A top-down view of a desk with various items: a laptop on the left, a bowl of snacks in the top left, a calculator with a '+' sign in the top center, a pair of glasses in the top right, and a hand writing on a notepad in the center right. The entire image is overlaid with a semi-transparent purple filter.

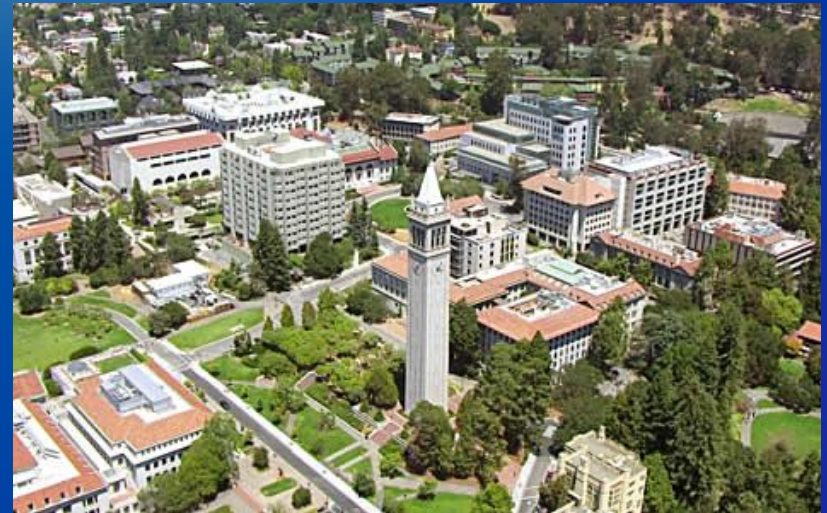
# Applying Predictive Analytics to Educational Challenges: *Ethical Issues*

**Kim Darnell**  
**Aidan Feay**  
**Jessica Hays Fisher**

*Final Project*  
*W231 Fall 2018*

**Berkeley** SCHOOL OF  
INFORMATION

# Educational Quality and Efficacy *Matter*





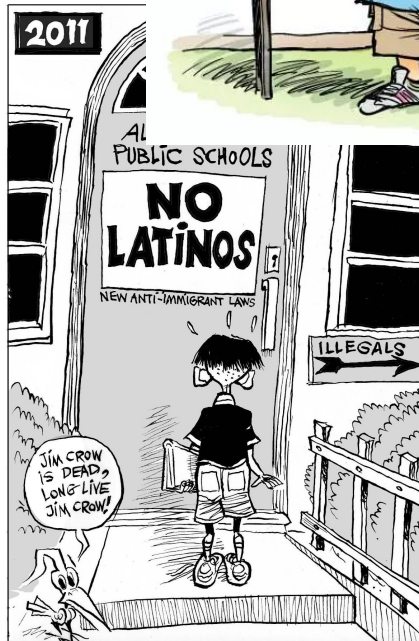
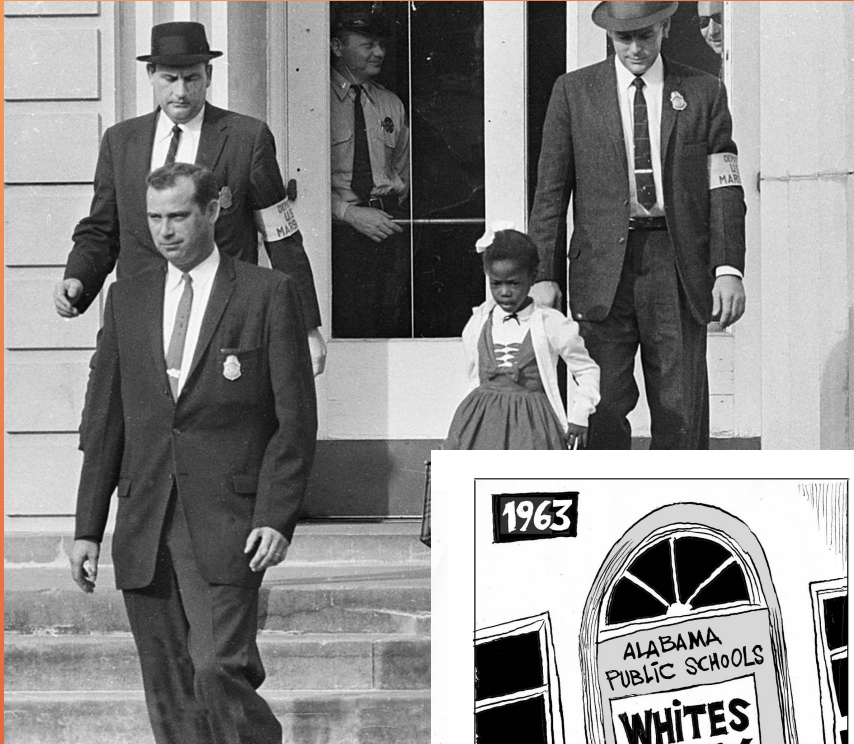
What are the benefits and consequences of attempting to improve educational outcomes using the tools of *data science*?



