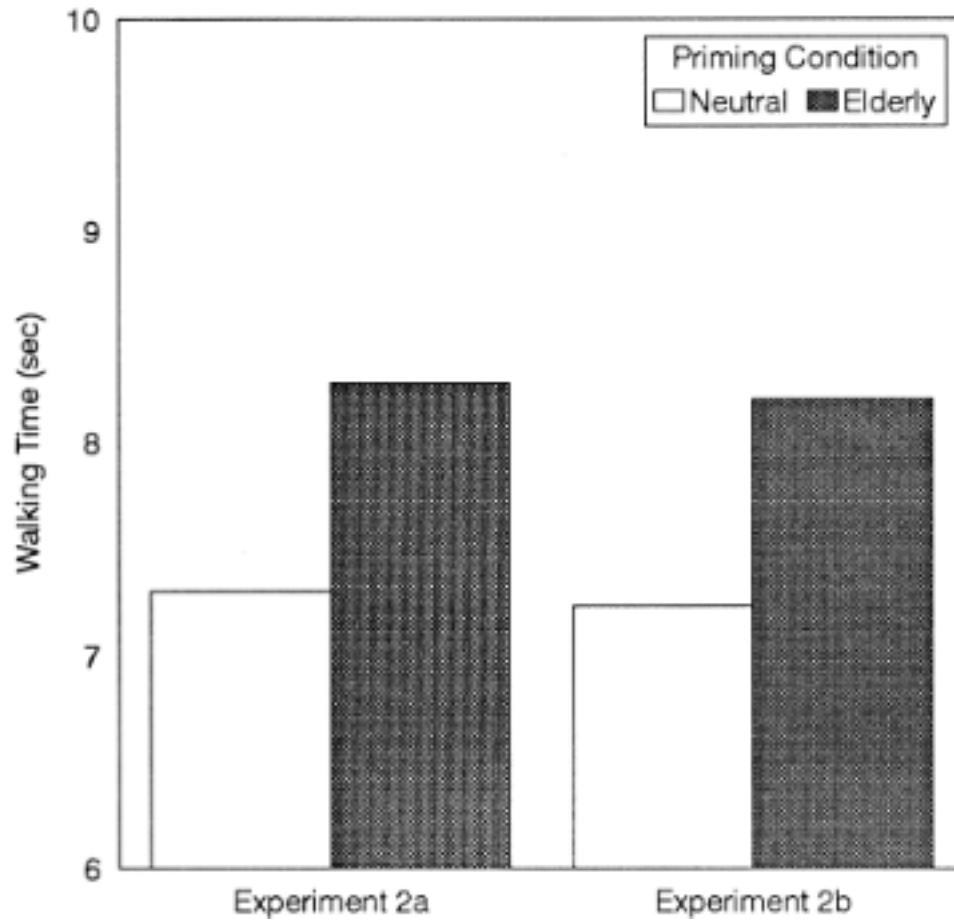
Objectively inaccurate (but good enough for  
evolutionary survival)



**How about actions?**  
**Is there “truth” in actions?**



# Is a walk down the hallway free from bias?



Elderly prime words:  
worried, Florida, wrinkle,  
cautious, bingo, lonely, retired...

Neutral prime words:  
thirsty, clean, private,...

Bargh, Chen, and Burrows 1996  
J Person Soc Psychol 71:230

**How well do we know why we do what we do? What degree of objective accuracy does self-report possess?**

seized. Immediately thereafter, Maier asked the subject to tell about his experience of getting the idea of a pendulum. This question elicited such answers as "It just dawned on me." "It was the only thing left." "I just realized the cord would swing if I fastened a weight to it." A psychology professor subject was more inventive: "Having exhausted everything else, the next thing was to swing it. I thought of the situation of swinging across a river. I had imagery of monkeys swinging from trees. This imagery appeared simultaneously with the solution. The idea appeared complete."

Nisbett & Wilson 1977

Telling more than we know: Verbal reports on mental processes

Psychol Review 84:231

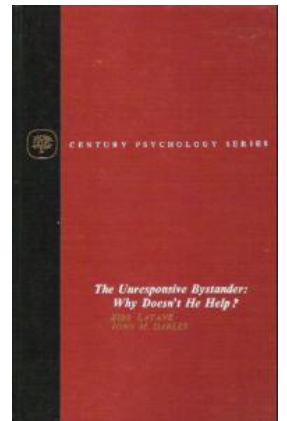
# Bystander effect

Smoke flows into a room:

