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October 7, 2018

# Strengthening the Profession through Diversity and Inclusion-related Research Within OR

Michael P Johnson, Jr.



Available at: [https://works.bepress.com/michael\\_johnson/106/](https://works.bepress.com/michael_johnson/106/)

# STRENGTHENING THE PROFESSION THROUGH DIVERSITY AND INCLUSION- RELATED RESEARCH WITHIN OR

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Dean's Diversity Luncheon  
School of Engineering and Applied Sciences, University at Buffalo  
May 14, 2018



MCCORMACK GRADUATE SCHOOL OF POLICY STUDIES  
UNIVERSITY OF MASSACHUSETTS BOSTON

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# Purpose of talk

Present ideas and findings related to two research questions:

- 1) What has the decision sciences profession done to address important social problems in which diversity, equity and inclusion play a strong role?
- 2) What can the decision science profession do to meet diversity, equity and inclusion goals for the primary professional society; the larger population of students, practitioners and scholars, and the STEM profession generally.

# Who am I?

- Middle-class African-American male
- Third-generation college graduate
- Born in Midwest; culturally identifies with Northeast
- BS, Morehouse College (math and French); PhD Northwestern University (operations research)
- Professional experience at two different types of universities and public policy programs
- Founder and chair, INFORMS committee on Diversity, Equity and Inclusion
- Co-founder and member, INFORMS Pro Bono Analytics

# Acknowledgements

George Chichirau, Public Policy PhD program, University of Massachusetts Boston: research assistance

Institute for Operations Research and the Management Sciences

- Nicholas Hall, President
- Brian Denton, Past President
- Melissa Moore, Executive Director

INFORMS Committee on Diversity, Equity and Inclusion

Key informants and thought leaders

- Deborah Elizabeth Finn, Tech Networks of Boston
- Gerald Midgley, University of Hull, UK
- Mark Daskin, University of Michigan
- David Hunt, Pro Bono Analytics
- The Movement for Black Lives

# What do the terms mean?

- **Diversity:** The quality of being different or unique at the individual or group level. This includes age; ethnicity; gender; [*and many others*]. Diversity can be broadly understood to encompass externally-identifiable individual measures that are often viewed or treated as markers of difference, as well as internal individual measures that may reflect personal understandings of the world, often referred to as cognitive diversity.
- **Inclusion:** A strategy to leverage diversity. Diversity always exists in social systems. Inclusion, on the other hand, must be created. A diverse environment does not imply an inclusive environment. Inclusivity fosters diversity and makes diversity sustainable. In order to leverage diversity, an environment must be created where people feel safe, supported, listened to, valued and able to do their personal best.
- **Equity:** A concern for perceived fairness regarding procedures, outputs and outcomes associated with processes and initiatives for organization, strategy and operational design

