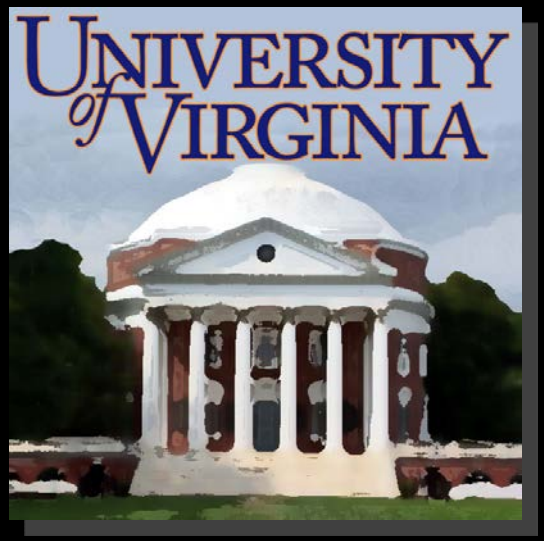
STEM Success in Selective Colleges: Effects of Relative Strength of Preparation

Frederick Smyth
Department of Psychology



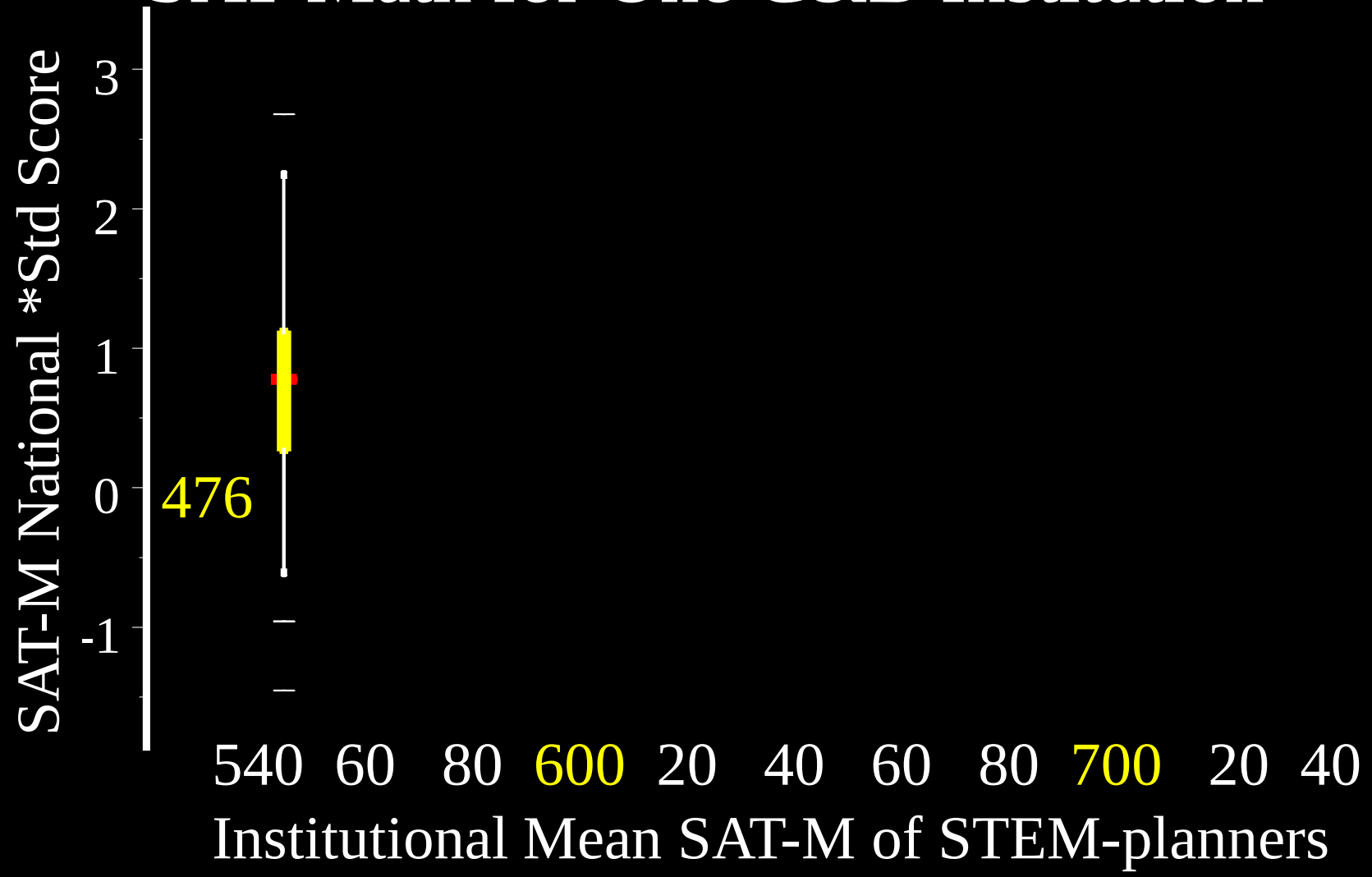
The Brookings Institution symposium on
The Effects of Racial Preferences in Higher Education on Student Outcomes
September 21, 2012

STEM Success is Race-Blind, but not Preparation-Blind

Smyth & McArdle (2004)

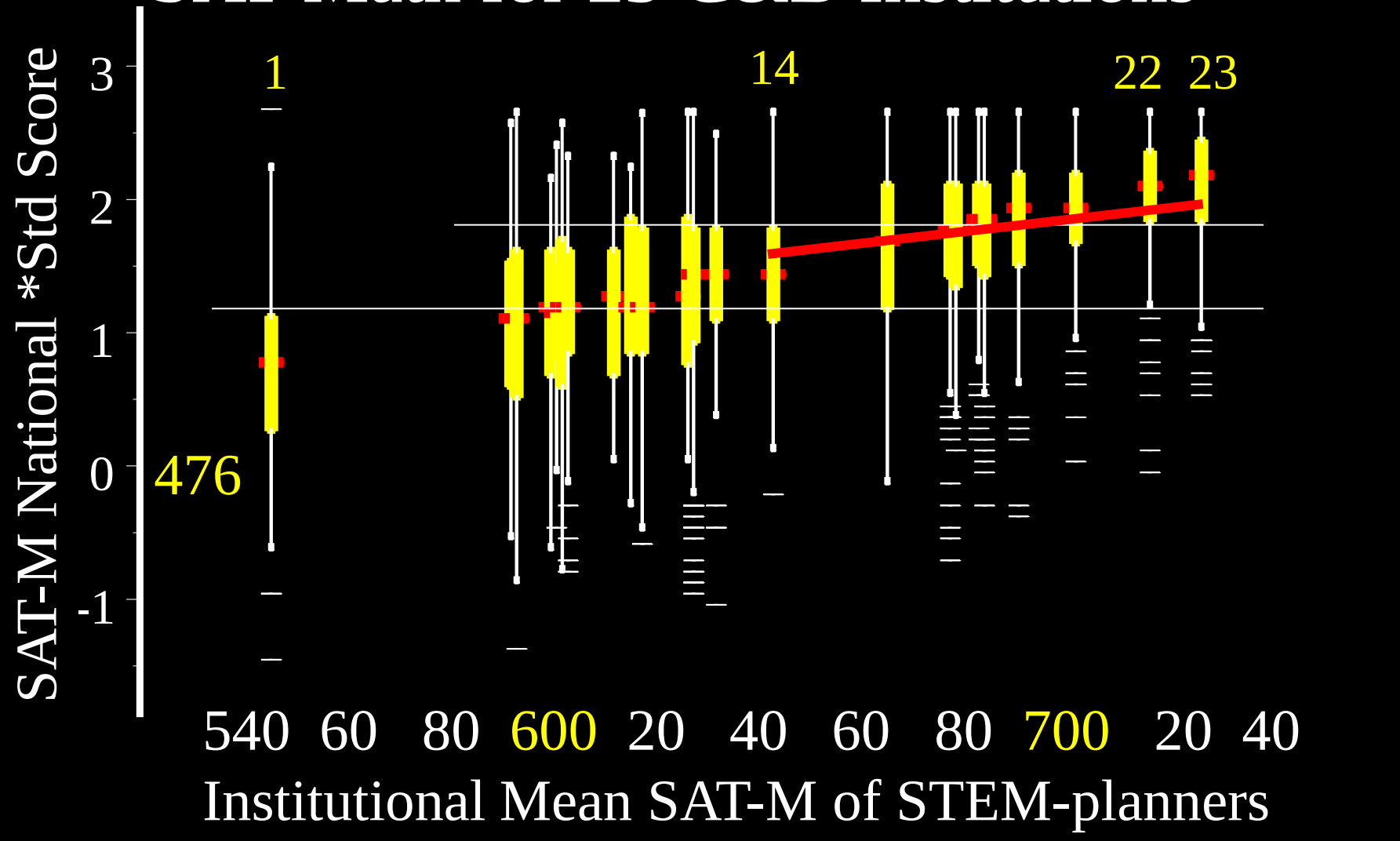
- *Relative* preparation matters
- No matter your race

