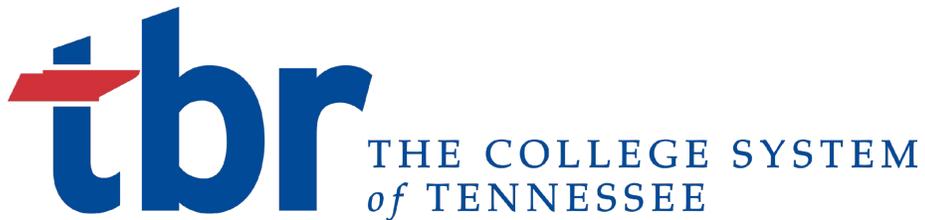


Undergraduate Research Benefits for Community College Students

High Impact Practices at TBR institutions



Statewide HIP Conference

January 13, 2022

We examine several questions:

Does undergraduate research affect:

- Likelihood of graduation, transfer & departure?
- Academic performance?
- Progression to completion, transfer & departure?

Objectives:

- Estimate the participation effect.
- Dissect the effect by frequency.

Participants & non-participants are **systematically different**

Participants may have:

- better preparation
- different backgrounds
- higher motivation

Some differences affect both participation & outcomes

- Better preparation Better outcomes
- Complicates teasing out participation effect

How do we address the selection bias?

Make sure to compare outcomes of similar students

Use appropriate methods:

- Machine learning for propensity scores
 - Weighting on inverse probability of participation
 - Logistic & OLS regression, EHA
- Attribute difference in outcomes to participation

We account for 33 key factors

Demographic:

- Age, gender, ethnicity, residency, Pell eligibility

Academic:

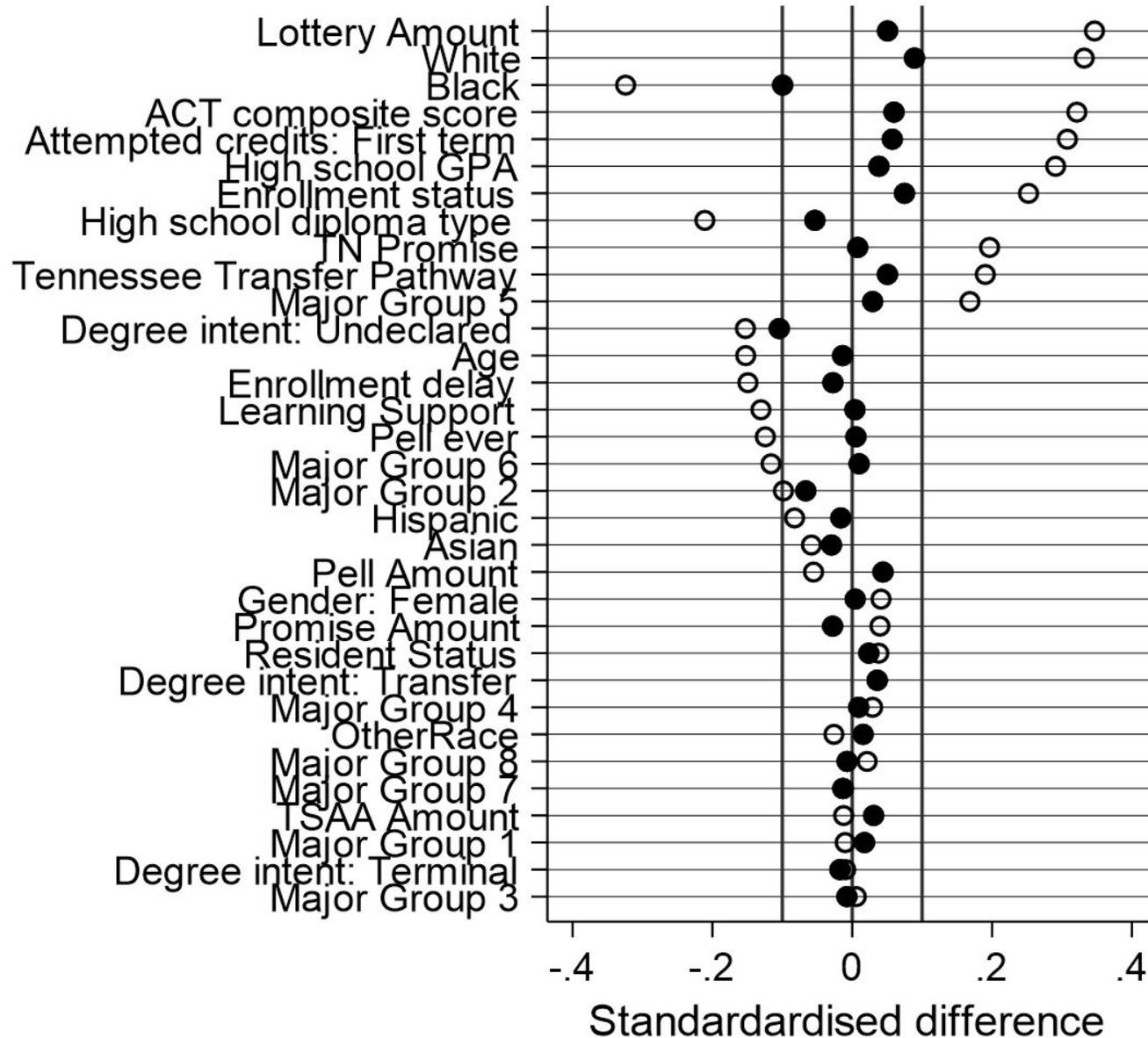
- ACT score, HS GPA, diploma type, learning support, Promise, attempted credits, attendance, delay, TTP, major groups