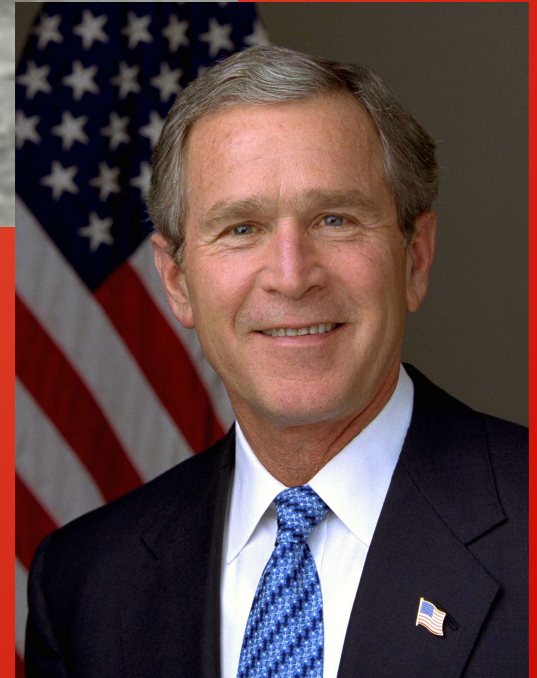
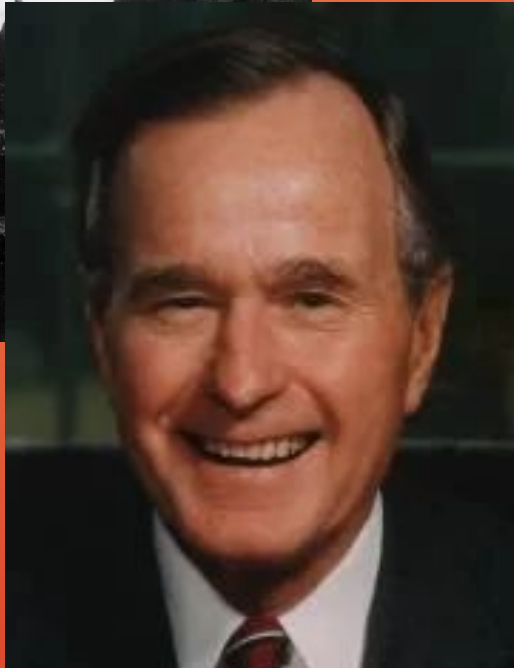
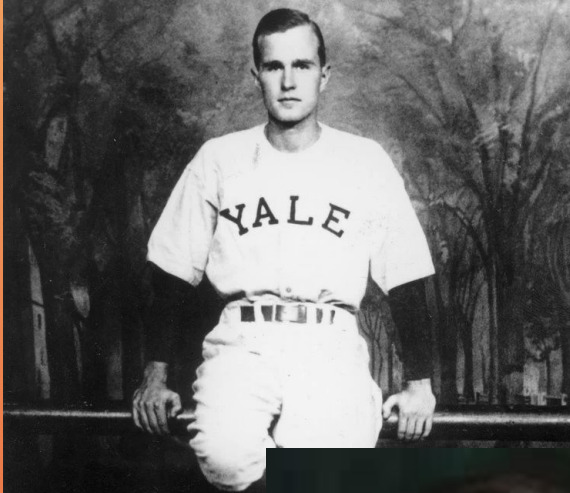
Learning  
Machine



