



*ABC guide to ADRD research*  
*June 7, 2022*



# Cognition/ADRD work using secondary data

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# Data collected for other purposes

- Public datasets: HRS & int'l, NHATS, NSHAP, & many many others

## Publicly Available Databases for Related Secondary Analyses in Health and Social Sciences

The databases included in this document have been supported by the National Institute on Aging.

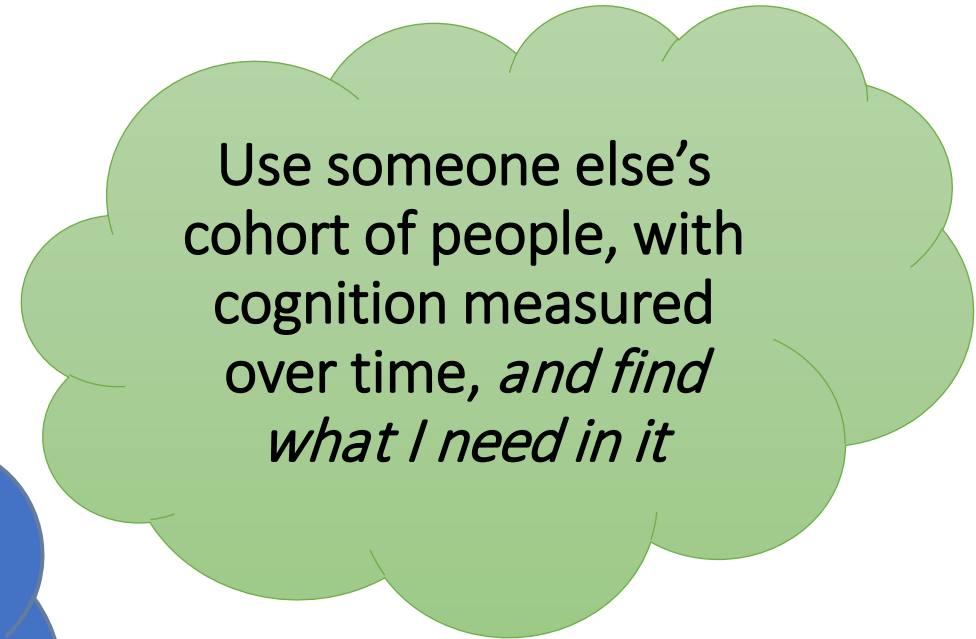
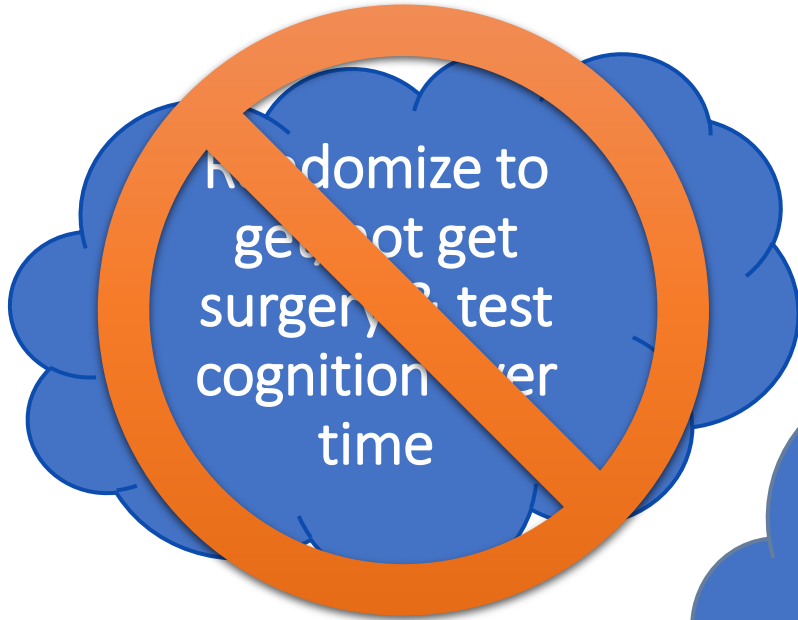
- Secondary analyses of trials
- EMR/billing/administrative





# Evolution of a research question

- Does surgery/anesthesia cause cognitive decline in older adults?



# Evolution of a research question

- Does surgery/anesthesia cause **cognitive decline** in older adults?
- Does surgery/anesthesia cause long-term memory ↓ / ADRD in older adults?

