Applying Behavioral Science to Wearing Masks and Social Distancing

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https://advanced-hindsight.com/health-research/

DICON
November 13, 2020

Duke UNIVERSITY | CENTER FOR ADVANCED HINDSIGHT

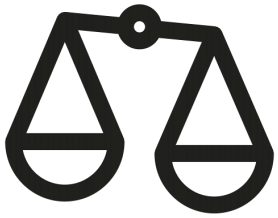
Challenge

- Universal masking policies in hospitals
- Suboptimal compliance, especially in administrative offices, shared work rooms, and break rooms (Advani et al., 2020)
- Why? How change?
- Some pieces of the puzzle

Homo economicus

ExpCost(mask) =

Pr(infected|mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + **Cost**(discomfort)



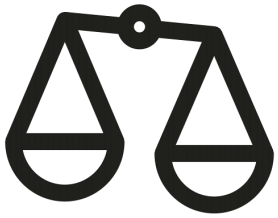
ExpCost(no mask) =

Pr(infected|no mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + 0

Homo economicus

ExpCost(mask) =

Pr(infected|mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + **Cost**(discomfort)



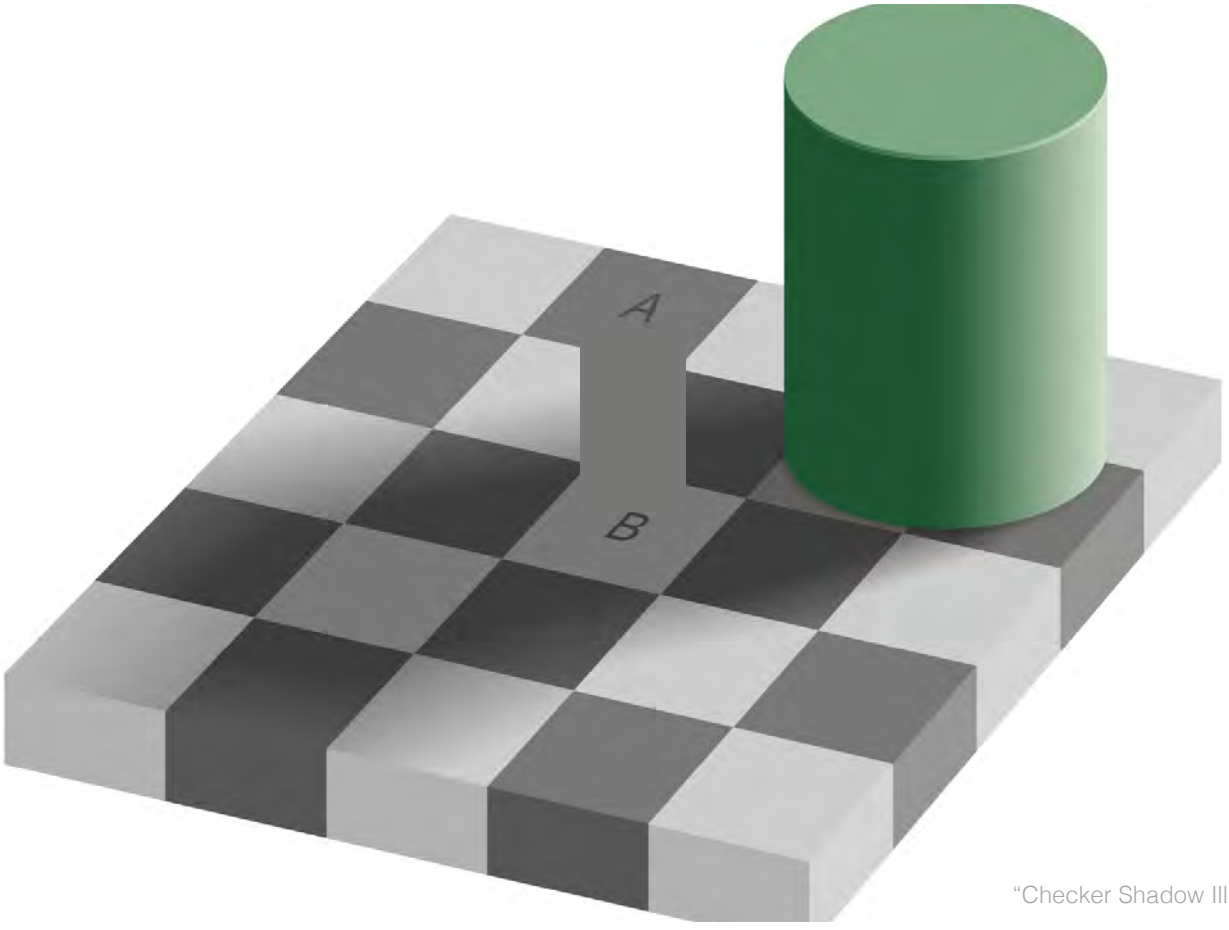
ExpCost(no mask) =

Perceived severity of disease ~ vaccination:
small-moderate (r = .16); smaller (r = .14) for medical personnel

Pr(infected|no mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + 0

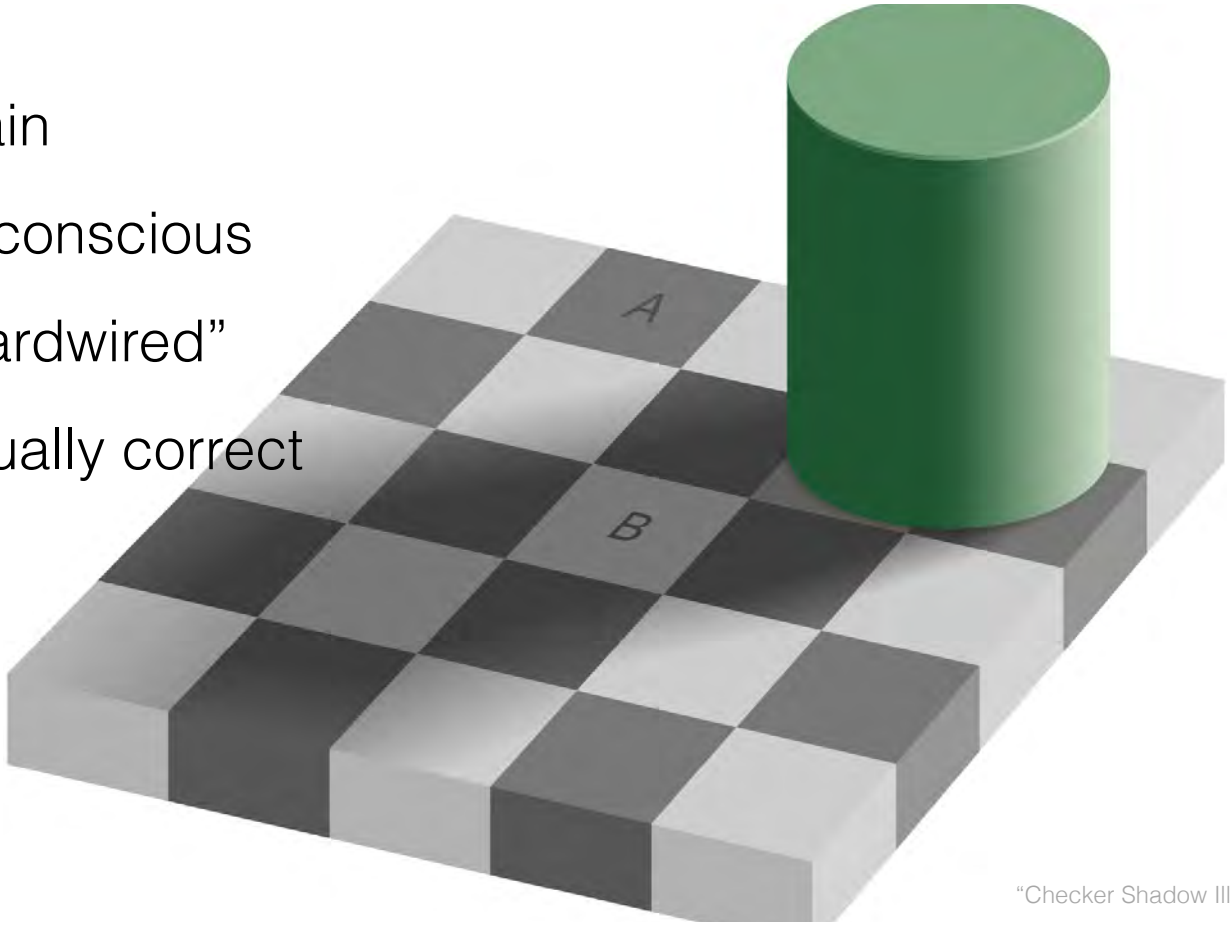
Perceived likelihood of contracting disease ~ vaccination:
moderate (r = .25); small (r = .07) for medical personnel

