

# In-person session 10

**March 27, 2025**

PMAP 8521: Program evaluation  
Andrew Young School of Policy Studies

# Plan for today

**Schedule things**

**One little R thing**

**RDD fun times**

# Schedule things

# One little R thing

# Lines across categories

# RDD fun times

**Is there a rule of thumb to determine which quasi-experimental method we should use?**

**How do we know which method applies to which circumstance? Does the data tell us?**

**With RDD we rely on "the rule" to determine treatment and control groups**

**How do you decide on the rule?  
You mentioned that it's arbitrary—  
we can choose whatever rule we want?**



**Can we use RDD to evaluate a program that doesn't have a rule for participation?**

# Can we use a binary running variable?

e.g. someone is eligible for a program if they complete a course

**Do we have to limit  
the data to a bandwidth?**

**How common are these kinds of rules  
in the real world?**



**Andrew Heiss**

@andrewheiss



changing my behavior at the discontinuity by holding off on finishing a couple books until saturday so they count in my 2022 goodreads stats

11:51 PM · Dec 30, 2021 · Twitter for iPhone



**Andrew Heiss** @andrewheiss · Dec 30, 2021



Replying to [@andrewheiss](#)

what're you gonna do about that, econometricians??

**Where do these eligibility thresholds come from? Do policy makers research them first and reexamine them later?**

# Discontinuities everywhere!

Size	Annual	Monthly	138%	150%	200%
1	\$12,760	\$1,063	\$17,609	\$19,140	\$25,520
2	\$17,240	\$1,437	\$23,791	\$25,860	\$34,480
3	\$21,720	\$1,810	\$29,974	\$32,580	\$43,440
4	\$26,200	\$2,183	\$36,156	\$39,300	\$52,400
5	\$30,680	\$2,557	\$42,338	\$46,020	\$61,360
6	\$35,160	\$2,930	\$48,521	\$52,740	\$70,320
7	\$39,640	\$3,303	\$54,703	\$59,460	\$79,280
8	\$44,120	\$3,677	\$60,886	\$66,180	\$88,240

**Medicaid**  
138%\*

**ACA subsidies**  
138–400%\*

**CHIP**  
200%

**SNAP/Free lunch**  
130%

**Reduced lunch**  
130–185%

# The US's official poverty measure



Mollie Orshansky

**Formula created in 1963**

**Based solely on food expenses from a survey of household budgets in 1955**



# The US's official poverty measure

Official formula:

**1955 annual food budget × 3**

That's all!

