

# Measuring Diversity: A New Approach for Health Professions Education

AIR Annual Forum

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*Presenters:*

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# Diversity in the Health Professions

- Preparing students to be effective in an increasingly diverse environment is an educational imperative in the health sciences
- National healthcare organizations and a growing number of health profession schools articulate diversity as a key part of their mission and vision statements



# Diversity in the Health Professions

- Chief Diversity Officer for the Association of American Medical Colleges Marc Nivet: “Medical schools and teaching hospitals are shifting their strategies to better capture, leverage, and respond to the rich diversity of human talents and aptitudes” and that “initiatives are under way to integrate personal experiences and attributes into the existing metrics used to evaluate medical school applicants.”
- American Association of Colleges of Nursing: “Diversity implies expanding the traditional pool of qualified applicants for the academic experience and employment by appropriately defining variables reflecting the value and worth of the human experience. It should require an admissions and employment process that fully encompasses the principles of equal opportunity. Qualified applicants should represent the cultural, racial, ethnic, economic, gender, and social diversity of the broader population”.



# Diversity in the Health Professions

A sustainable infrastructure for Diversity and Inclusion:

- Image
- Accessibility
- Timing of connections
- Mentoring
- **Measurement**

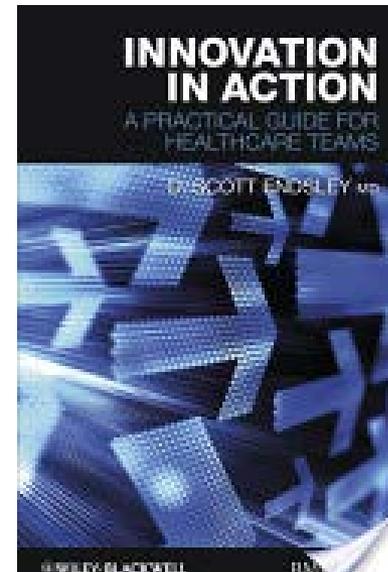
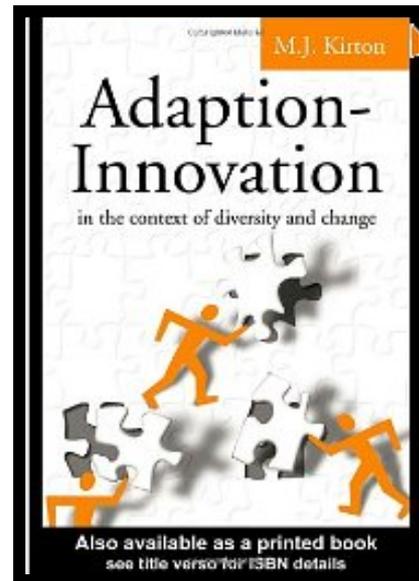
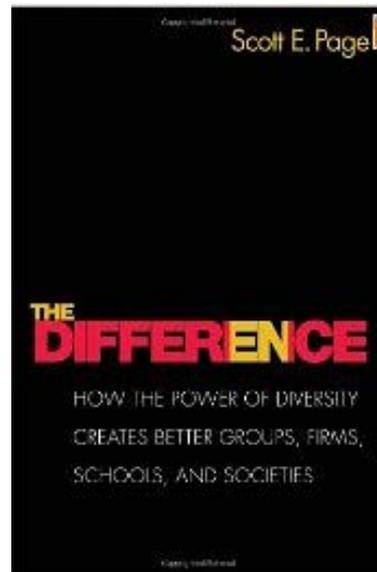


# Why Measure

- Validates the diversity strategy
- What we measure gets done
- Competitive advantage
- Legal implications

# Broadening Diversity Measurement

“The most profound diversity we experience in life has to do with diversity of thought. Diversity can have important benefits, but the real reason we want to pursue diversity is for innovation.”



Richard Boyatzis, Distinguished University Professor, and a Professor in the Departments of Organizational Behavior, Psychology, and Cognitive Science Organizational Behavior and Cognitive Science Case Western Reserve University

# Limitations of Traditional Measures: magnitude and proportion

1. Are not monotonically related to diversity (i.e. as the proportion goes past  $1/n$  diversity decreases while the proportion increases) .
2. Are not a unique number for characteristics described by more than two categories (i.e., Race/Ethnicity defined as as Asian, Black, Hispanic, White, Other).
3. Do not support simultaneous consideration of multiple individual characteristics (i.e., race, gender, socio-economic status, religion).