Brewer et al., 2007

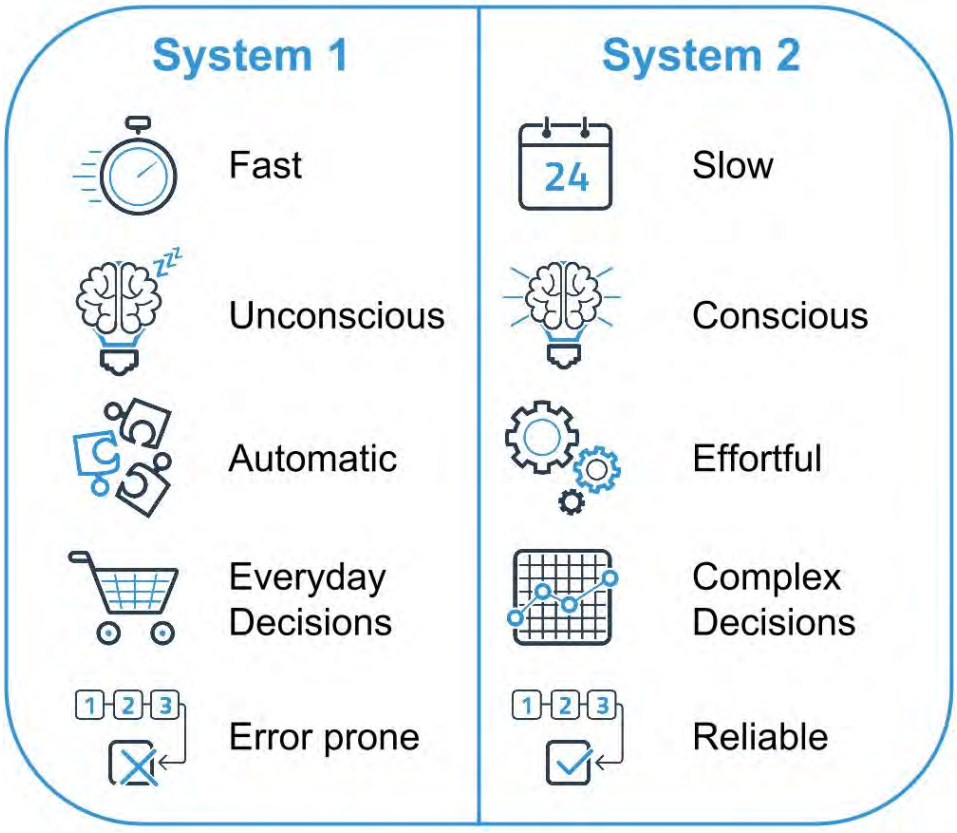


"Checker Shadow Illusion", *Wikipedia*

- Brain
- Unconscious
- “Hardwired”
- Usually correct



“Checker Shadow Illusion”, *Wikipedia*

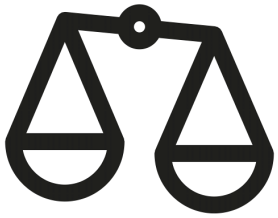


Homo economicus

ExpCost(mask) =

Present, certain

Pr(infected|mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + **Cost**(discomfort)



Future, uncertain

ExpCost(no mask) =

Pr(infected|no mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + 0

Tomorrow

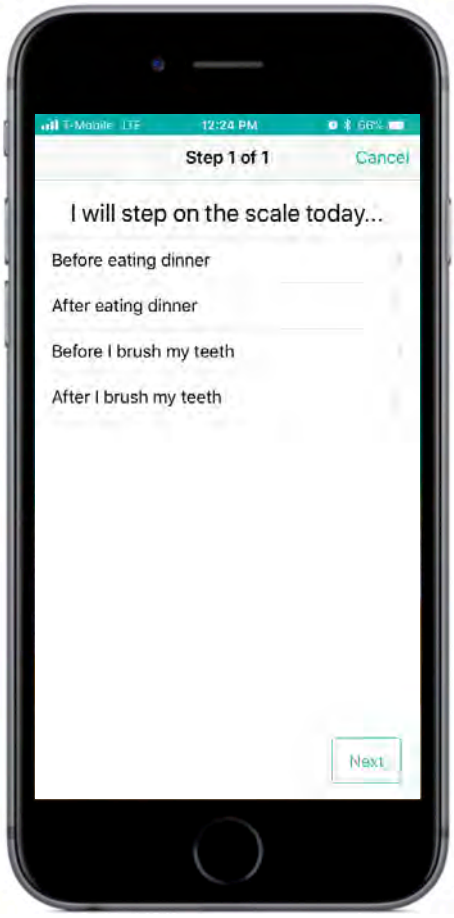
PRECOMMITMENT

Masks/distancing?

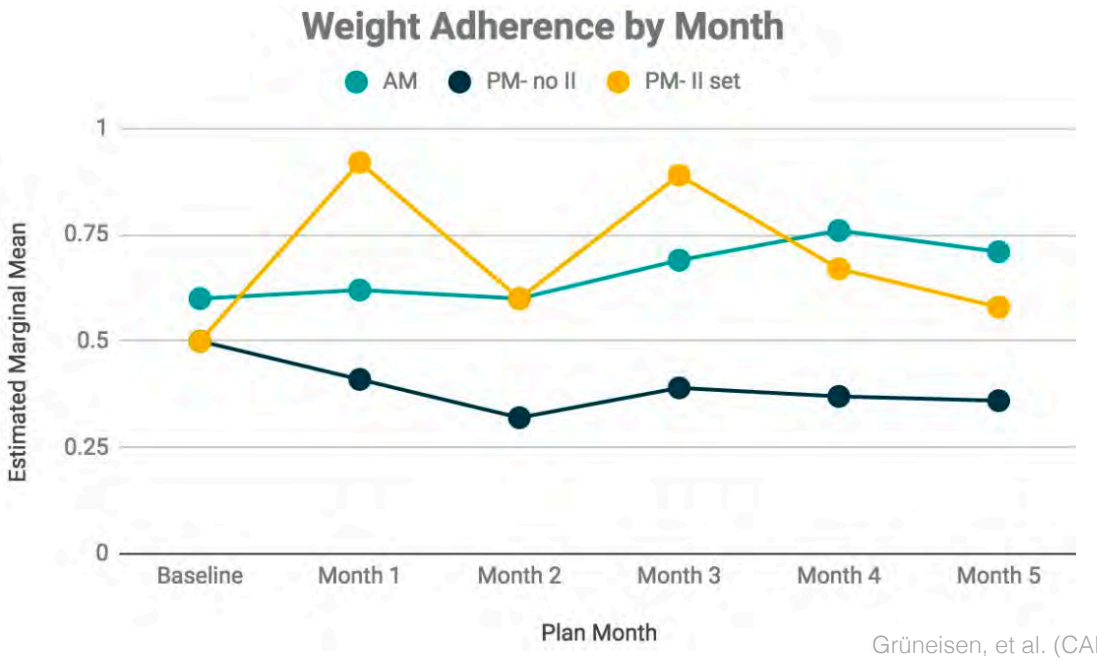
PRESENT BIAS

33% → 65%

Lee, Kiesler, & Forlizzi, 2011



IMPLEMENTATION INTENTIONS



Grüneisen, et al. (CAH)

Some pieces of the masks/distancing puzzle

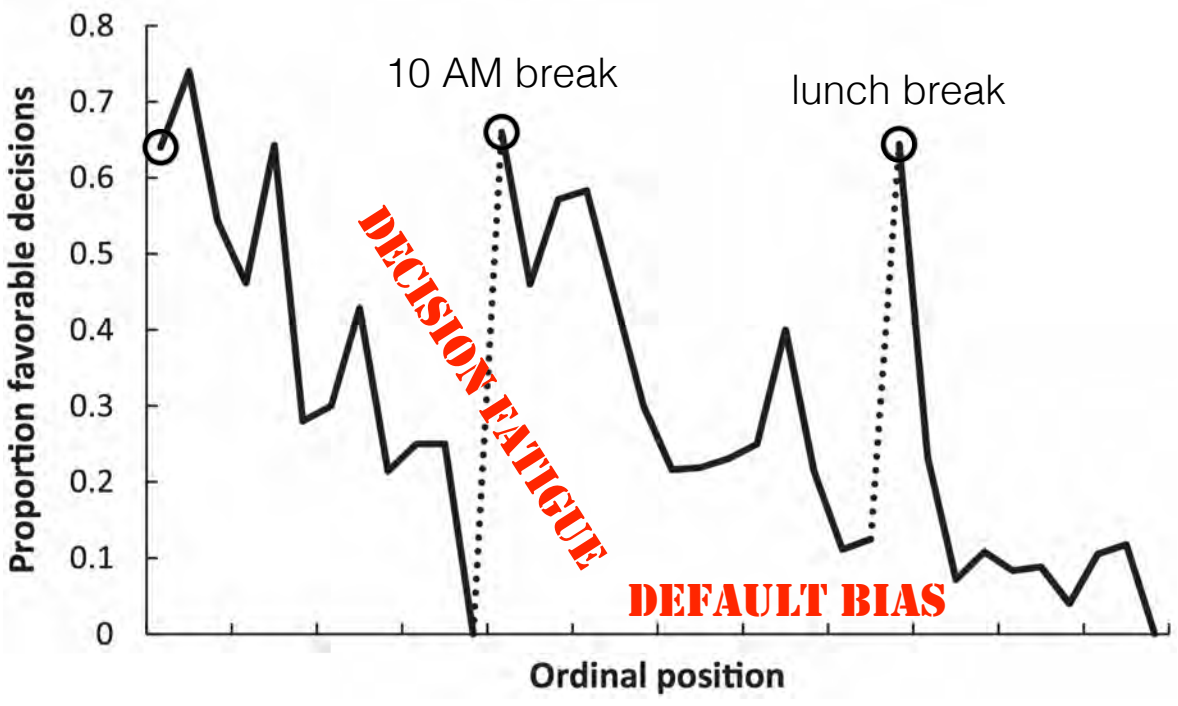
- Real people vs *Homo economicus*
- System 1 vs system 2
- Present bias, precommitment
- Implementation intentions