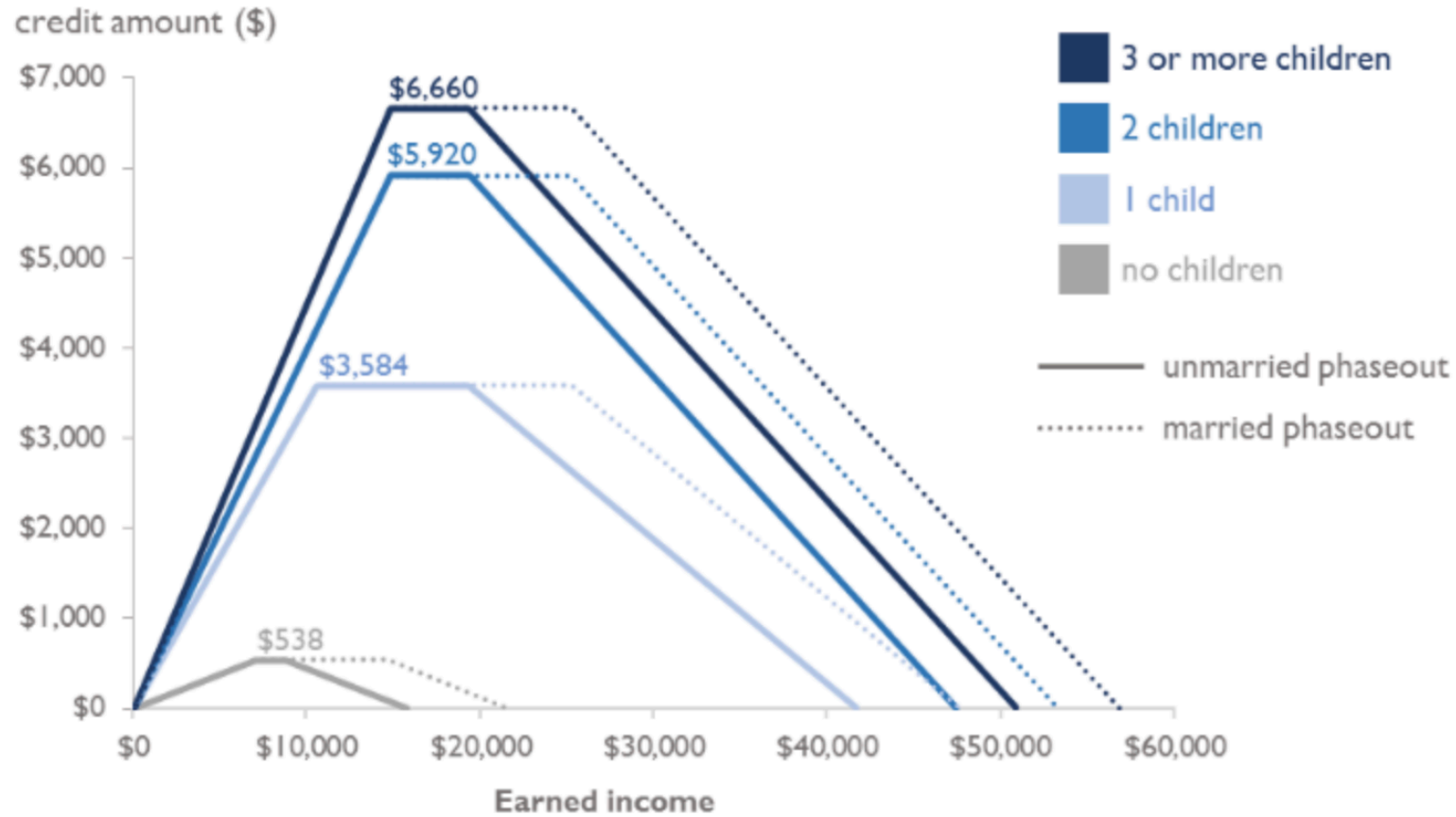
In 1963 poverty line was 50% of median income;  
in 2005 it was 28%; 18% today