# Biodiversity

- Biology seeks to measure the variety and balance of species
- The variety of species is often referred to as “Species Richness”
- The most balanced systems are the most diverse.
- There seem to be three main metrics
  - Number of species
  - Uncertainty of species selected at random – Shannon’s Entropy
  - Probability that randomly select two different species – Simpson’s Index
- Simpson’s Index has the advantage of simplicity
- Simpson’s Index originally developed in the field of Biology as a measure of biodiversity in 1949: *Nature vol 163*

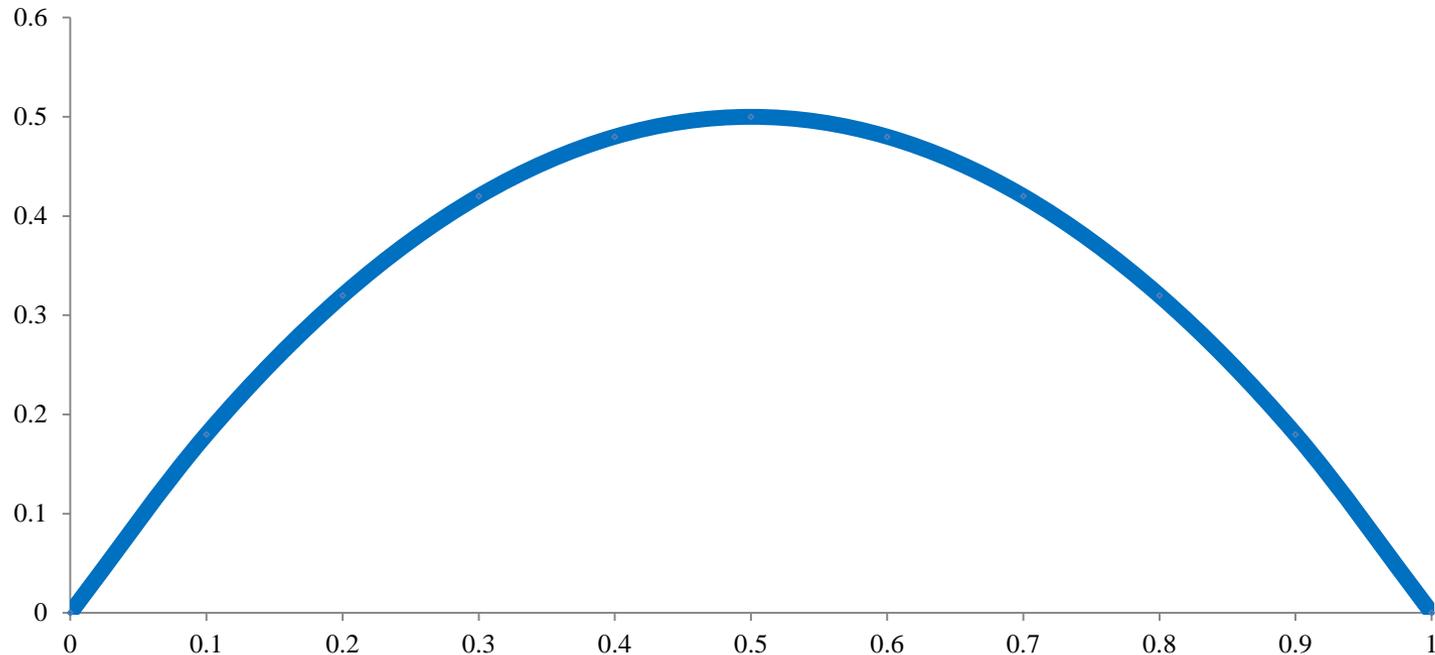
# Simpson's Index of Diversity

$$D = 1 - \sum_{k=1,p} (Y_k)^2$$

$$D_{MAX} = (p-1)/p$$

Simpson's Diversity Index

Diversity vs. Dichotomous Categorical Proportion



Dichotomous Categorical Proportion

# Example: Diversity as a Probability

If there are two institutions that have the following multiple categories for race/ ethnicity:

Institution	Asian	Black	Hispanic	White
A	10%	<u>30%</u>	15%	45%
B	5%	<u>60%</u>	5%	30%

$$\text{Diversity for A} = 1 - (.10^2 + .30^2 + .15^2 + .45^2) = 1 - .325 = \mathbf{.675}$$

$$\text{Diversity for B} = 1 - (.05^2 + .60^2 + .05^2 + .30^2) = 1 - .455 = \mathbf{.545}$$

**Institution A is more diverse.**

# Sullivan's Extension

- Simpson: one characteristic defined by multiple categories
- Sullivan: multiple characteristics defined by multiple categories
  - Political Science, Linguistics, Economics
  - Sum the squares over the multiple proportions and divide by the number of variables:

$$A_w = 1 - (\sum_{k=1,p} (Y_k)^2/V)$$

[where there are V variables, p categories and  $Y_k$  proportions in each category]

- **Interpretation:** “The proportion of characteristics upon which a randomly-selected pair of individuals will differ assuming sampling with replacement”

Sullivan, J.L. (1973), Political correlates of Social, economic, and religious diversity in the American states. *The Journal of Politics*, V. 35, No. 1, 70-84.

# Study Purpose

1. Apply Simpson's Index and Sullivan's Model to examine diversity in Health Professions Education
  - Gender
  - Race (asian, black, hispanic, white, other)
  - Discipline (CIP code 51.xxx: health professions and related)
  - Composite Diversity Index (Gender, Race, Discipline combined)
2. Examine changes in diversity indices over time (2002, 2007, 2012)
  - By Degree Level
  - By Professional Discipline
  - *Repeated measures ANOVA, Bonferonni Adjustment*