# INTRODUCTION TO DECISION SCIENCES

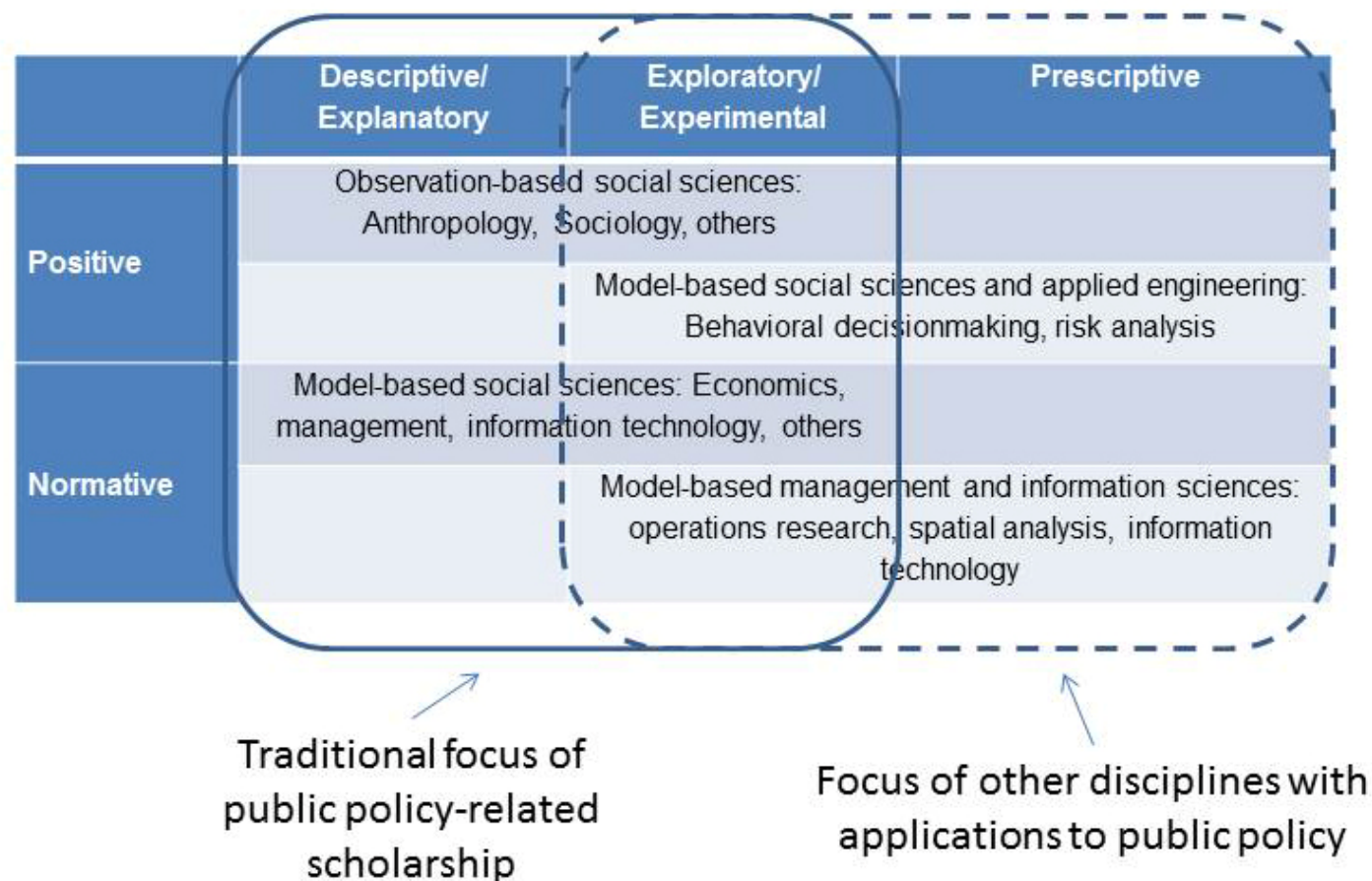
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# What is Operations research?

- A scientific approach to decision making
- A discipline concerned with optimal design, operation and management of systems under resource limitations
- Also known as: management science, decision models, decision science, industrial engineering, analytics
- Methods and insights drawn from: mathematics; economics and other social sciences; urban and regional planning; sciences and engineering
- Applications to: public policy and public management; health care; military; and business management, finance, operations and strategy



# How is Operations research related to other disciplines?



# Operations research as an analytic method

- Study a process or phenomenon to determine what actually happens and what ought to happen
- Develop a representation incorporating all actors
- Measure actual characteristics of process
- Determine the effect of changes in model characteristics on process output (prediction)
- If possible, choose a most-desired course of action (prescription)
- Validate the model using actual data
- Implement the model through changes in organization practices

# DIVERSITY, EQUITY AND INCLUSION: HOW CAN DECISION SCIENCES CONTRIBUTE?

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# Why engage in diversity and inclusion-related activities?

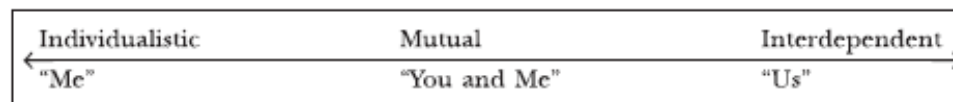
- They serve to remedy past and current discrimination and structural barriers to opportunity
- They enable organizations to better meet the needs and reflect the interests of employees, clients, customers and other stakeholders whose socio-demographic characteristics are increasingly distinct from historical norms
- They enable organizations to deliver products and services in ways that make best use of available resources and expertise.

Diversity and inclusion can be viewed as a way to foster social justice through public policy initiatives

# How can researchers and practitioners be persuaded to participate?

To attain educational and social reforms, privileged persons must give serve as *allies* – provide support to members of disadvantaged groups. Why might these persons be motivated to do so?