# Why don't we change it?

A New Formula for Poverty - The West Wing



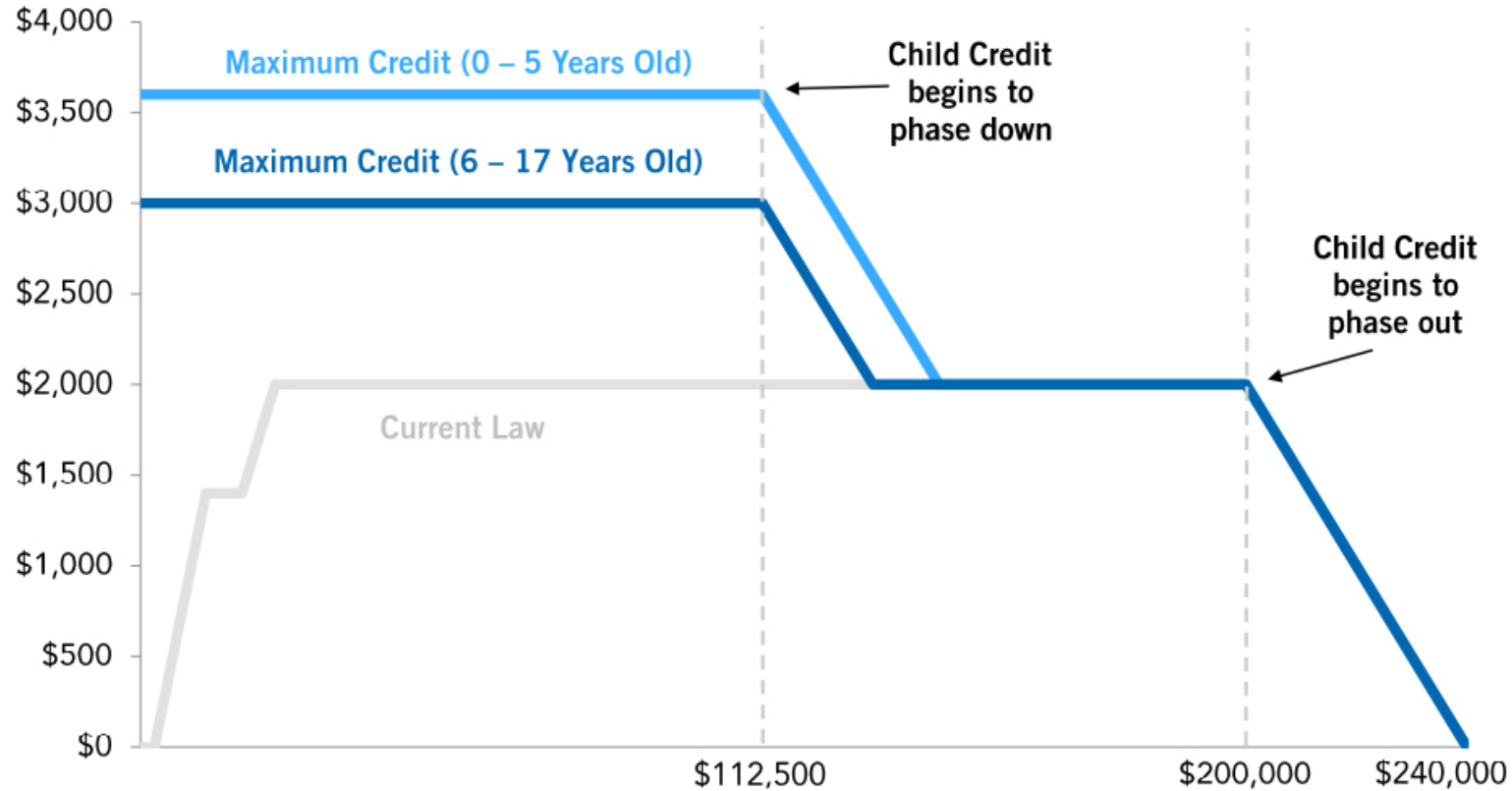
## EITC Amount by Number of Qualifying Children, Marital Status, and Income, 2020





## The Child Tax Credit is fully refundable under the American Rescue Plan

CTC FOR A SINGLE PARENT WITH ONE CHILD FOR 2021 (DOLLARS)



SOURCE: Congressional Research Service, *The Child Tax Credit: Temporary Expansion for 2021 Under the American Rescue Plan Act of 2021*, March 2021.

NOTE: Single parent is assumed to file as head of household.

© 2021 Peter G. Peterson Foundation

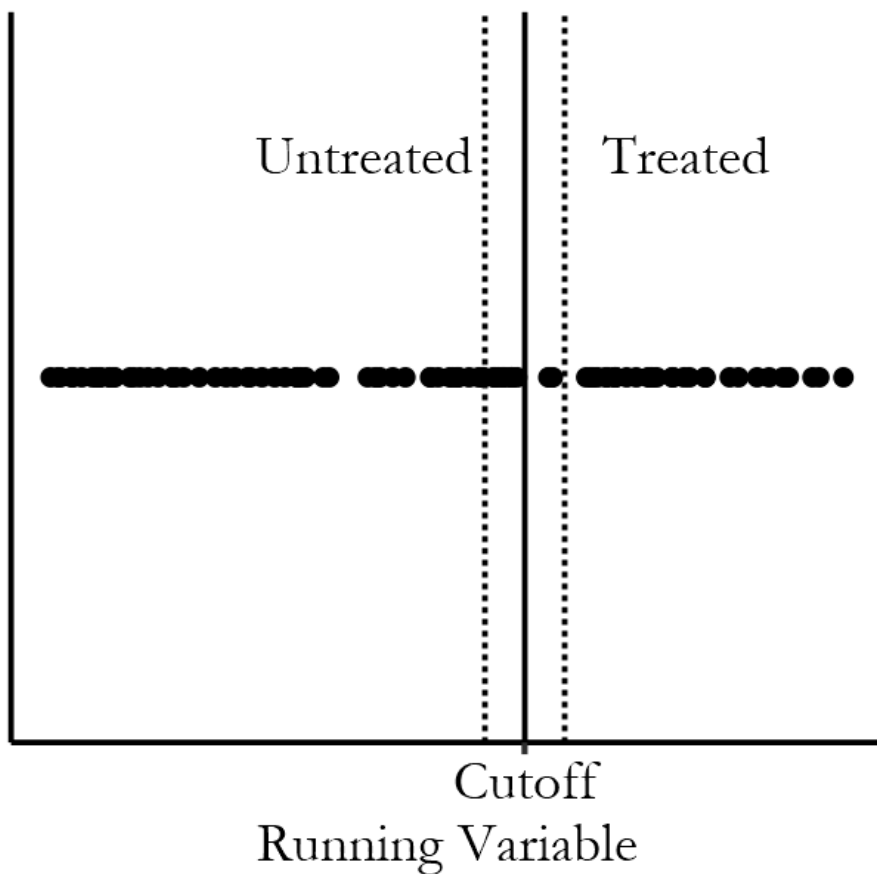
**Why does the cutoff need  
to be unique to the  
program of interest?**