Ballot Ordering Nov-2000 Precinct 455080, Escondido	Ballot Ordering Nov-2000 Precinct 457270, Escondido
1. President	1. President
2. U.S. Senator	2. U.S. Senator
3. (L) U.S. Representative	3. (L) U.S. Representative
4. (L) State Assemblyman	**4. (L) State Senator**
5. Superior Court Judge	5. (L) State Assemblyman
6. (L) Palomar Community College	6. Superior Court Judge
7. (L) Escondido City Council	7. (L) Palomar Community College
8. (L) Escondido City Treasurer	**8. (L) Local School Board**
9. (L) Palomar Health System	**9. (L) Local School Board**
10. State Proposition 32	**10. (L) Local School Board**
11. State Proposition 33	**11. (L) Local School Board**
12. State Proposition 34	12. (L) Escondido City Council
13. State Proposition 35	13. (L) Escondido City Treasurer
14. State Proposition 36	14. (L) Palomar Health System
...	15. State Proposition 32
28. (L) City Proposition R	16. State Proposition 33
	17. State Proposition 34
	18. State Proposition 35
	19. State Proposition 36
	...
	33. (L) City Proposition R

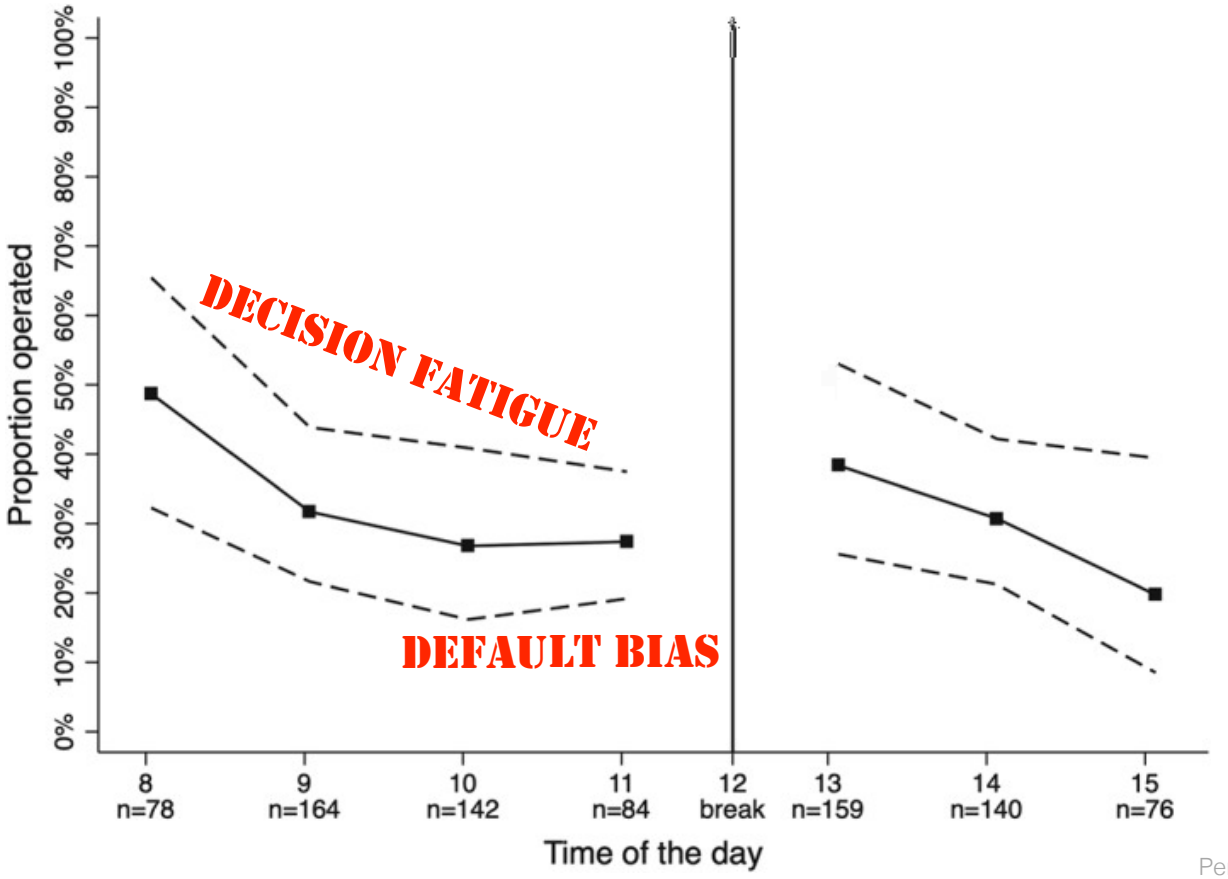
DECISION FATIGUE

DEFAULT BIAS
INERTIA

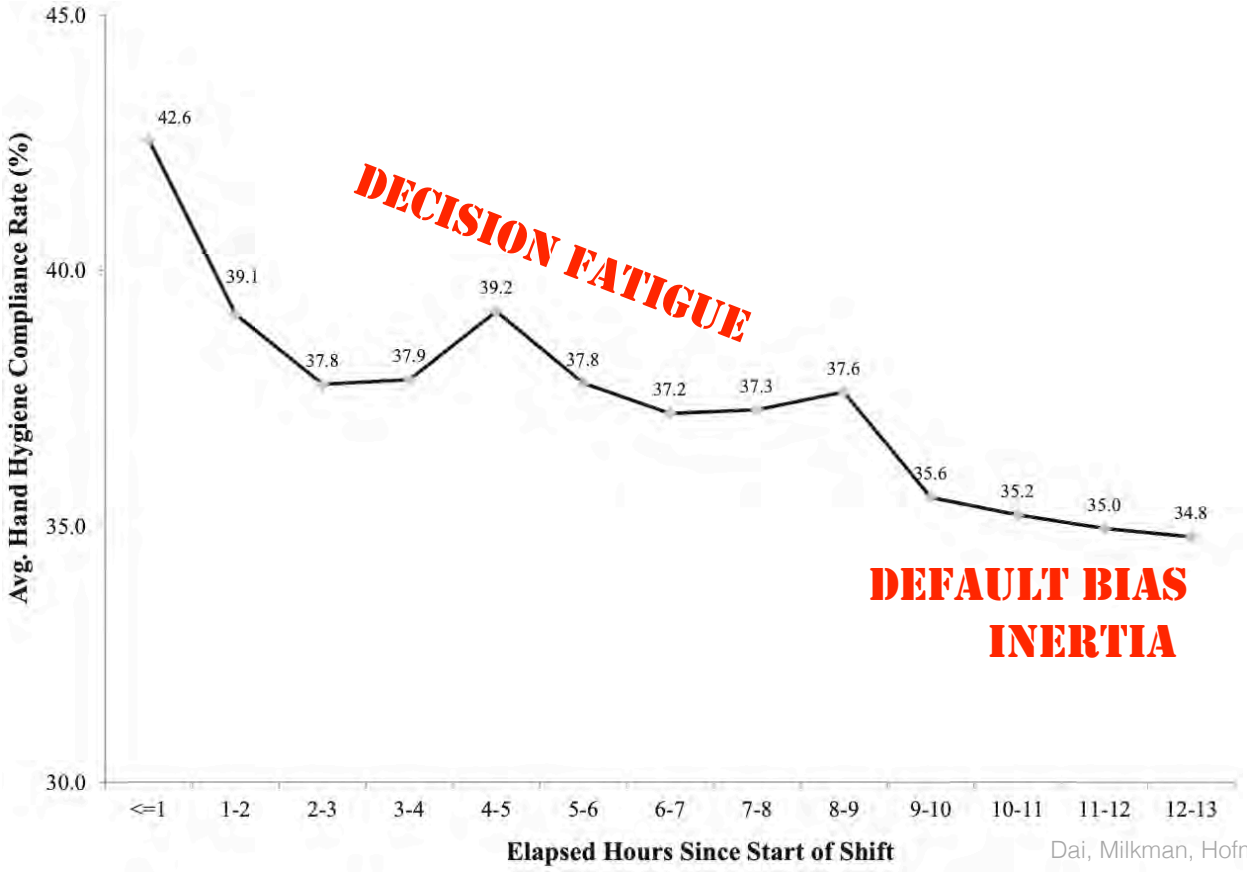
Augenblick & Nicholson, 2016



Danziger, Levav, & Avnaim-Pesso, 2011

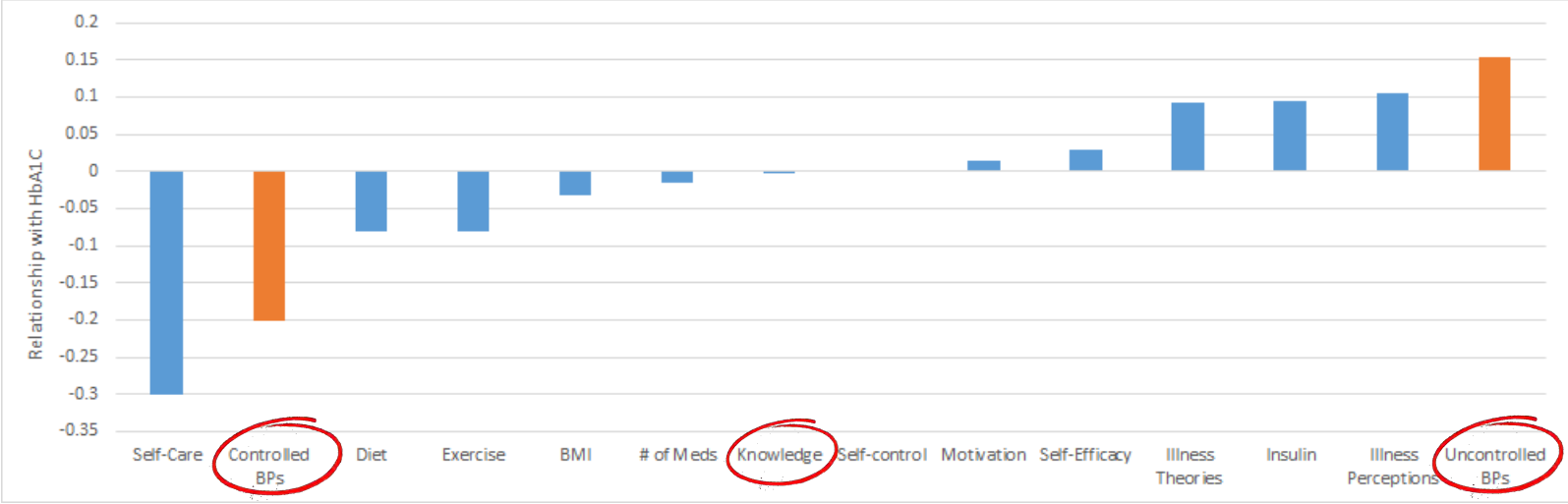


Persson et al., 2019



Dai, Milkman, Hofmann, & Staats, 2015

BREAKING POINTS



Clark, et al. (CAH)

Homo economicus

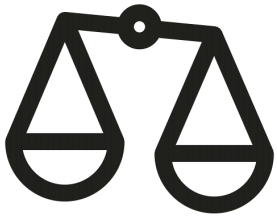
ExpCost(mask) =

Pr(infected|mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + **Cost**(discomfort)

Calculation

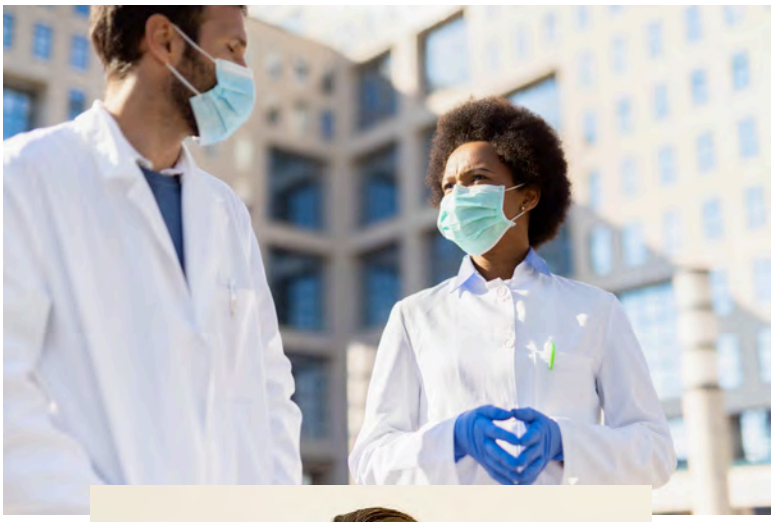
+ **Cost**(put on)

Friction



ExpCost(no mask) =

Pr(infected|no mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + **Cost**(take off)