Financial aid:

- Grant amount: Pell, TN Promise, TN Lottery, TSAA

College of enrollment

Weighting makes groups similar on key factors



Due to weighting, a good balance is achieved in the observed student characteristics

○ Before Adjustment
● After Adjustment

We track UR participation & outcomes for 4 years

21,578 freshmen

Undergraduate research 3,300

Once 1,891

Twice 753

3+ times 656

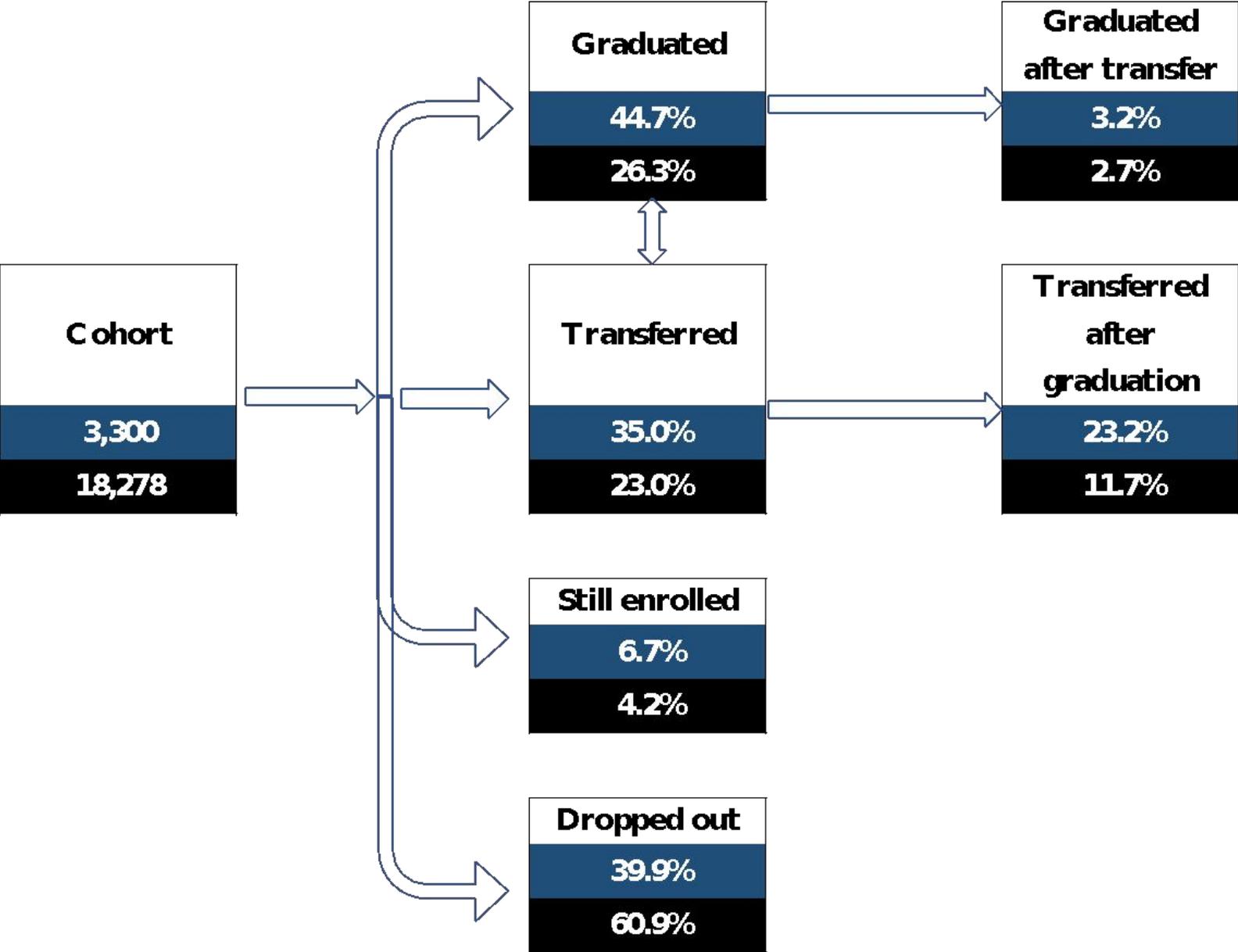
Term 1 (Fa '17)	Term 2	Term 3	Term 4	Term 5	Term 6	Term 7	Term 8	Term 9	Term 10	Term 11 (Sp '21)
--------------------	--------	--------	--------	--------	--------	--------	--------	--------	---------	---------------------

(percent of all terms of observation)



Participants graduate & transfer in greater shares

21,578 freshmen
tracked over 12 terms



Legend
Participants
Non-participants

Data from:
TBR & NSC

How to interpret statistically significant findings:

Participants & non-participants are similar re:

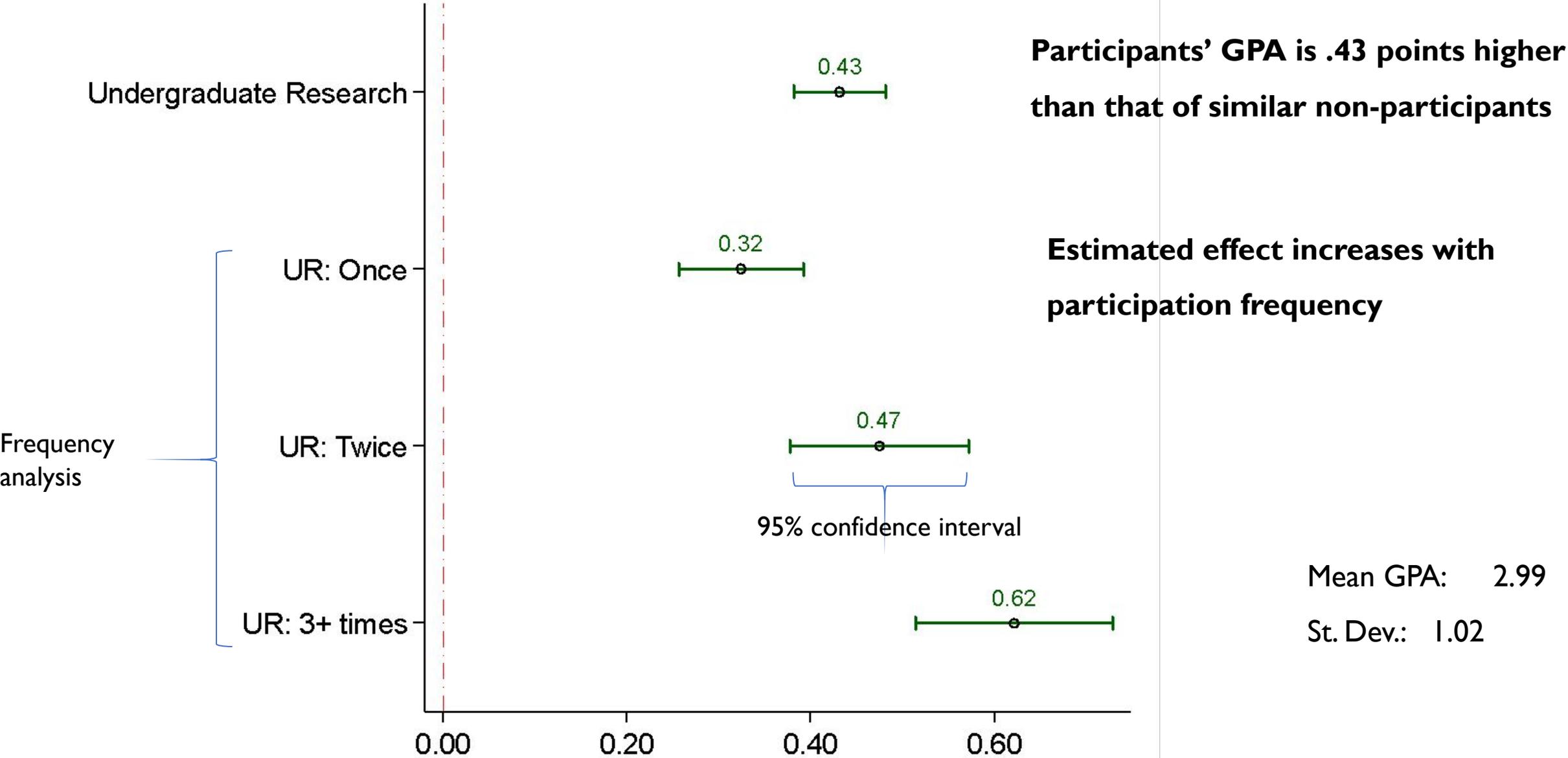
- Likelihood of UR participation
- Control variables