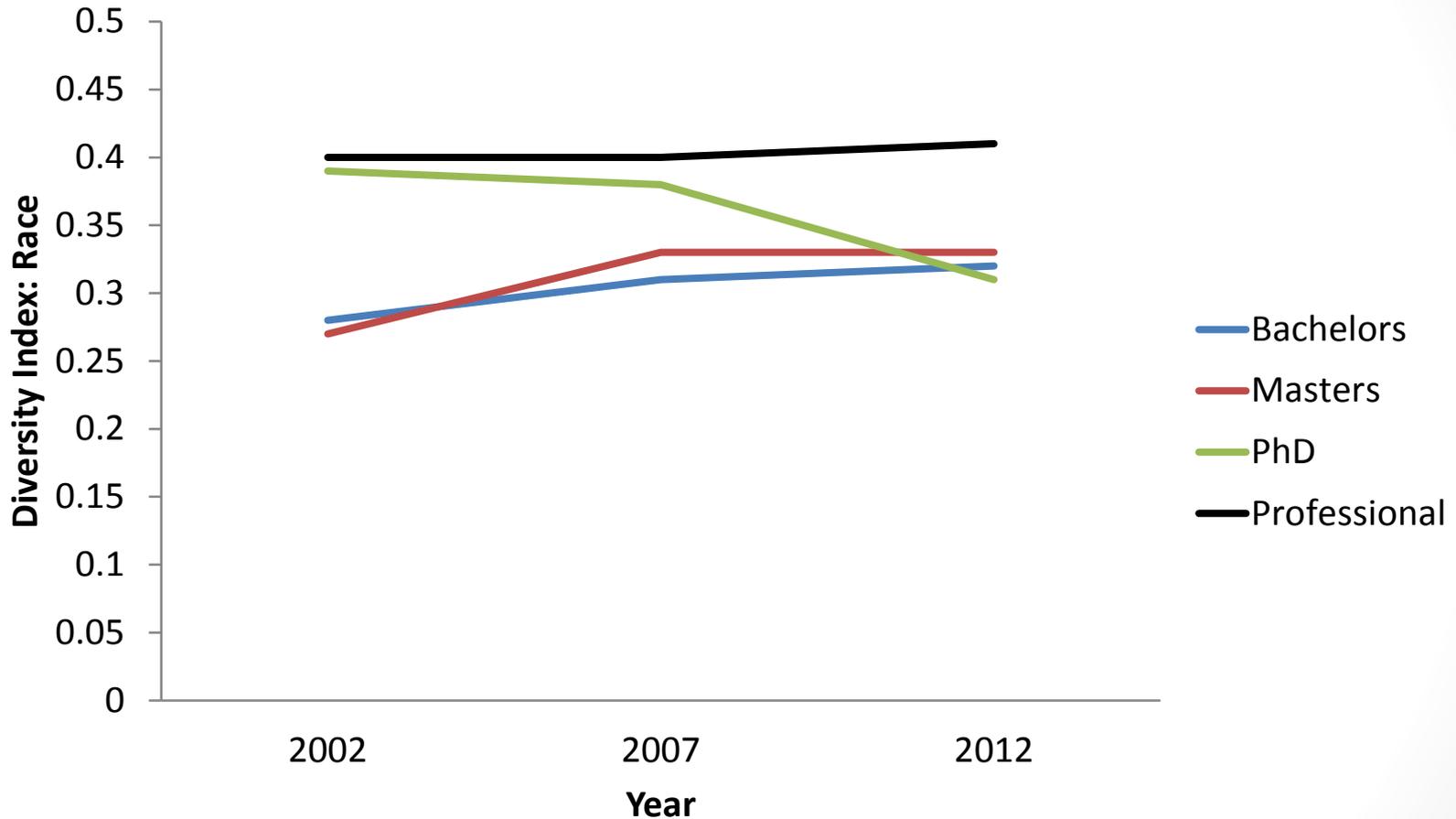
# Methodology

- Data collected from IPEDS (CIP CODE 51)
  1. Awarded degrees in health sciences and health professions in 2002, 2007, and 2012 &
  2. Awarded 25+ total degrees in 2012 (n = 881 schools)
    - Bachelors (n = 681)
    - Masters (n = 494)
    - PhD (n = 127)
    - Professional (n = 217)
      - Chiropractic (n = 14)
      - Dental (n = 51)
      - Medical (n = 117)
      - Optometry (n = 16)
      - Osteopathic (n = 18)
      - Pharmacy (n = 78)
      - Podiatry (n = 5)

# Degrees Awarded

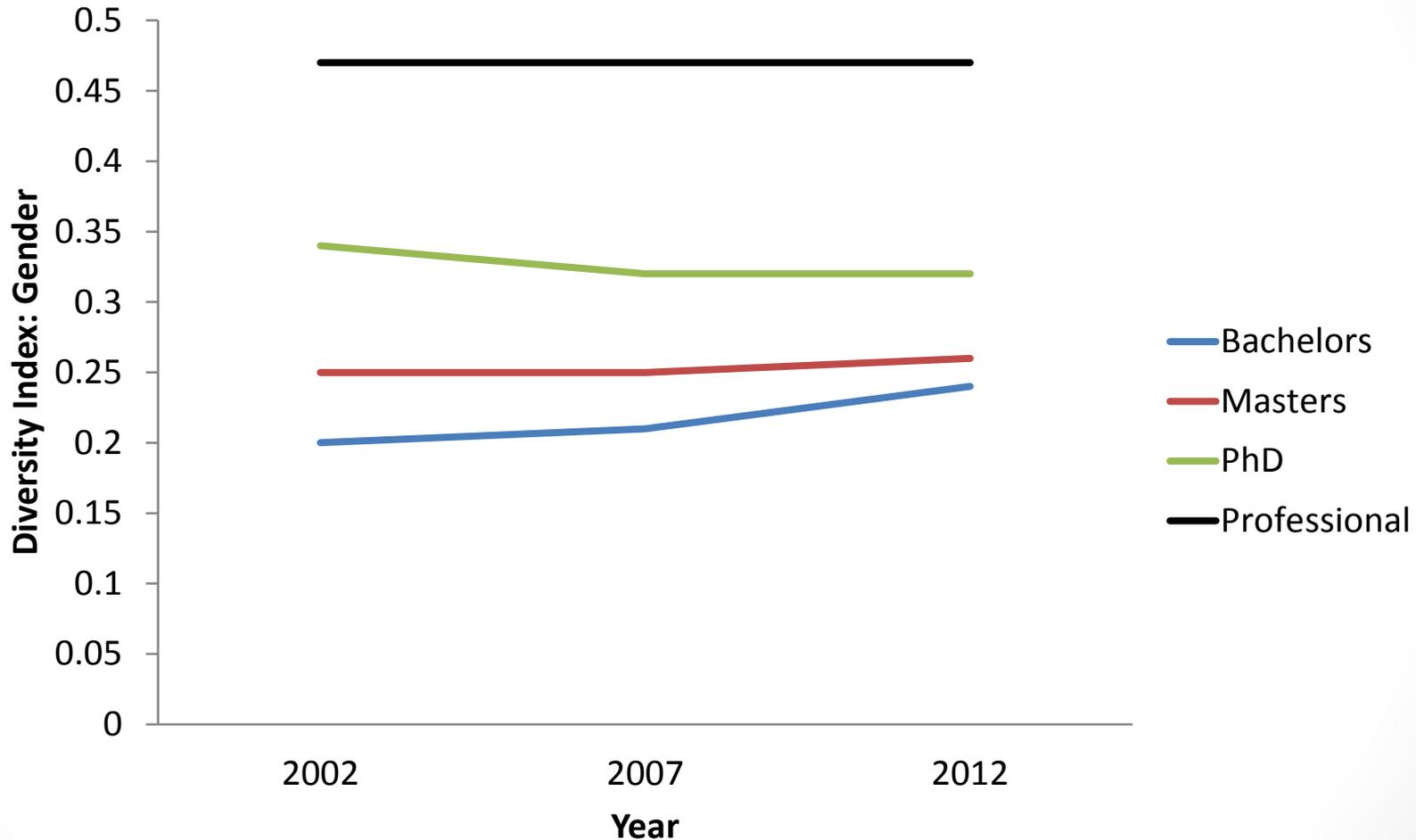
	2002	2007	2012
Bachelors	64,478	93,053	150,332
Masters	36,886	46,145	71,812
PhD	3,175	7,838	4,320
Professional	35,243	40,190	56,514
Total	139,782	187,226	282,978