- Empathy
  - Responses: Personal or empathetic distress; Sympathetic distress
  - Actions: Compliance with social norms; counter negative feelings; altruism
- Moral principles and spiritual values
  - Types: Person-oriented ethic of care; principle-oriented ethic of justice
  - Motivations to act: practical concerns; clarity of injustice
- Self-interest
  - Continuum



Source: Goodman, 2000

# Contrasting disciplinary perspectives relevant to diversity and inclusion

- **Social sciences:**

- Identify causal relationships associated with diversity and inclusion
- Evaluate specific diversity and inclusion initiatives.

- **Decision sciences:**

- Develop models and methods to produce guidelines, prescriptions or strategies that to enable individuals and organizations to deliver products and services that optimize multiple goals
- Account for a variety of process-related constraints and limitations
- Rely on commonly-accepted assumptions regarding the efficacy of policies which serve as a rationale for modeling; efficiency is usually a primary measure of impact or utility

# Contrasting conceptions and worldviews make diversity & inclusion modeling challenging

- **Why we do it:** optimize organization efficiency (e.g. Page) vs. address structural social inequalities (e.g. Goodman)
- **What we know:** Positivist vs. interpretivist conception of data and modeling
- **Relationship type:** Client-consultant vs. community partner-engaged researcher
- **How we solve the problem:** Quantitative data and analytic methods vs. mixed-methods
- **How we design the intervention:** Technocratic/managerial vs. democratic/community-focused

Who are we developing diversity and inclusion-focused decision models for (and with)?

To what purpose will (should) these models be put?

# There are many diversity 'best practices'

Organizations implement (appoint):

- affirmative action plans
- diversity committees and taskforces
- diversity managers
- diversity training
- diversity evaluations for managers
- networking programs
- mentoring programs

Etc.



**"The local business journal wants to do an article on the 10 most powerful women in our company. Quick, go hire 7 more women!"**



# Impacts of diversity and inclusion initiatives vary widely

- Severe data constraints
- Initiatives are implemented differently
- Did the intervention make a difference?
- Diversity initiatives fail when focused on training, hiring tests, performance ratings and grievance procedures
- Diversity initiatives succeed when they use engagement, human contact and social accountability

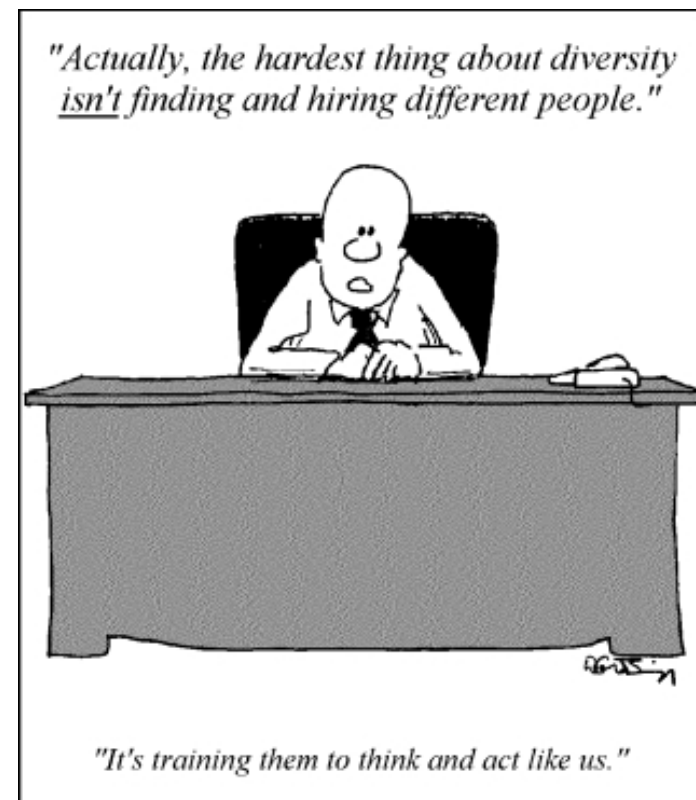
(Baron et al. 1991; Holzer and Neumark 2000; Konrad and Linnehan 1995; Naff and Kellough 2003; Kalev 2006; Dobbin and Kalev 2016)

