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Abdul Latif Jameel Poverty Action Lab Executive Training: Evaluating Social Programs  
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# How to randomize II

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# Outline

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- I. Methods of randomization (recap)
- II. Unit of randomization
- III. Multiple treatments: an example
- IV. Stratification
- V. Mechanics of randomization

# Methods of randomization—recap

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Design	Most useful when	Advantages	Disadvantages
<b>Basic lottery</b>	Program oversubscribed OK for some to get nothing	Familiar Easy to understand Easy to implement Can be implemented in public	Control group may not cooperate Differential attrition
<b>Phase in</b>	Expanding over time Everyone must receive treatment eventually	Easy to understand Constraint easy to explain Control comply as expect to benefit later	Anticipation of treatment may impact short run behavior Difficult to measure long term impact
<b>Rotation</b>	Everyone must get something at some point, not enough resources a year for all	More data points than phase in	Difficult to measure long term
<b>Encouragement</b>	Program has to be open to all comers  When take up in general is low but can be impacted with incentive easily.	Can randomize at individual level even when program isn't	Measures impact of those who respond to the incentive  Need big enough enducement to get change in take up  Encouragement may have direct effect

# Unit of randomization

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- Randomizing at the individual level
- Randomizing at the group level
  - School
  - Community
  - Health center
  - District
- Which level to randomize at?

# Unit of randomization

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- Individual randomization gives you a bigger sample size at lower cost
- Politically may be difficult to have unequal treatment within a community
- Program can only be implemented at a certain level
- Spillovers
- Encouragement—program implemented at community/district level, randomization at individual level

# Multiple treatment: an example

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- Problems identified in Balsakhi case
  - Large class size
  - Children at different levels of learning
  - Teachers often absent
  - Curricula inappropriate for level of poor children
- Possible responses
  - More teachers to split classes
  - Streaming of pupils into different achievement bands
  - Make teachers more accountable, may show up more
  - Curricula focused on the basics

# Balsakhi study's solution

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- Balsakhi study
  - Each school got a Balsakhi (a tutor)—in grade 3 or 4
  - Lowest achieving children sent to Balsakhi half day
  - All children given test
- Do smaller class sizes improve test scores?
  - Compare high achieving pupils in treatment and control
- Does an accountable teacher get better results?
  - Compare treatment effect for low vs. high achieving
  - But low achieving get different teacher and different curricula
- Does streaming improve test scores?
  - Compare high achieving pupils in treatment and control
- Does focusing on the basics improve results?
  - Compare treatment effect for low vs. high achieving
  - But same as for accountable teacher