- Older adults
- Long-term
- Cognition

HRS | HEALTH AND  
RETIREMENT  
STUDY

ORIGINAL ARTICLE

Combining Direct and Proxy Assessments to Reduce  
Attrition Bias in a Longitudinal Study

Qiong Wu, PhD,\* Eric J. Tchetgen  
Kellee White, PhD,|| Mahasin Mu

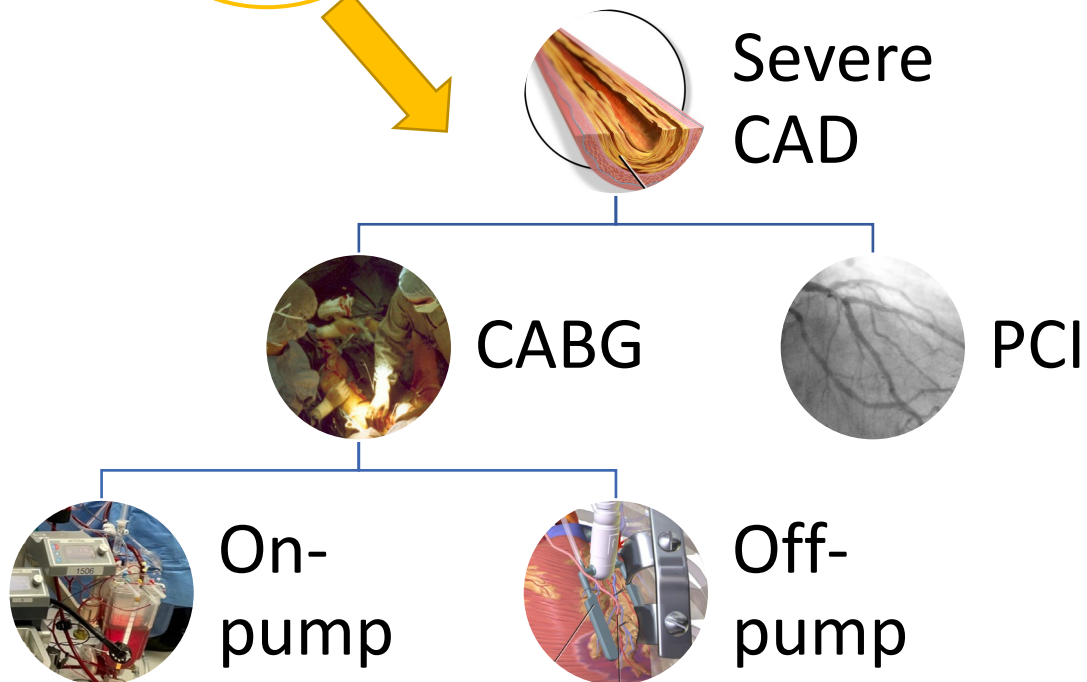
Abstract: Retaining severely impaired individuals poses a m

data on aging

Composite “**memory score**”  
– modeling will be easy,  
interpretation tricky

# Evolution of a research question

- Does surgery/anesthesia cause cognitive decline in older adults?
- Does surgery/anesthesia cause long-term memory ↓ / ADRD in older adults?
- Is CABG associated with different long-term memory ↓ / ADRD compared with PCI in older adults?



PCI AVOIDS:  
Sternotomy (trauma)  
Chronic pain  
General anesthetic  
CPB exposure  
Mechanical ventilation  
ICU stay  
Postoperative delirium

**Hypothesized to CAUSE cognitive decline**

- ~~• \$12m for 10y of cognitive trajectories~~
- \$75k/yr x 2y for 2ary data analysis

<b>9. NAME OF FEDERAL AGENCY*</b> National Institutes of Health		<b>10. CAT</b> TITLE:
<b>11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT*</b> Impact of Coronary Revascularization on Longitudinal Cognitive Change in the Elderly		
<b>12. PROPOSED PROJECT</b>		<b>13. COM</b>
Start Date*	Ending Date*	CA-012
07/01/2018	06/30/2020	



HEALTH INFORMATION    RESEARCH & FUNDING    NEWS & EVENTS    ABOUT NIA

**Grants for Early Medical/Surgical Specialists' Transition to Aging Research (GEMSSTAR)**

Research

JAMA | **Original Investigation**

## Association of Coronary Artery Bypass Grafting vs Percutaneous Coronary Intervention With Memory Decline in Older Adults Undergoing Coronary Revascularization