# Typical problems in diversity and inclusion amenable to traditional decision sciences

- Public school assignment: maximize equity of access, proximity to home, predictability, community cohesion. The Boston school system implemented a multinomial logit discrete choice model with school and program-type fixed effects (Shi, 2015).
- College admissions: quantitative analysis of different strategies and mechanisms. Chinese scholars seek to achieve Pareto efficiency in college choice for students nationwide (Chen and Kesten 2016)
- Job interviews: Design applicant pools to ensure increased diversity in candidates and (it is hoped) new hires. Recent work casts doubt on the 'if we can only get one' approach (Johnson, Heckman and Chan 2016)
- Assign students to teams: Build cultural 'families' to maximize diversity within teams by solving the maximally diverse grouping problem (Maas et al. 2015)

# Some problems in diversity and inclusion do not accommodate traditional approaches

1. Senior management decide to increase the percentage of employees who are women and minorities
2. Huge diversity recruiting campaign initiated
3. A number of women/minority candidates join the company
4. But over the next few years, they leave and the demographic make-up returns to the original numbers



Sometimes the diversity and inclusion problem is a 'mess'!

# Is this a problem in diversity and inclusion?

**“The integration of the inherent trade-offs between sociopolitical, environmental, ecological, and economic factors is one major source of complexity in the decision-making processes of mining projects. Typical challenges include condensing multiple criteria into monetary value, and dealing with the inevitable difficulty in addressing conflicting stakeholder preferences.”** (Pimentel et al. 2015, p. 23).



*Sioux clashing with police at Standing Rock, November 2016 (Copyright CBC; public domain image)*

Social problems in which modelers and decisionmakers have less control over the environment and where there is disagreement over the nature of the ‘problem’ are particularly difficult to solve using decision sciences

# Handling the messes: Critical perspectives

- What are the power relationships that characterize the institution or phenomenon of interest?
- Who is defining the problem to be solved?
- Is the primary goal of the engagement to develop solutions that preserve the current organizational structure or mission?
- Is interest in diversity and inclusion primarily intended to support organizational efficiency, or to engender social justice?

# Community engagement

- What is the *community*?
  - Residents in a geographical locale
  - Members of a self-help group
  - Population with particular needs or requirements
  - On-line and/or in-person
- What is *engagement*?
  - Includes, but is not limited to, consultation
  - Supports input by community into issue framing, problem formulation and solution, policy implementation
  - Prevent co-optation, manipulation, exclusion, tokenism
- What communities are of special interest?
  - Disadvantaged, under-served, excluded, under-resourced, marginalized
  - Dimensions of identity that are salient to problem at hand

# Complex societal problems are 'issues' that may resist conventional modeling approaches

Problem definitions are *contested*:

- Some problems are primarily a matter of critical limits, like social or environmental standards
- There is an overwhelming number of societal problems, but only a small part of them is officially recognized
- Recognized problems may be volatile

Issues *evolve* over time:

- Attention may peak in public consciousness then fade
- Initially, a clear-cut definition of the issue has usually not yet emerged, but over time the range of options decreases
- Issues may change in content even within a single cycle



# Issue 'framing' is essential to defining solution approaches

- Framing '... is seen as rendering what would otherwise be a meaningless aspect of the scene into something that is meaningful.... [It] allows the user to locate, perceive, identify, and label a seemingly infinite number of concrete occurrences defined in its terms.' (Goffman, 1974)
- Diagnostic framing: diagnosing a 'problem' and the demand to eliminate the contradiction or tension
- Prognostic framing: how to solve the 'problem' and how to proceed

**Table 1** Multiple gap typology with examples (based on Wartick and Mahon<sup>47</sup>)

<i>Issue</i>	<i>Gap</i>	<i>Focus</i>	<i>Example</i>
Type I	What is vs what is	Facts, as viewed by two groups	Is a pesticide produced by Company A as harmful to human health in India as it is in the United States?
Type II	What is vs what ought to be	Conformance, as viewed by one group	Should Company A continue to produce the pesticide?
Type III	What ought to be vs what ought to be	Ideals, as viewed by two groups	Should the criteria for determining hazardous products in one country be applied throughout the world?

Source: Liebl, 2004

But how can we frame and address an issue if we don't know the full scope of the problem?