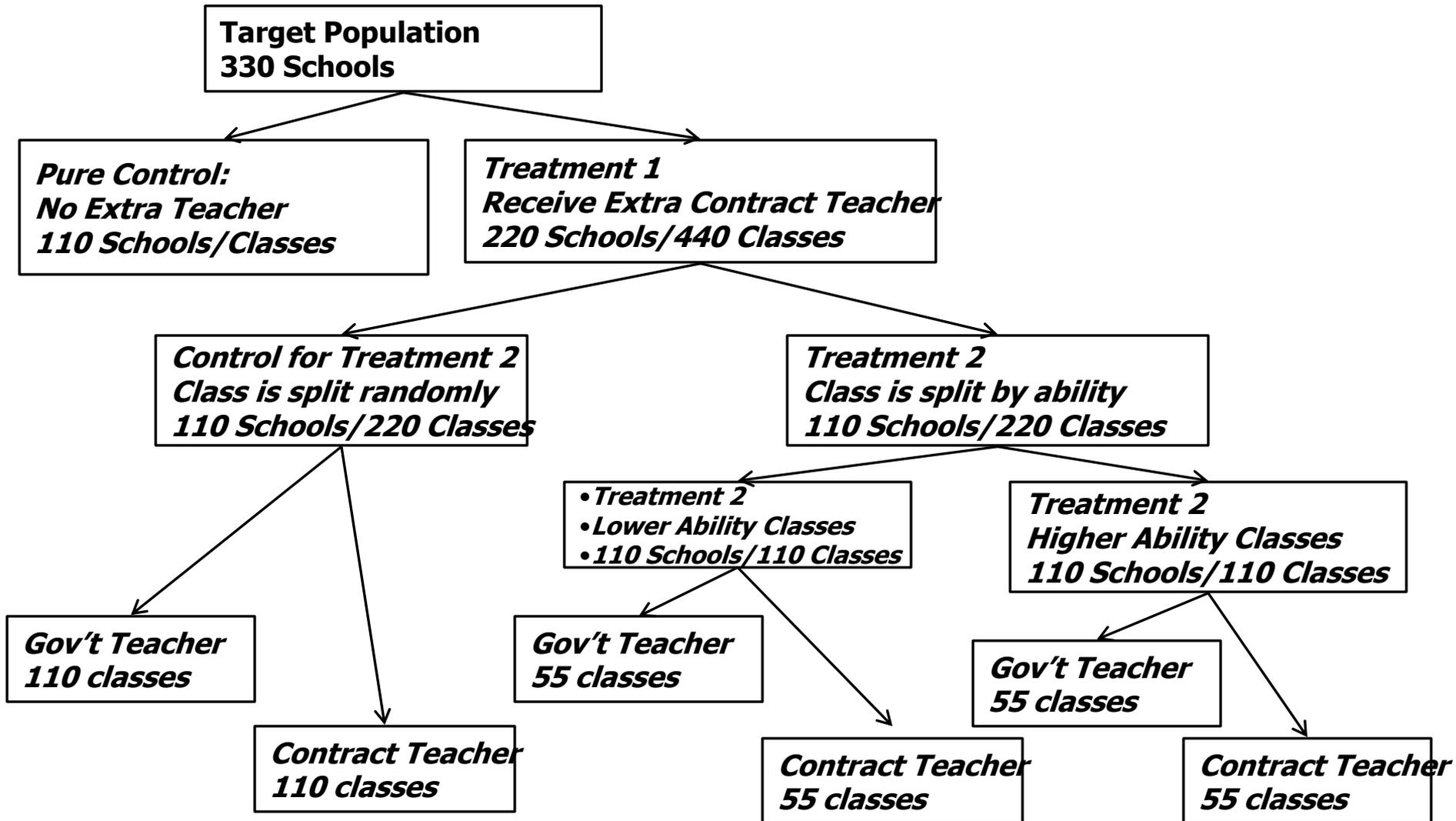
# Alternative with multiple treatments

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- Do smaller class sizes improve test scores?
  - Add new teachers
- Does accountable teacher get better results?
  - New teachers more accountable
  - Randomize who gets new accountable teacher
- Does streaming improve test scores?
  - Divide some classes by achievement, others not
- Does focusing on basics improve results?
  - Treatment effect on lower achievement groups
  - Train some to focus on basics

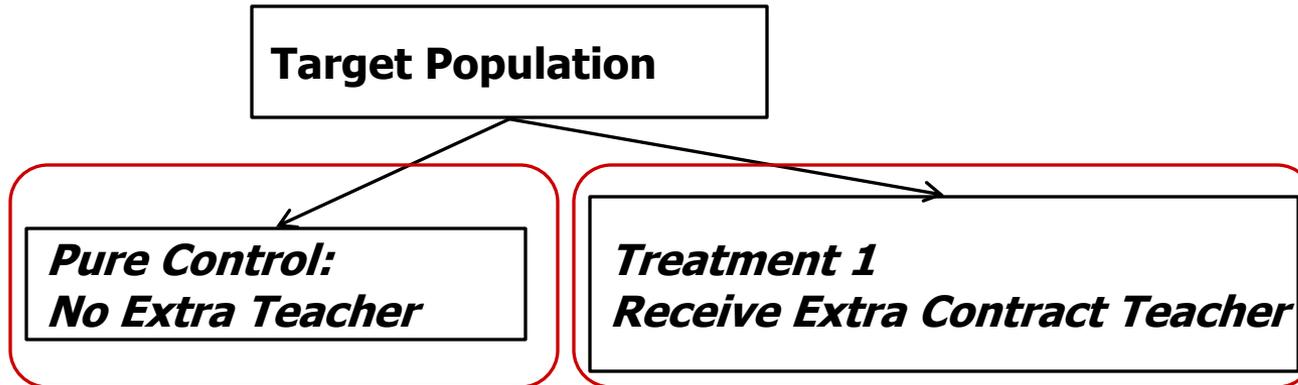
# Example: extra teacher provision

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# Example: extra teacher provision