75% of those alone in a room left the room to report the smoke

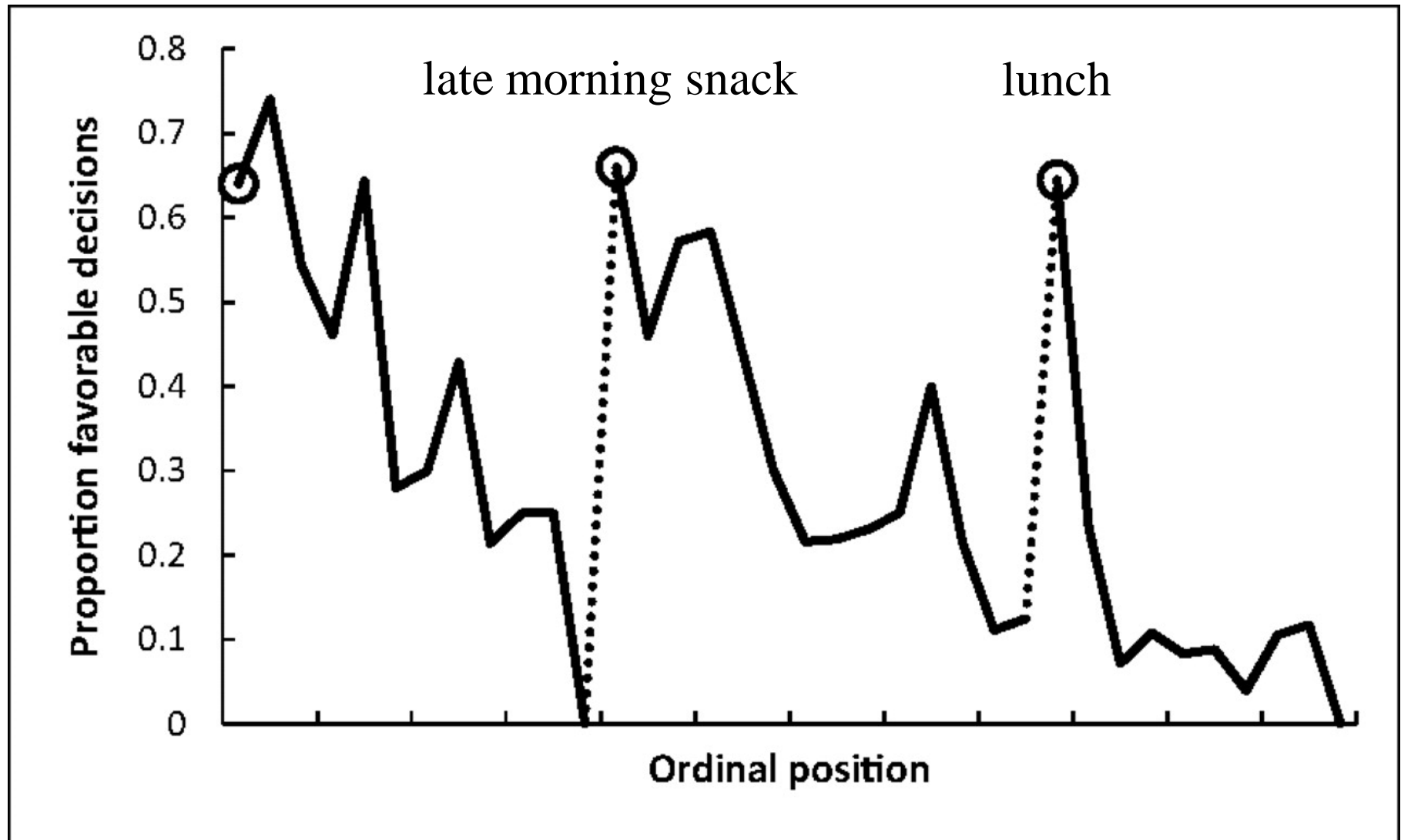
13% of those in a room with others left the room to report the smoke

*The Unresponsive Bystander: Why Doesn't He Help?* by Bibb Latané and John M Darley (Prentice-Hall, Inc, 1970)



**Is there bias in actual (not laboratory)  
actions that have important  
consequences and are intended to be  
free of preconceived bias?**

# Proportion of rulings in favor of the prisoners across the day



Shai Danziger et al. PNAS 2011;108:6889-6892

PNAS

**Does knowing our psychological weaknesses inoculate us against falling under their influence?**

# Can people use *general knowledge* to make accurate judgments on particulars?

*Nisbett and Borgida (as reported by Kahneman in Thinking Fast and Slow):*

Taught the bystander effect (seizure example) *OR* no instruction on same (control)

Showed short, bland (non-informative) videos of two participants

Asked psychology students if they thought these participants had helped.

*general*  
*specific*



# No!!

## People “quietly exempt themselves” (and friends and... even strangers that they see in a video).

Psychology students who  
were taught the bystander  
effect and those who were  
not (controls) *both predicted  
that the two (video)  
participants had helped.*



Daniel Kahneman, *Thinking Fast and Slow*. Farrah Straus and Giroux 2011.