Elizabeth L. Whitlock, MD, MSc; L. Grisell Diaz-Ramirez, MS; Alexander K. Smith, MD, MPH;  
W. John Boscardin, PhD; Kenneth E. Covinsky, MD; Michael S. Avidan, MB, BCh; M. Maria Glymour, ScD, MS



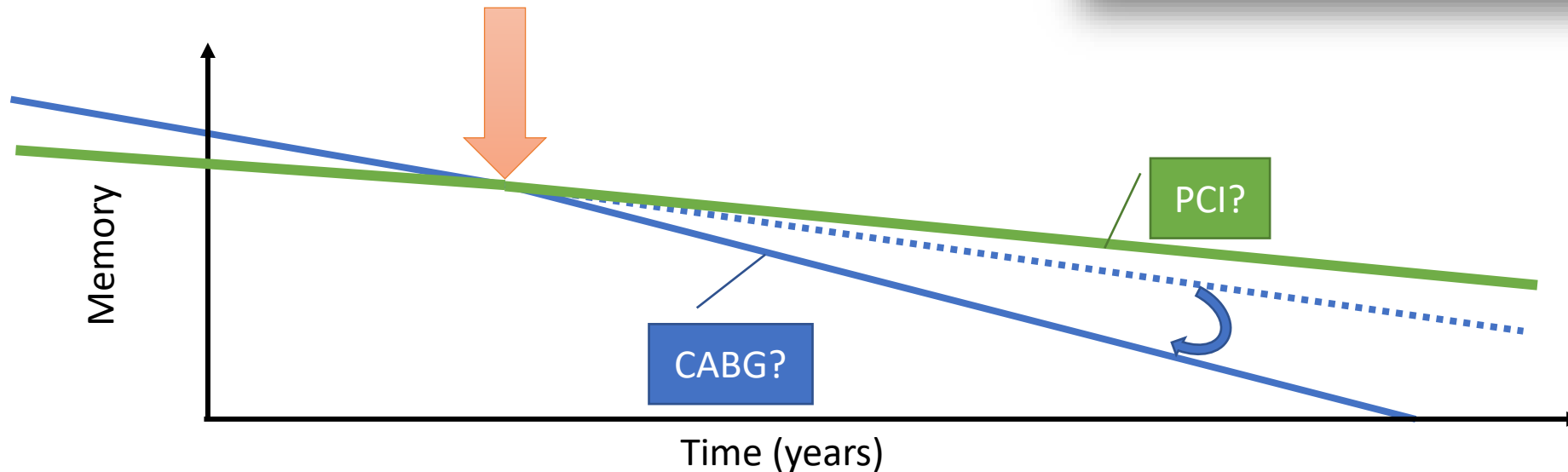
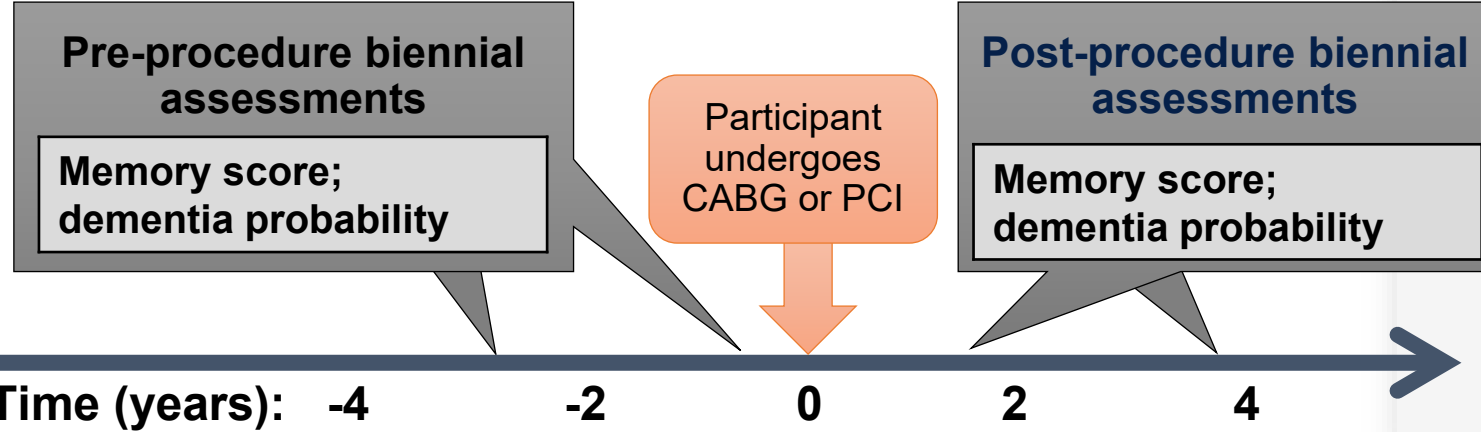
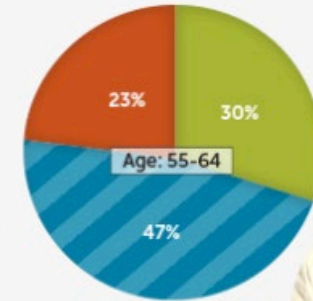
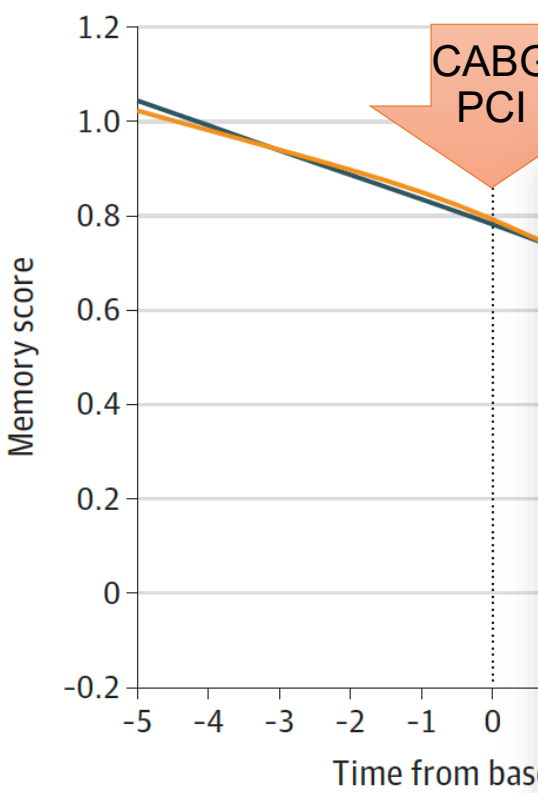
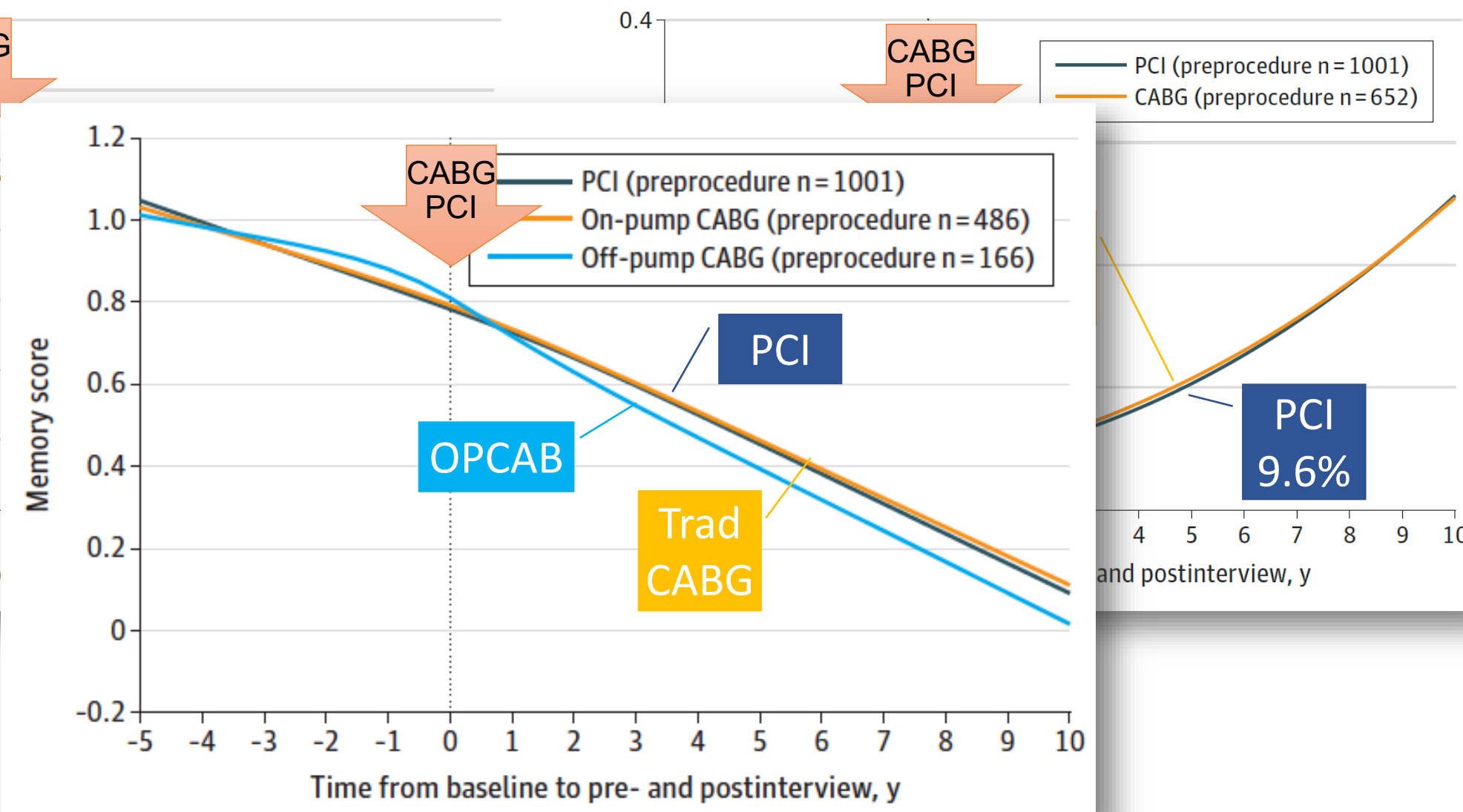


