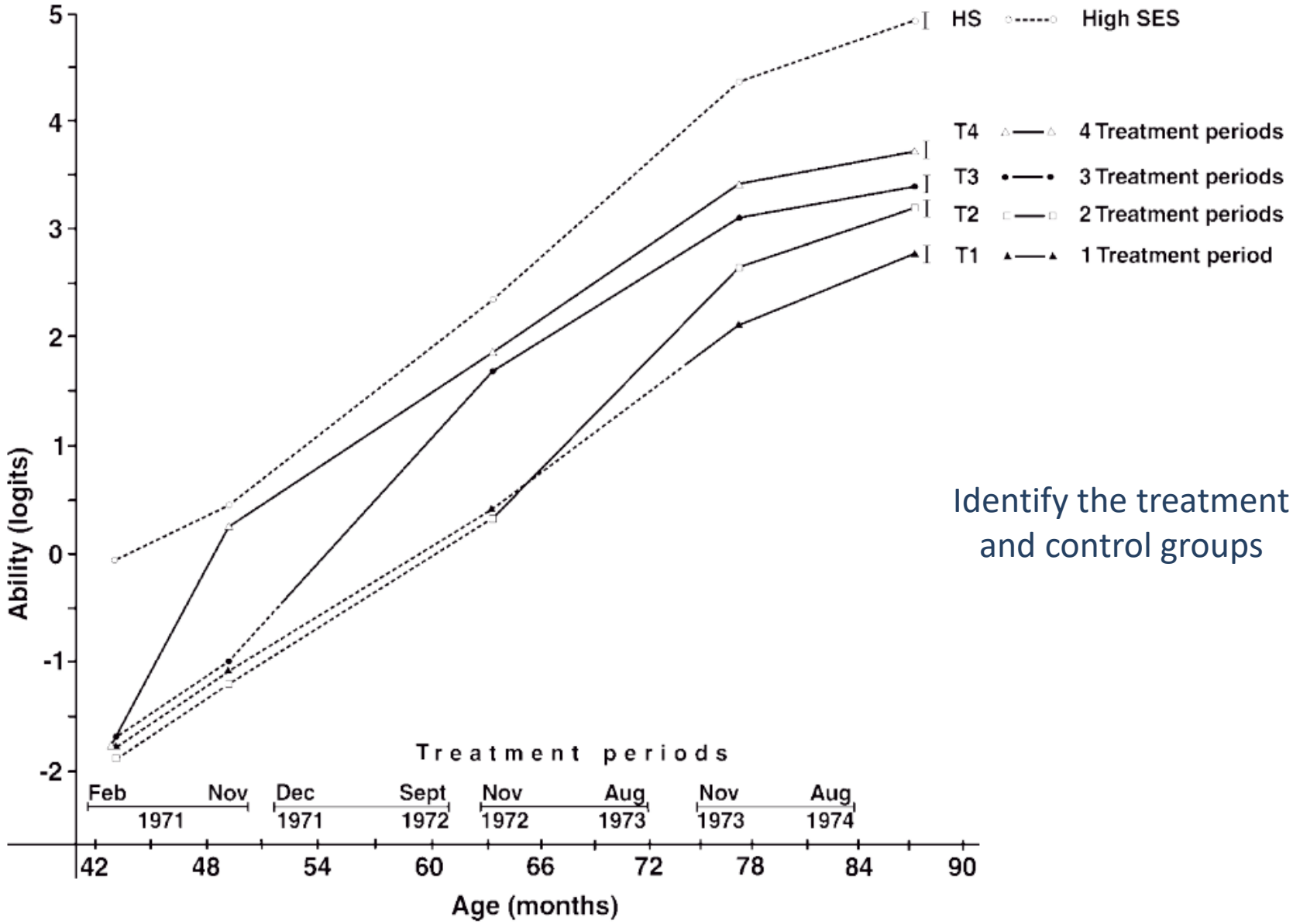
# CONTRASTS AND EFFECT SIZE

*Lecy * CPP 524*

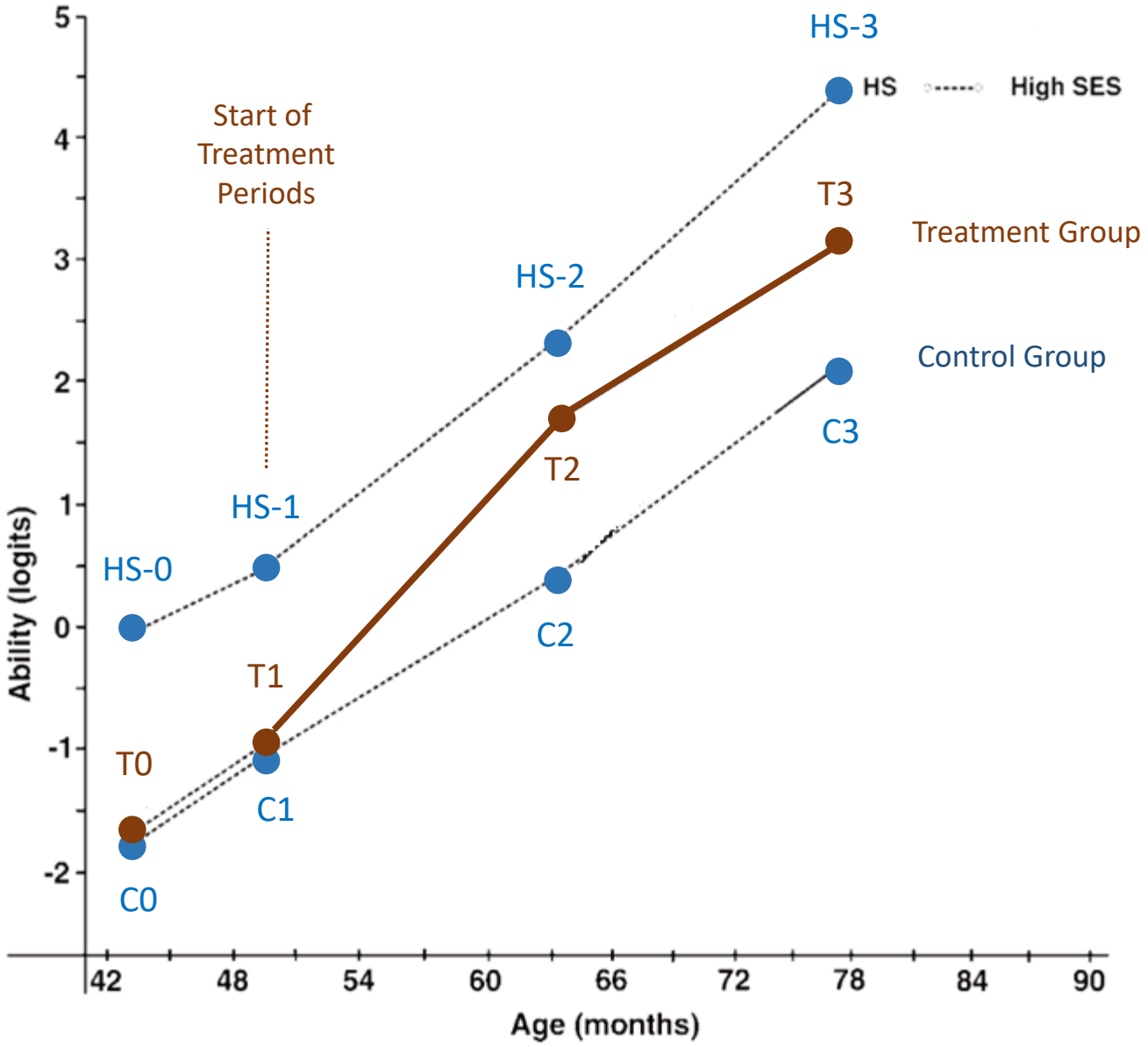
# CASE STUDY FROM READINGS

*Bingham, R., & Felbinger, C. (2002). Evaluation in practice: A methodological approach. CQ Press.*