## What if there are multiple cutoffs?

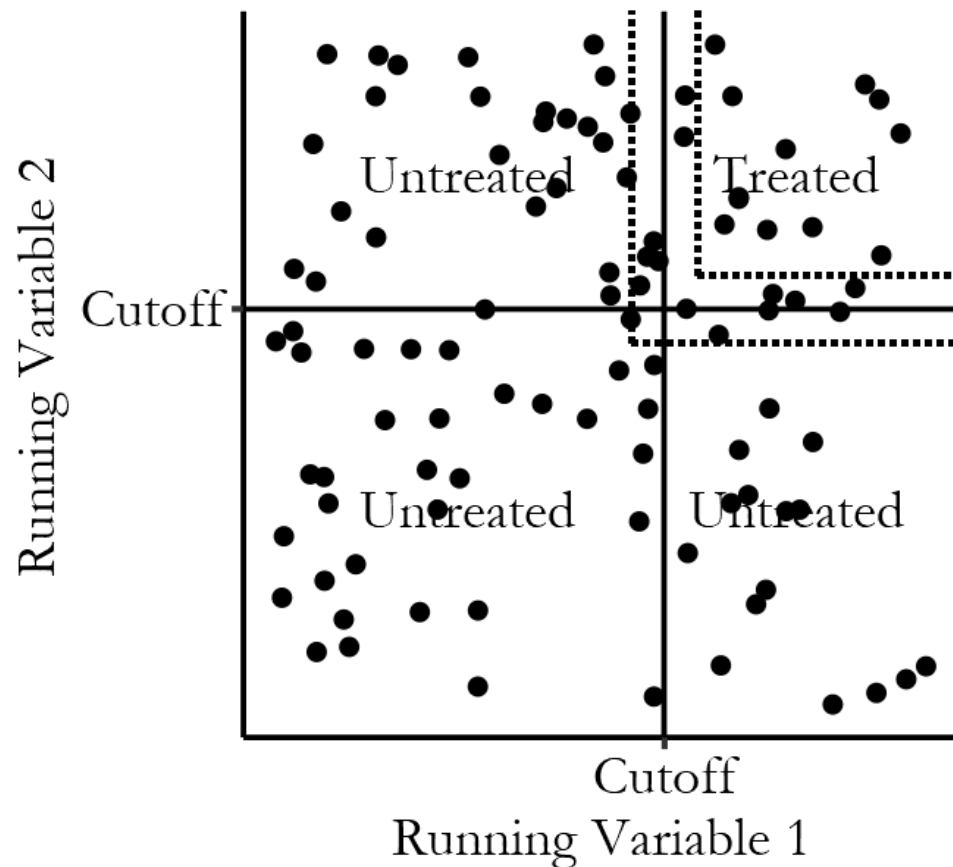
College admission is based on GPA *and* test scores...

WIC/SNAP/Medicaid are based on income *and* family size...