# The Data Bear the Burden of *History*

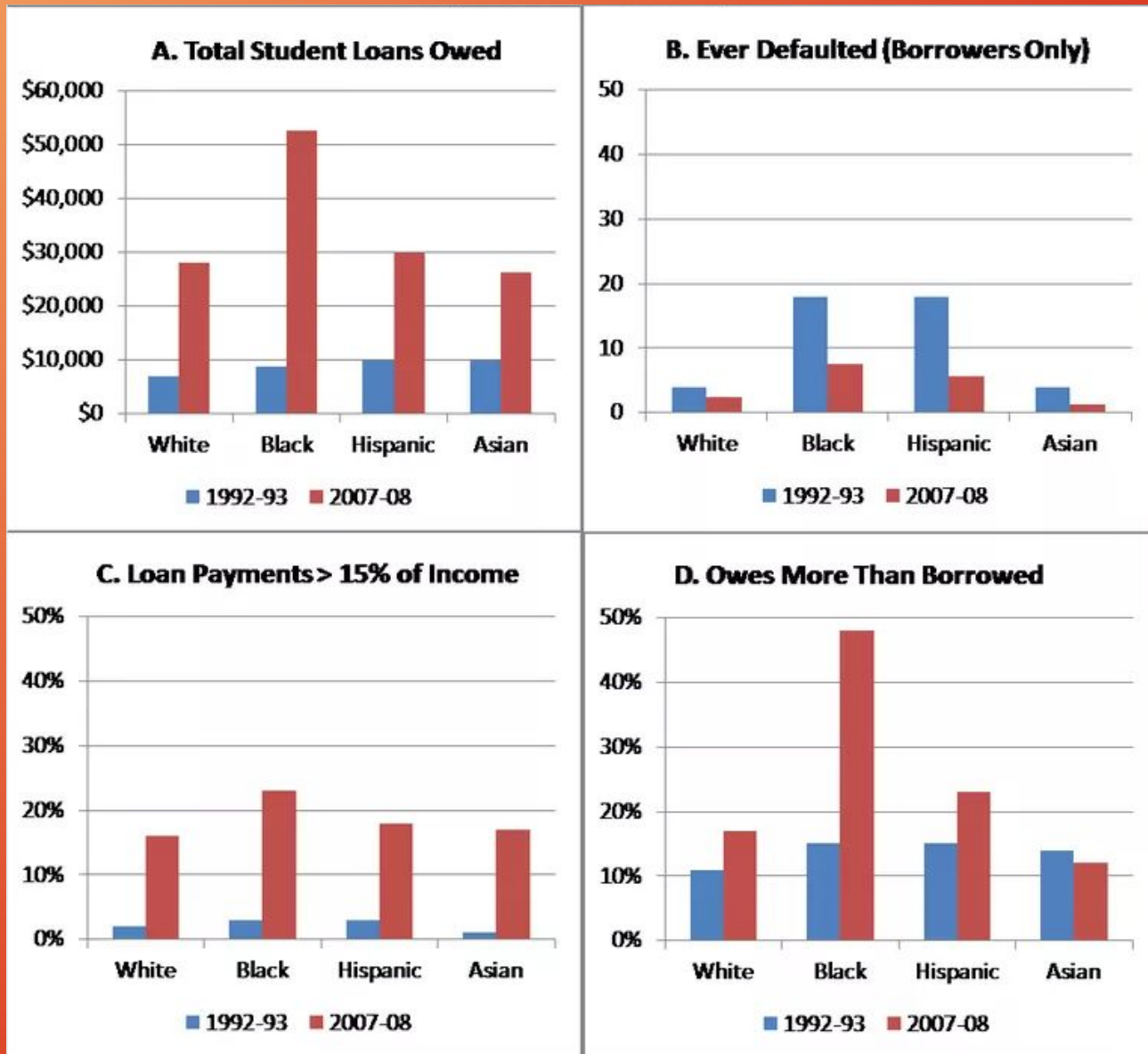


# Privilege Perpetuates *Itself*



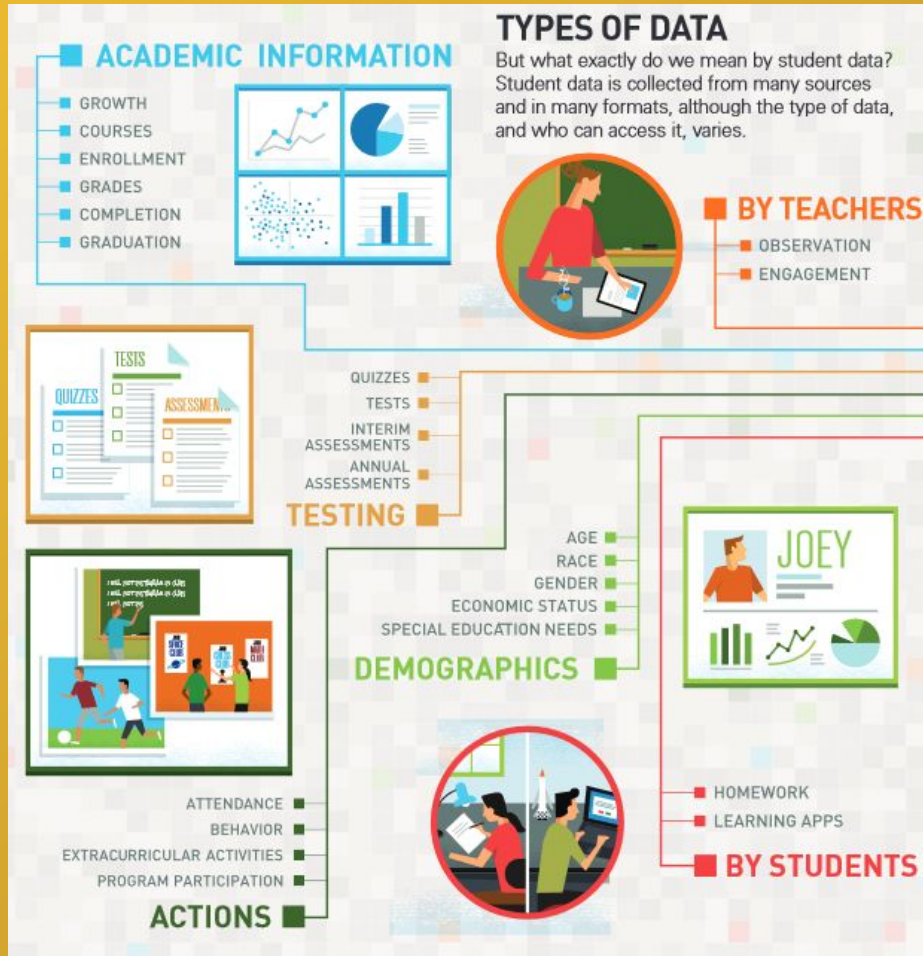


# Growing Privilege is Increasingly *Expensive*





# Data Science in *K-12*



- Standardized testing
  - ▶ More data, more granular tracking
- Approaches vary
  - ▶ Many public school systems dedicating few/no resources at district level
- Rise of Ed-tech companies
  - ▶ Outsourcing of supplemental data gathering, analysis, sharing of insights