SAT-Math for One C&B Institution



(*Standardized by 1989 national SAT-M mean=476, *SD*=121)

SAT-Math for 23 C&B Institutions



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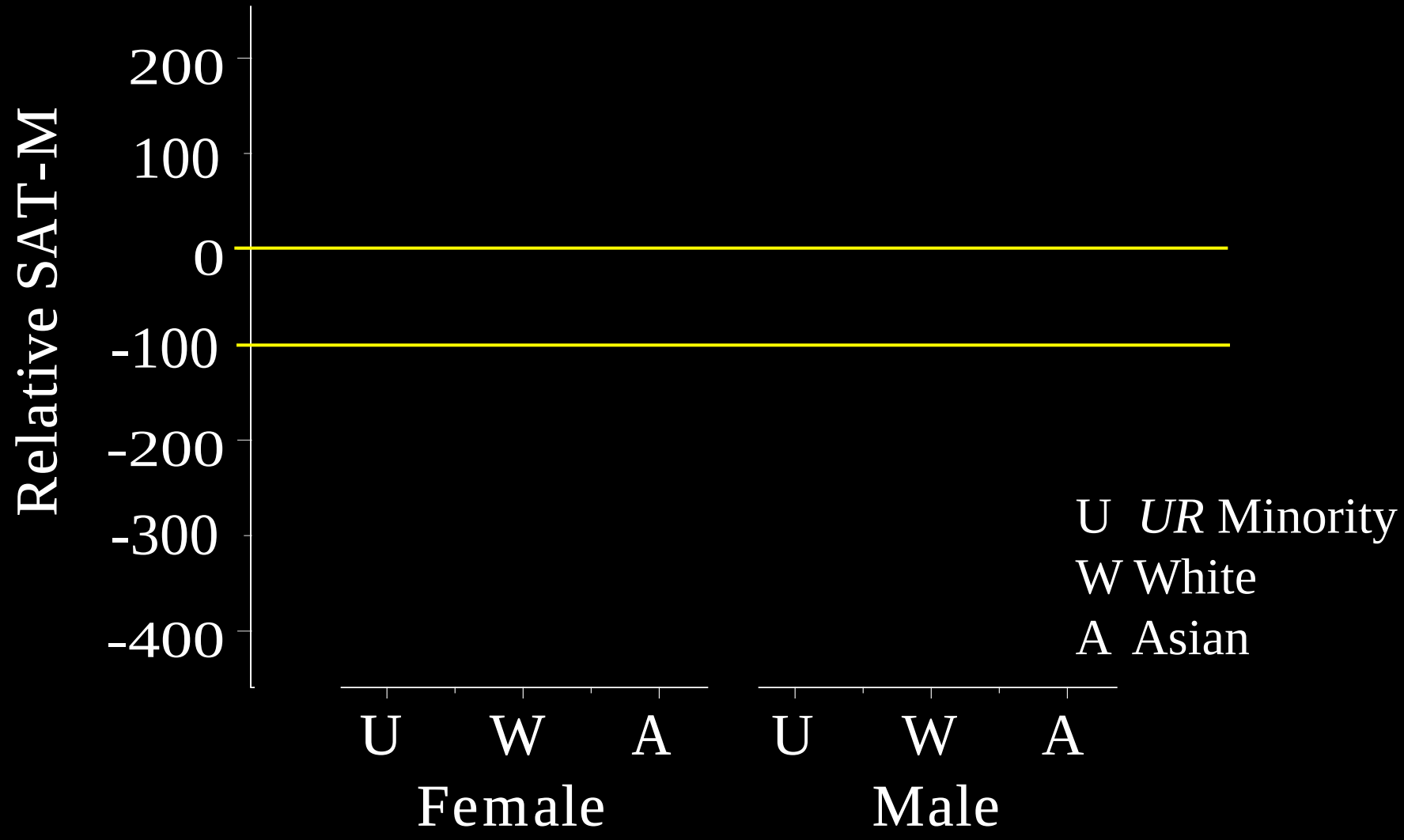
SAT-Math by Gender & Race (centered within institution)



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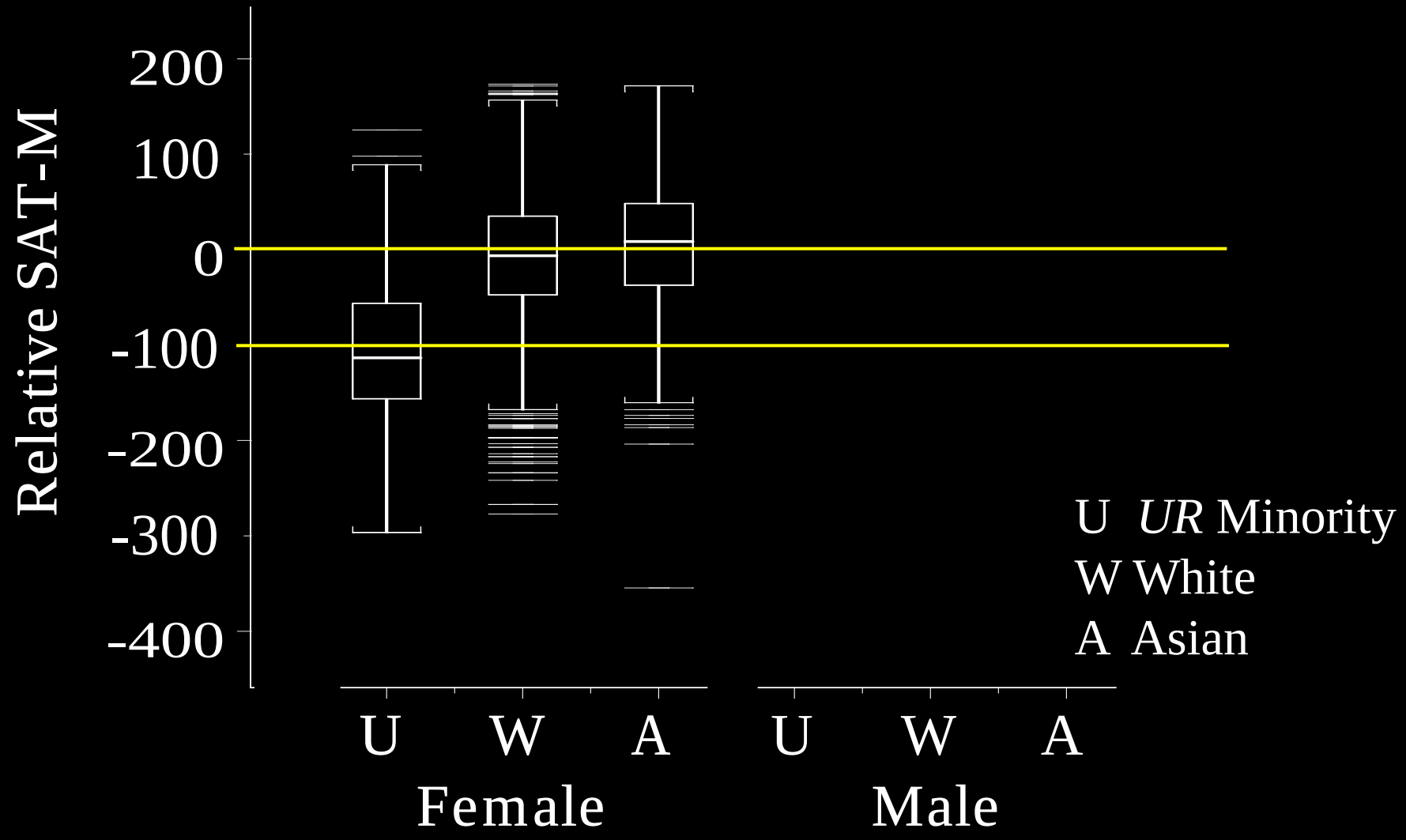