(a) One Running Variable



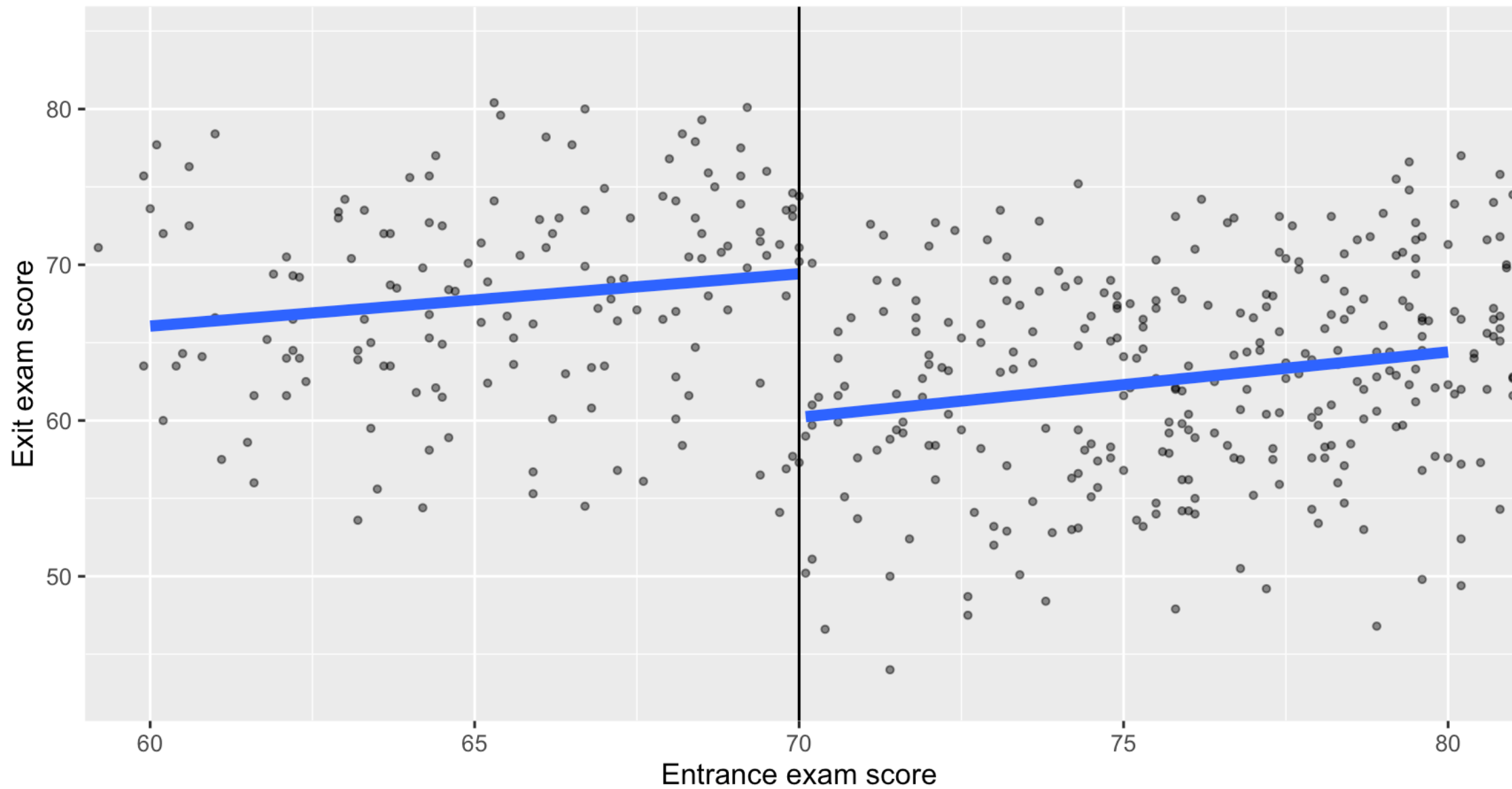
(b) Multiple Running Variables



**Why do we center  
the running variable?**



**Regression is just fancy averages!**



```
lm(exit_exam ~ entrance_exam + tutoring,  
    data = filter(tutoring, entrance_exam <= 80,  
                   entrance_exam >= 60)) %>%  
tidy()
```

```
## # A tibble: 3 × 5
```