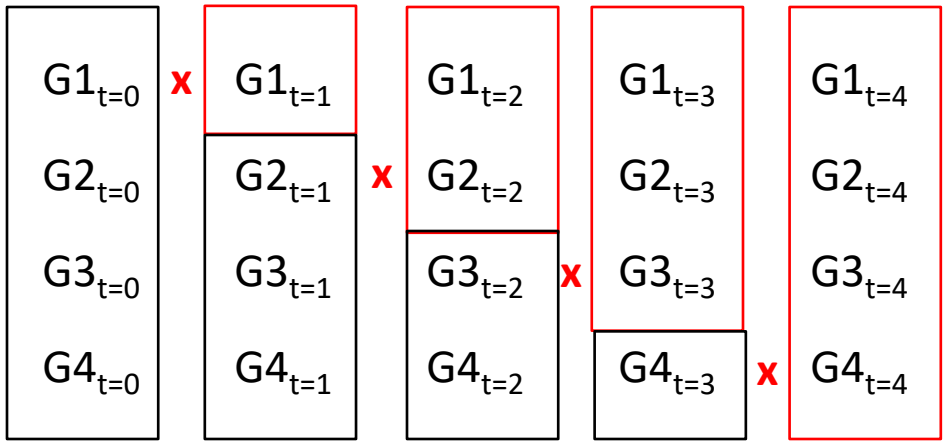
CH-05: Improving Cognitive Ability in Chronically Deprived Children [pdf]




Identify the treatment and control groups


HS-3
HS
High SES
Start of
Treatment
Periods
T3
Treatment Group
HS-2
Control Group
C3
T2
HS-1
HS-0
C2
T1
T0
C1
C0
Ability (logits)
5
4
3
2
1
0
-1
-2
42
48
54
60
66
72
78
84
90
Age (months)

Treatment Groups




Control Groups

Treatment Group

Control Group

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $G1_{t=0}$ | x | $G1_{t=1}$ | | $G1_{t=2}$ | | $G1_{t=3}$ | | $G1_{t=4}$ |
| $G2_{t=0}$ | | $G2_{t=1}$ | x | $G2_{t=2}$ | | $G2_{t=3}$ | | $G2_{t=4}$ |
| $G3_{t=0}$ | | $G3_{t=1}$ | | $G3_{t=2}$ | x | $G3_{t=3}$ | | $G3_{t=4}$ |
| $G4_{t=0}$ | | $G4_{t=1}$ | | $G4_{t=2}$ | | $G4_{t=3}$ | x | $G4_{t=4}$ |

Specific tests: treatment gains for late treatment?

# TREATMENT DOSAGE (PROGRAM DURATION)

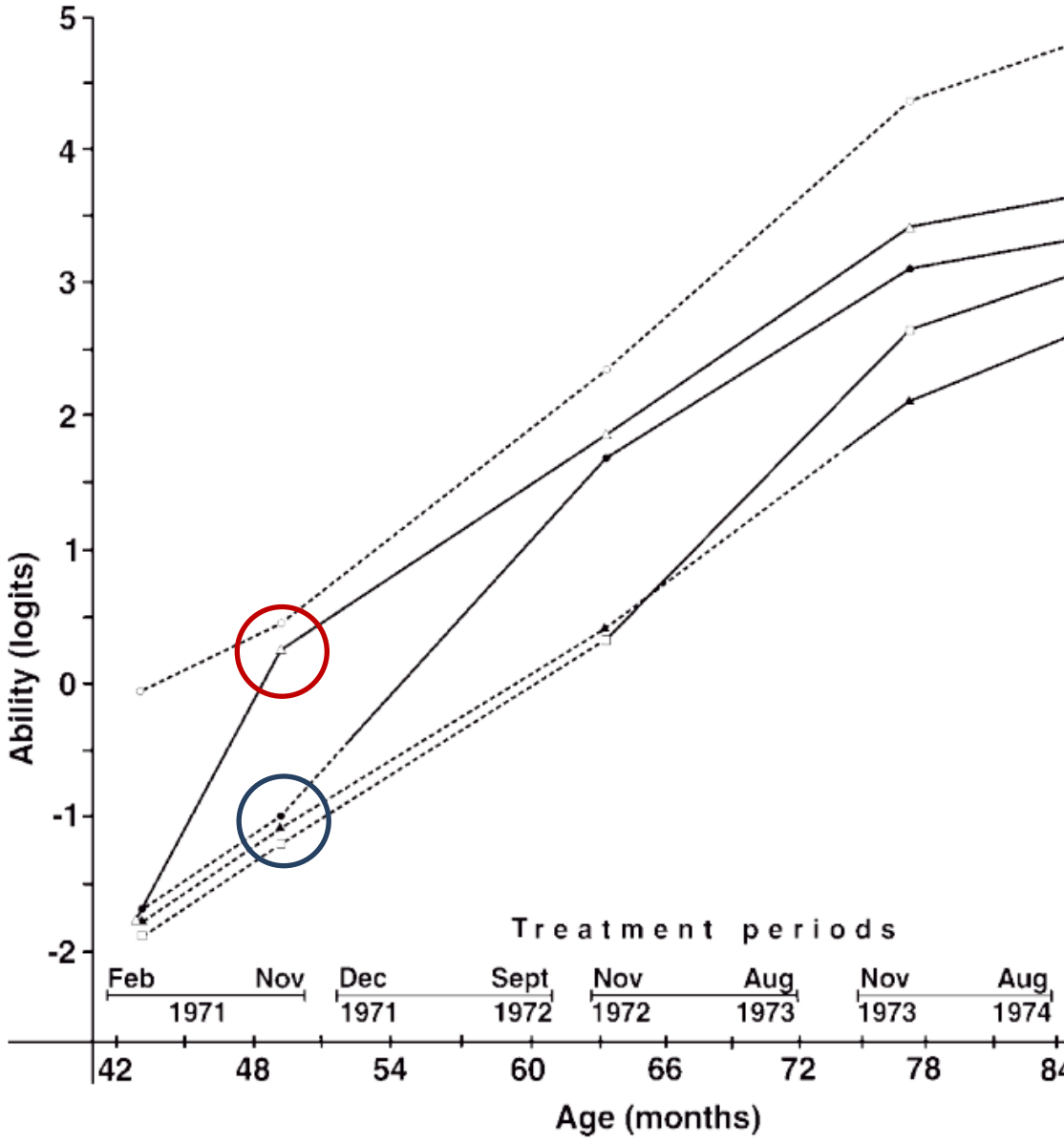
G1 = 6 months
G2-G4 = 0 months

G1 x {G2,G3,G4} would represent outcome after 6 months of treatment

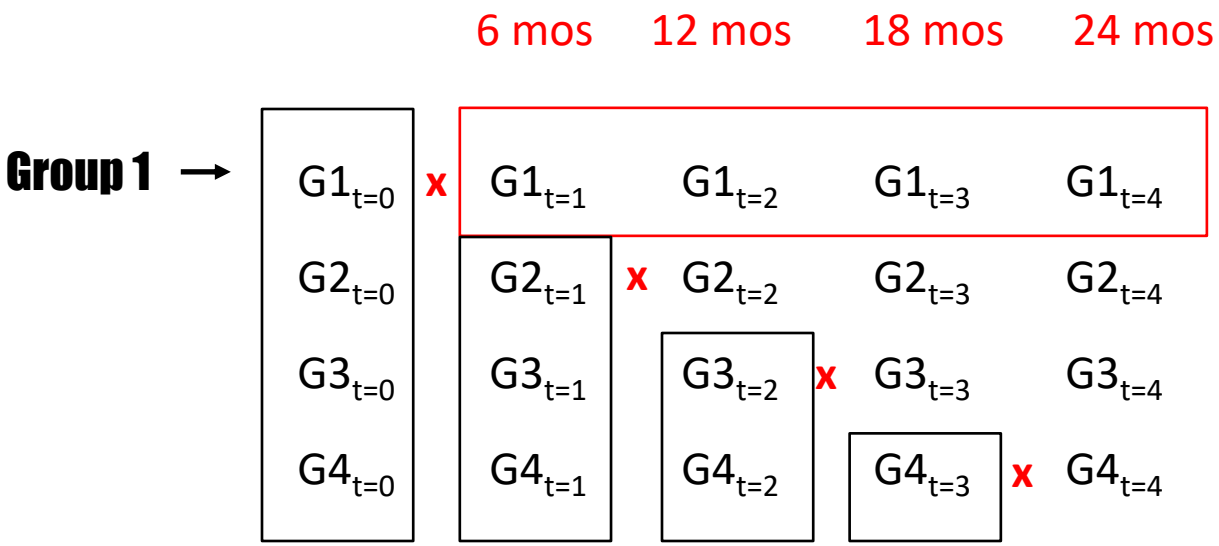
*Might pool data to increase statistical power*