Convenience enhancements

Descriptive labeling

Evaluative labeling

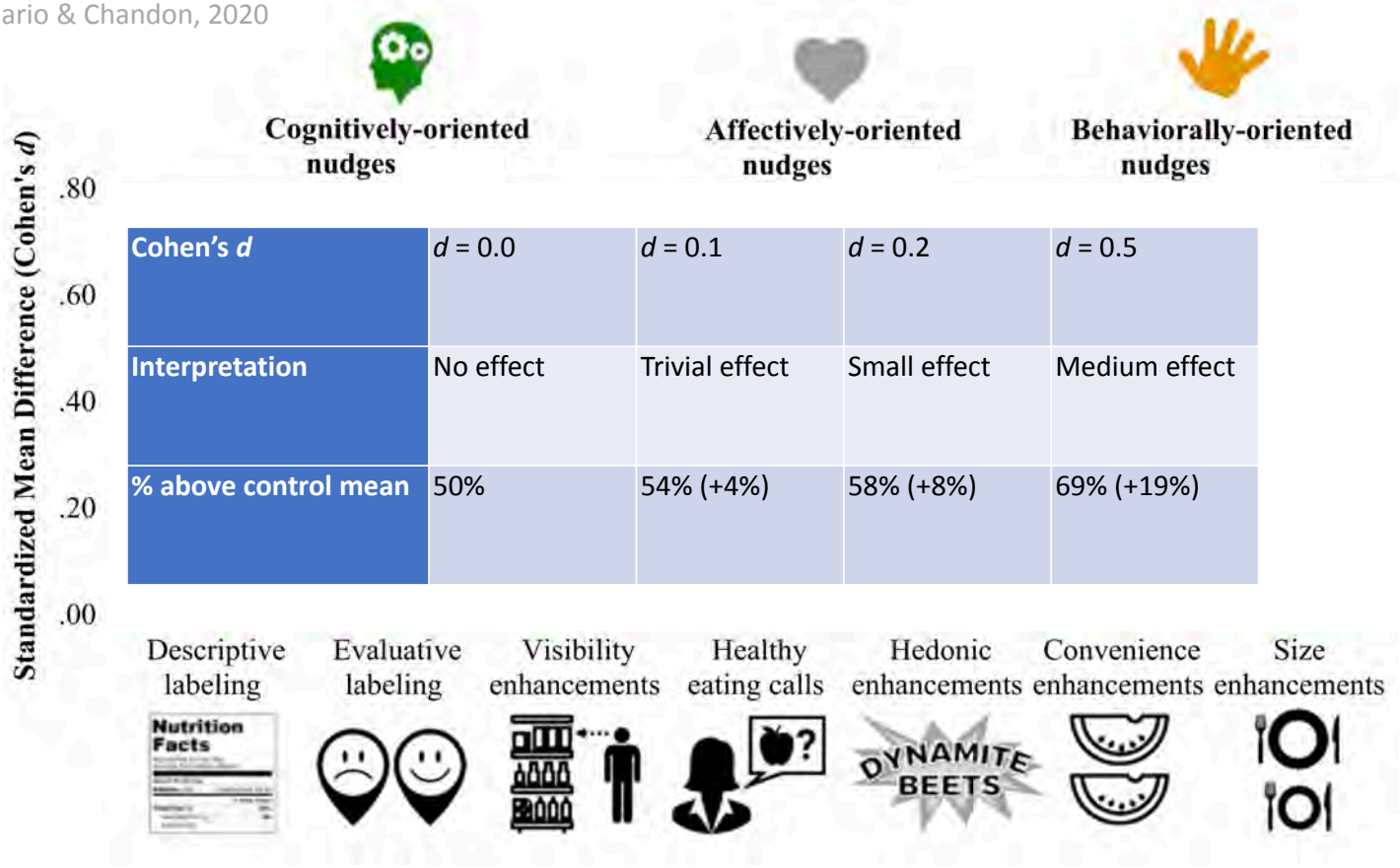
Healthy eating calls

Hedonic enhancements

Size enhancements

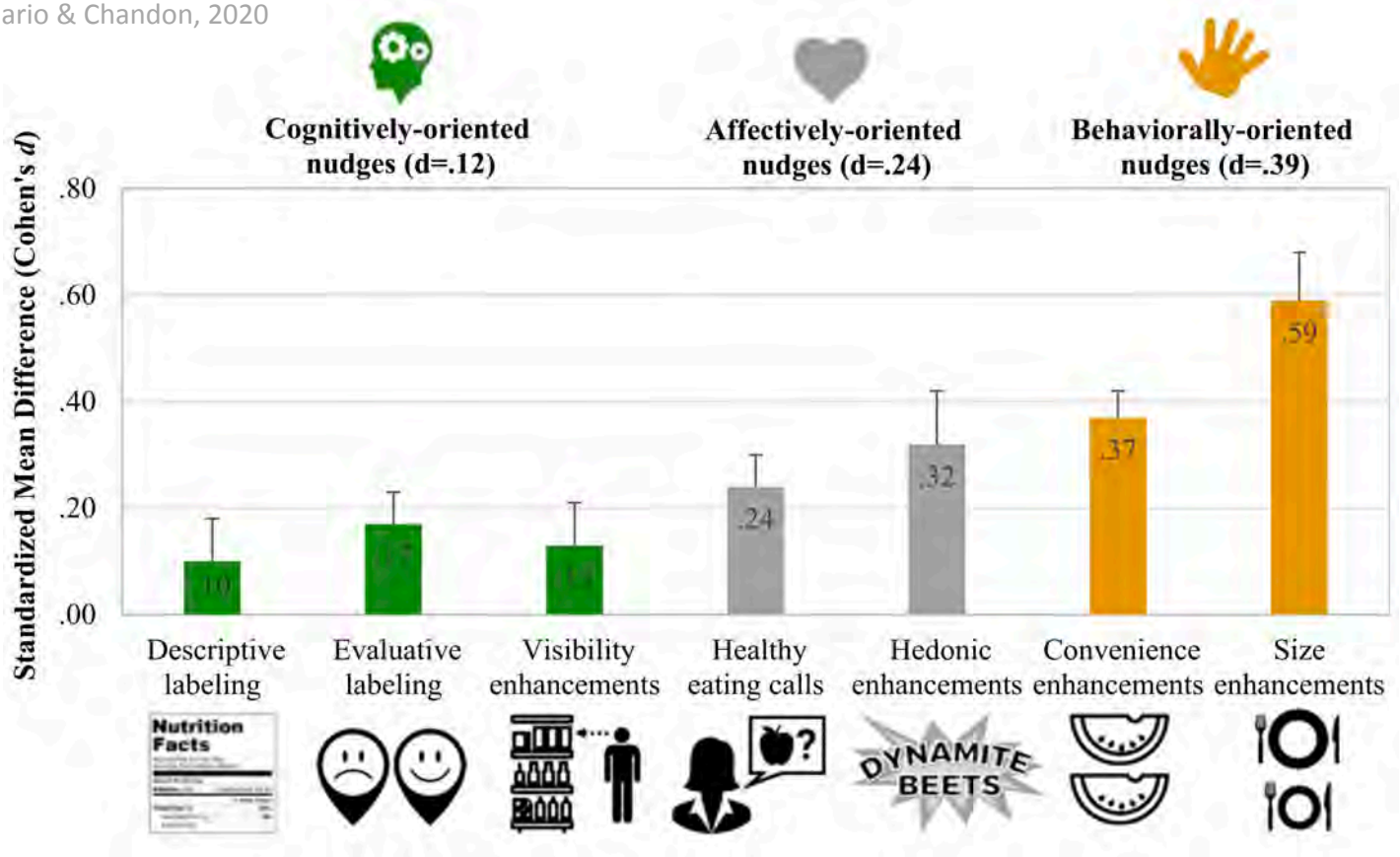
Visibility enhancements

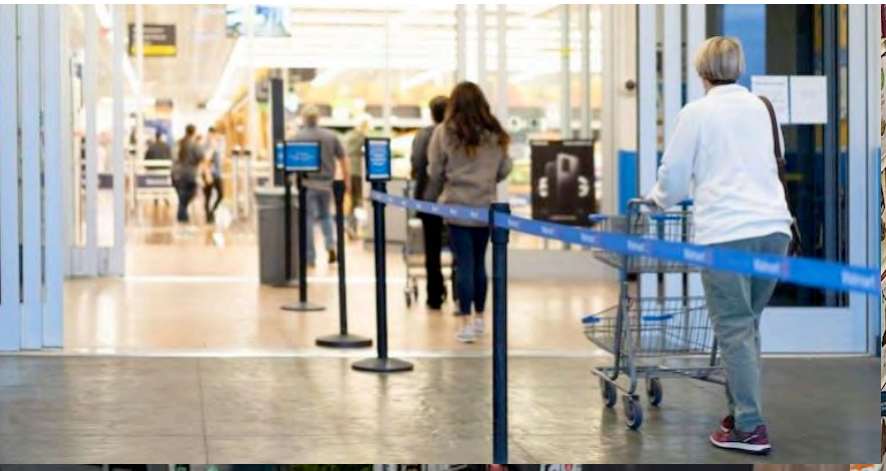
Cadario & Chandon, 2020



Cohen's *d*	*d* = 0.0	*d* = 0.1	*d* = 0.2	*d* = 0.5
Interpretation	No effect	Trivial effect	Small effect	Medium effect
% above control mean	50%	54% (+4%)	58% (+8%)	69% (+19%)

Cadario & Chandon, 2020





Some pieces of the masks/distancing puzzle

- Real people vs *Homo economicus*
- System 1 vs system 2