## 🗨 Case Study: *Tacoma Public Schools*

- ▷ Dashboards inform planning for teachers and principals
- ▷ Shared data to drive transparency for students, parents, community
- ▷ Early interventions enabled and encouraged

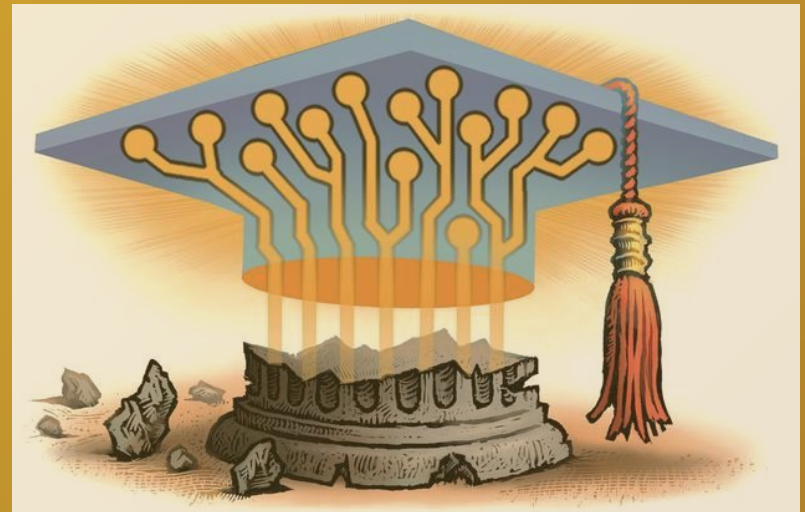


Graduation rates have risen by 28%; individual schools have seen even more drastic results

# 🗨 Data Science in *Higher Education*

Most schools are trying to do more with fewer public resources and greater public expectations

- ▷ The traditional stuff
  - ▶ Application information
  - ▶ School-related activities
  - ▶ Financial details
- ▷ Plus...
  - ▶ Online activities
  - ▶ Microassessment of progress
  - ▶ All on-campus interactions with technology



## Case Study: *Georgia State University*



- ▷ Tracking students' progress through major programs
- ▷ Encouraging tutoring and advising through alerts
- ▷ Targeting high risk students for microgrants
- ▷ Applying adaptive learning tools across the curriculum



## Georgia State *University (cont.)*

- ▷ Graduation rates up 2% per year since 2013
- ▷ Graduates finish sooner, saving millions in tuition
- ▷ The graduation gap has been closed!
- ▷ Students from all backgrounds are graduating at higher rates in high demand majors