| | | | | |
|---|---|---|---|---|
| $G1_{t=0}$ | x | $G1_{t=1}$ | $G1_{t=2}$ | |
| $G2_{t=0}$ | | $G2_{t=1}$ | x $G2_{t=2}$ | |
| $G3_{t=0}$ | | $G3_{t=1}$ | $G3_{t=2}$ | x |
| $G4_{t=0}$ | | $G4_{t=1}$ | $G4_{t=2}$ | |

Control Group – no treatment

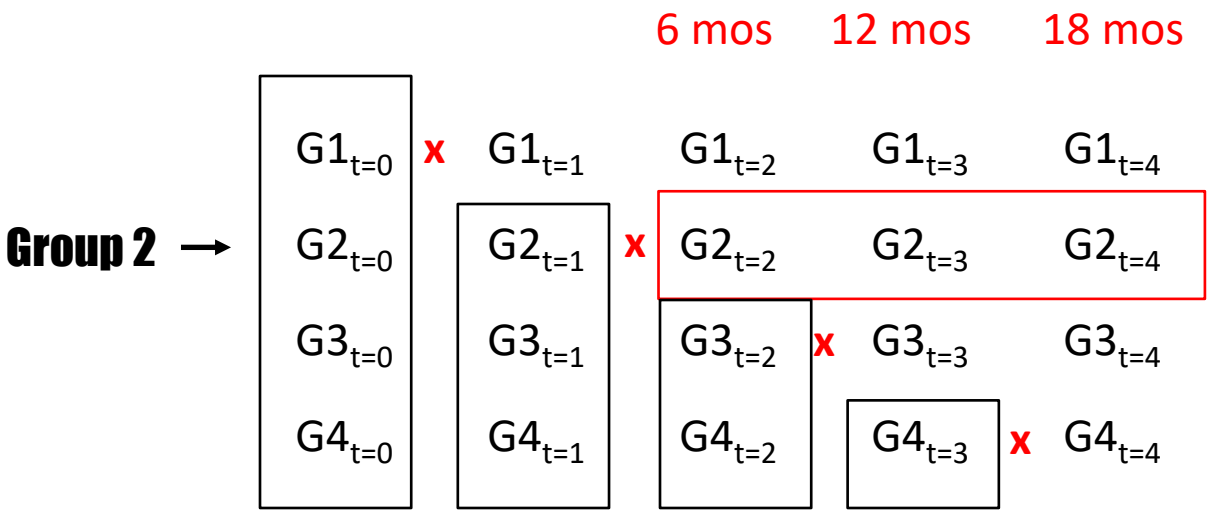


# TREATMENT DOSAGE (PROGRAM DURATION)




Control Groups – no treatment

# TREATMENT DOSAGE (PROGRAM DURATION)




Control Groups – no treatment

# TREATMENT DOSAGE (PROGRAM DURATION)

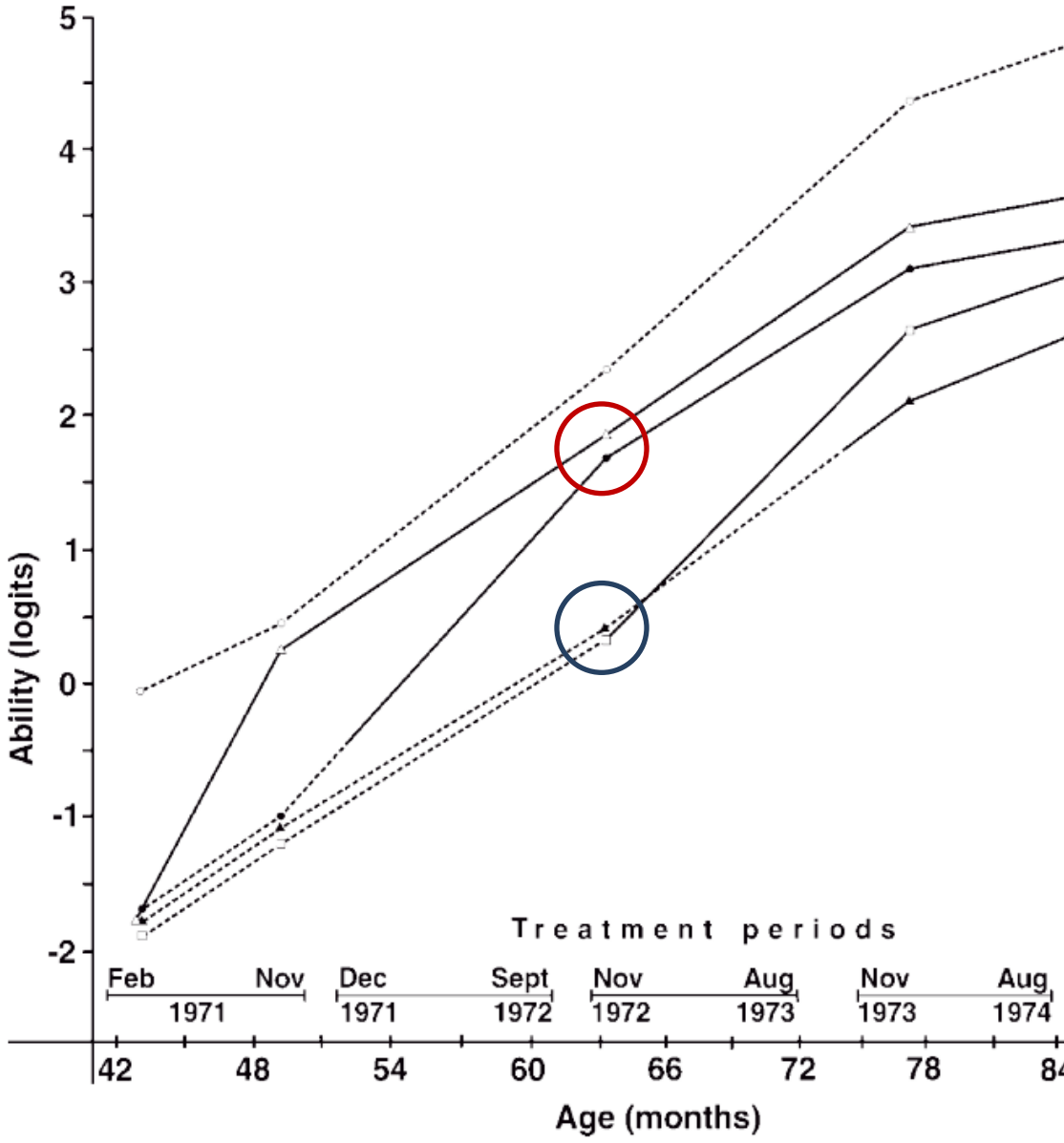
G1 = 12 months
G2 = 6 months

Pooled G1+G2 would represent outcome after 9 months of treatment

*Might pool data to increase statistical power*

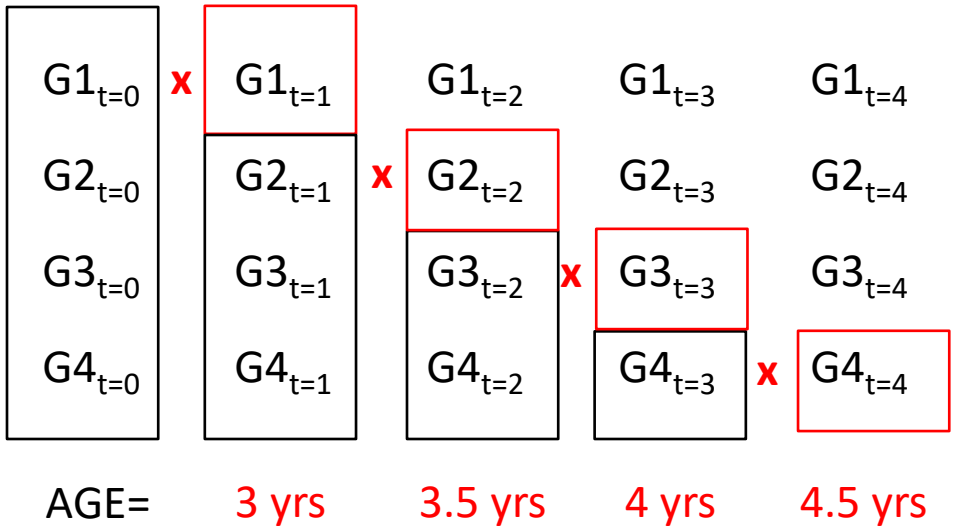
$G1_{t=0}$ x $G1_{t=1}$ $G1_{t=2}$