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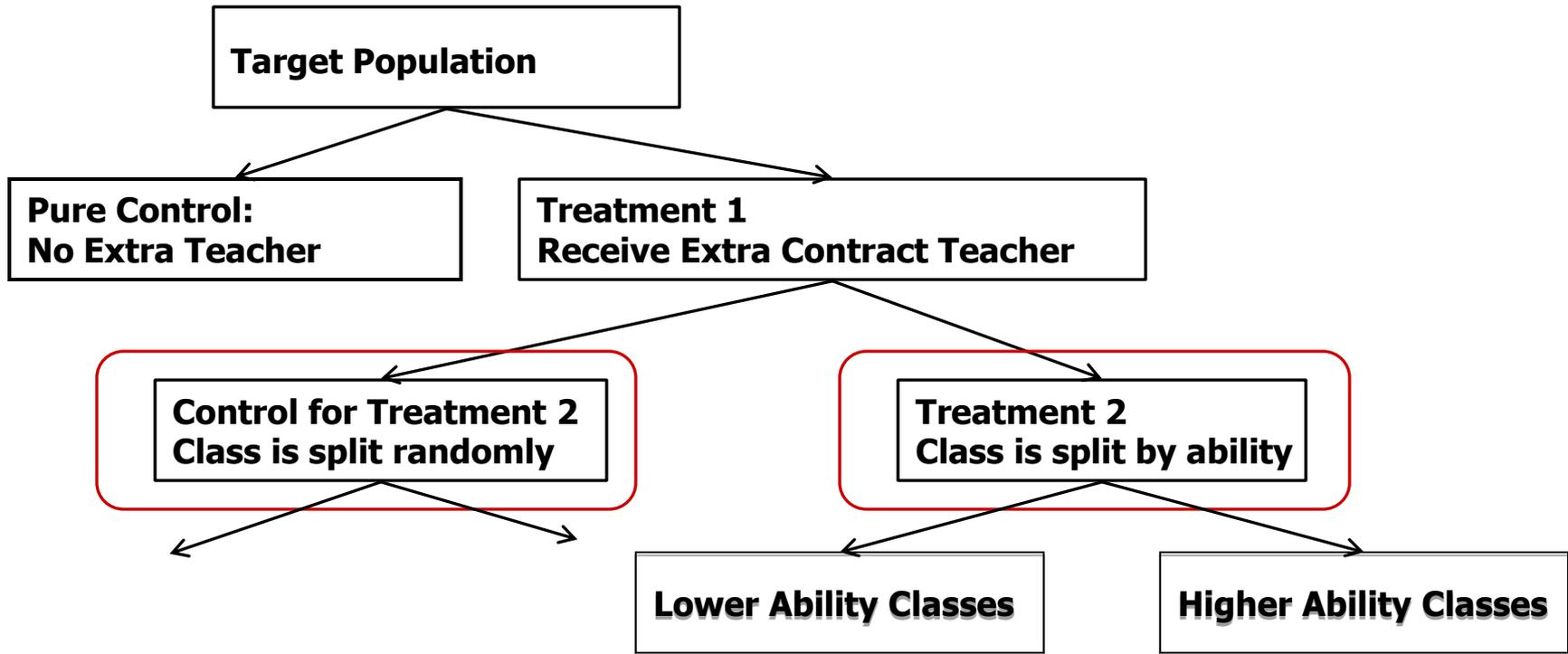


Hypothesis 1: Providing extra teachers leads to better educational outcomes (i.e. through reduced class size).