- Present bias, precommitment
- Implementation intentions
- Decision fatigue, breaks
- Default bias, status quo bias, friction
- Cognitive vs affective vs behavioral nudges

Homo economicus

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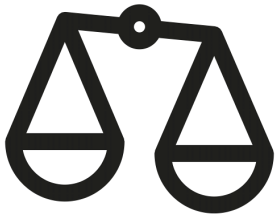


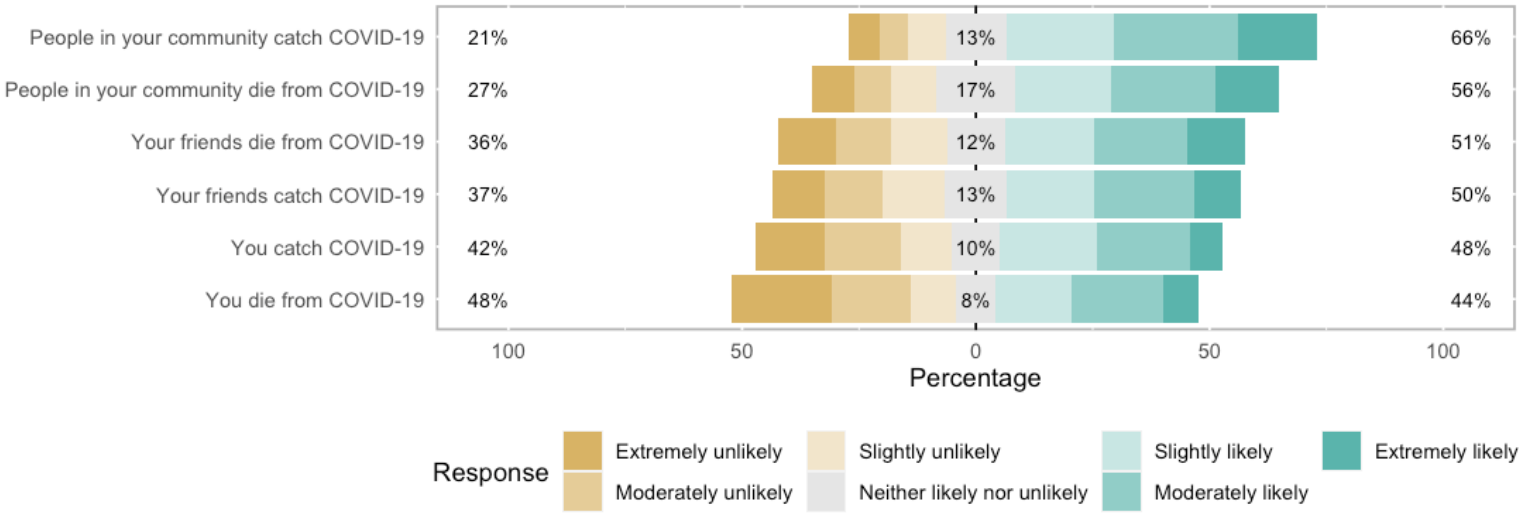
"Hand hygiene prevents **you** from catching diseases" vs
"Hand hygiene prevents **patients** from catching diseases"

45%+ Grant & Hoffman, 2011

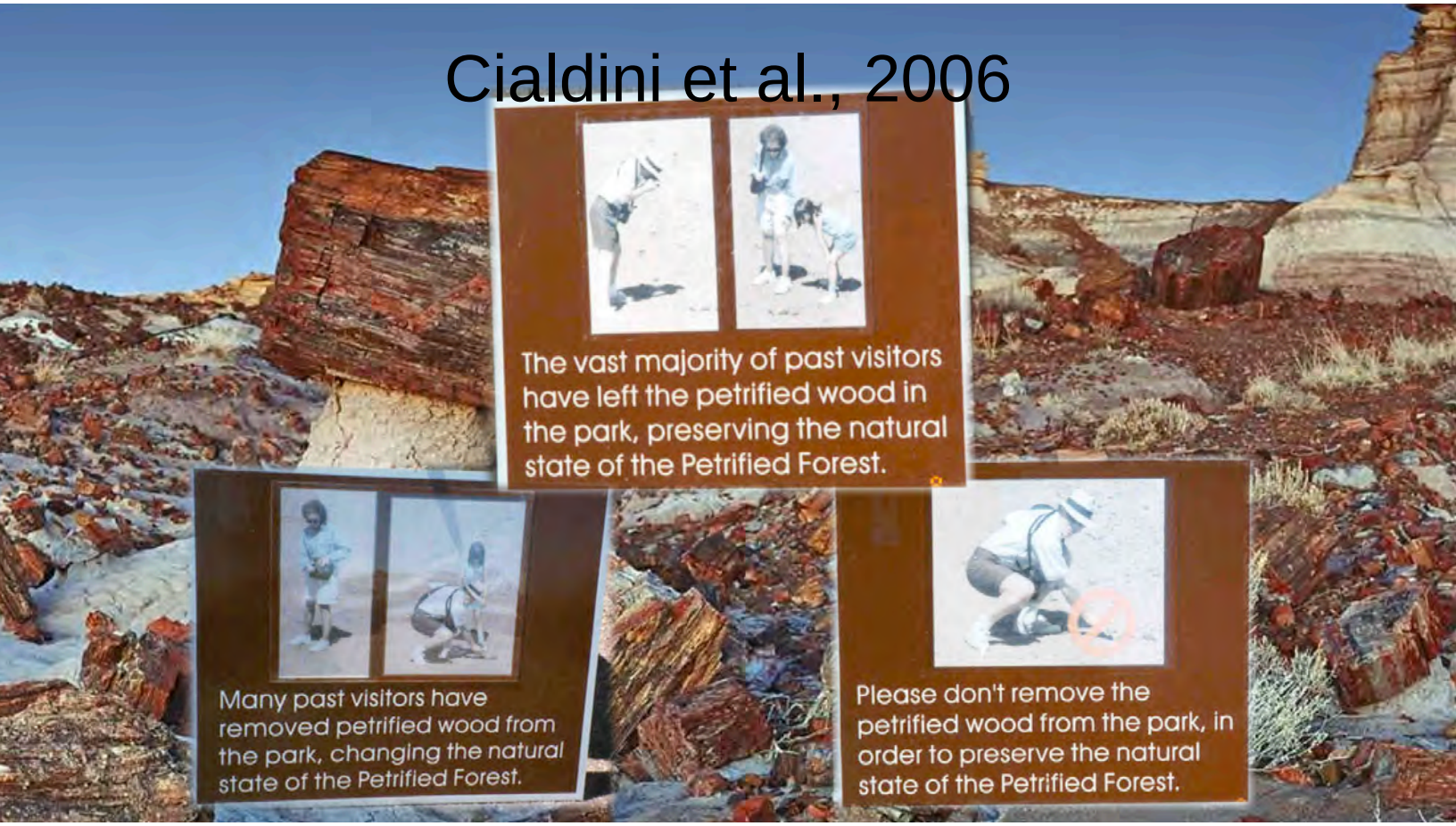
ExpCost(no mask) = Self Other

Pr(infected|no mask)*(**Pr**(ill|infected)***Cost**(ill) + **Cost**(infected)) + 0