$G2_{t=0}$ $G2_{t=1}$ x $G2_{t=2}$
$G3_{t=0}$ $G3_{t=1}$ $G3_{t=2}$ x
$G4_{t=0}$ $G4_{t=1}$ $G4_{t=2}$

Control Group – no treatment



# TREATMENT DOSAGE (PROGRAM DURATION)

6 months vs 0 months
but conditioned on
AGE children start the program




Control Groups – no treatment

Treatment Group

Control Group

| | | | | |
|---|---|---|---|---|
| $G1_{t=0}$ x | $G1_{t=1}$ | $G1_{t=2}$ | $G1_{t=3}$ | $G1_{t=4}$ |
| $G2_{t=0}$ | $G2_{t=1}$ x | $G2_{t=2}$ | $G2_{t=3}$ | $G2_{t=4}$ |
| $G3_{t=0}$ | $G3_{t=1}$ | $G3_{t=2}$ x | $G3_{t=3}$ | $G3_{t=4}$ |
| $G4_{t=0}$ | $G4_{t=1}$ | $G4_{t=2}$ | $G4_{t=3}$ x | $G4_{t=4}$ |

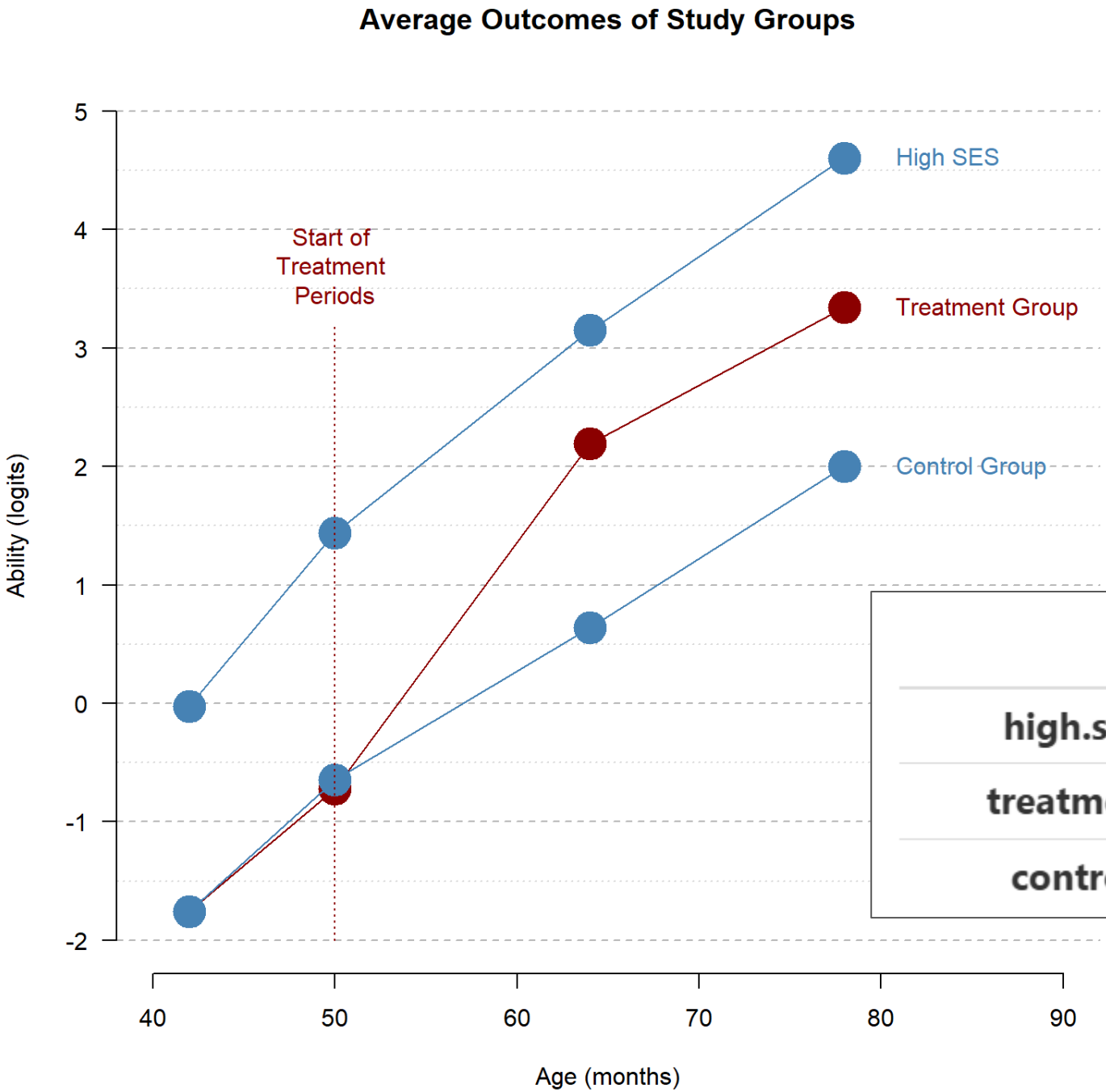
Specific tests: treatment gains for late treatment?