Secondary Hypothesis: Providing extra teachers leads to better educational outcomes for low-performing children

# Example: grouping classes by ability

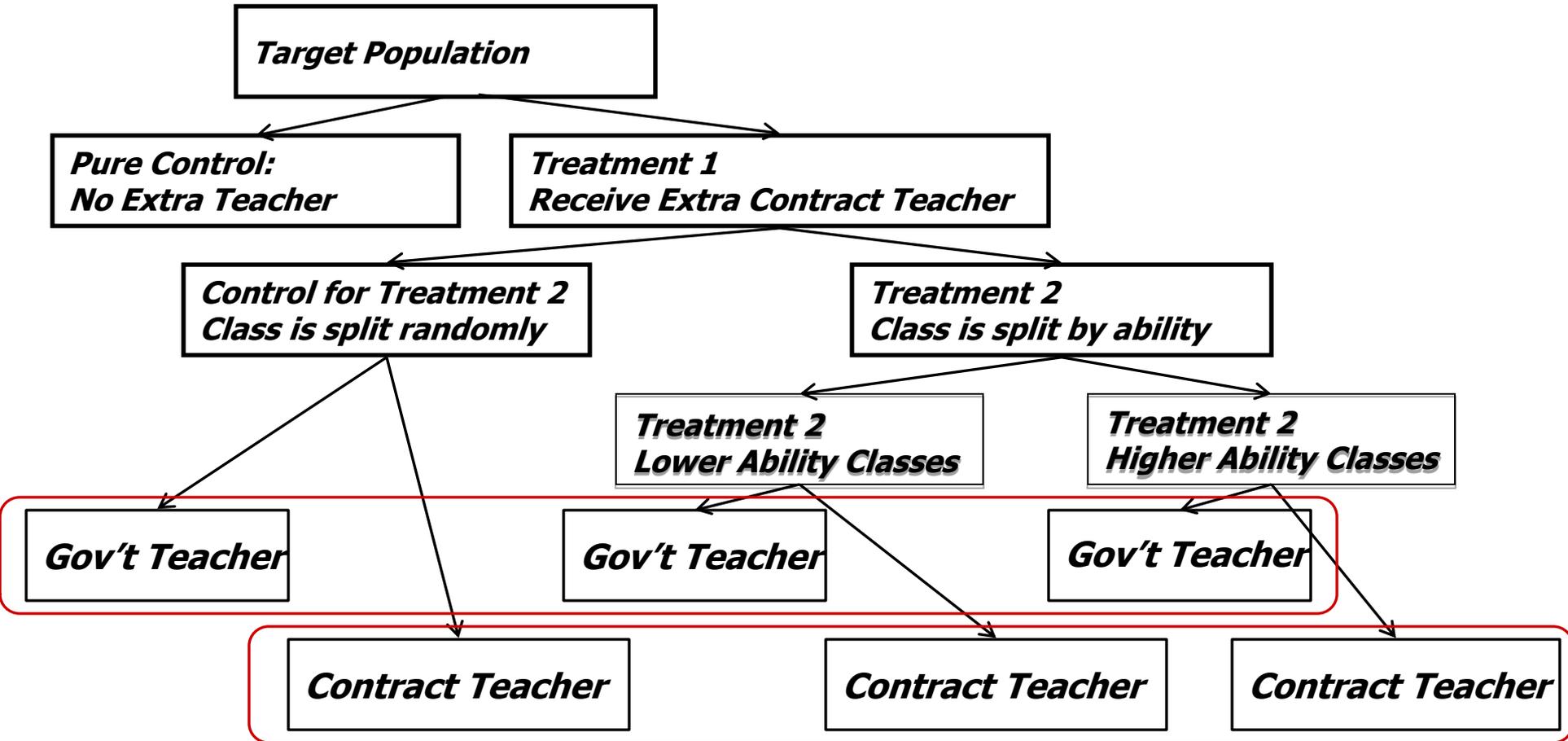
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Hypothesis 2: Students in classes grouped by ability perform better on average than those in mixed classes