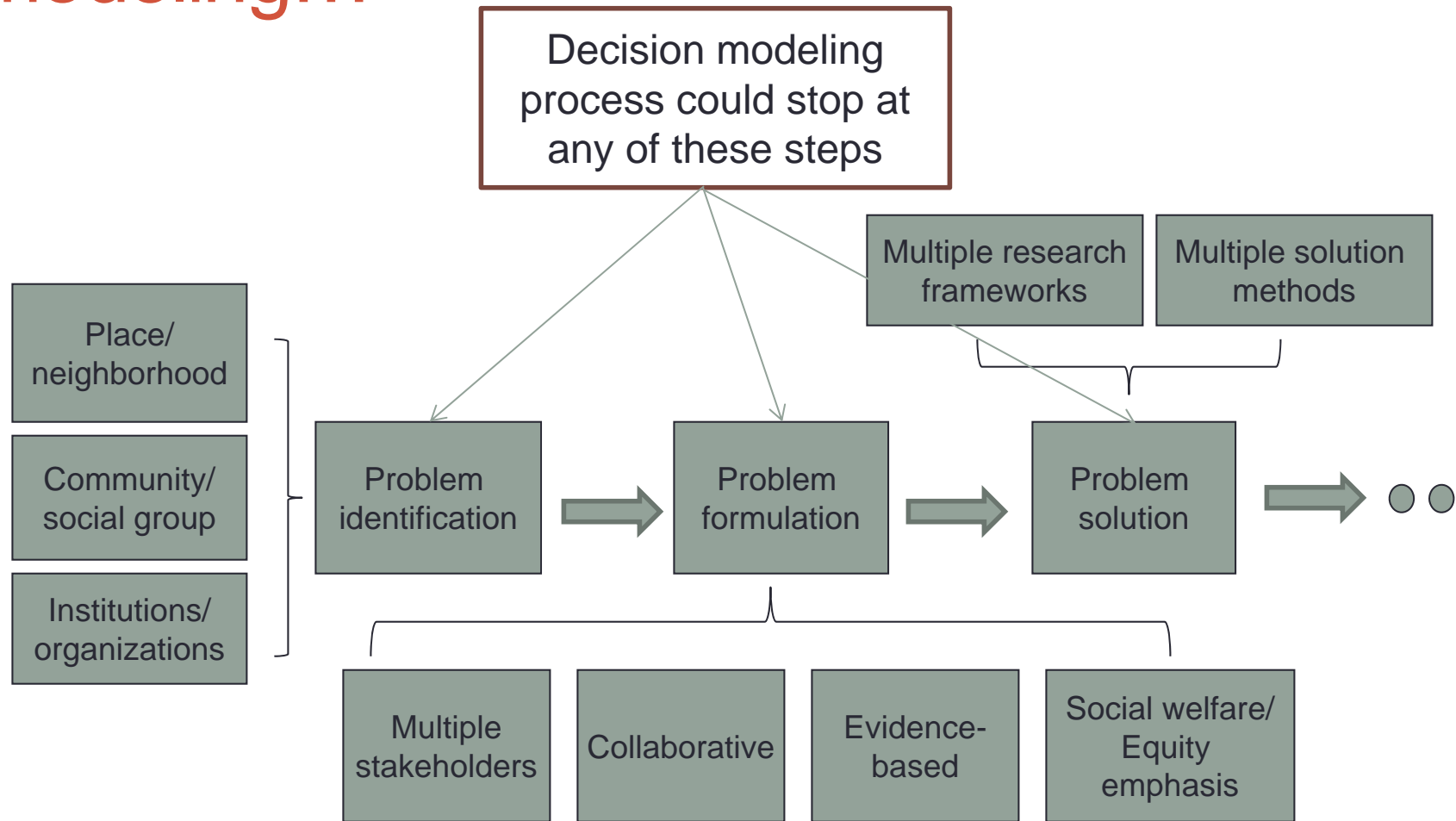
# How can decision sciences address these problems?

- Systems thinking can emphasize outcomes (vs. outputs) and decision alternatives (vs. defined tasks)
- Problem-structuring methods such as value-focused thinking helps generate structures by which core values, goals, objectives, constraints, attributes and alternatives can be identified (Keeney 1992)
- Community-based operations research and community operational research provide theoretical frameworks for inductive, mixed-methods, community-engaged problem-solving (Johnson 2012; Midgley and Ochoa-Arias 2004)
- Social science-based research methods can document social inequities and benefits of diversity (Hoisl and Mariani 2016; Keck and Tang 2018)