Results are unlikely to be due to chance

Different analyses are presented together

- Binary: *Did or did not participate?*
- Frequency: *How many times?*

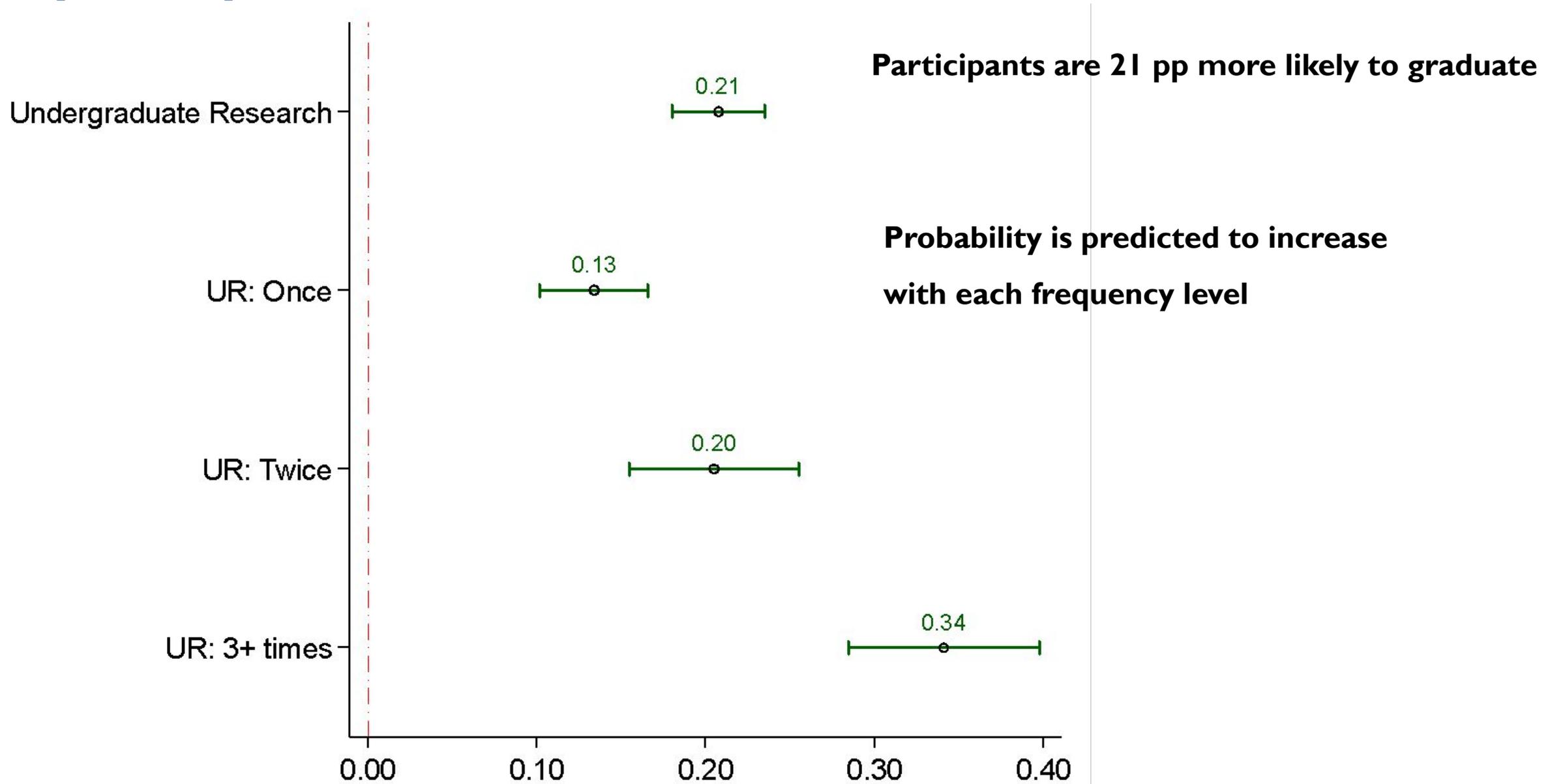
Participants tend to have higher GPA, on average



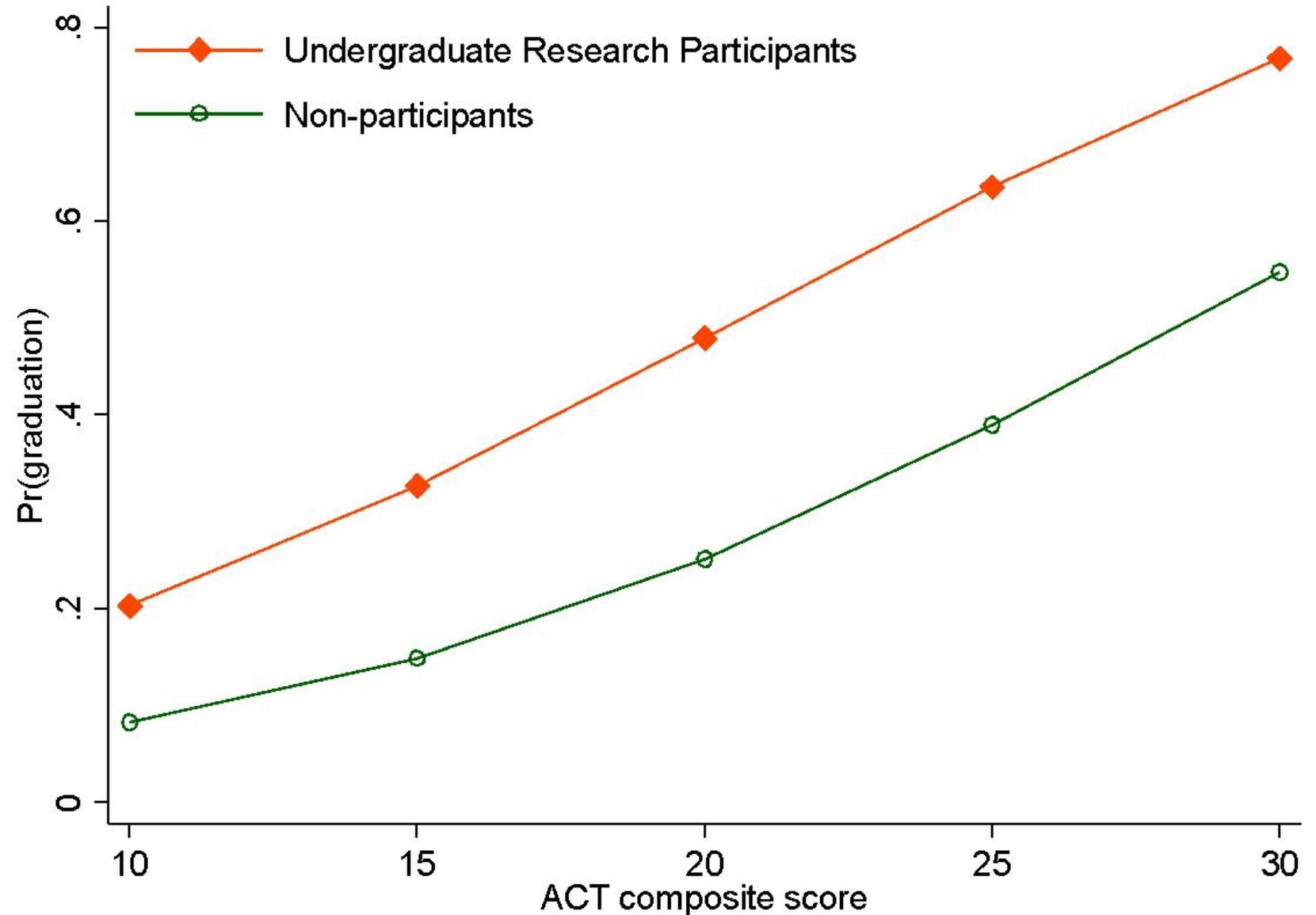
Participants show higher probability of graduation