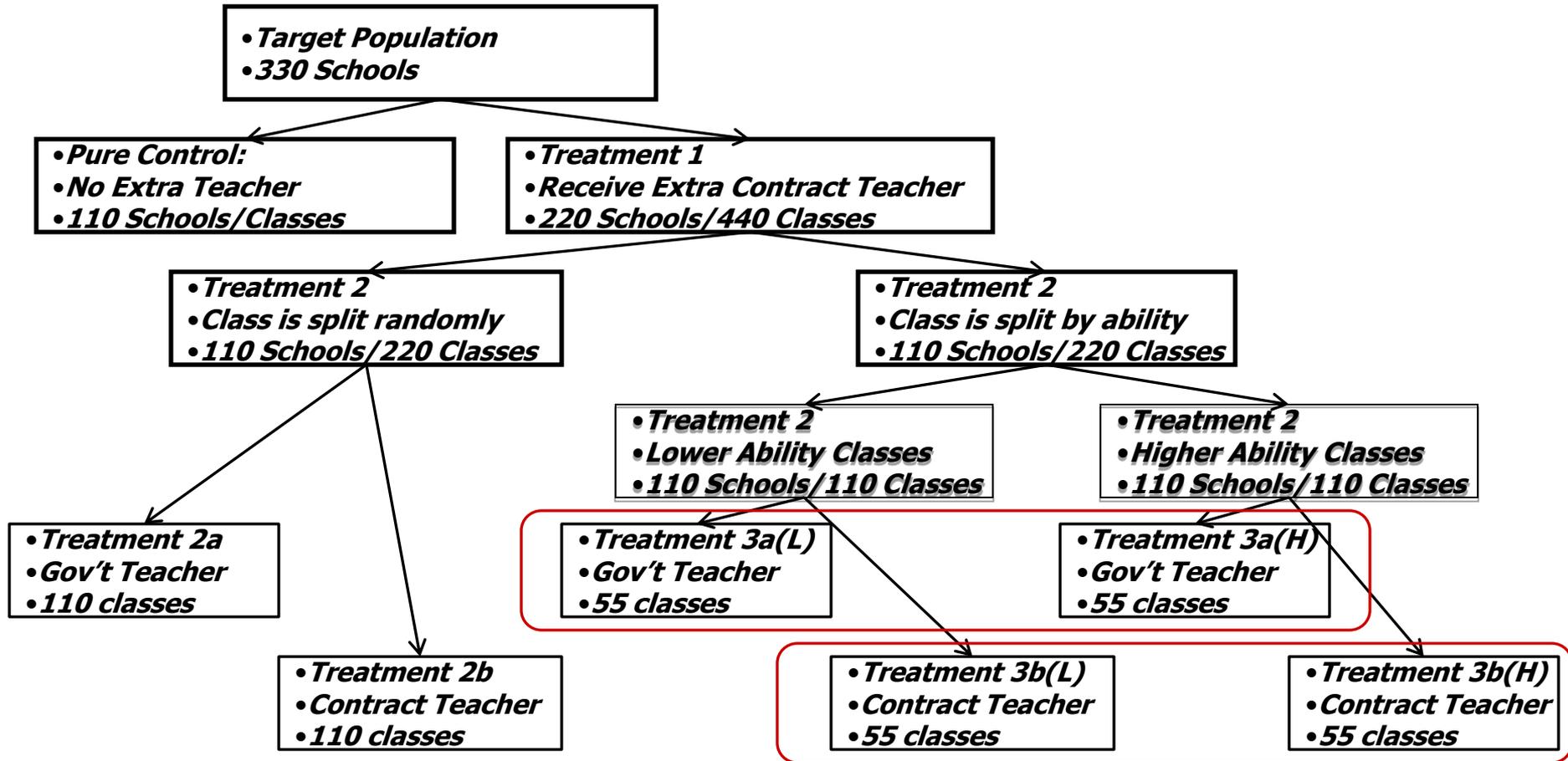
Secondary Hypothesis: ability grouping is harmful to low-performing students