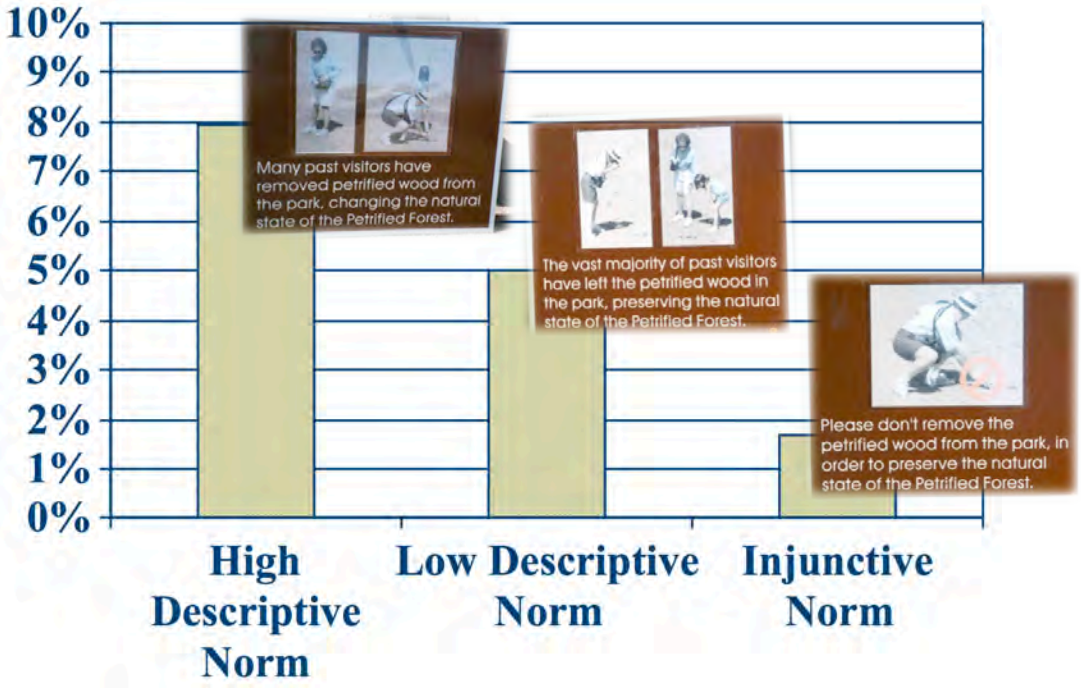
Optimism bias



Cialdini et al., 2006



Cialdini et al., 2006



Kidney Allocation for Donors with KDPI 21% - 34% MATCH RESULTS

OPO Contact Number : [redacted]

Blood Type: O

Note: These data are provided for organ allocation and monitoring purposes and are subject to applicable privacy and confidentiality regulations. Use of these data for any other purpose is not sanctioned by the OPTN/UNOS and may require compliance with Federal Policy for the Protection of Human Subjects. Seek guidance from your counsel or Institutional Review Board (IRB) before using these data for any other purpose.

Electronically Notify | View all Provisional Acceptances>>

Match ID: [redacted] KI | # Per Page: 100 | Hide empty classifications | Page 1 of 297

View candidates from all centers

100% CPRA, 0-ABDR mismatch, Local, blood type identical or permissible

Seq#	Center	Name	SSN	Age	ABO	CPRA	Score	Mismatch A	Mismatch B	Mismatch DR	Other Organs	Email/Fax Status	Offer Response
173	SCMU-TX1	[redacted]	[redacted]	44	O	100	209.289041	0	0	0			

MAKE AN ORGAN OFFER

Candidate Information for [redacted] - [redacted] | Waitlist Organ: Kidney | Waitlist ID [redacted]

Age:	44 yrs	**HLA:**	A (1, 3) B (8, 51) BW4: P BW6: P C (7, 14) DR (1, 17) DR51: DR52: DR53: DQB1 (2, 5)	**Crossmatch result at time of match:**	No Results
Gender:	Female			**Crossmatch Required:**	
ABO:	O	**CPRA:**	100	**Other Organs:**	None
		HLA Antibody Tested:	Yes, antibodies detected	**UNOS Status:**	Active (1)
		Mismatch A,B,DR:	0, 0, 0		

View all candidate information | View all potential recipients at SCMU-TX1 | View score breakdown

Contact Notified:
Notification Date:
Acknowledged Date:
Evaluation Started:
Evaluation Date:
Time Remaining:

Organ Verification

Offer details
Offer Response: * Refuse Provisional Yes
Comments:

OPO phone: [redacted]
Offer made by:
Offer respond date:
Offer made to:
Response Type:

Save | Save & Go Next | Save & Go Next Incomplete | Next Offer

Stewart et al. (with CAH) redacted

Tests | Attachments

PROVIDER INFORMATION

OPO:	TXSA - Texas Organ Sharing Alliance		
Donor hospital:	[redacted]		
Time zone:	Central	Is Daylight Savings Time observed?:	YES

DONOR INFORMATION

Name:	***** *****	Height:	5 ft 4 in / 163.00 cm
Date of birth:	[redacted]	Weight:	154 lbs / 70.0000 kg
Age:	70 Years	Body Mass Index (BMI):	26.346 kg / m^2
Gender:	FEMALE		
Current KDPI:	90% Graft Survival Rates by KDPI		
Ethnicity/race:	White; White; Not Specified/Unknown		

Blood Type: O

Cause of death:	CEREBROVASCULAR/STROKE	Admit date:	[redacted]
Mechanism of injury:	INTRACRANIAL HEMORRHAGE/STROKE	Pronouncement of death date:	[redacted]
Circumstance of death:	DEATH FROM NATURAL CAUSES	Cross-clamp date:	
		Cold Ischemic Time:	[Cross-clamp data not available.]

Donor meets DCD criteria:	NO
Cardiac arrest/downtime?:	NO
CPR administered?:	NO

Donor Highlights:

Serologies resulted EBV IgG (+) but IgM (-) NATs (-) for HBV, HCV, HIV Organ Procurement terminated due to liver mass. OR set for 0300 on 10/2/16 Regular Insulin 2units IV given for BS 178 9/30/16 21:03. Regular Insulin 20 units IV given on 10/01/2016 at 0603 as part of T4 protocol.

Admission course comments:

70 y/o CF who had been complaining of intermittent headaches for couple of days. On [redacted] she told her husband that her headache was more severe. Within an hour of the PT saying this she became unresponsive and the husband called EMS. Pt was transferred to [redacted] ED and then intubated in ED to protect her airway. She was then taken for a CT head showing a massive left temporoparietal hemorrhage with subfalcine herniation. Neurosurgery discussed the results of the CT head with the husband and went over possible options for a decompressive craniectomy, and the risks and benefits of the surgery. After a long conversation of the possibility of a meaningful survival being very low, the husband decided against proceeding with surgery. PT was transferred to the ICU for comfort care. Around 1830 pt developed SVT, was given diltiazem and adenosine and converted back to NSR. PT became areflexic and Dr. [redacted] order a CBF. The findings are consistent with an absence of cerebral blood flow and brain death. PT was pronounced by [redacted].