# Simpson's Index: Race



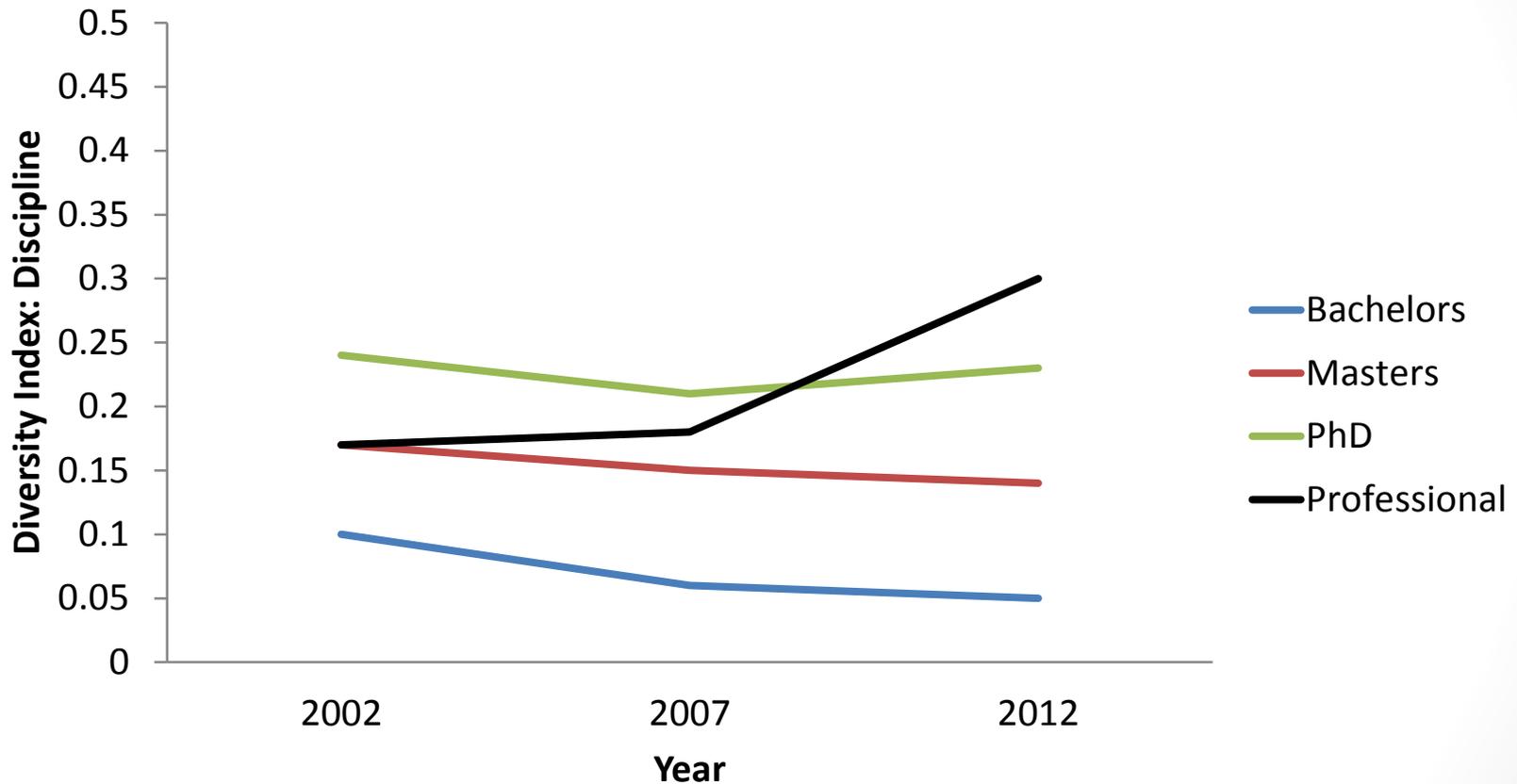
In 2012, Bachelors, Masters, and PhD were significantly different,  $p < 0.001$