# Discussion Questions:

1. Is this an RCT? Do we have an identical “control group”?
2. What role does the high SES group perform?
3. Why do we have four treatment groups?
4. What outcome is measured here? Is it valid and reliable?
5. How would I test whether two treatment periods has the same impact as three periods, but is more cost-effective?
6. Can you identify a weakness in the design or a threat to validity?

| student | group | time | treat.dummy |
|---|---|---|---|
| student_1 | control | time2 | 0 |
| ... | control | time2 | 0 |
| student_k | control | time2 | 0 |
| student_1 | treatment | time2 | 1 |
| ... | treatment | time2 | 1 |
| student_k | treatment | time2 | 1 |

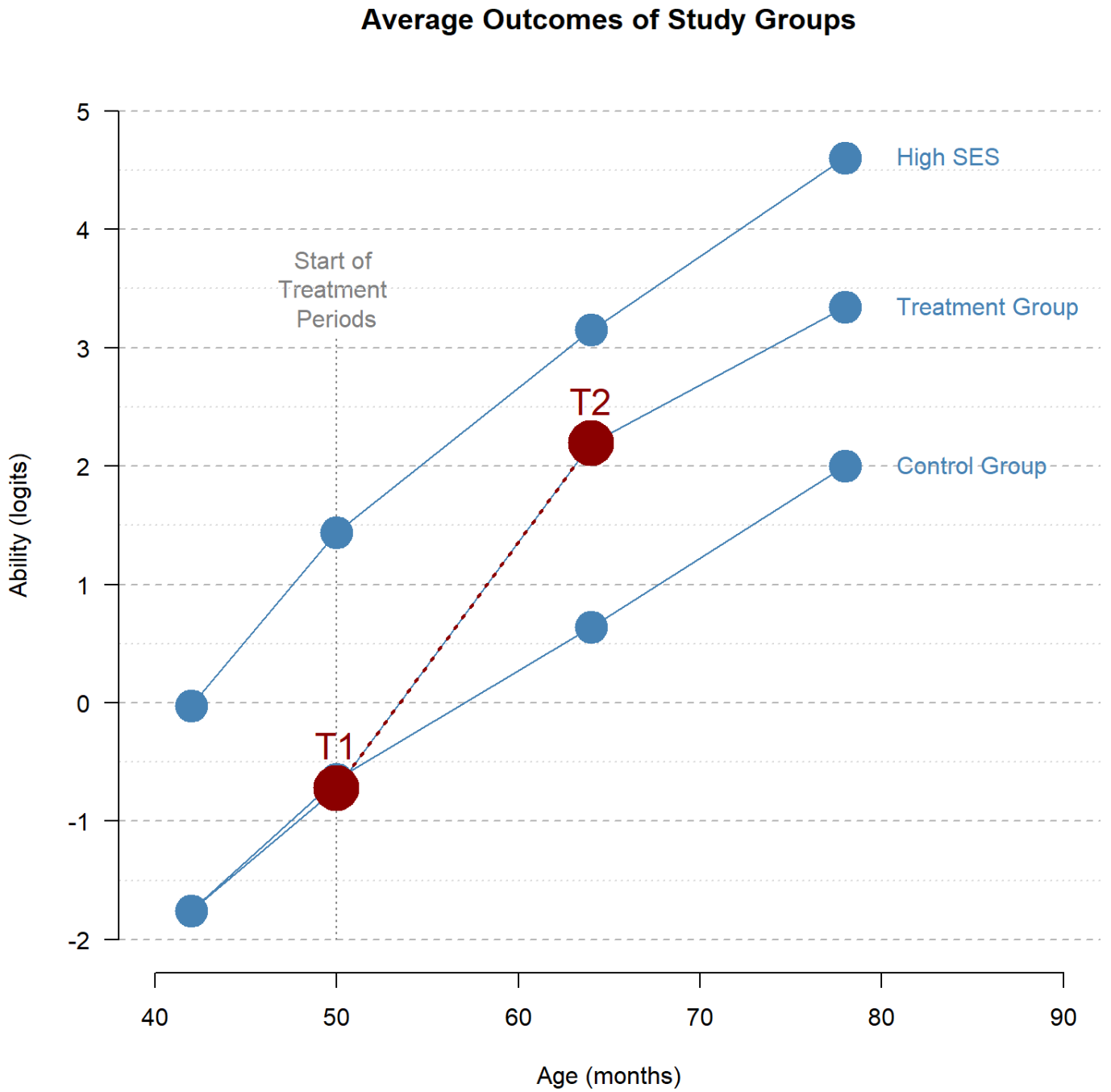
https://watts-college.github.io/cpp-524-fall-2021/labs/lab-05-diff-in-diff.html




| | time0 | time1 | time2 | time3 |
|---|---|---|---|---|
| **high.ses** | -0.02 | 1.44 | 3.15 | 4.61 |
| **treatment** | -1.76 | -0.72 | 2.19 | 3.34 |
| **control** | -1.76 | -0.65 | 0.64 | 2 |