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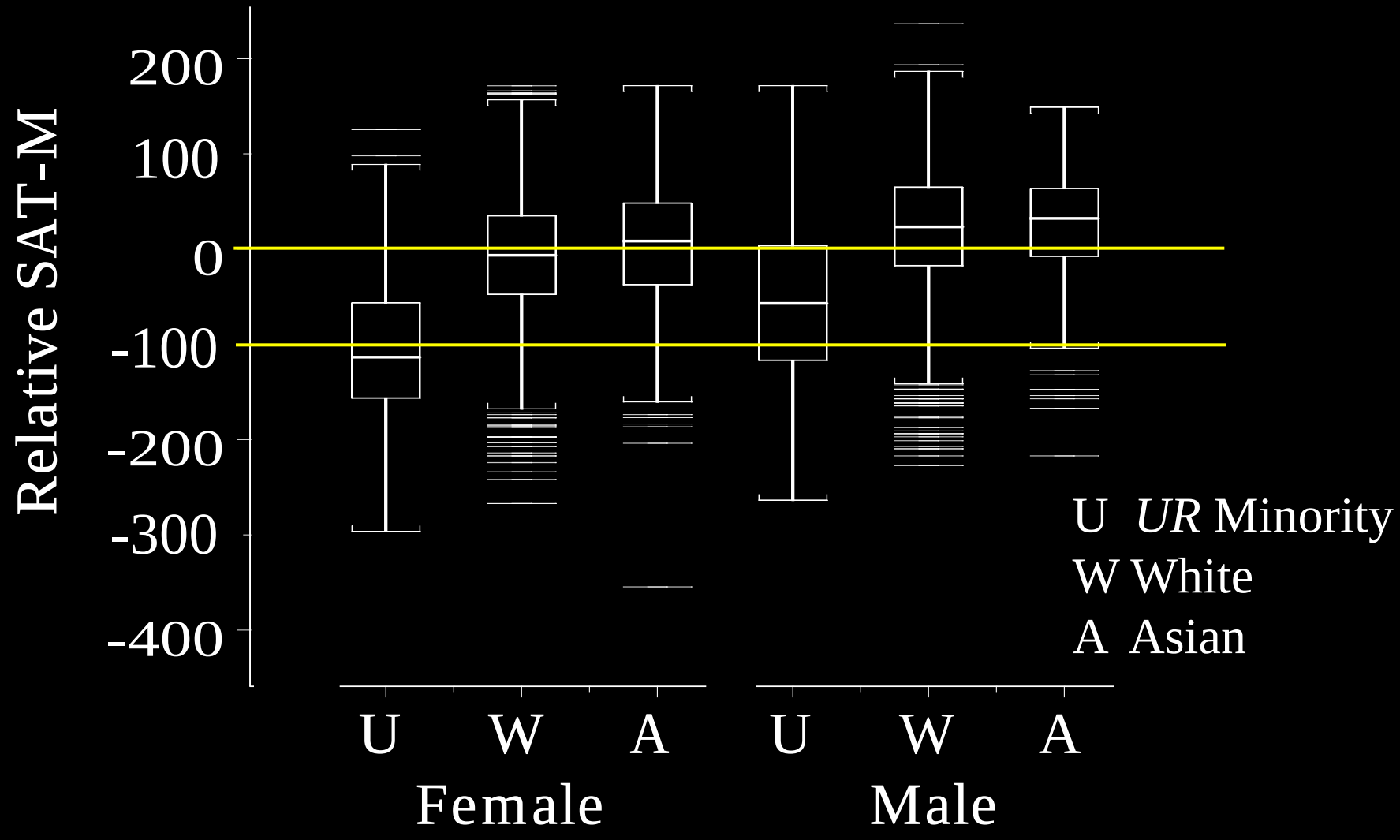
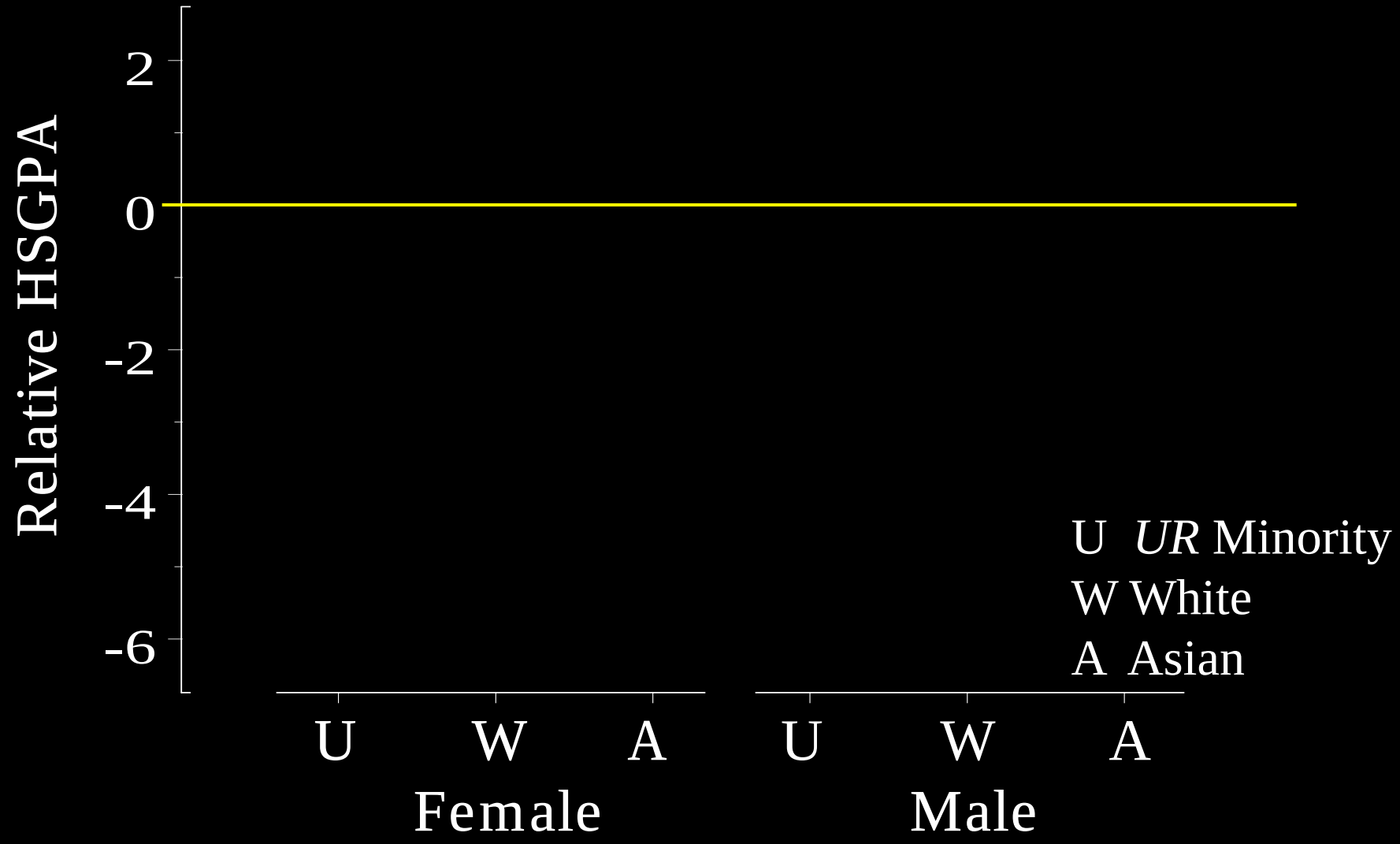


HSGPA by Gender & Race (centered within institution)