# Simpson's Index: Gender



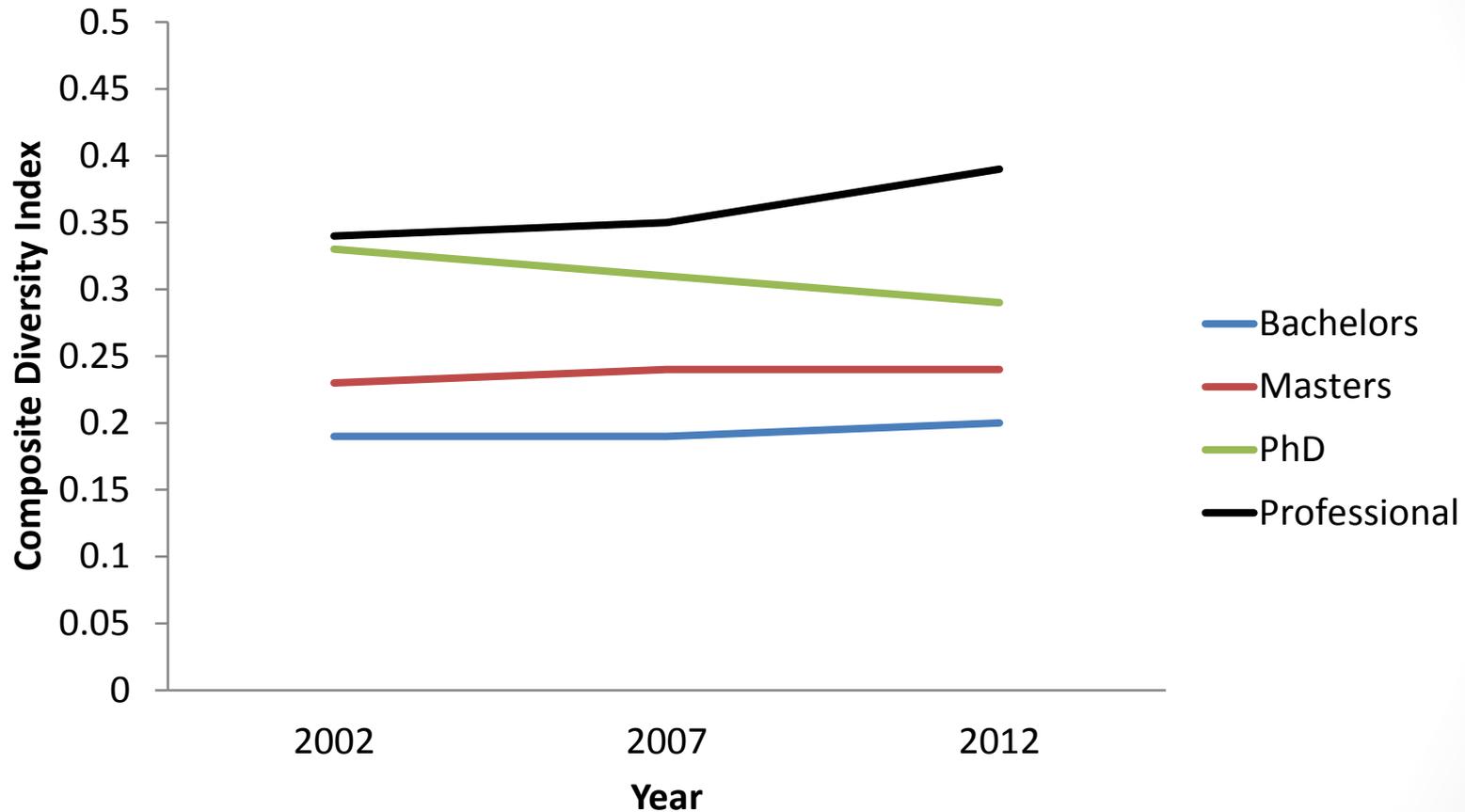
In 2012, Bachelors degree was significantly higher than 2002,  $p < 0.001$