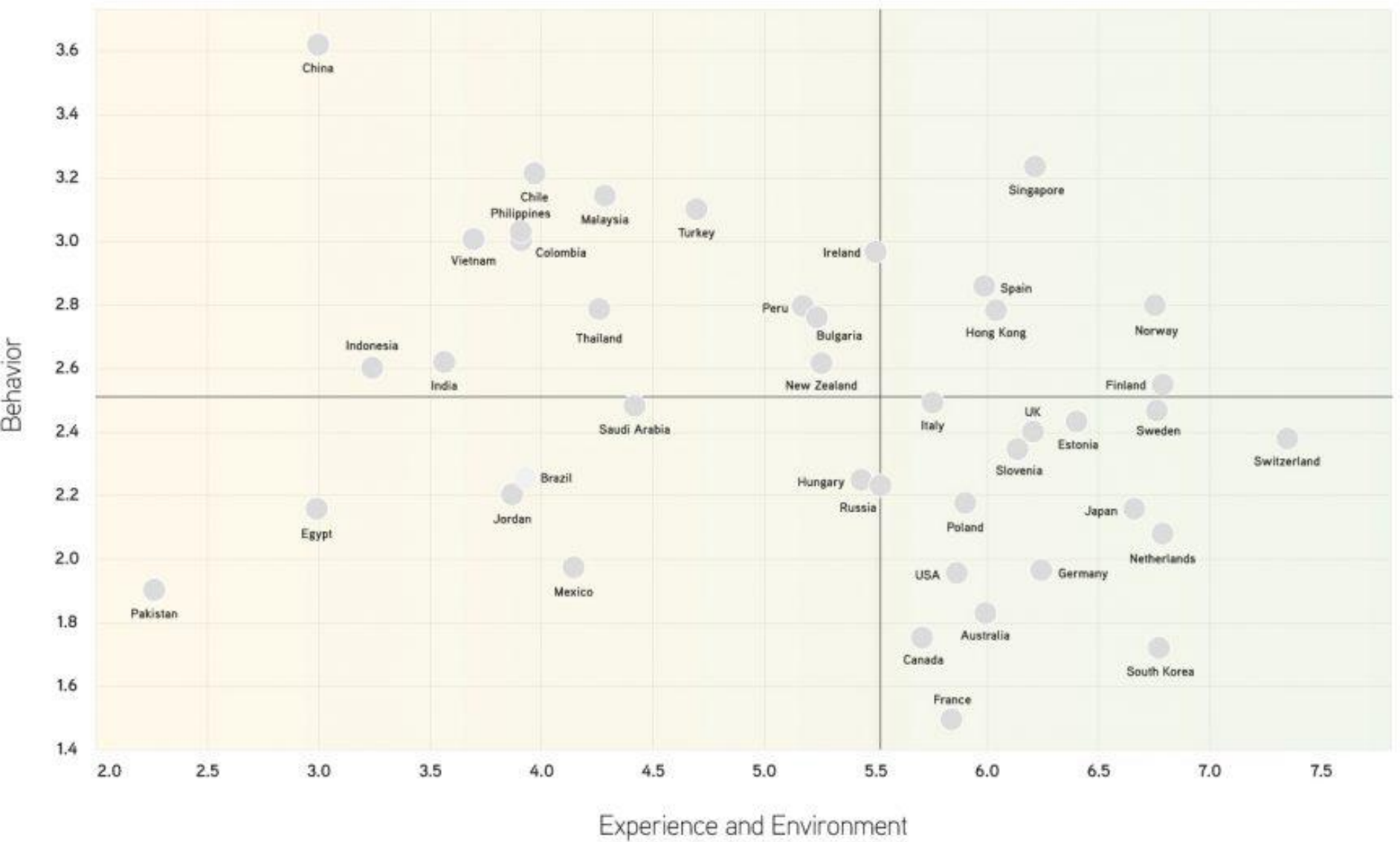
# 💬 Motivations of Participants: *Qualitative*

- ▷ Why are students studying?
  - ▶ Learning
  - ▶ Performance
- ▷ Do they trust technology?
  - ▶ Trust deficit



# Trust Index Landscape

Digital Evolution Index 2017





## Motivations of Participants: *Quantitative*

- ▷ How do engagement metrics in education differ from traditional media consumption?
  - ▶ YouTube views vs lecture views
  - ▶ Students revisit sections of lectures in a way inconsistent with other media viewing habits
- ▷ “Measure YouTube views? Your employees will strive for more and more views.”
  - ▶ Jeff Bladt and Bob Filbin



# 🗨 Motivations of Practitioners: *Conscious*

- ▷ Limited School Transparency
- ▷ Trade-offs
  - ▶ Altruism vs Profit
  - ▶ Difficulty of Measurement
  - ▶ Re-identification
  - ▶ FERPA



# 💬 Motivations of Practitioners: *Subconscious*

- ▷ Lack of Domain Knowledge
- ▷ Hacking
  - ▶ Loss of trust
  - ▶ Public image
  - ▶ Ransoms
- ▷ Training
- ▷ Data Classification