	Average non-participant	Average UR participant
Undergrad. research	.24	.45
UR – once	.22	.35
UR – twice	.22	.42
UR – 3+ times	.22	.56

Participants are more likely to graduate than similar non-participants



Difference in predicted probability of graduation is observed for any ACT score

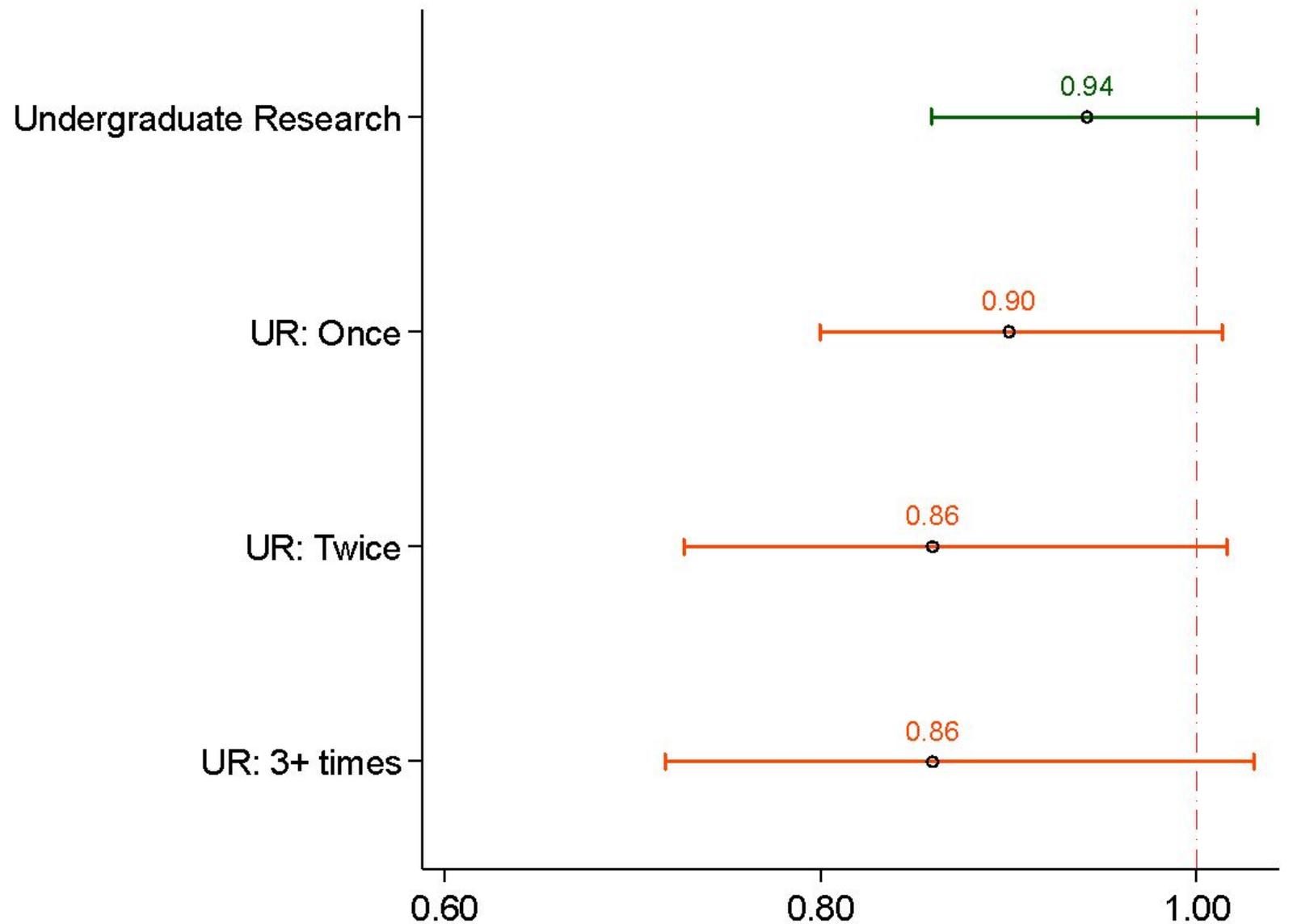


Note:

Sample size decreases at the higher end of ACT score distribution

There is no evidence that UR participation affects time to completion

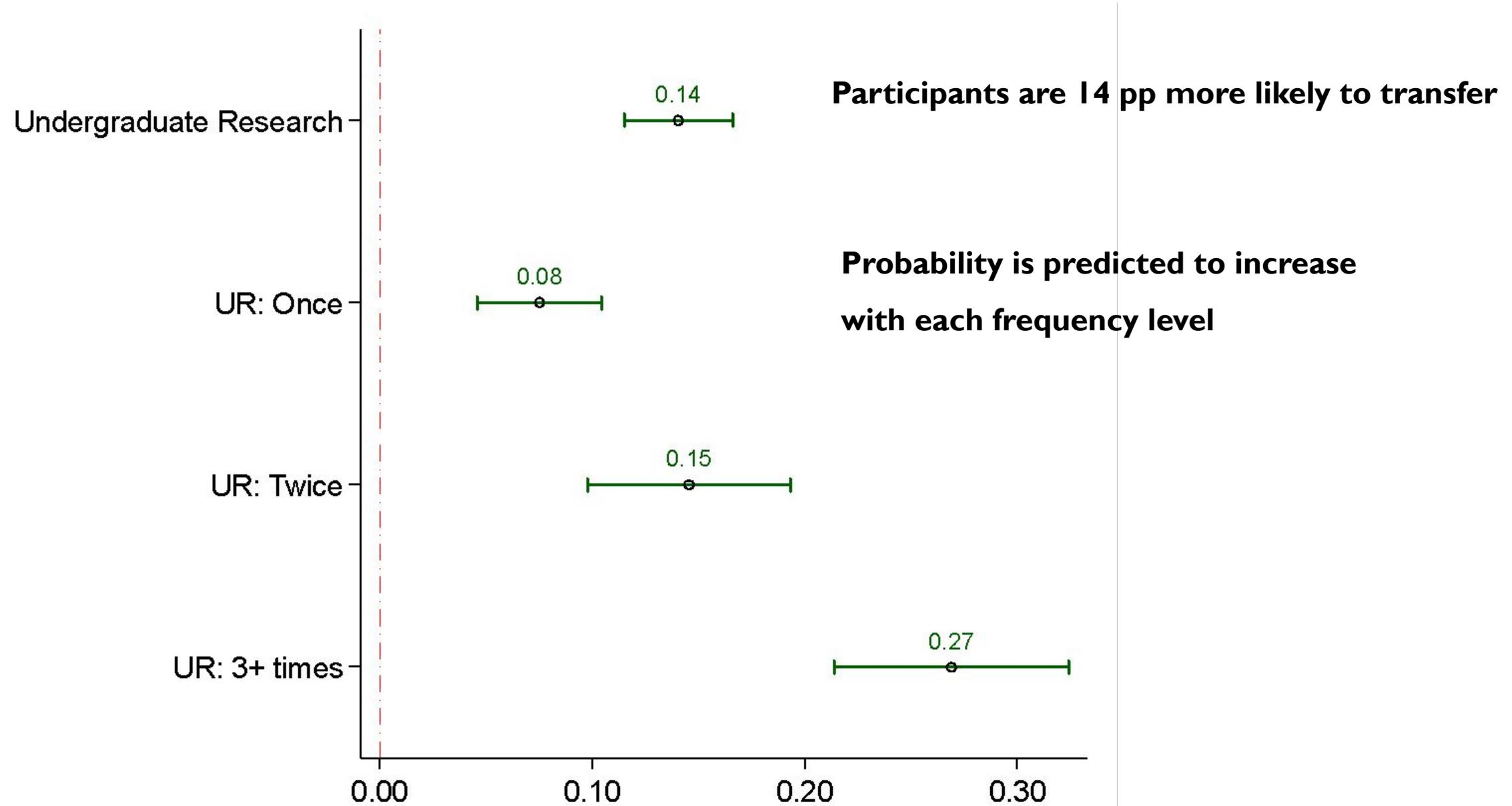
All confidence intervals include the value of “no effect”