# Simpson's Index: Discipline



In 2012, Bachelors, Masters, and Professional discipline diversity was significantly different,  $p < 0.001$

# Sullivan's Model: CDI



- In 2012, Professional significantly more diverse than 2002 and 2007

# Health Professions: Race

Mean (SD) Race Index for all Health Professions Schools (n = 217), by Discipline

Discipline	2002	2007	2012
Chiropractic	.39 (.14)	.39(.14)	.38(.15)
Dental	.44 (.17)	.43(.17)	.46(.17)
Medical	.45 (.15)	.45(.15)	.48(.14)
Optometry	.40(.18)	.38(.22)	.41(.20)
Osteopathic	.37(.16)	.34(.17)	.41(.16)
Pharmacy	.39(.17)	.35(.18)	.40(.18)
Podiatry	.49(.14)	.55(.23)	.54(.15)

# Health Professions: Gender

Mean (SD) Gender Index for all Health Professions Schools (n = 217), by Discipline

Discipline	2002	2007	2012
Chiropractic	.43(.04)	.45(.04)	.47(.02)
Dental	.45(.06)	.48(.03)	.48(.03)
Medical	.49(.02)	.49(.01)	.49(.01)
Optometry	.46(.07)	.47(.03)	.45(.05)
Osteopathic	.47(.05)	.49(.01)	.50(.01)
Pharmacy	.43(.07)	.43(.05)	.47(.03)
Podiatry	.45(.05)	.49(.02)	.46(.04)

# Lesson from Presentation

Developing a  
Composite  
Diversity Index  
is:

- Doable
- Desirable
- Valuable

# Implications for Health Professions

- Societal context
  - Legal
    - Grutter v. Bollinger (Equal Protection Clause)
    - Fisher v. University of Texas at Austin (Strict Scrutiny)
    - Michigan's Constitutional Amendment [Proposal 2, Bans use of race]
  - Professional
    - Preparing providers to meet the needs of increasingly diverse populations and workplaces
    - Promoting interprofessional education and collaboration
- Institutional context
  - Enrollment management
    - Mission consistency/success
    - Alignment with broadened conceptualization of diversity
    - Benchmarking and informing decision-making over time