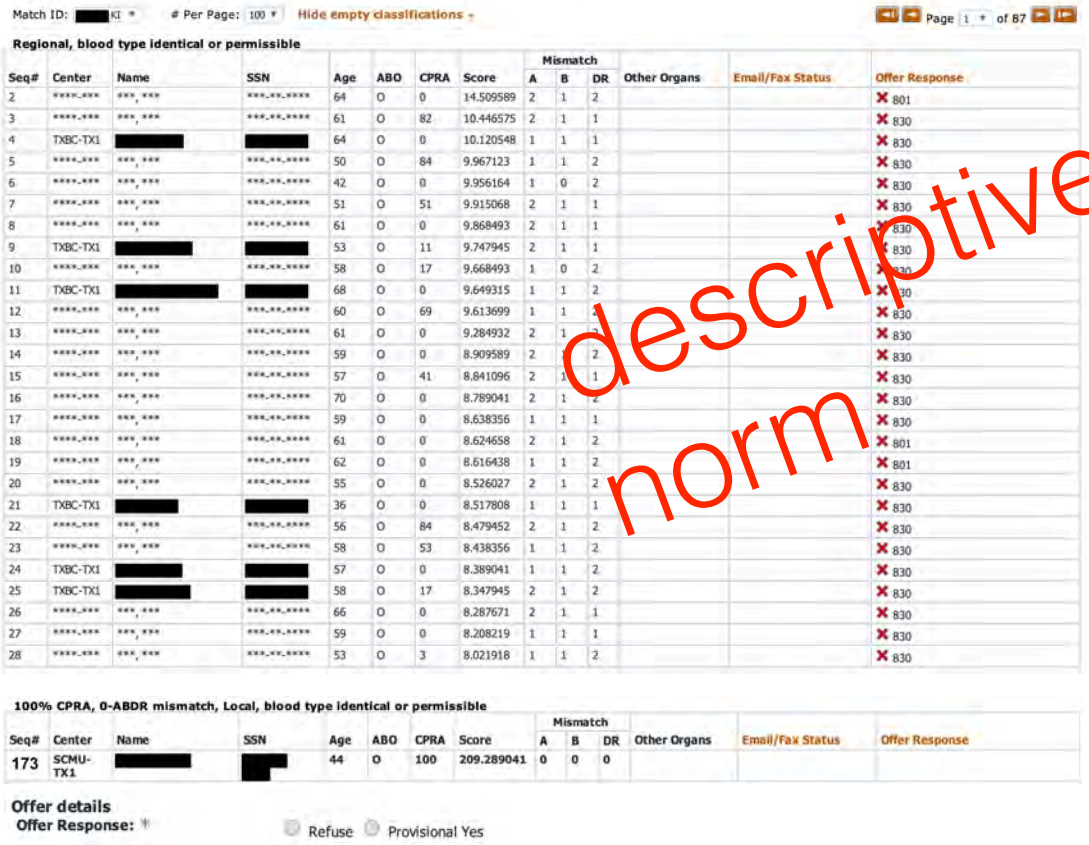
MEDICAL & SOCIAL HISTORY

History of diabetes:	NO
History of cancer:	NO
History of hypertension:	NO
History of coronary artery disease (CAD):	NO
Previous gastrointestinal disease:	NO
Chest trauma:	NO
Cigarette use (>20 pack years) ever:	NO
Heavy alcohol use (2+ drinks/daily):	NO
I.V. drug usage:	NO
According to the OPTN policy in effect on the date of referral, does the donor have risk factors for blood-borne disease transmission:	NO

Medical & social history comments:

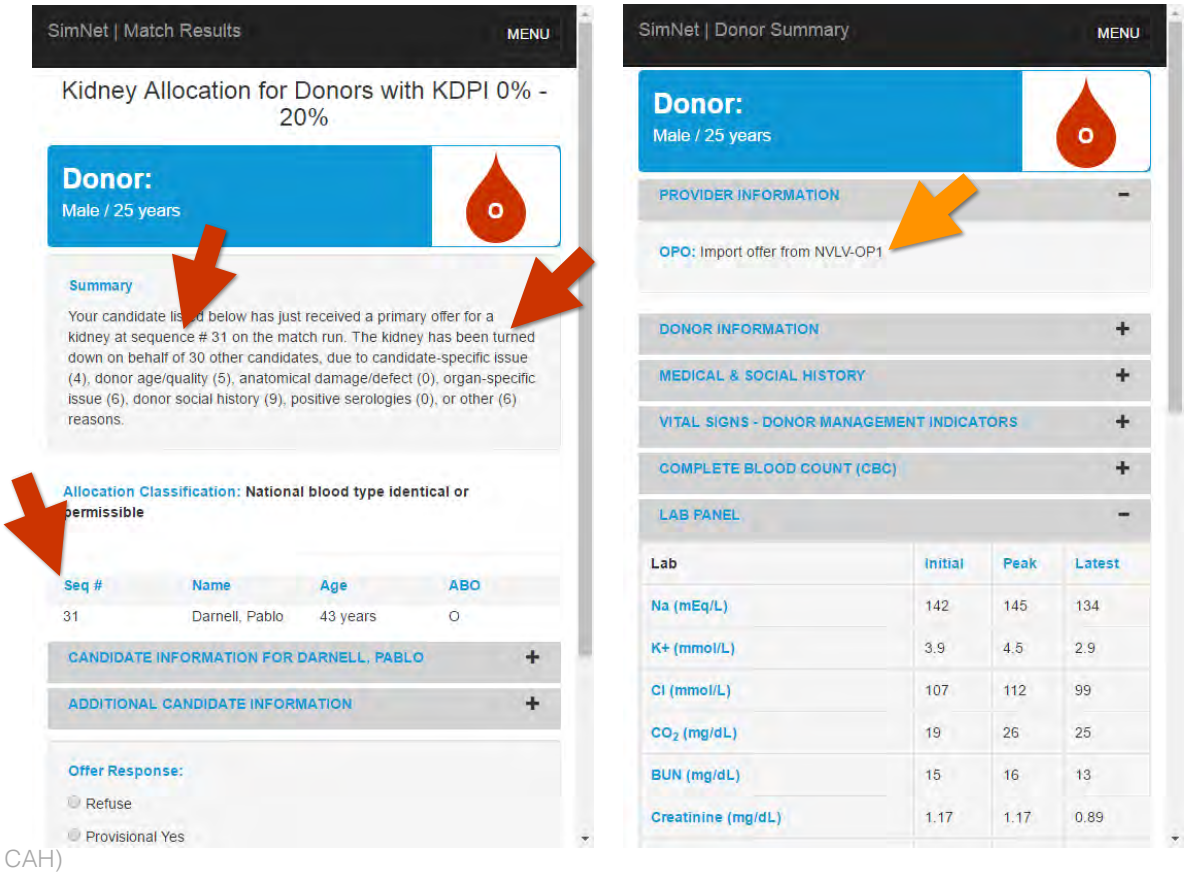
See DRAI

Stewart et al. (with CAH) redacted



Stewart et al. (with CAH)

redacted



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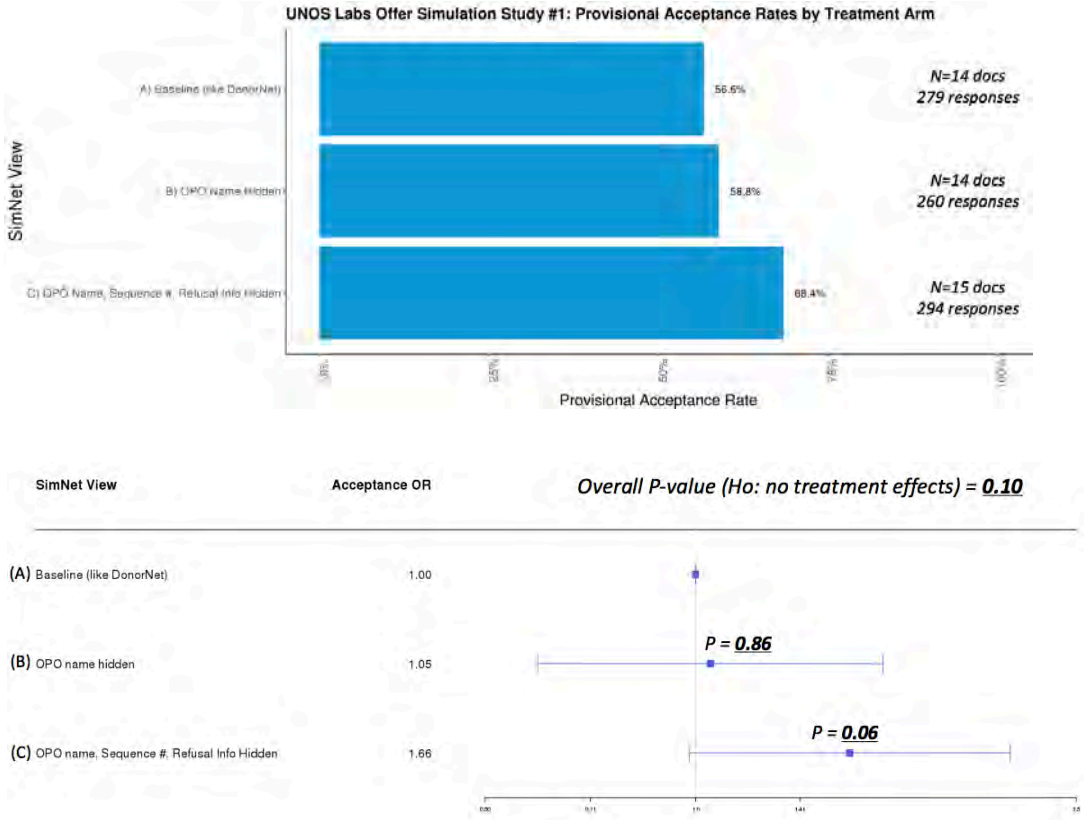

Stewart et al. (with CAH)