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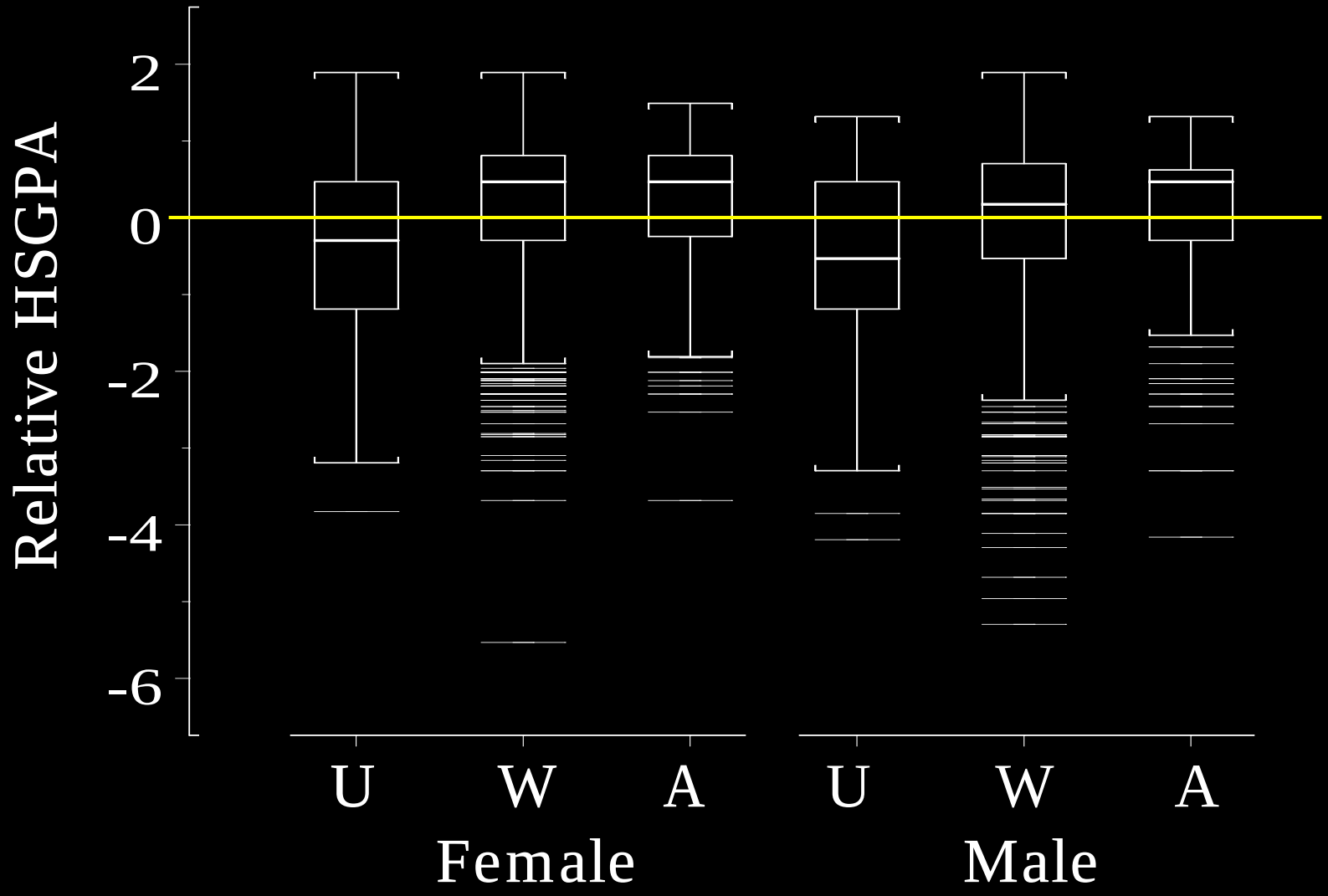
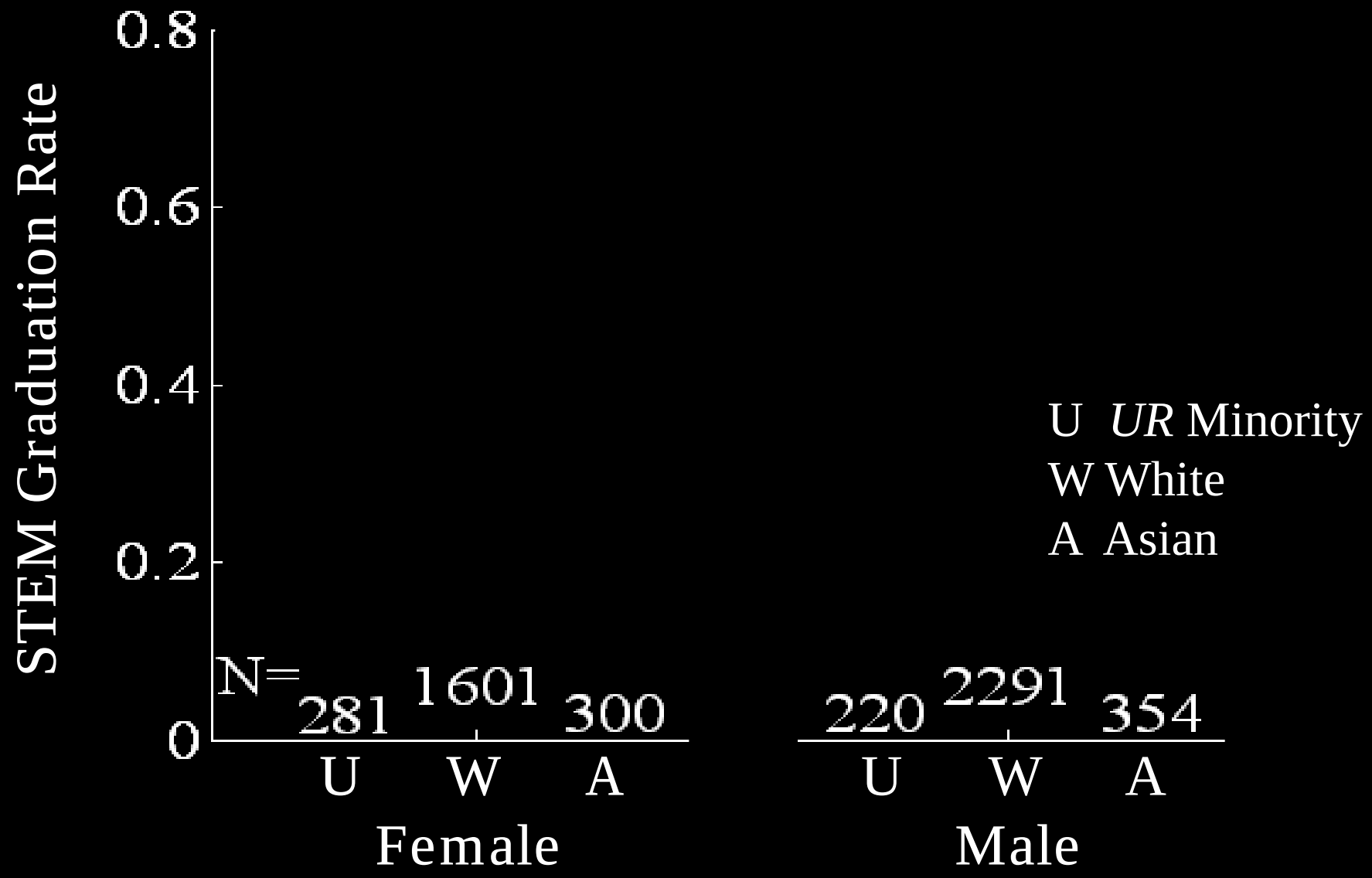


STEM Grad Rates by Gender & Race

(± 1 standard error)



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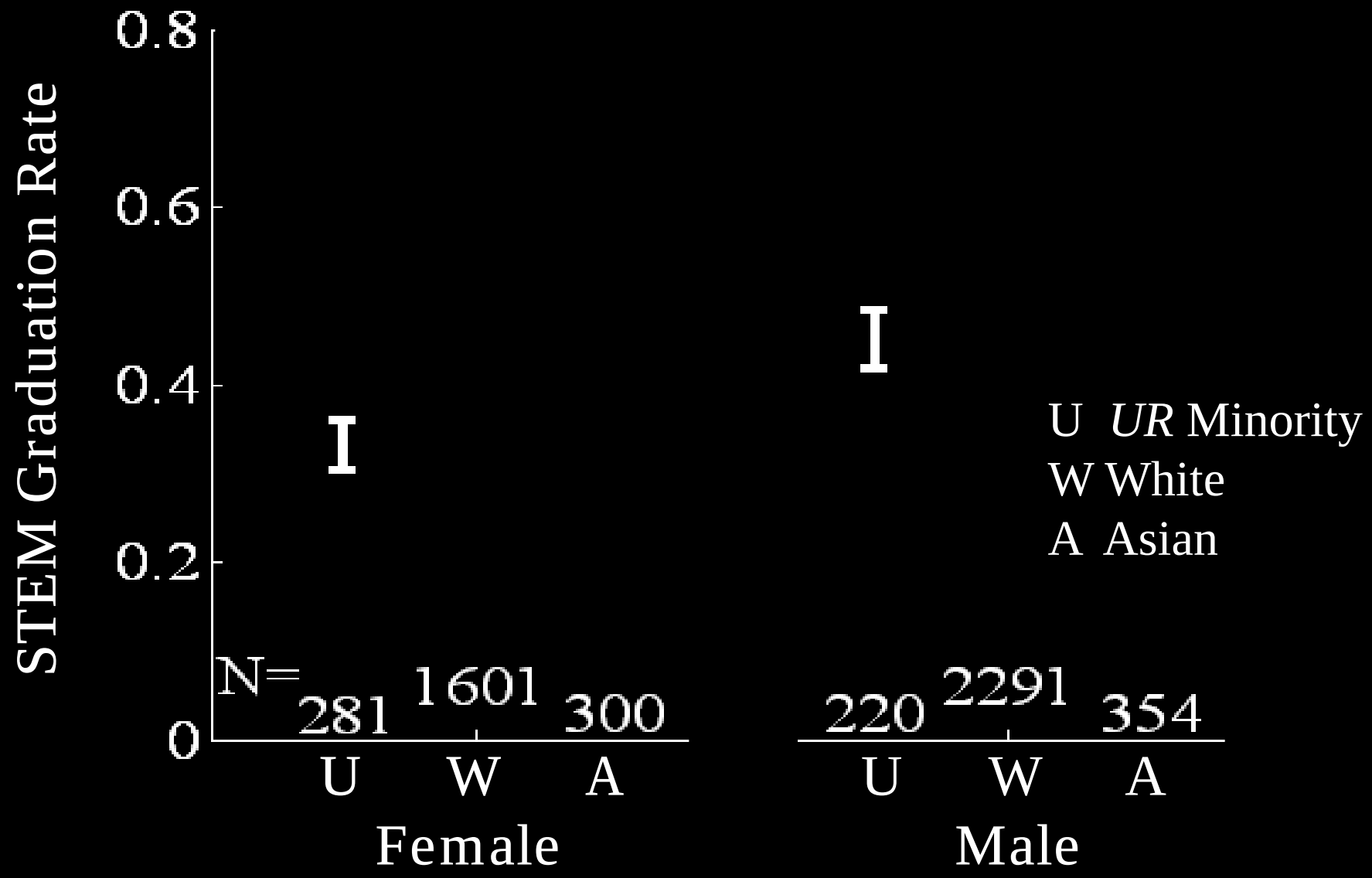