# Implications for Institutional Researchers

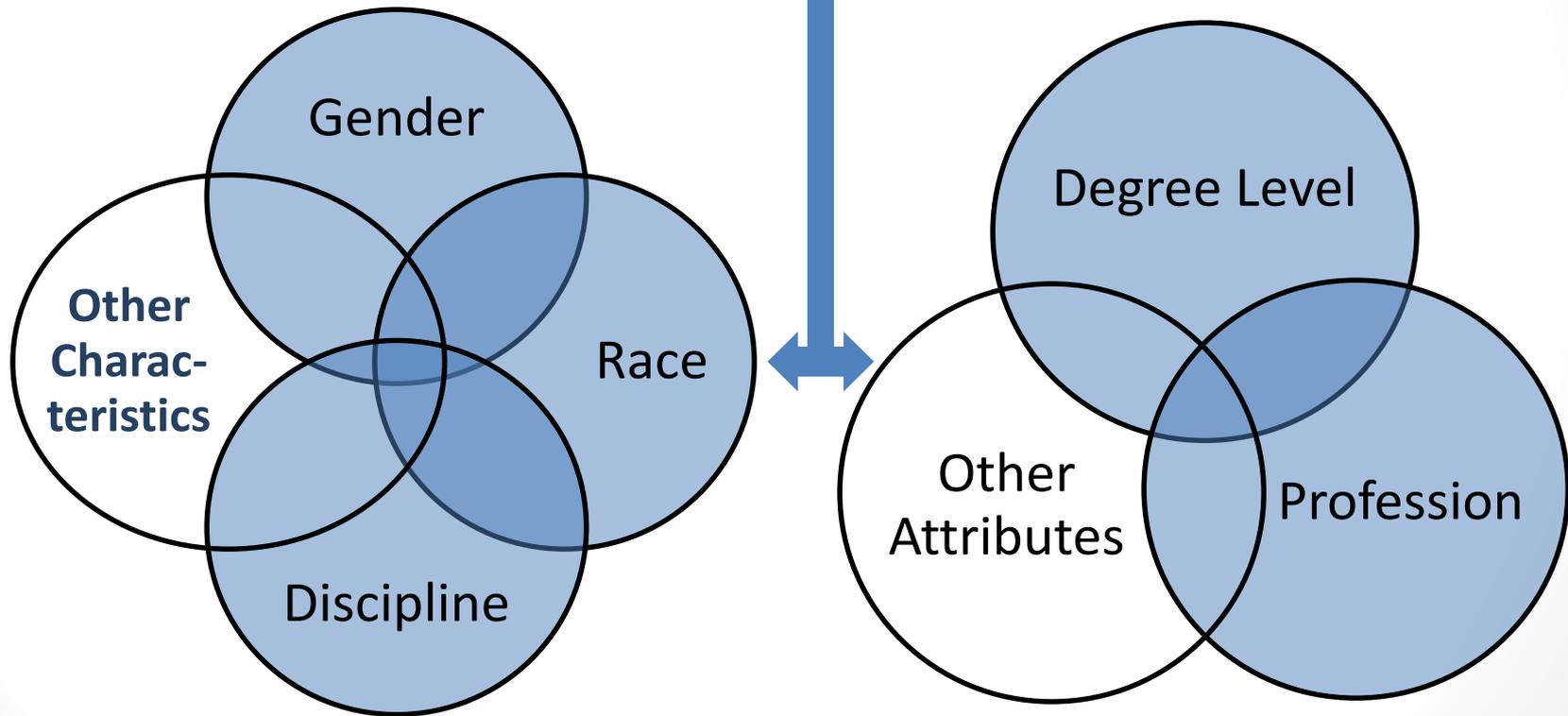
- IR Professionals can contribute to a better understanding of diversity by development of more effective measures of diversity.
- Recommendation
  - Create a diversity index that respects a broader conceptualization of diversity while remaining mission consistent
  - Create an infrastructure for benchmarking diversity performance outcomes in both the present and over time that
    - Respects both traditional measures and the use of composite indices.
    - Informs decision makers on best practices in diversity management.
    - Respects the societal context in which decisions on what constitutes diversity are being made.

# Note: Use of Complimentary Measures

- Complimentary measures should be included alongside the traditional metrics of interest.
  - Race
  - Ethnicity
  - Gender
- These characteristics have been shown to play an important role in
  - a) student experiences
  - b) faculty experiences
  - c) institutional culture
- A Comprehensive Diversity Index facilitates research about the role of diversity and its relationship with other characteristics.

# Next Step: Refinement of Composite Diversity Index

## The Diversity Index



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