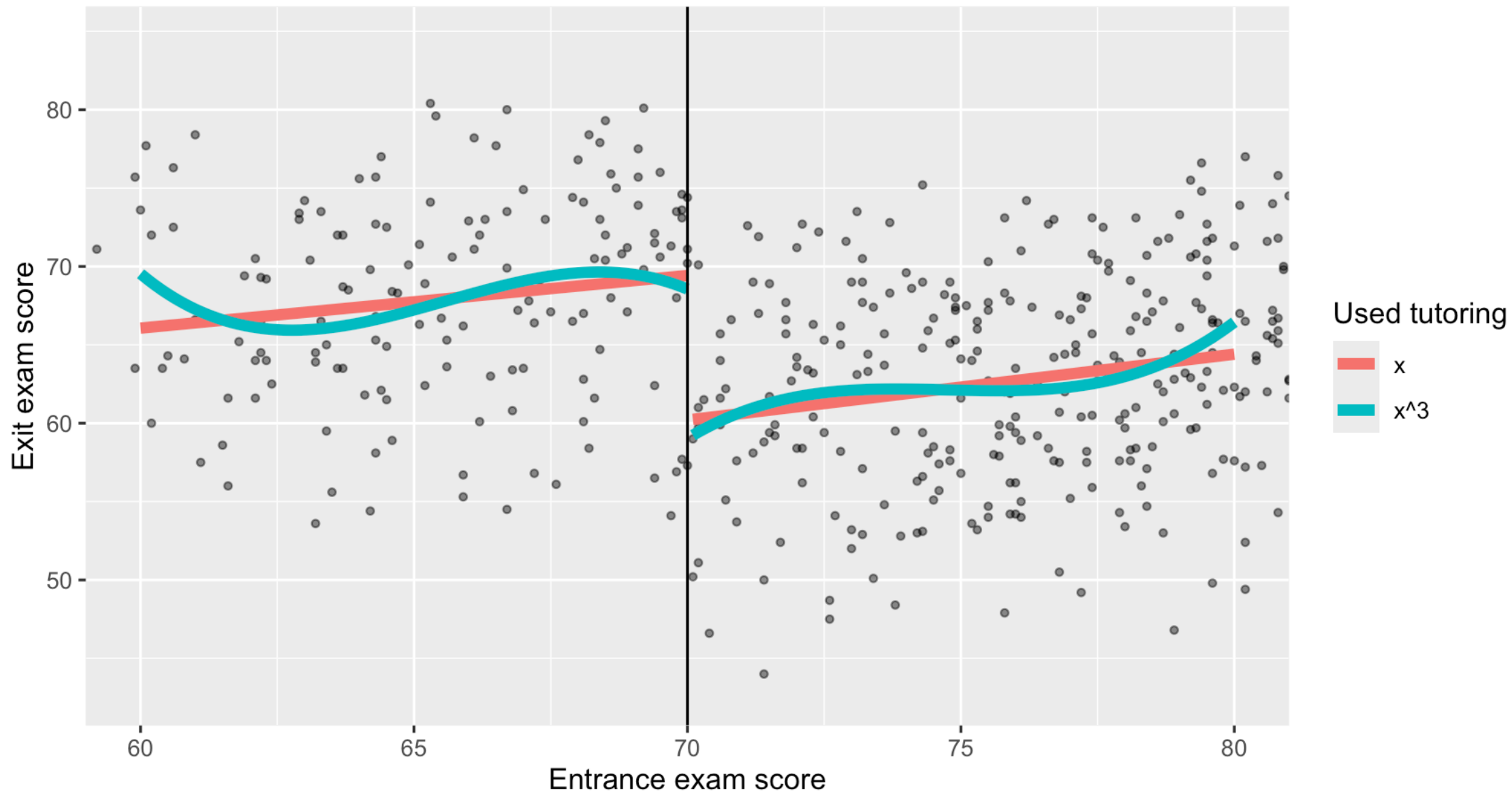
##	term	estimate	std.error	statistic	p.value
##	<chr>	<dbl>	<dbl>	<dbl>	<dbl>
## 1	(Intercept)	33.2	8.64	3.84	1.43e- 4
## 2	entrance_exam	0.388	0.114	3.40	7.45e- 4
## 3	tutoringTRUE	9.27	1.31	7.09	6.27e-12

```
tutoring_centered <- tutoring %>%
  mutate(entrance_centered = entrance_exam - 70)

lm(exit_exam ~ entrance_centered + tutoring,
  data = filter(tutoring_centered, entrance_exam <= 80,
    entrance_exam >= 60)) %>%
  tidy()
```

```
## # A tibble: 3 × 5
```

