

Building Knowledge about What Works:

Using **RCT-YES** in Your Evaluations

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Overview of Presentation

- What is *RCT-YES* ?
- Demo with hypothetical data
- What are the key features of *RCT-YES*?
- How can it be run?
- Key statistical concepts
- Then the fun begins!

Hypothetical RCT for the *RCT-YES* Demo

- Intervention is an after-school program with an academic focus
- Assume 39 middle schools randomized to a treatment or control group in 10 school districts
- Sample contains 2,256 5th graders
- Key research questions:
 1. Did the after-school program improve student math and reading test scores?
 2. Did impacts differ by gender?

Description of Variables in RCT Data File

Name	Description	Values
DISTRICT	District (Block) ID (masked)	1 to 10
SCHOOL	School (Cluster) ID (masked)	1 to 39
TREATMENT	Treatment-control indicator	1 = Trt., 0 = Ctrl.
MATH_SCORE	Spring math test score	0 to 100
READ_SCORE	Spring reading test score	0 to 100
GENDER	Gender indicator variable	1 = Girls, 0 = Boys
SG_MATH_PROF	Math proficiency in prior year	1 = Not proficient 2 = Proficient 3 = Highly proficient
SG_READ_PROF	Reading proficiency in prior year	1 = Not proficient 2 = Proficient 3 = Highly proficient
PRIOR_MATH_SCORE	Math score in prior year	0 to 100
PRIOR_READ_SCORE	Read score in prior year	0 to 100

Selected Variables in Student-Level Data File

DISTRICT	SCHOOL	TREATMENT	MATH_SCORE	GENDER	PRIOR_MATH_SCORE
1	1	0	62	1	58
1	1	0	66	1	76
1	1	0	70	0	74
1	1	0	e	0	40
1	1	0	62	1	65
1	2	1	65	1	64
1	2	1	56	0	64
1	2	1	61	0	63
1	2	1	68	e	e
...

Why *RCT-YES* ?

- Analyzing experimental or observational studies often requires
 - Extensive knowledge of statistical methods,
 - Software skills in programs such as Stata, R, SAS, or SPSS,
 - Most importantly, a significant amount of time programming multiple analyses
- Yet many analyses share common features which could be automated
- *RCT-YES* is a free, user-friendly set of tools for analyzing experimental and observational studies

What Is **RCT-YES** ?

- Tool for analyzing and reporting RCT and QED data
- Funded by IES to support “opportunistic” experiments
- Key features
 - User-friendly and free: targets a broad audience
 - Covers a full range of RCT and QED designs
 - Requires a treatment and control (comparison) group
 - Available in R or Stata: no programming needed
 - Reports findings in formatted tables that address some data disclosure issues
 - Contains a graphics application to plot results

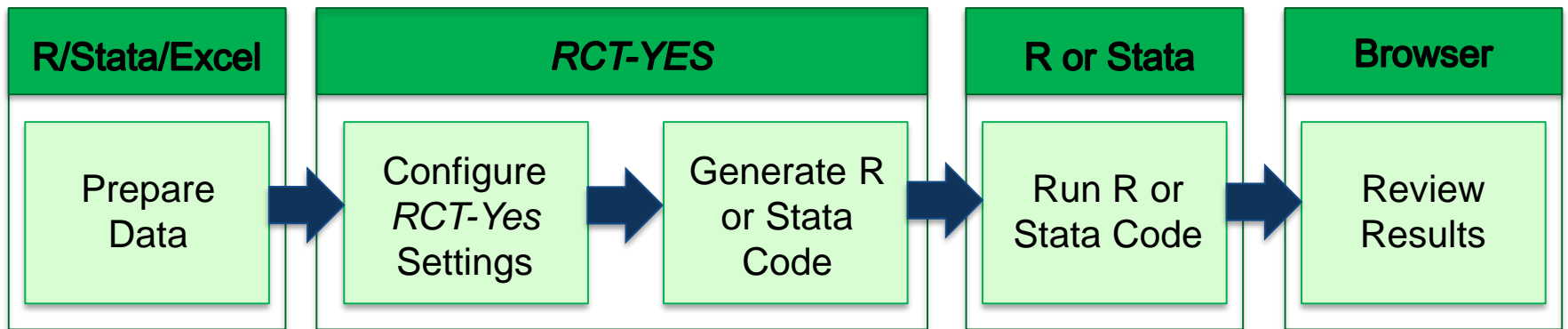
Causal Research Questions Addressed

- 1. What are average effects of the intervention for the full sample?**
- 2. Do intervention effects differ for key subgroups defined by their baseline characteristics?**

Conducts Full Range of Core Analyses

- Conducts statistical tests of significance
 - Performs multiple comparisons adjustments
- Allows for both continuous and binary outcomes
- Estimates impacts on the offer and receipt of intervention services
- Accommodates weights and baseline covariates
- Conducts baseline equivalence analyses
- Helps protect personal identifying information

RCT-YES Workflow



Design-Based Approach

- **Nonparametric**
- **Allows for heterogeneity of impacts across individuals, blocks, and clusters**
- **Does not assume error terms and covariates enter the model linearly**
- **Uses randomization and sampling principals to derive the error terms and models**

Randomization and Sampling

- **Results depend on**
 - **Whether study participants are randomly selected from a larger population**
 - **Whether assignment to treatment happens within blocks**
 - **Whether individuals or groups are assigned to treatment**

Sampling and Randomization Examples

- **Sampling**
 - A group of school districts applies for grants, agreeing to participate in an evaluation (finite population)
 - Career centers are randomly chosen from the northeastern United States to participate in evaluation (super population)
- **Randomization**
 - Intact classrooms in one school are randomly assigned to smaller classes (clustering)
 - Within each participating hospital doctors are randomly assigned to shorter shifts (blocking)

Depiction of the Clustered, Blocked Design

Random Assignment of Schools in a Single School District

Treatment
Schools

Control
Schools



The RCT design repeats this figure for each district

Estimating Population and Sample Parameters

	Clusters	Individuals
Sample Average Treatment Effect (SATE)	Not randomly sampled	Not randomly sampled
Cluster Average Treatment Effect (CATE)	Not randomly sampled	Randomly sampled
Unit Average Treatment Effect (UATE)	Randomly sampled	Not randomly sampled
Population Average Treatment Effect (PATE)	Randomly sampled	Randomly sampled

Now For the Fun...

Teach For America Study

- **Examines the effect of Teach For America teachers on student math and reading scores (and other outcomes)**
- **Schools from six large metropolitan areas participated**
- **Students were administered a pre-test in the fall, and a post-test in the spring**

Selected Variables in the TFA File

blockid	pre_m	nce_m	gender	hispanic	race
18	1	10	1	.m	Black
17	1	19	1	.m	Black
29	37	24	0	0	Black
18	23	15	0	.m	Black
25	26	24	1	0	Black
35	37	40	0	0	Black
35	26	20	1	0	Black
14	43.90677	36.111391	0	1	Asian/PI/ Missing
18	37	25	0	1	Asian/PI/ Missing
...

What To Do

- Read more about the study
- Enter key parameters into *RCT-YES* handouts
- Review the output in *RCT-YES*

Coming Soon...

- Targeting end of May for release
- ***RCT-YES*** User's Manual
 - Step-by-step instructions on how to download and run the program using examples
 - Mini-RCT course
 - Information on free R software

For More Information

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