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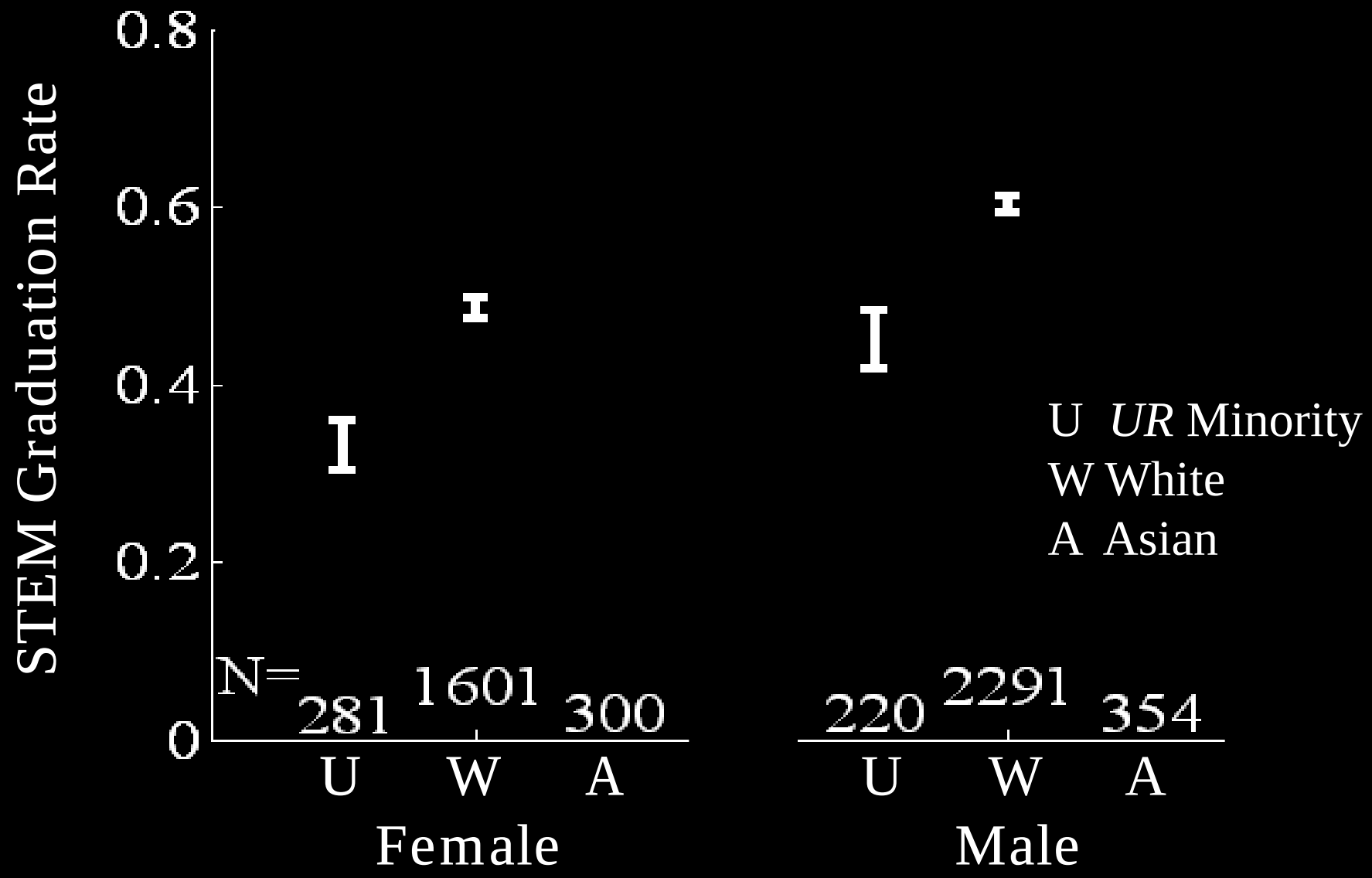

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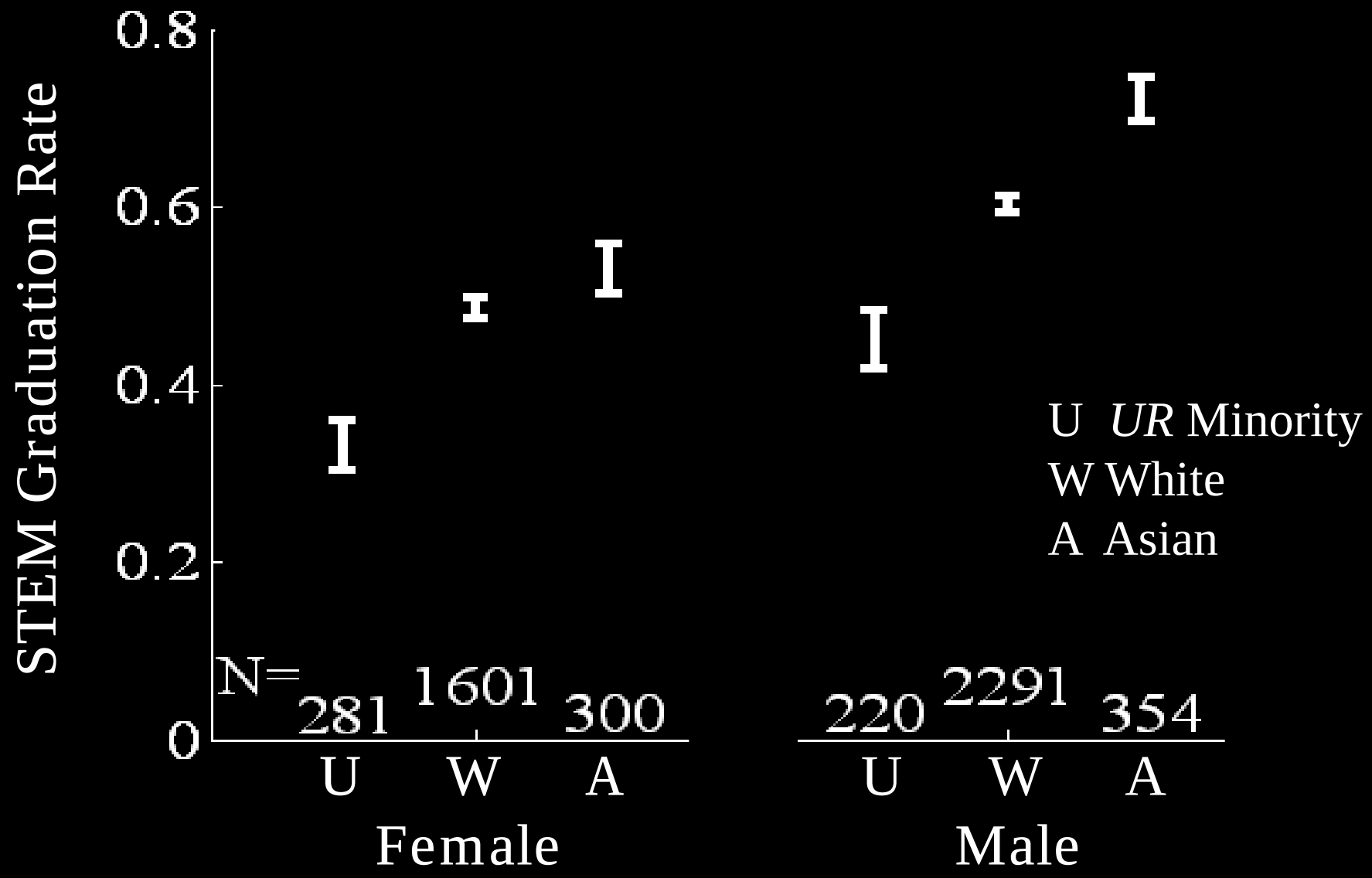