Figure 2. Adjusted Linear Mixed-Effects Models for Memory Score and Dementia Probability for CABG vs PCI Recipients

**A** Memory score

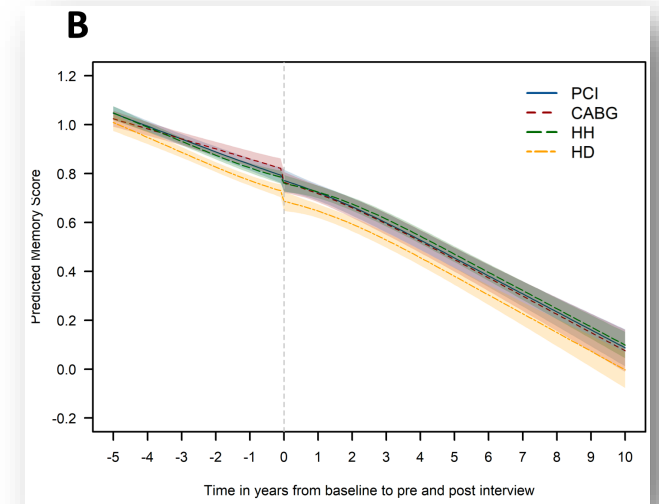


**B** Dementia probability



# Was it REALLY that easy?? Nope.

- Sophisticated 4-arm control strategy to address potential for spurious model findings
- Two methods of confounder adjustment, plus other sensitivity analyses (long Supplement!)
- Reviewers:
  - We don't like this "memory score" thing
  - No causal inference allowed
  - Analytic recommendations



Dementia probability was helpful here  
"Years of cognitive aging" and graphs

This wasn't fair but  
sometimes life isn't fair

"What about MY favorite  
confounder/modeling strategy?"

Ultimately: This study  
could not have been  
done any other way  
(not by me, certainly!).



# Is secondary data right for you?



- *Mentors experienced with your dataset of choice are key.*
  - I found my mentor and my data, and THEN my question
  - Knowing what's *in* your “big data” is a learned skill, especially when it comes to cognition!
- *Do you have a flexible question?*
- *Prove to me there isn't a better way to do this.*
  - Takes too long
  - Too expensive
  - Ethically problematic

} All 3 is best!

# Thanks!



## Mentorship team:

M. Maria Glymour, UCSF Dept of Epidemiology & Biostatistics

Alex K. Smith, UCSF Division of Geriatrics

Ken Covinsky, UCSF Division of Geriatrics

Michael Avidan, Washington University Dept of Anesthesia

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NIH: NIA Pepper Older Americans Independence Center Scholar Award

NIH: NCATS UCSF KL2 Award

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UCSF Anesthesia Department Pathway to Scientific Independence

UCSF Scholars' Track Residency Program