# Soft OR

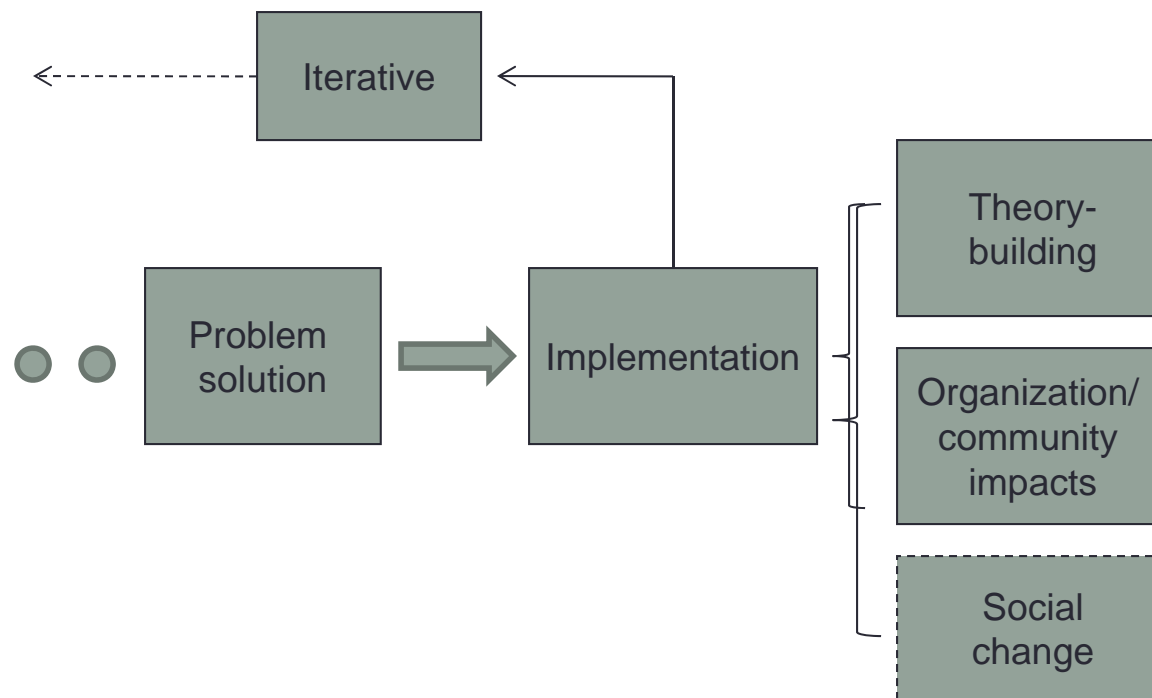
- The Critical Systems Practitioner is a “holistic doctor” (Jackson 2010, p. 137)
- The ideal practitioner is committed to:
  1. Critical awareness of the strengths and weaknesses of different systems approaches;
  2. Methodological pluralism
  3. Improvement
- Emphasis on problem structuring, values assessment and systems modeling (Rosenhead and Mingers 2001; Keeney 1992)