# Example: extra teacher provision



Hypothesis 3: Contract teachers are more effective than government teachers

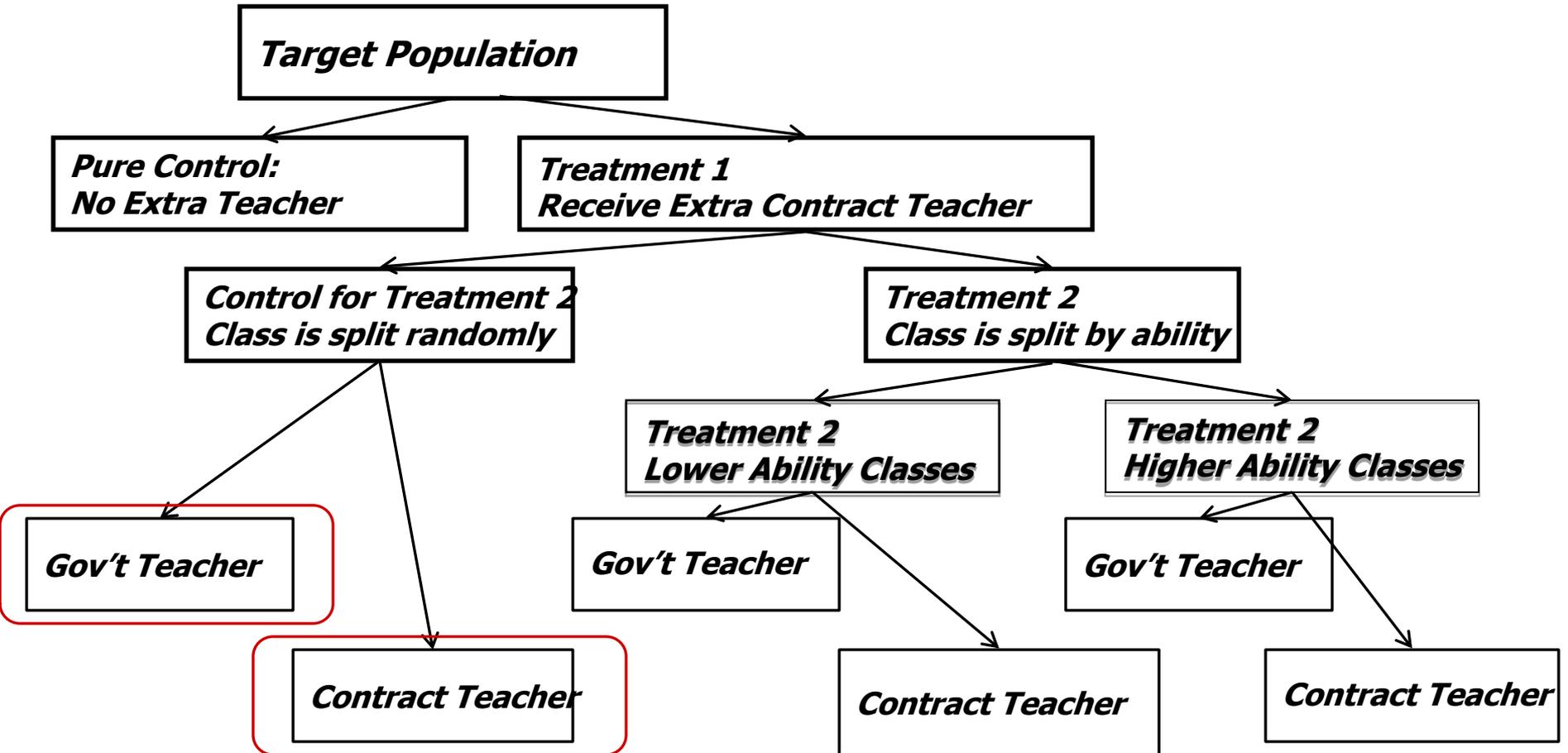
# Example: extra teacher provision



Secondary Hypothesis: Contract teachers are more effective than government teachers, when classes are tracked