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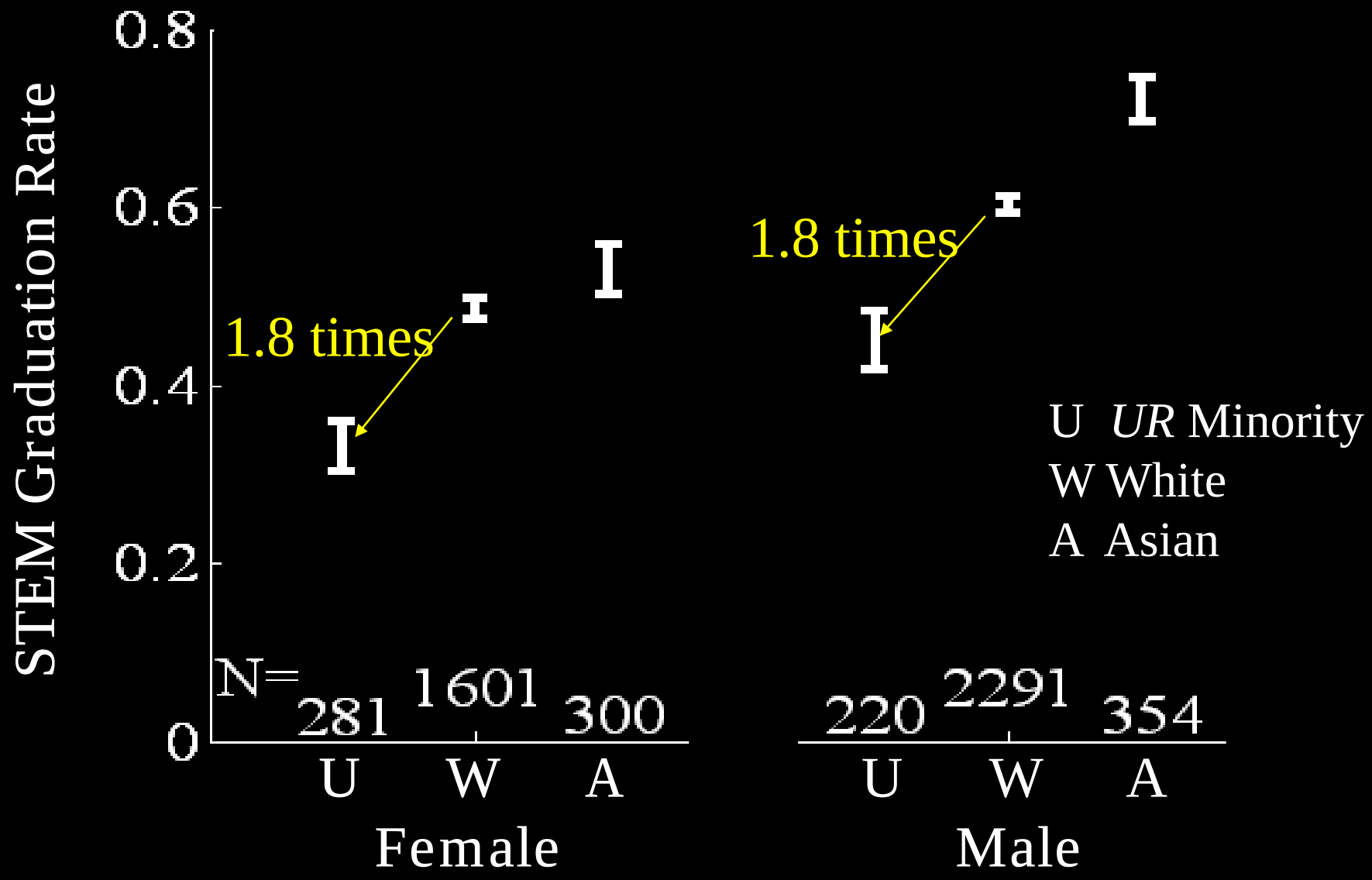

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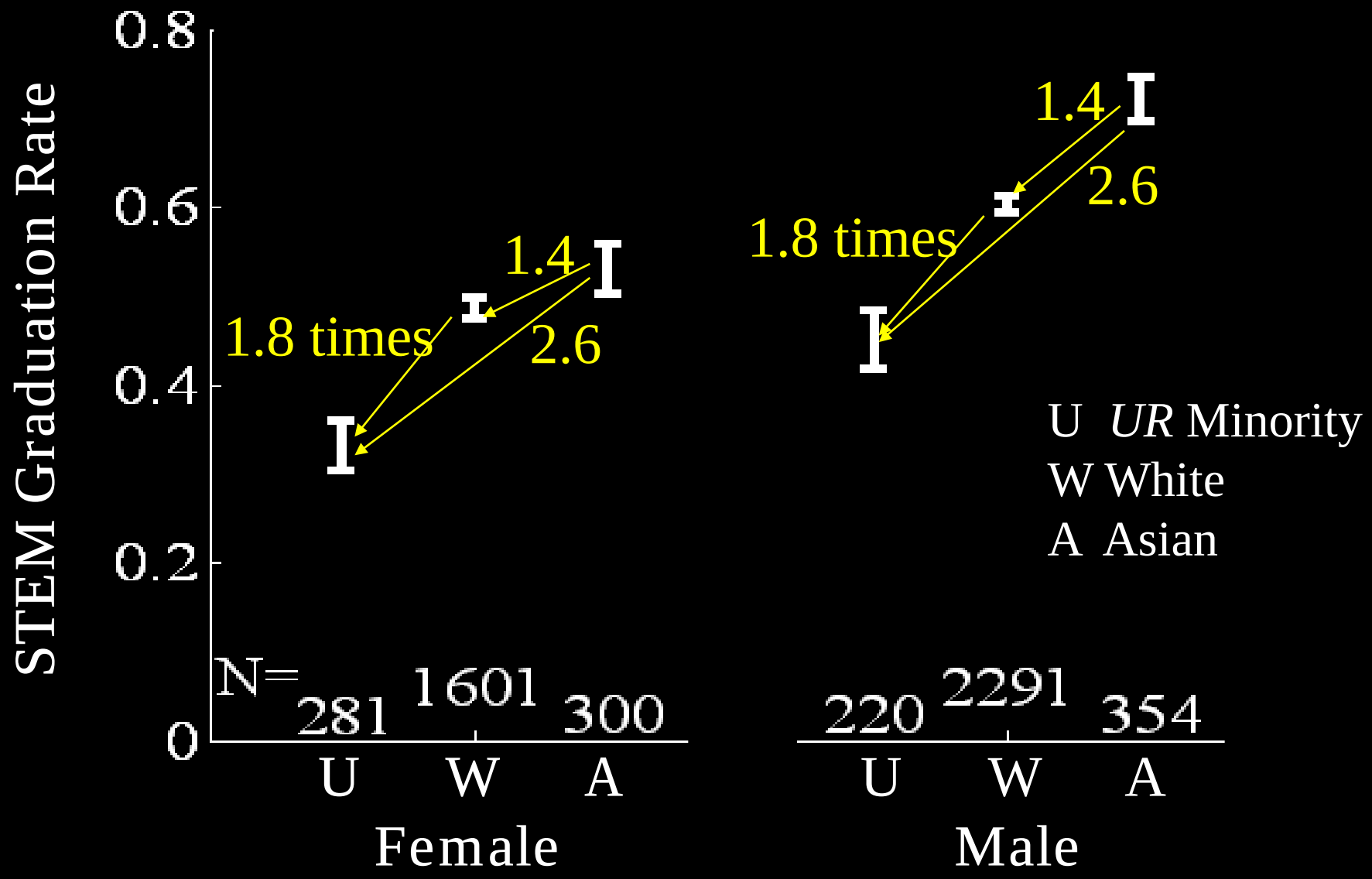
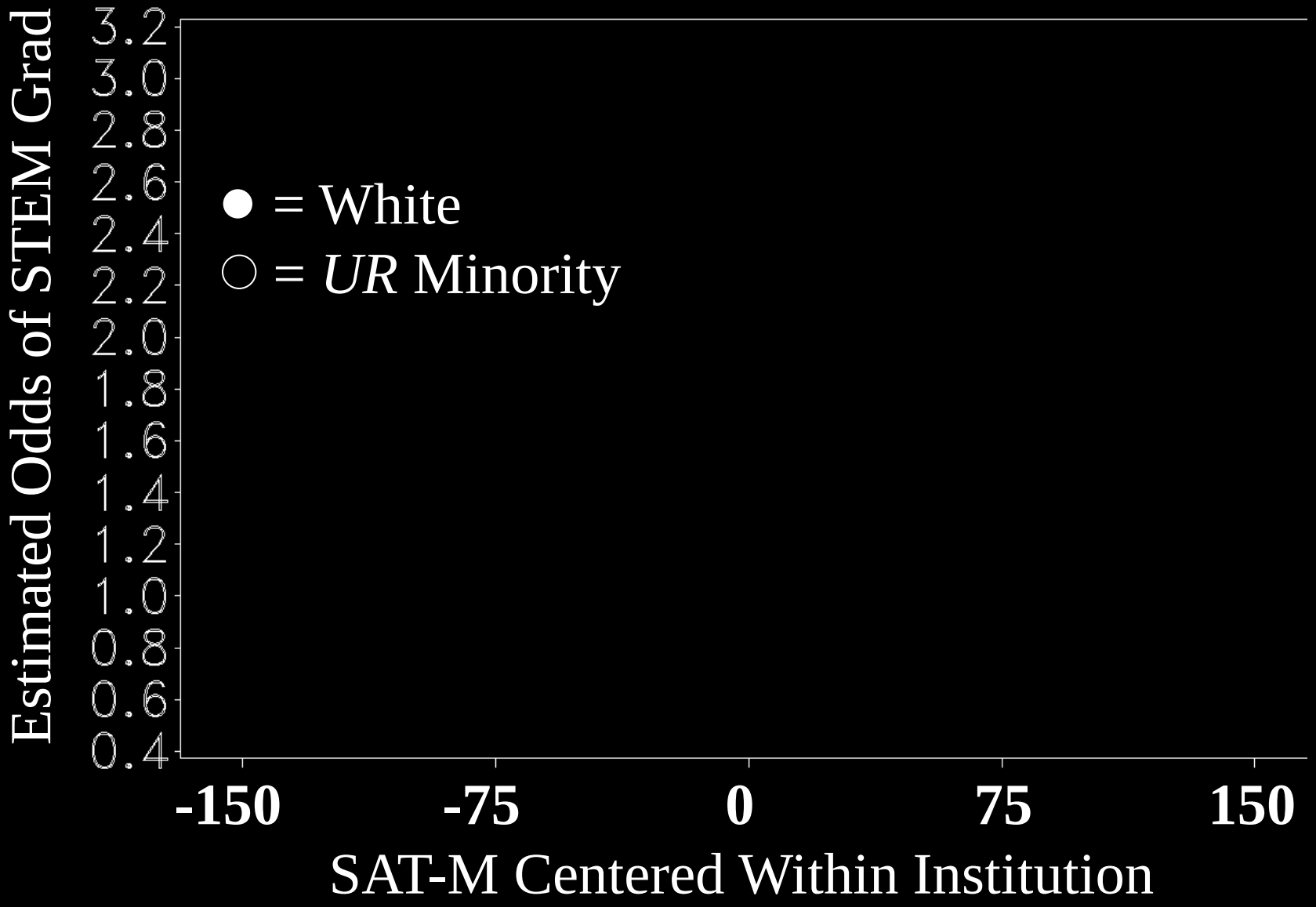