# Community-based operations research enlarges traditional notions of decision modeling...

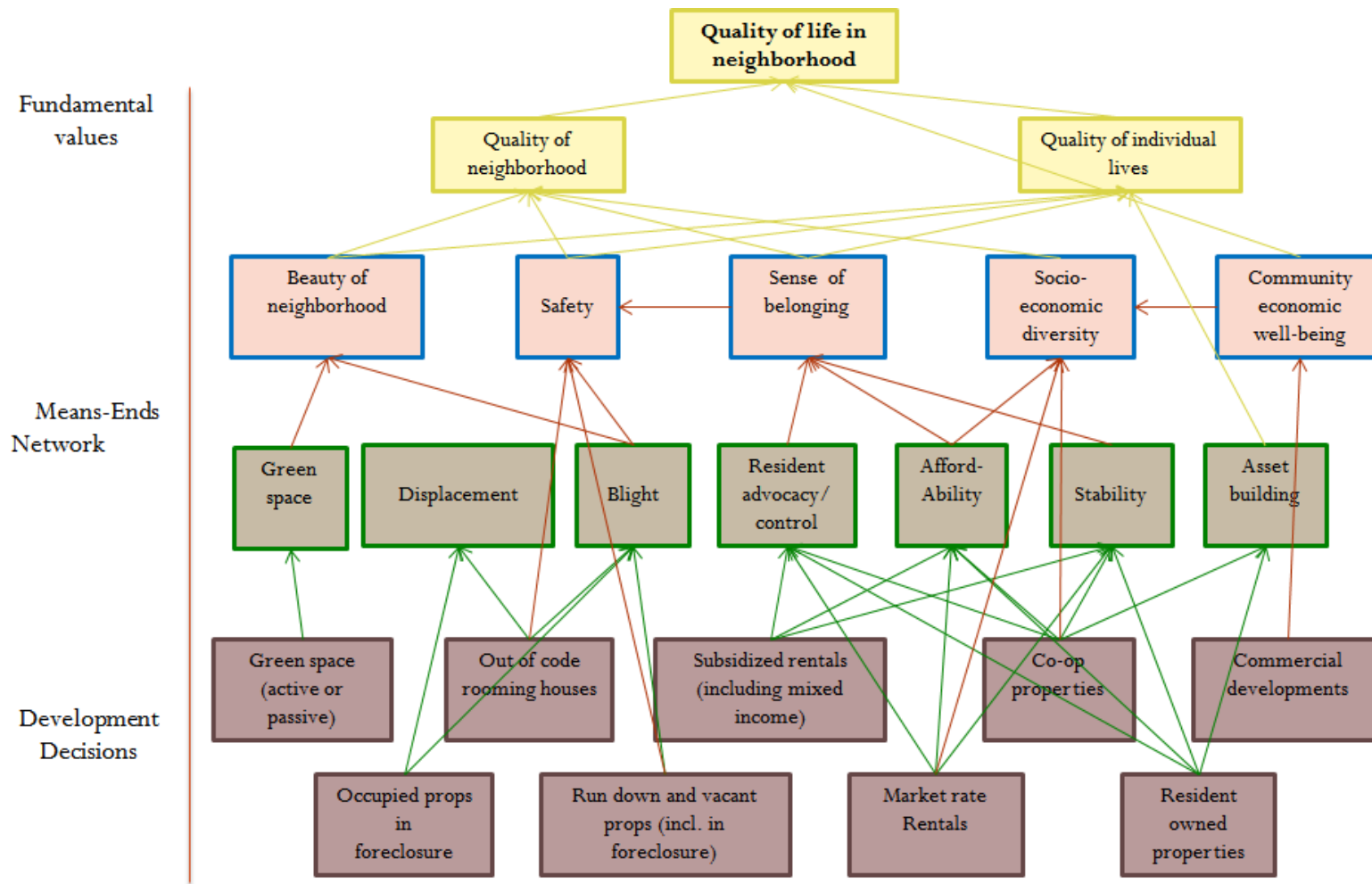


Source: Johnson (2012)

# ..and accommodates elements of participatory action research and soft OR



# Value-focused thinking can be used to connect values with alternatives



Source: Johnson, et al. (2015)

# Community operational research is distinct from other OR methods and application areas

Core concept: “meaningful engagement of communities”

Key characteristics:

- ‘Intervention’
- Local engagement and impact
- Disadvantaged, underrepresented and underserved populations
- Problem-solving processes as well as outcomes
- Critical approach and concern for ethics
- Qualitative and mixed methods
- Community empowerment and social change

COR enables co-creation of knowledge, emphasizes primacy of community-level actors, and is rooted in a concern for social justice