# Example: extra teacher provision

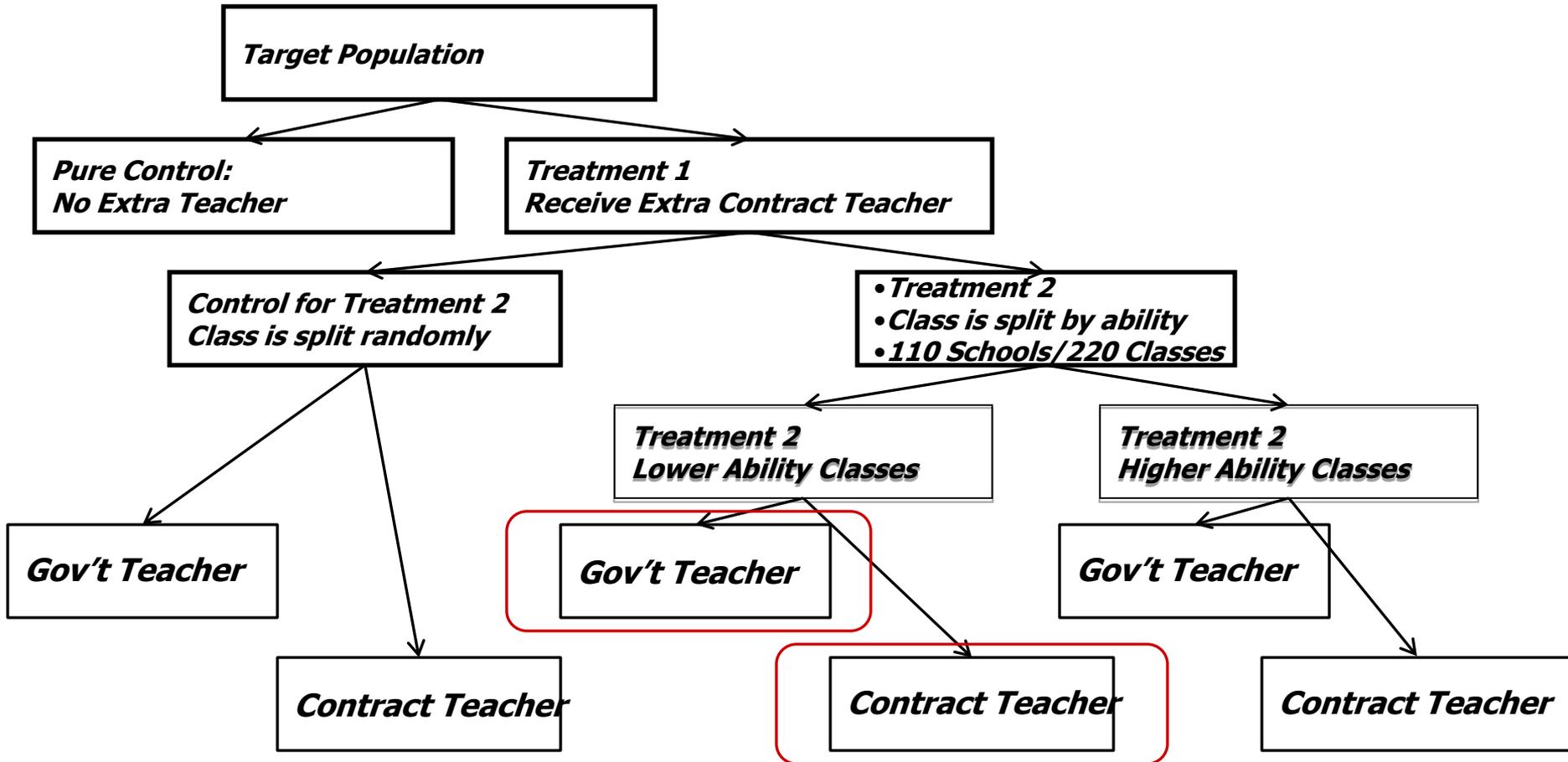
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Secondary Hypothesis: Contract teachers are more effective than government teachers in mixed classes

# Example: extra teacher provision

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Secondary Hypothesis: Contract teachers are more effective than government teachers in classes of low-performing students

# Benefits/costs of cross cutting treatments

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- Explicitly test interactions
- Economizes on data collection and fixed costs
- Influences the characteristics of the control group
  - E.g. for ETP

# Stratification

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- Objective: balancing your sample when you have a small sample
- What is it:
  - dividing the sample into different subgroups
  - selecting treatment and control from each subgroup
- What happens if you don't stratify?

# When to stratify

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- Stratify on variables that could have important impact on outcome variable (bit of a guess)
- Stratify on subgroups that you are particularly interested in (where you may think impact of program may be different)
- Stratification more important when small data set or weak power
- Can get complex to stratify on too many variables
- Makes the draw less transparent the more you stratify
- You can also stratify on index variables you create

# Mechanics of randomization

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- Need sample frame
  - Most methods need a pre-existing list
- Pull out of a hat/bucket
  - Transparent
  - Time consuming, complex if large group
  - Hard to stratify on many dimensions
- Use random number generator in spreadsheet program to order observations randomly
  - Stratify by putting into groups, randomize order within groups
- Stata program code
  - Circulate some examples
- What if no existing list?
  - Do a census
  - Randomize on the spot, but worry about implementation