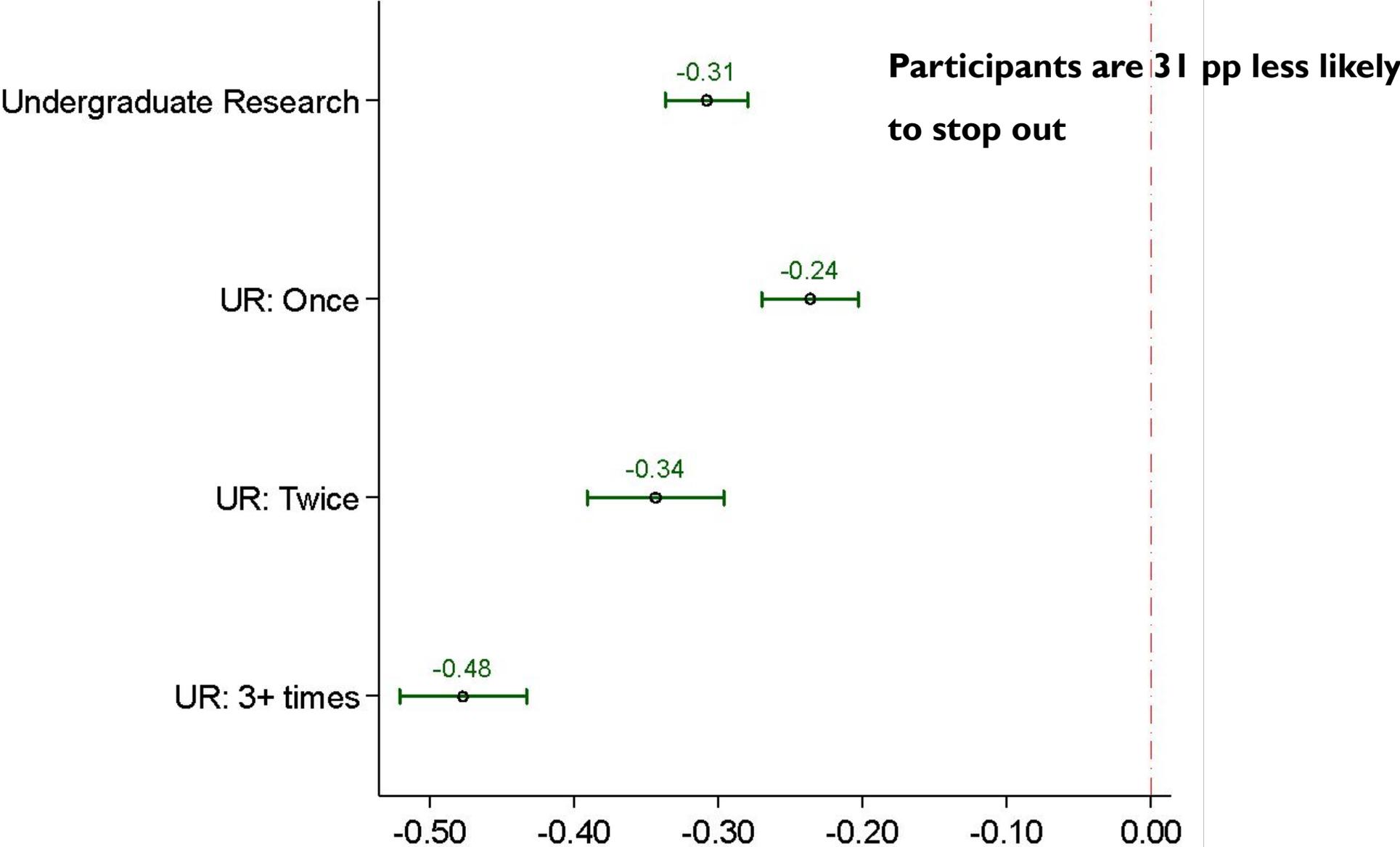
Participants have higher probability of university transfer

	Average non-participant	Average UR participant
Undergrad. research	.21	.35
UR – once	.20	.28
UR – twice	.20	.35
UR – 3+ times	.20	.47

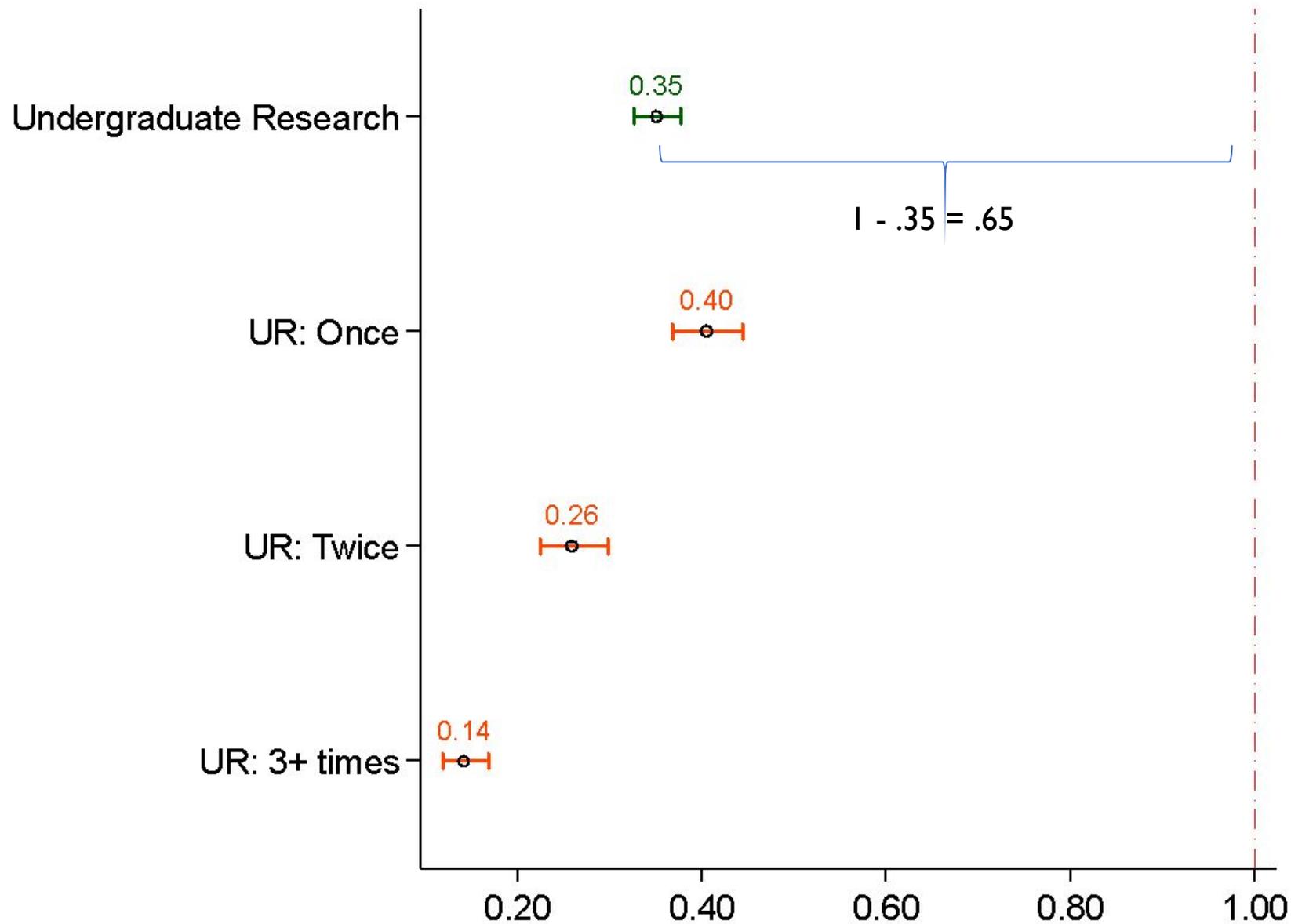
Participants are more likely to transfer to university than similar non-participants