##	term	estimate	std.error	statistic	p.value
##	<chr>	<dbl>	<dbl>	<dbl>	<dbl>
## 1	(Intercept)	60.4	0.752	80.3	2.99e-249
## 2	entrance_centered	0.388	0.114	3.40	7.45e- 4
## 3	tutoringTRUE	9.27	1.31	7.09	6.27e- 12



**What's the difference between weighting with kernels and inverse probability weighting?**

**There must be some math behind for the non-parametric lines. Should we care about that or should we just trust in R?**

**Should we control for confounders?**



# How do we decide on the right model?

Parametric with  $y = x$ ?

With  $y = x^2 + x$ ?

With  $y = x^{\text{whatever}} + x^{\text{whatever}} + x$ ?

Nonparametric?

`rdrobust()` or just `lm()`?

Controls or no controls?

**How do you justify a bandwidth?**

**Does the bandwidth need to be  
the same on both sides?**

**How should we think about the impact of the program on people who score really high or low on the running variable?**

**If we're throwing most of the data away and only looking at a narrow bandwidth of people, what does this say about generalizability?**

**What do we do about noncompliance  
and manipulation?**

**Fuzzy regression discontinuity!**

# Why wait for fuzzy regression discontinuity?

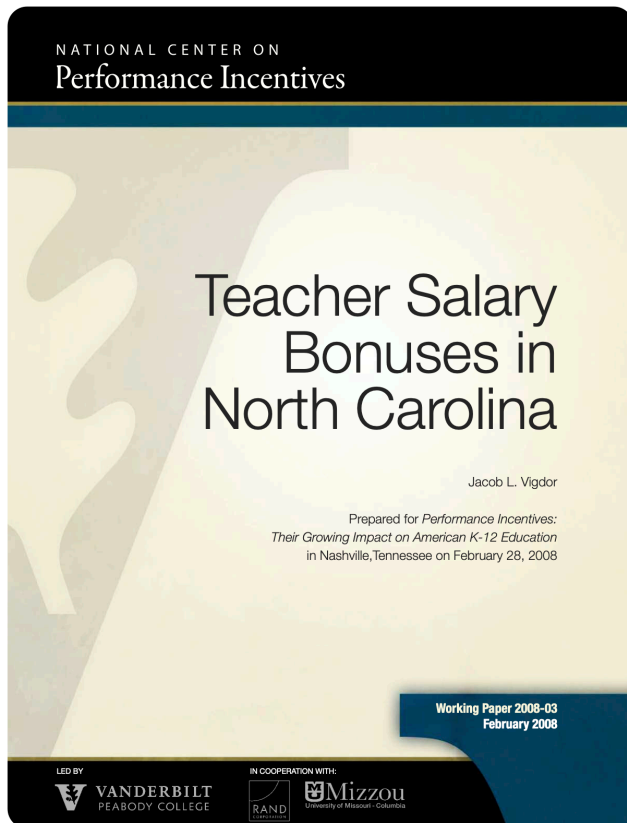
It's RD + instrumental variables

# Can other quasi-experimental methods be combined too?

Difference in discontinuity!  
Diff-in-diff + RD

<https://doi.org/10.1016/j.jebo.2023.12.001>

**RD play time!**



Teachers in North Carolina Public schools earn a bonus of \$750 if the students in their school meet a standard called "expected growth." A summary statistic called "average growth" is computed for each school; the expected growth standard is met when this summary measure exceeds zero.

Does getting a bonus in year  $t$  cause improved student performance in year  $t + 1$ ?