Estimated Odds of STEM Graduation by Race and SAT-M



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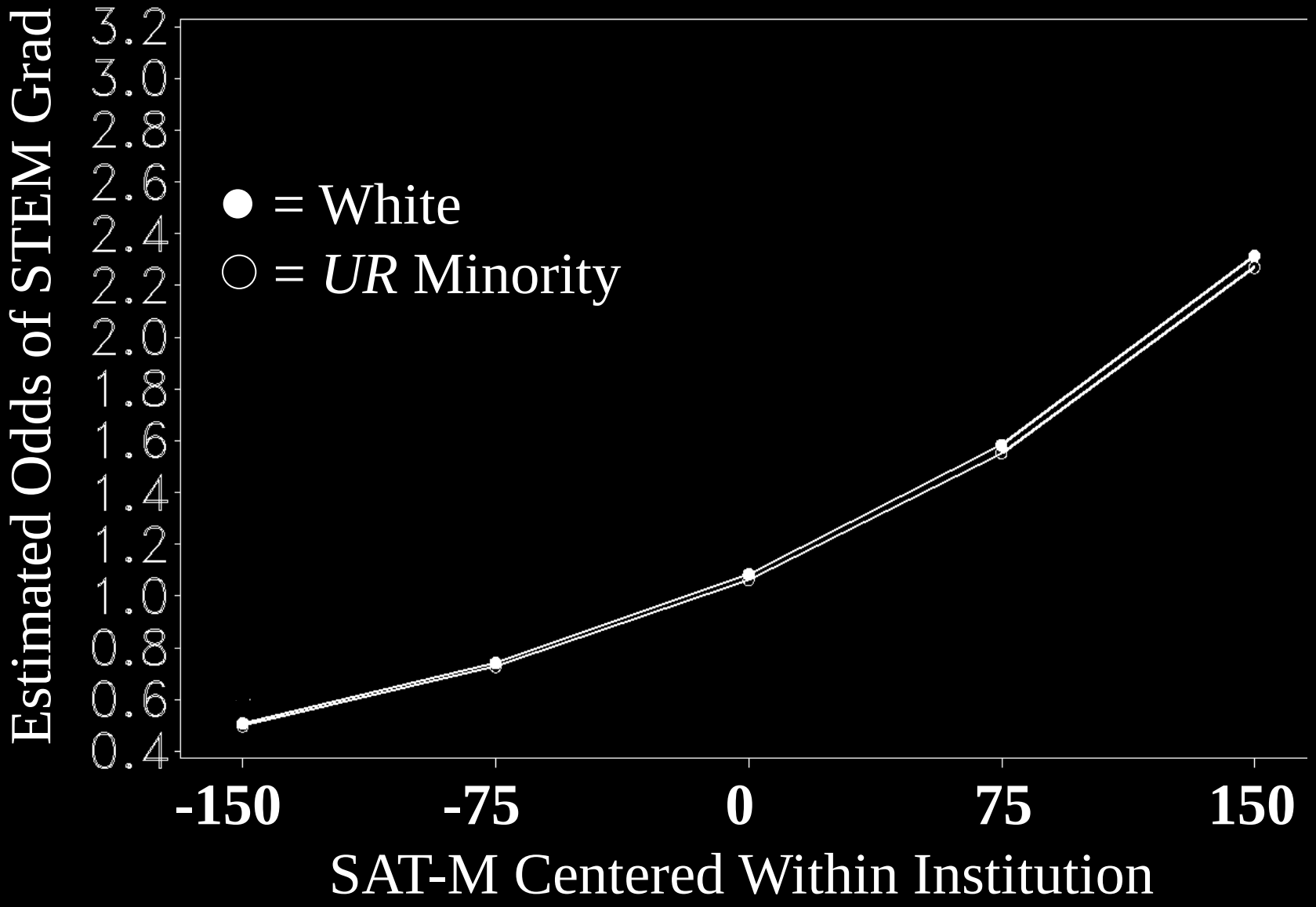

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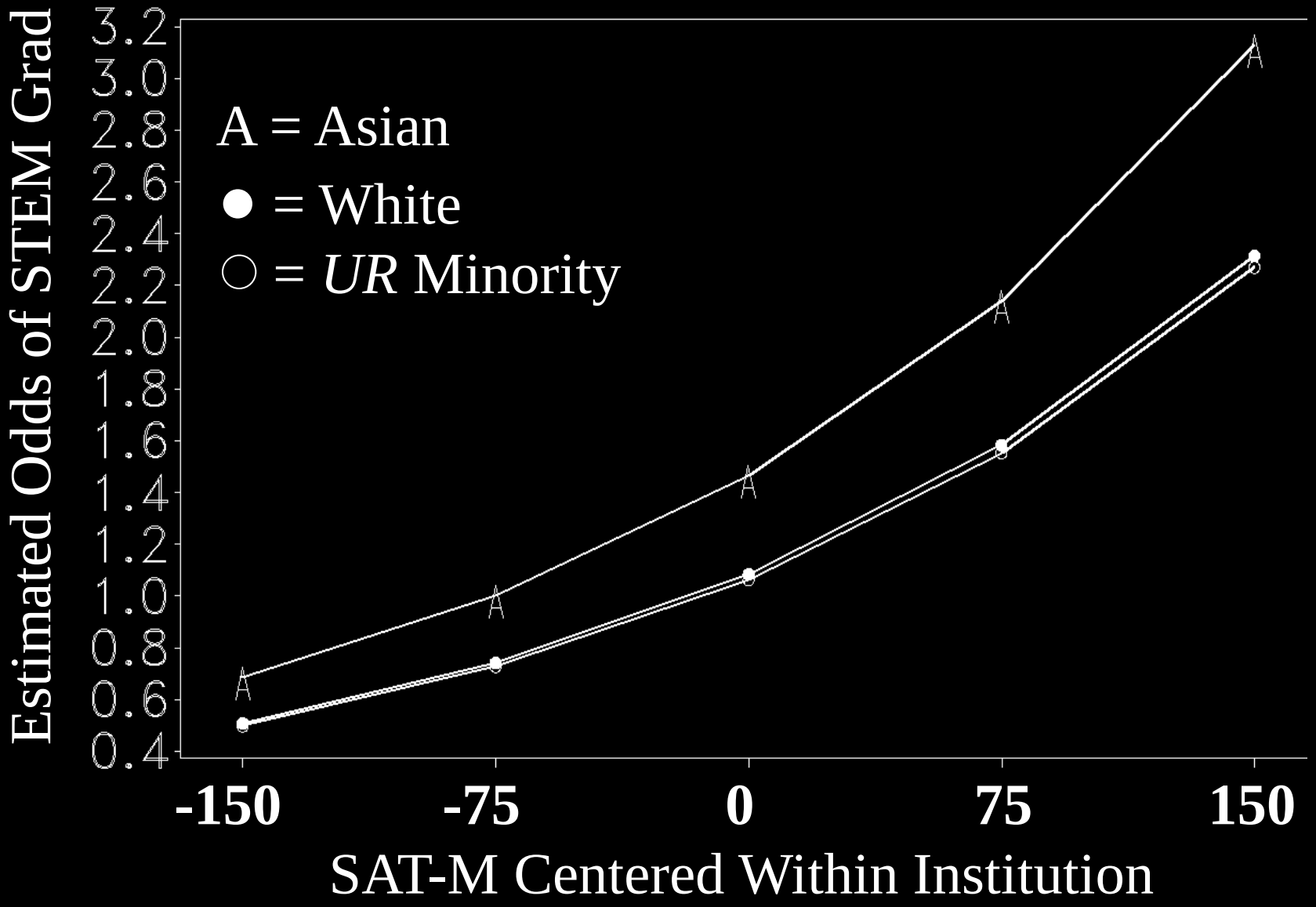


Estimated Practical Effects

Underrepresented Minority STEM losses:

72 women
62 men

Why reanalyze Bowen & Bok?

... “*Blacks and Whites were equally likely to have majored in … the natural sciences, and engineering*” (p. 71).