Participants show a lower probability of departure



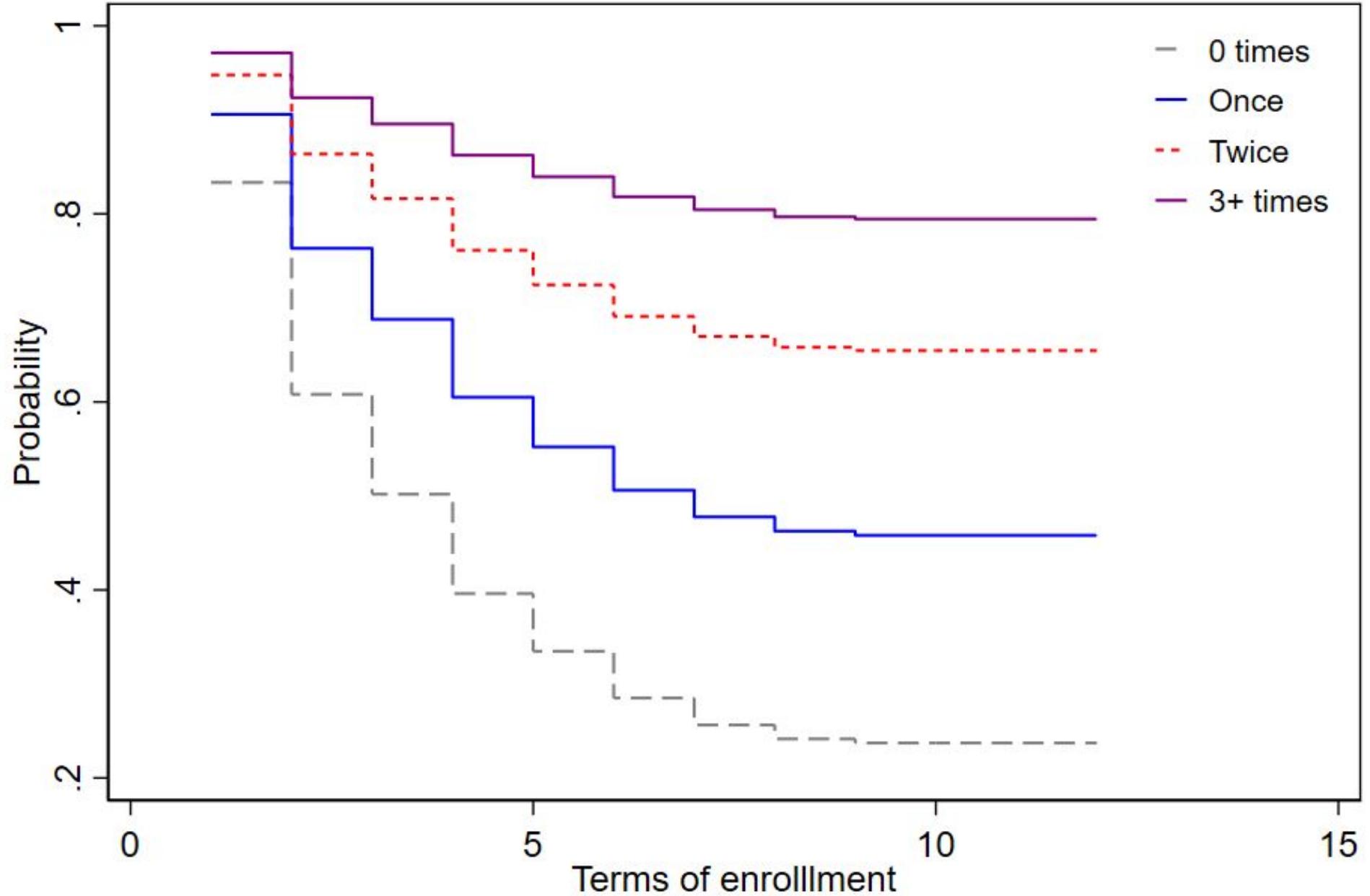
Participants are less likely to drop out in any term



Participants are 65% less likely to depart faster

Hazard for departure is predicted to decrease with each frequency level

Progression to departure slows down with frequency



In general, we find:

Undergraduate research participation

- Higher probability of graduation & transfer
- Higher GPA
- Better persistence

Results improve with an increase in frequency

Effect sizes are substantial