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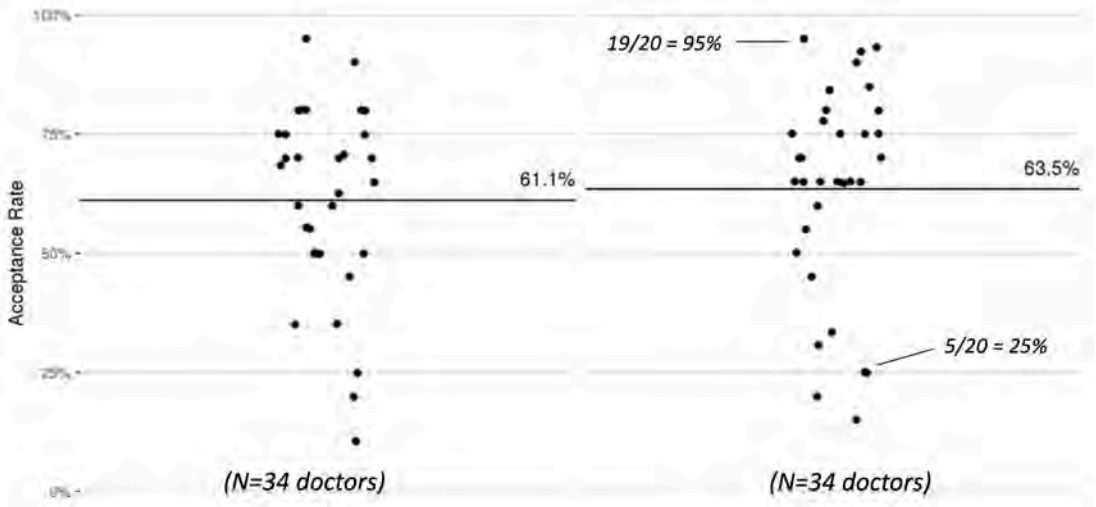

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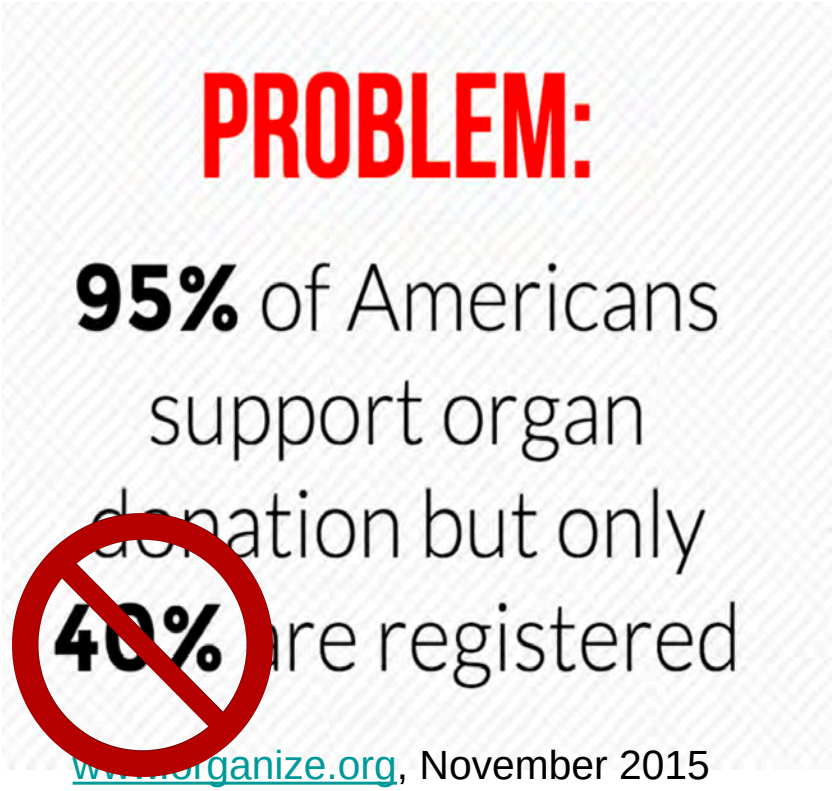


www.organize.org, November 2015

Lindemans, Kessler, Jiang, & Ariely (CAH)

INJUNCTIVE NORM

1% registered

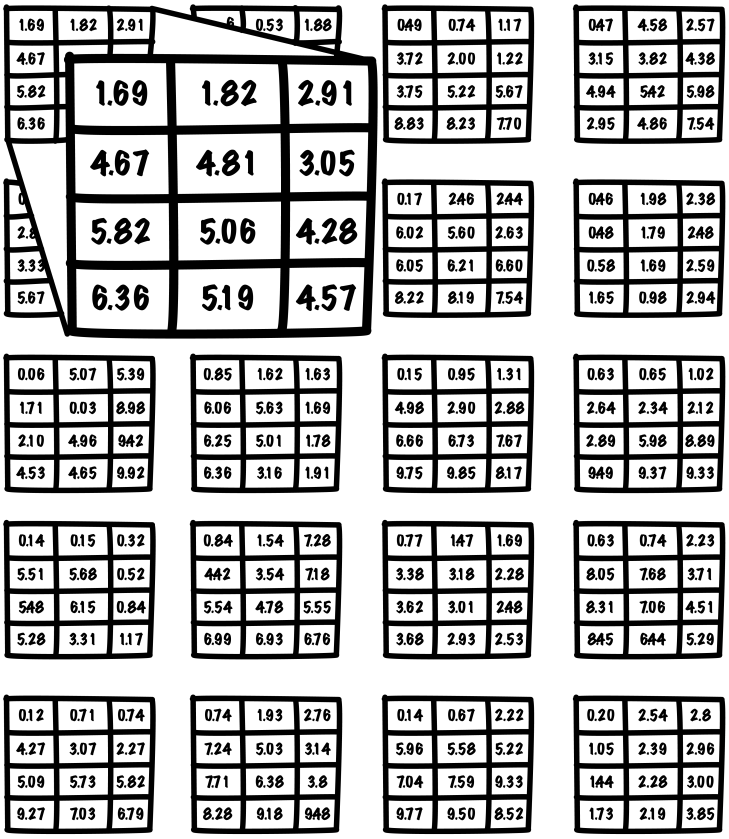
5% registered

Lindemans, Kessler, Jiang, & Ariely (CAH)

Habyarimana & Jack, 2011

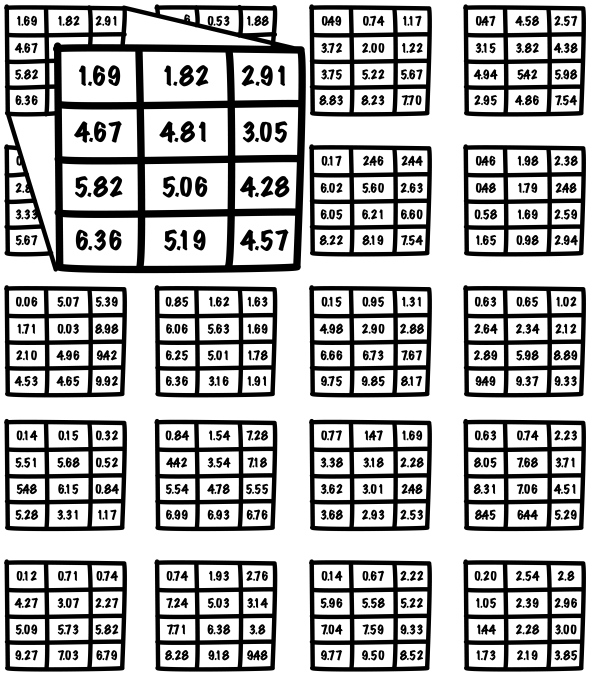
1.69	1.82	2.91
4.67	4.81	3.05
5.82	5.06	4.28
6.36	5.19	4.57

Gino, Ayal and Ariely, 2009



Gino, Ayal and Ariely, 2009

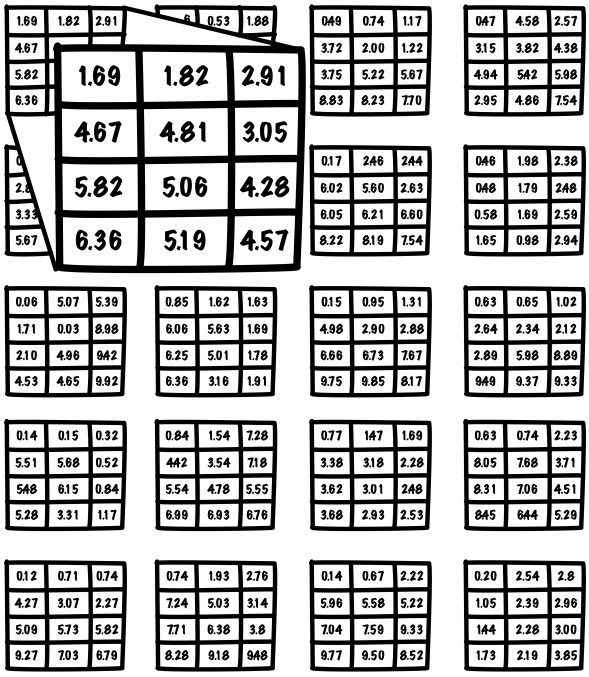
Ingroup–outgroup bias



- Conditions
  - Control
  - Shredder
  - And confederate
  - And he wears University of Pittsburg T-shirt
- Result: control (~7) < Pitt T-shirt (~9) < no confederate (~12) < plain T-shirt (~15)
- Universal masking: the 3rd year student who spoke up…

Gino, Ayal and Ariely, 2009

Self-concept maintenance



- Conditions
  - Control
  - Shredder
  - And token

- Result: control (~3.5) < no token (~6) < token (~9.5)
- Categorization malleability
- Universal masking: “We’re 100% compliant. … In break rooms and working rooms it’s sort of half-half.”

Mazar, Amir, & Ariely, 2008

Some pieces of the masks/distancing puzzle

- Real people vs *Homo economicus*
- System 1 vs system 2
- Present bias, precommitment
- Implementation intentions
- Decision fatigue, breaks
- Default bias, status quo bias, friction
- Cognitive vs affective vs behavioral nudges
- Optimism bias
- Injunctive vs descriptive norms
- Ingroup–outgroup bias
- Self-concept maintenance, categorization malleability

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https://advanced-hindsight.com/health-research/

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