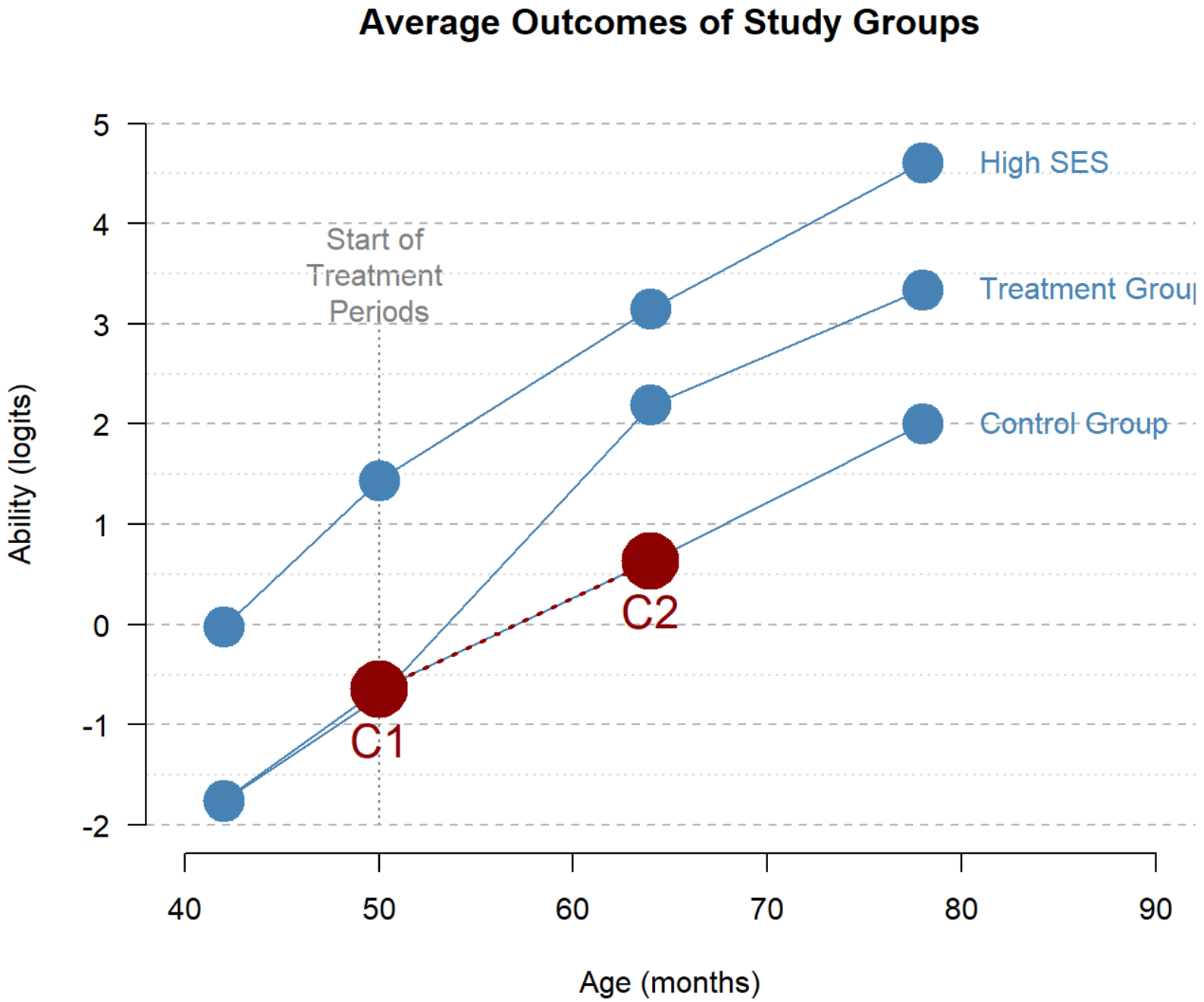
# Reflexive Estimator

- Estimator
- Assumptions



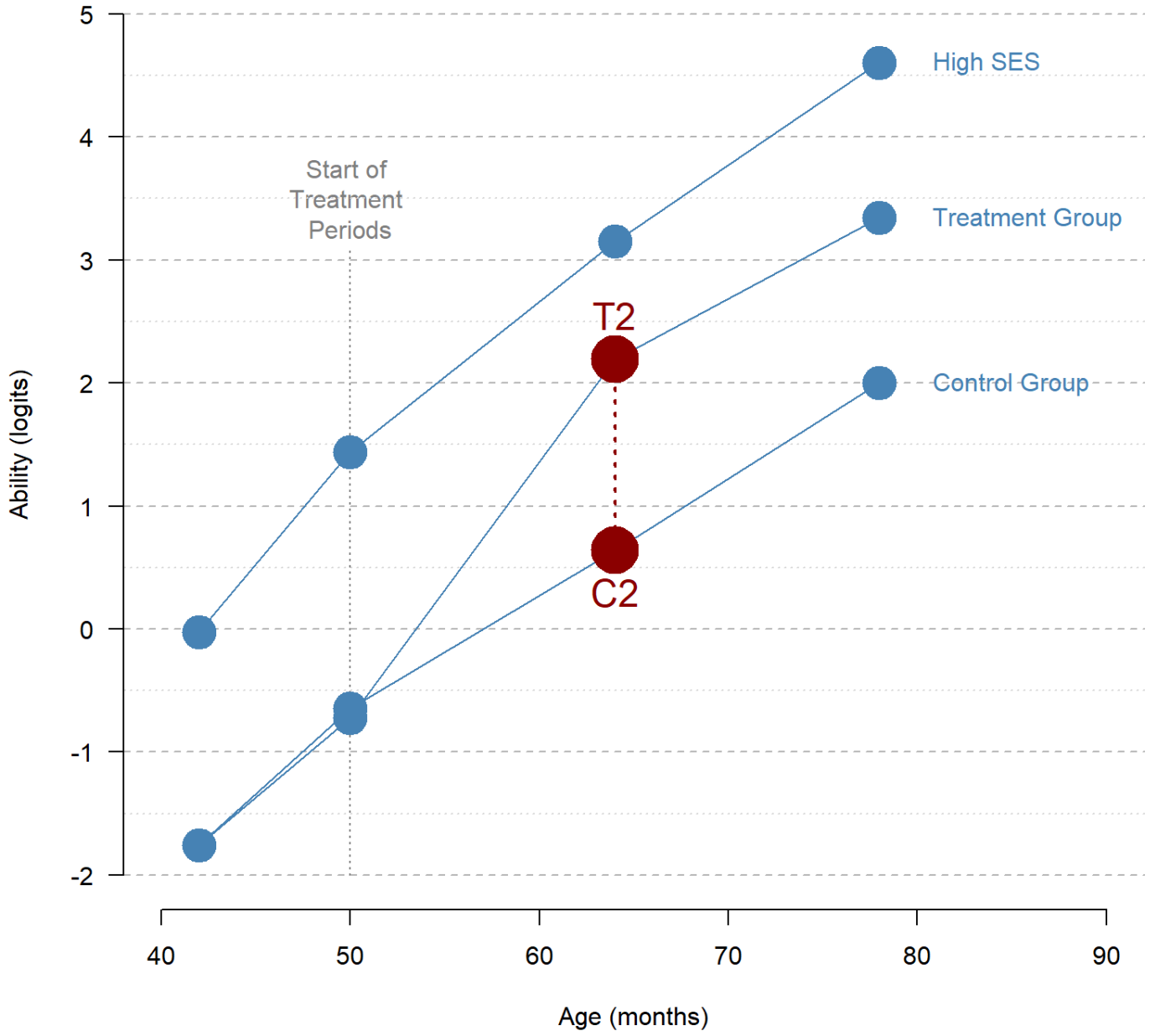
# Reflexive Estimator

- Estimator
- Assumptions



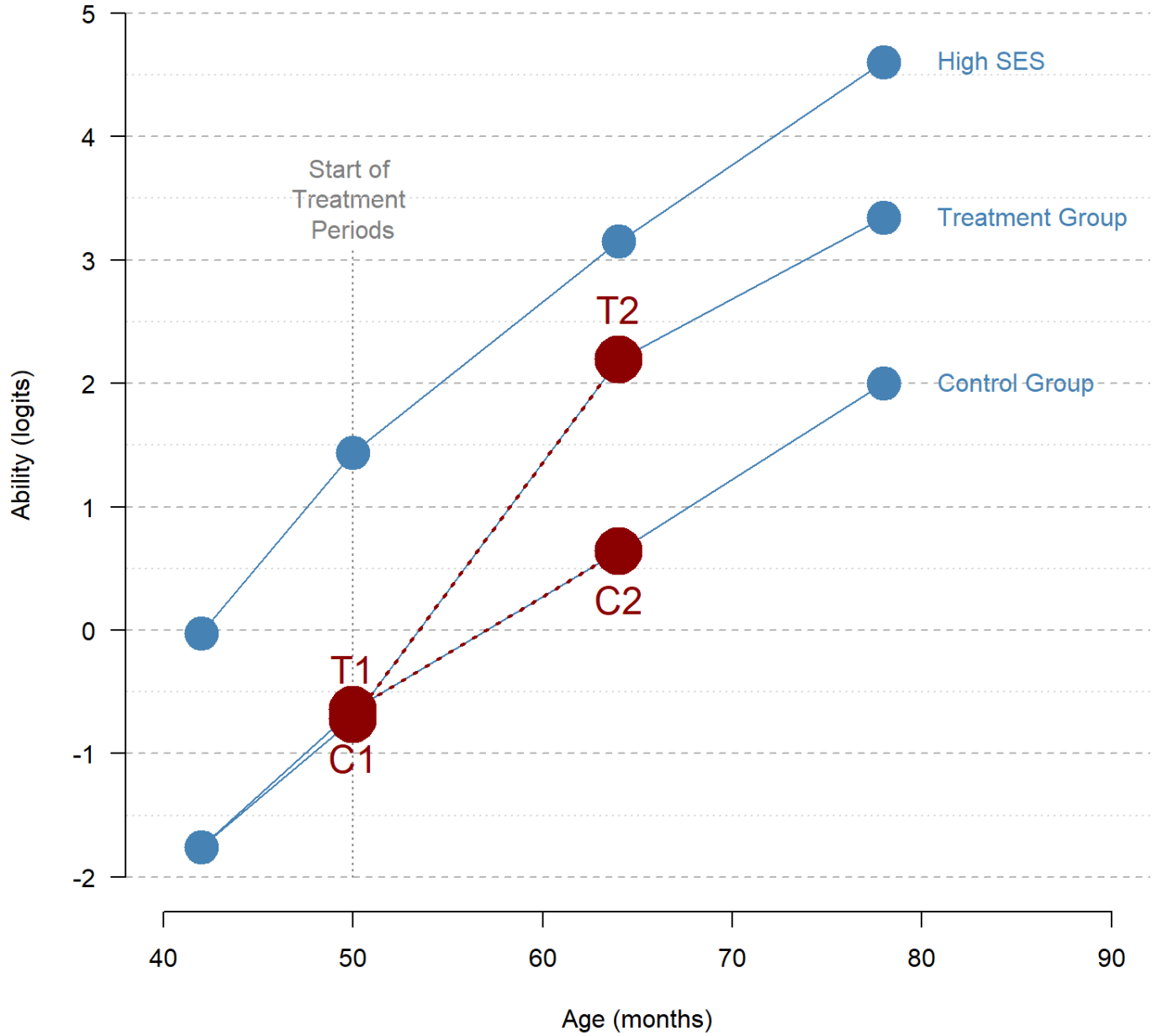
# Post-Test Only Estimator

- Estimator
- Assumptions



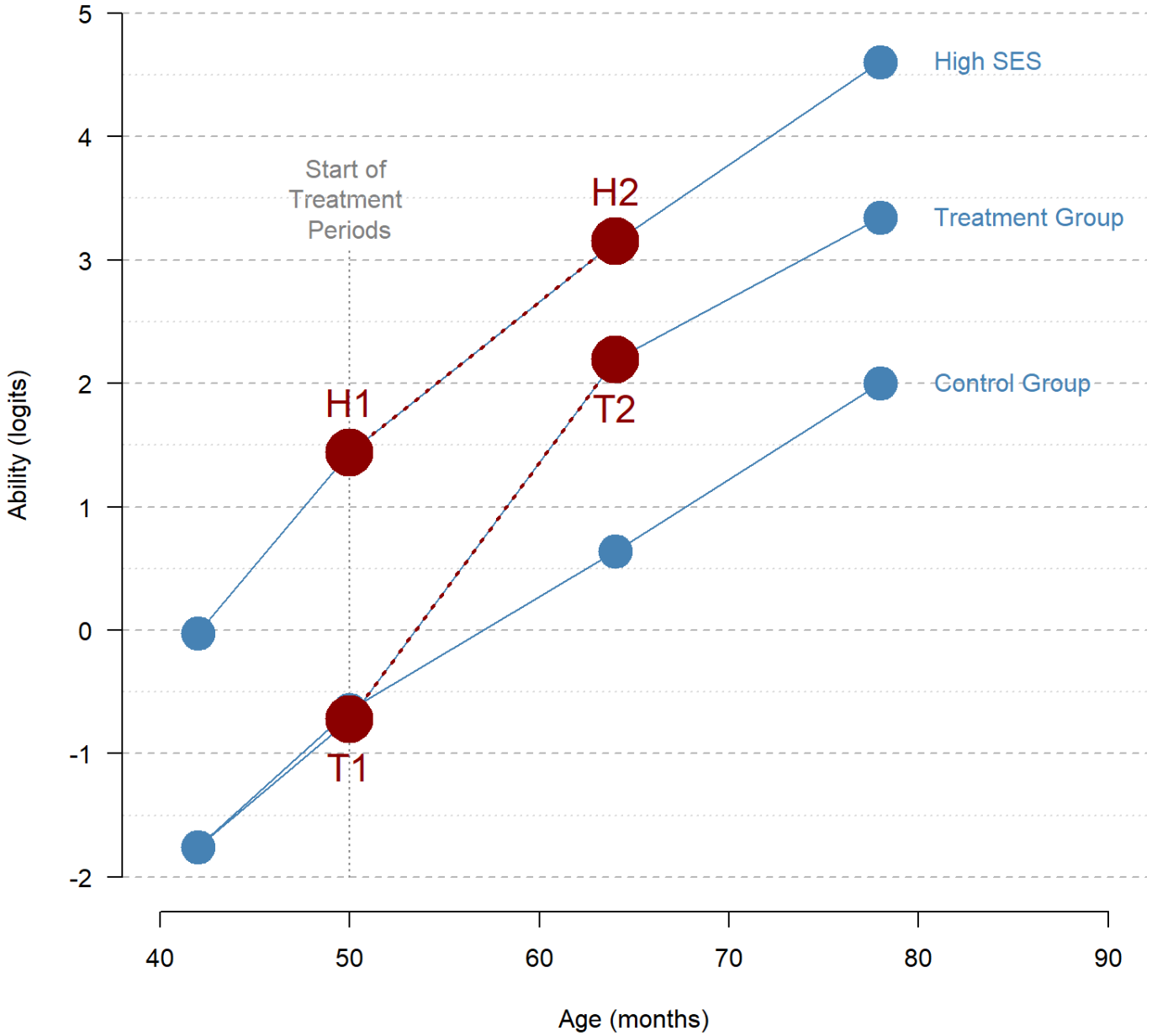
# Diff-in-Diff Estimator

- Estimator
- Assumptions