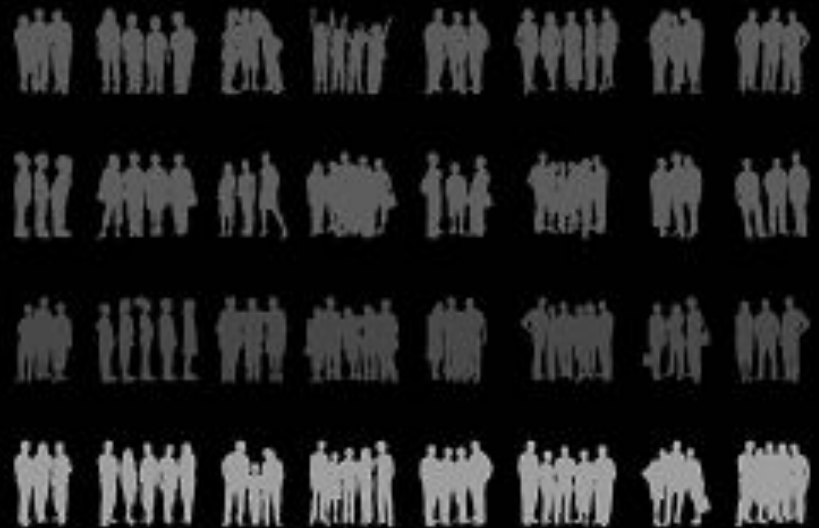


# Questions for Consideration: *Individuals*



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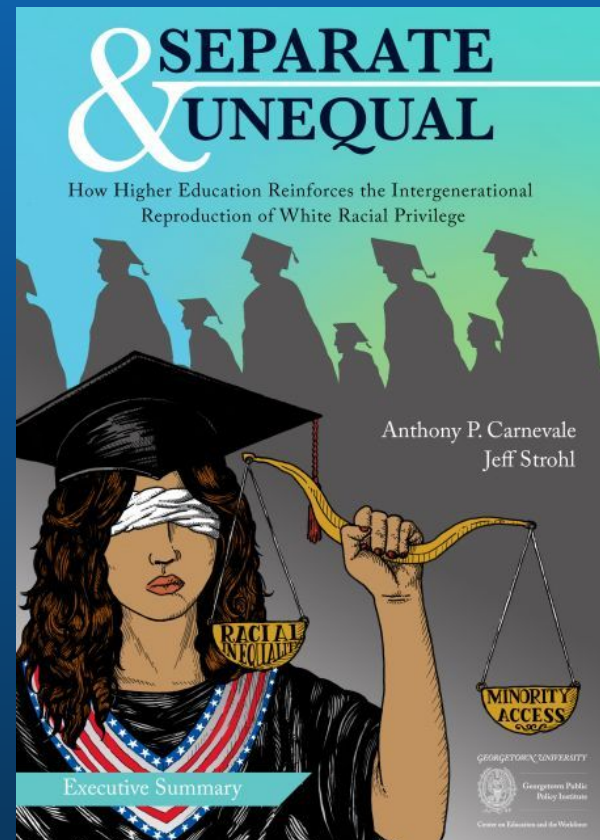
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# 🗨 Data and Their Applications are Not *Unbiased*

Using big data to solve our educational problems runs the risk of perpetuating or exacerbating inequity

- Women and minorities are directed to lower paying majors, because that's what they were permitted to study in the past
- Colleges and universities often favor recruiting students from higher socioeconomic groups, because these students present the least risk in economic and academic terms
- Higher prestige schools show bias toward recruiting white students





# How Can We Limit *Harm*?

- ▷ Diversity
  - ▶ Programmers
  - ▶ Decision-makers
  - ▶ Reviewers
  - ▶ Interviewers/Interviewees
- ▷ Clarity
  - ▶ Rationales
  - ▶ Metrics
  - ▶ Algorithms
  - ▶ Informed consent
- ▷ Opt-out





Questions?  
Comments?