# Can people use particular knowledge to make general predictions?

*Nisbett and Borgida (as reported by Kahneman):*

Showed short, bland videos of two participants

Told students that these two participants had not helped when in a group

Asked students to predict whether people help when in a group

Yes!!!



“Subjects unwillingness to deduce the particular from the general was matched only by their willingness to infer the general from the particular.”

**And now on to scientific  
misconduct...**

# Participants' report of why they were sent to “rehab”

## WHY ATTENDEES ENROLLED

Frequent reasons behind researchers' referrals to the Professionalism and Integrity Program (many are referred for more than one reason).

Failure to provide oversight, leading to problems



Consent violation concerning human research participants



Plagiarism



Inappropriate recruitment of human research participants



Animal-care violation



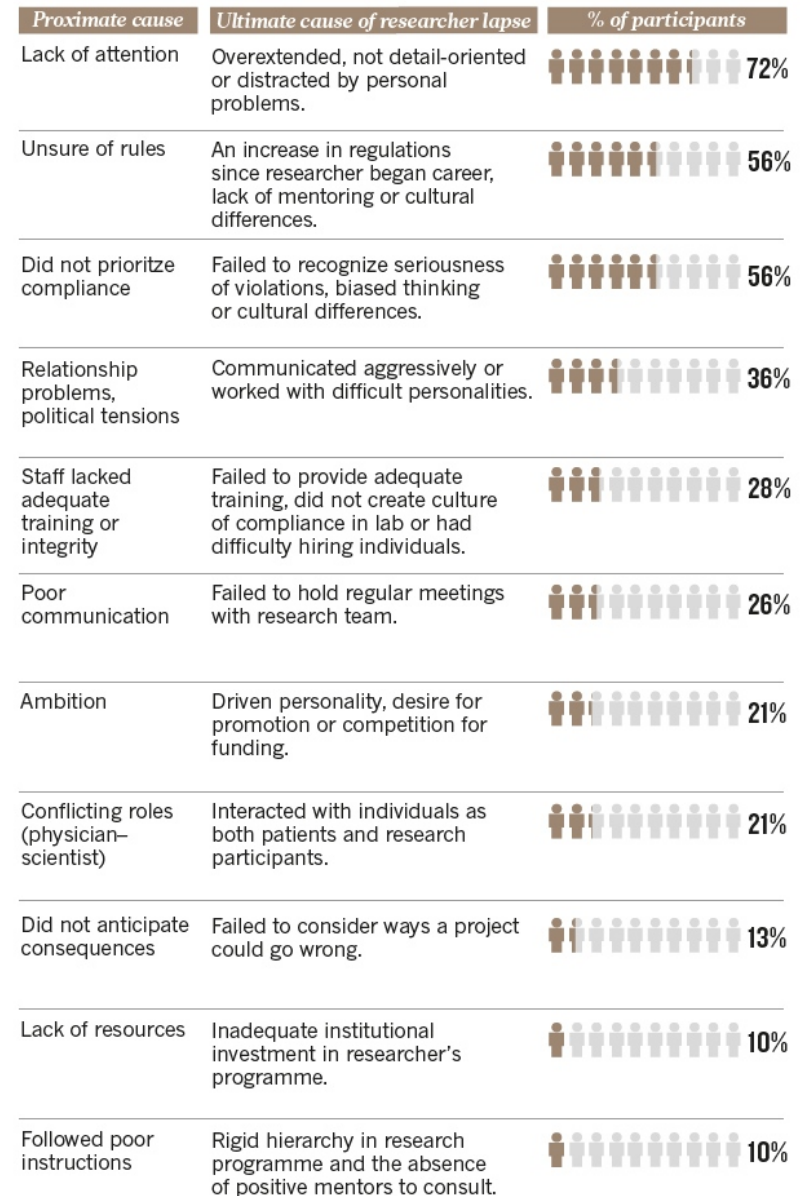
Data fabrication, falsification or substandard research leading to false data



# Instructors' view of why investigators performed research misconduct

## WHY RESEARCHERS STUMBLED

Instructors on the Professionalism and Integrity Program assessed underlying causes (often more than one) for researchers' lapses.



Researchers in our programme do not display personality traits that are distinct from the general population of scientists. We believe that most researchers may be susceptible, and that the busiest ones are most likely to err.... we work with talented faculty members who seek to do good research and whom institutions wish to retain.

The message that we want to send is this: *unless you are careful, it could happen to you.*

James M. DuBois, John T. Chibnall, Raymond Tait & Jillon Vander Wal  
(2016) Misconduct: Lessons from researcher rehab. *Nature*

# **A neurobiological view of retractions**

Self-report to the self is inaccurate

Incentive to modify the story given publicly

Multiple authors



**Want to learn  
more neuro'?**

**Who wouldn't?**



@neuroMOOC

<http://thebrainissocool.com>

<https://study-abroad.uchicago.edu/programs/paris-biology>

<https://www.coursera.org/course/neurobio>