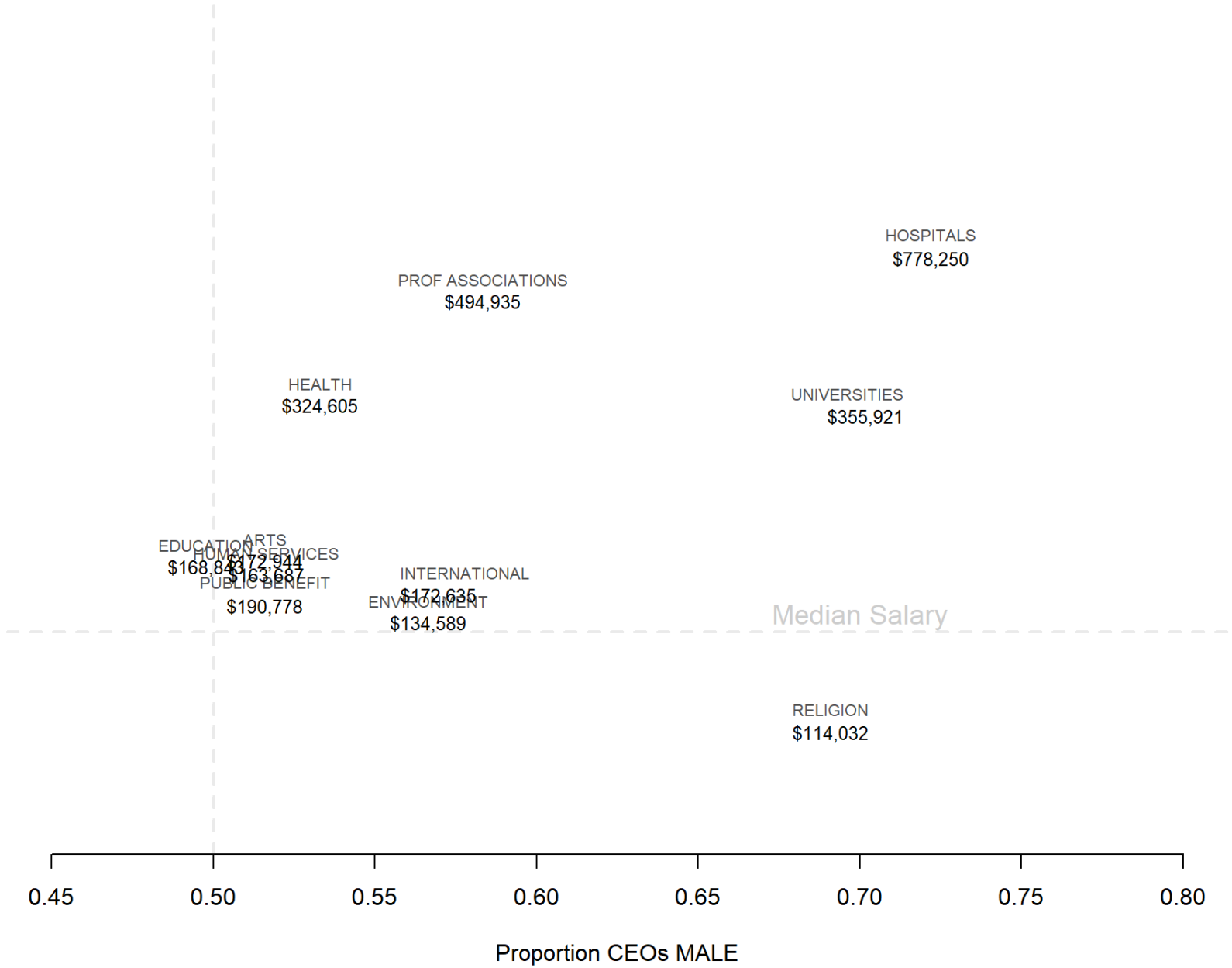


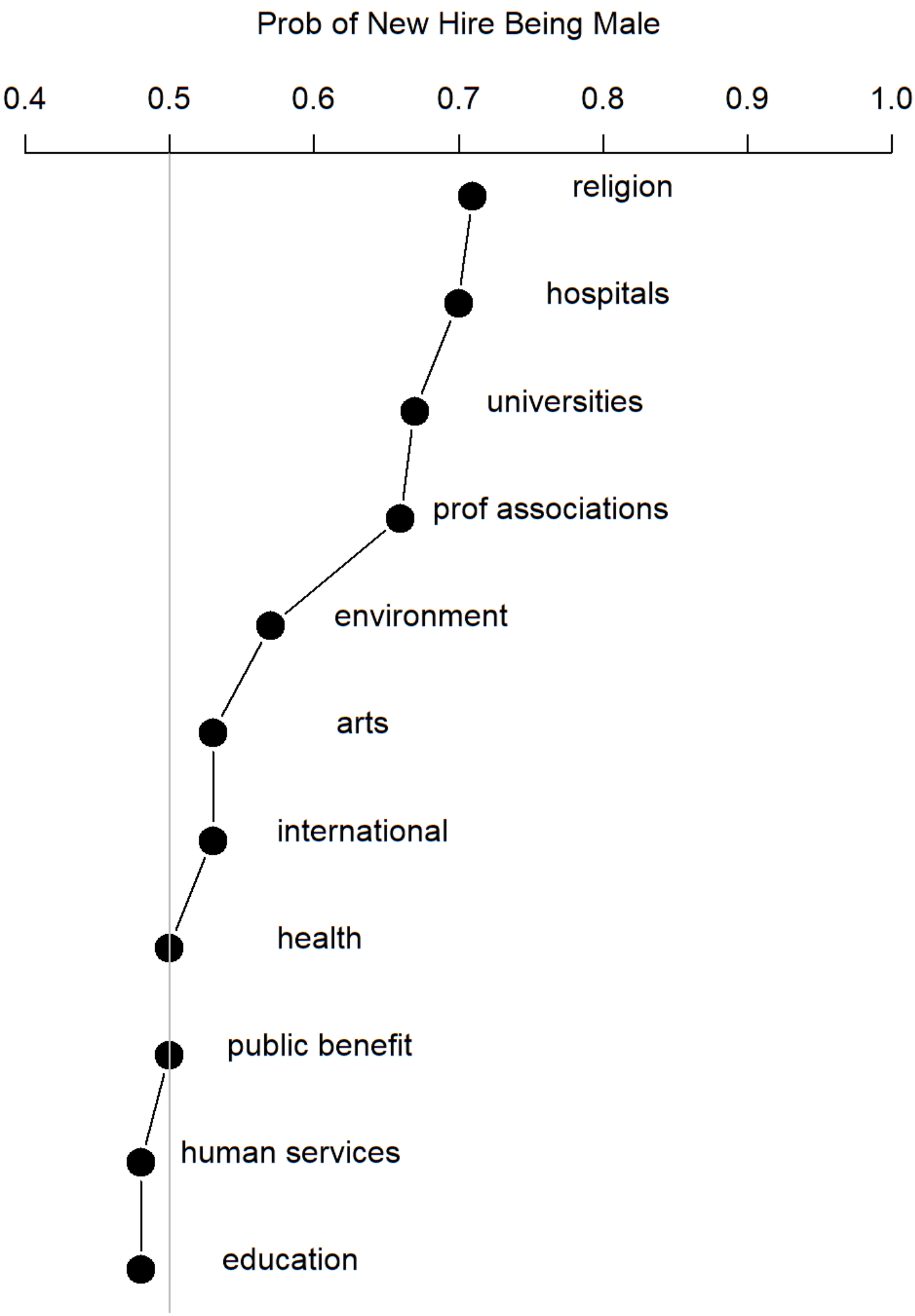
# Diff-in-Diff Estimator

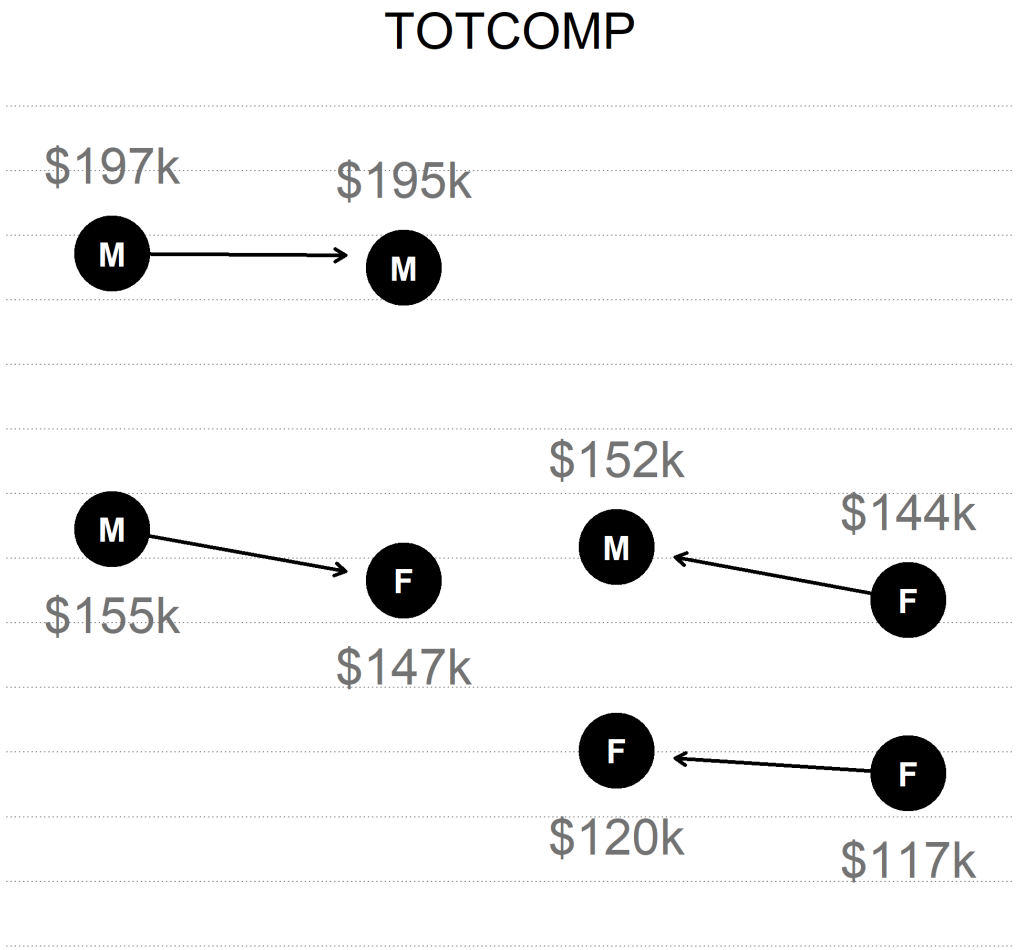
- Estimator
- Assumptions



# ANOTHER EXAMPLE


HOSPITALS
$778,250
PROF ASSOCIATIONS
$494,935
HEALTH
$324,605
UNIVERSITIES
$355,921
EDUCATION
$168,843
ARTS
$172,944
HUMAN SERVICES
$163,687
PUBLIC BENEFIT
$190,778
INTERNATIONAL
$172,635
ENVIRONMENT
$134,589
Median Salary
RELIGION
$114,032
0.45
0.50
0.55
0.60
0.65
0.70
0.75
0.80
Proportion CEOs MALE


Prob of New Hire Being Male
0.4
0.5
0.6
0.7
0.8
0.9
1.0
religion
hospitals
universities
prof associations
environment
arts
international
health
public benefit
human services
education




https://watts-college.github.io/cpp-524-fall-2021/labs/lab-07-gender-wage-gap.html