Pre-Bowen & Bok evidence of Race Differences in STEM Persistence

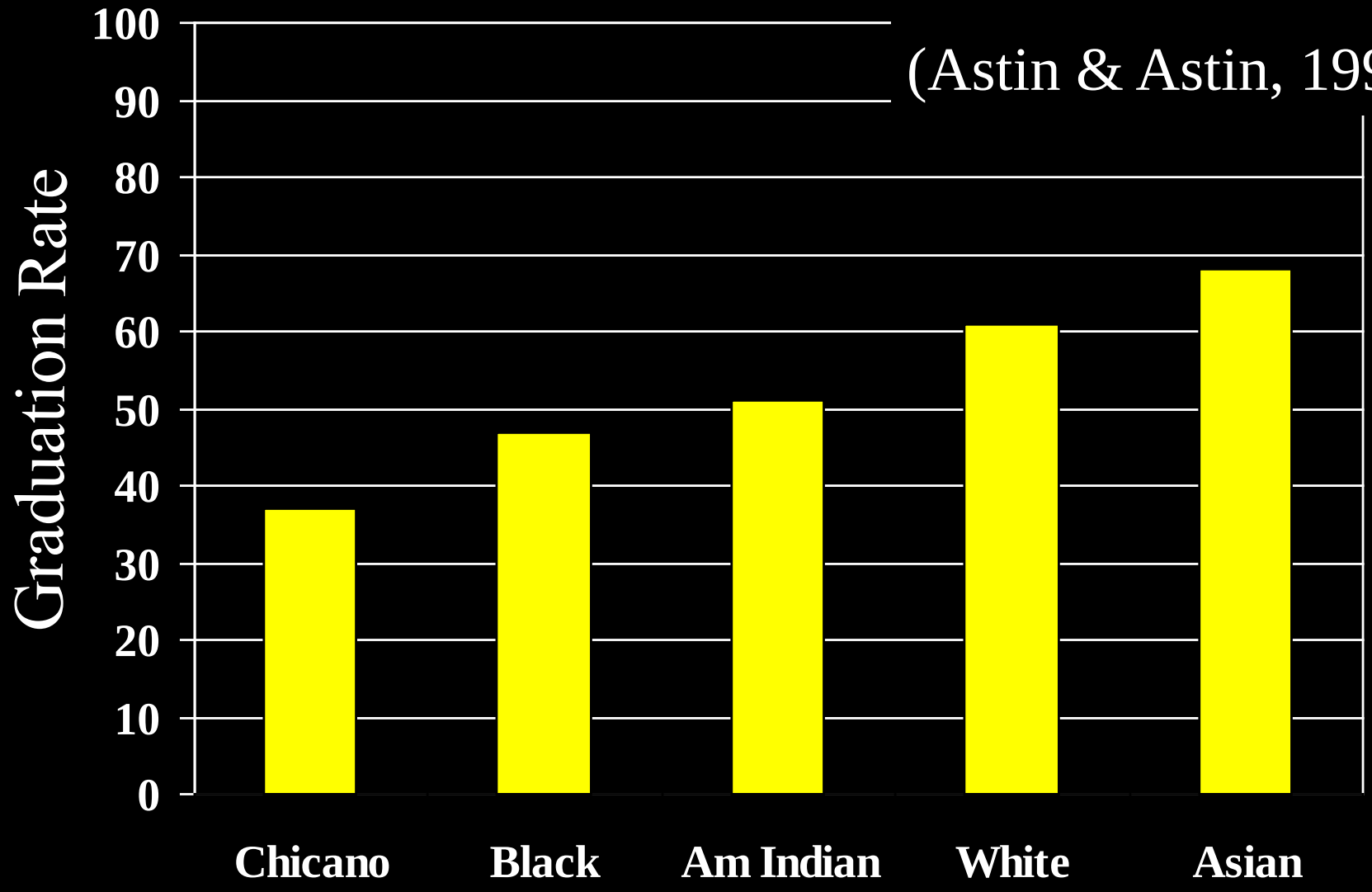
- Adair, 1991
- Astin & Astin, 1993
- Dunteman, Wisenbaker, & Taylor, 1979
- Elliott, Strenta, Adair, Matier & Scott, 1995
- Hilton, Hsia, Solorzano, & Benton, 1989
- Ware & Lee, 1988

Common finding:

– Academic prep explained race differences

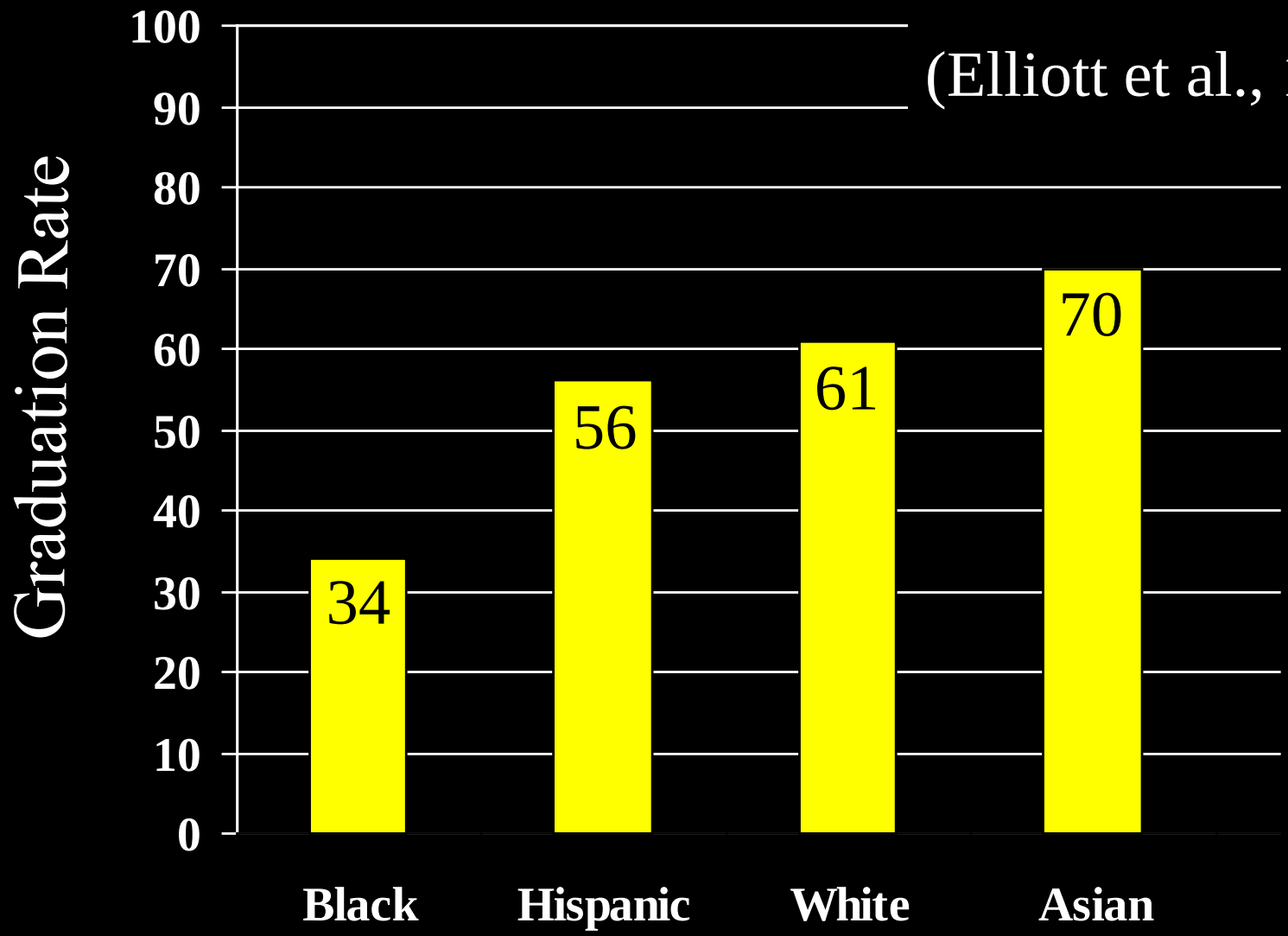
STEM Grad Rates: *N*>26,000 at 4-Year Colleges

(Astin & Astin, 1993)



STEM Grad Rates: Brown, Cornell, Dartmouth & Yale

(Elliott et al., 1995)



Why is Bowen & Bok's report different?

No account for initial aspirations.

The Mismatch Explanation

(Bowen & Bok, 1998)

"A student with a given SAT score, high school grades, and so on, who attends one of the most selective schools, should be expected to have a lower rank in class than a student with the same credentials who attends a school that enrolled a smaller number of top-rated students.

This is precisely the pattern we found.

Competing against fellow students with very strong academic credentials naturally affects one's class rank, even though this disadvantage may well be counter-balanced by other benefits." (p. 73)

Grade and Rank Gaps

Bowen & Bok (1998)

"While the majors chosen by black students are similar to those chosen by their white peers and provide no cause for concern, their college grades present a more sobering picture."

	Black	White
Cum GPA	2.61	3.15

This difference "is very large when seen in the context of the overall distribution of grades." (p. 72)

Class Rank	23rd	53rd

Summary

- *Relative* preparation differences explain STEM race differences (except Asian bonus).
- Same mechanism offered by Bowen & Bok to explain overall grade and rank gaps.

Recommendations

- Awareness of potential trade-off between different diversity goals
- Institutional self-study
- Information to prospective STEM students:
  - How does a student “like me” –academically– fare in STEM at each college?

Thank you.