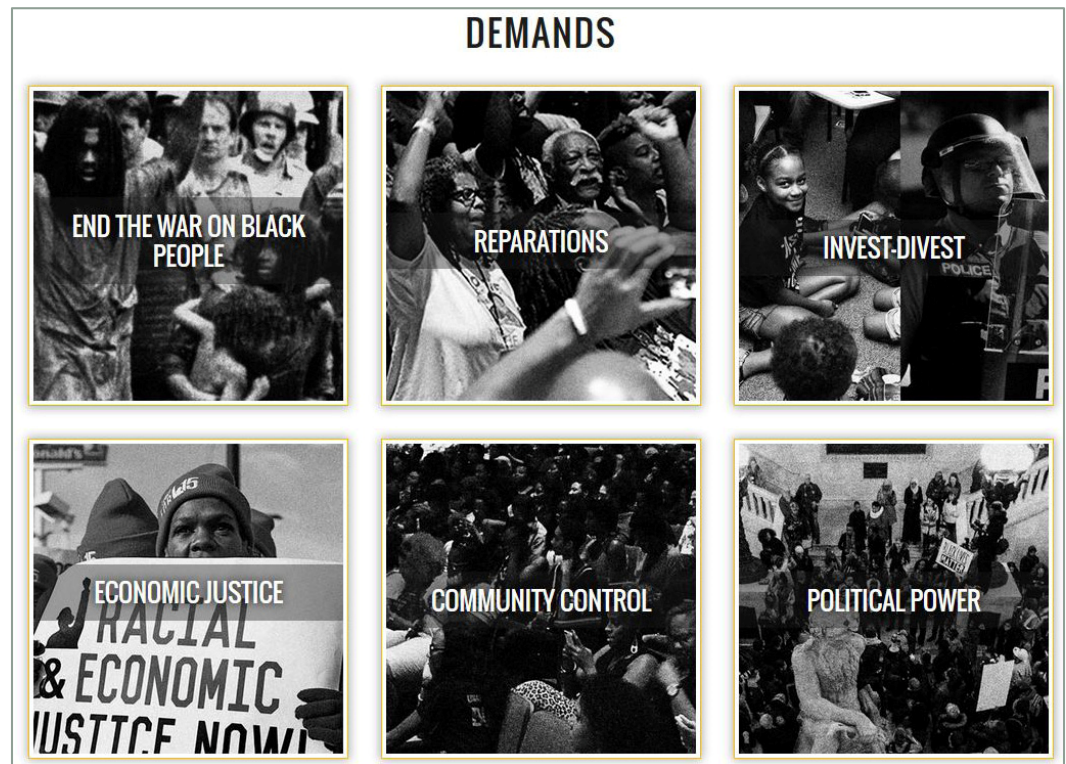
# COR-inspired alternative modeling approaches and impact measures

- Multiple levels:
  - First-level: Who is not at the table? What are the social concerns not obvious in the model?
  - Second-level: Who builds, vets and implements the model?
  - Third-level: What analytic and methodological framework should matter most for a particular case study?
- Multiple impacts:
  - Deep understanding of theory, context and stakeholders can generate long-lasting and sustainable solutions
  - The third-level approach can go beyond organizational change to support social justice and social change

# Opportunity for innovative decision science applications: The Movement for Black Lives

## Principles:

- Elevating the experiences and leadership of the most marginalized Black people
- Achieve a complete transformation of the current systems, which place profit over people
- Balance vision of a fundamentally different world with policies that address the immediate suffering of Black people



Movement for Black Lives policy platform  
(<https://policy.m4bl.org/platform/>)



# Movement for Black Lives policy platform

<b>Ending the war on Black People</b> <ul style="list-style-type: none"> <li>• End the criminalization and dehumanization of Black youth across all areas of society</li> <li>• End capital punishment</li> <li>• End money bail, mandatory fines, fees, court surcharges and “defendant funded” court proceedings</li> <li>• An end to the use of past criminal history to determine eligibility for services and civic obligations</li> </ul>	<b>Reparations for past and continuing harms</b> <ul style="list-style-type: none"> <li>• Full and free access for all Black people to lifetime education</li> <li>• Guaranteed minimum livable income for all Black people</li> <li>• Corporate and government reparations ensuring access and control of food sources, housing and land</li> <li>• Mandated public school curriculums</li> </ul>	<b>Investments and divestments</b> <ul style="list-style-type: none"> <li>• Reallocation of funds from policing and incarceration to long-term safety strategies</li> <li>• Retroactive decriminalization of all drug related offenses and prostitution, and reinvestment into restorative services</li> <li>• Real, meaningful, and equitable universal health care</li> <li>• A constitutional right at the state and federal level to a fully-funded education</li> </ul>
<b>Economic justice for all</b> <ul style="list-style-type: none"> <li>• Restructuring of tax codes to ensure a radical and sustainable redistribution of wealth</li> <li>• Federal and state job programs to ensure living wages, support for unions and Black-owned businesses</li> <li>• Support the development of cooperative or social economy networks</li> <li>• Protections for workers in under-regulated industries</li> </ul>	<b>Community Control</b> <ul style="list-style-type: none"> <li>• Democratic community control of local, state, and federal law enforcement agencies</li> <li>• End to the privatization of education and real community control</li> <li>• Participatory budgeting at the local, state and federal level</li> </ul>	<b>Black Political Power</b> <ul style="list-style-type: none"> <li>• End the criminalization of Black political activity</li> <li>• Public financing of elections and the end of money controlling politics</li> <li>• Election protection, electoral expansion and the right to vote for all people</li> <li>• Full access to technology</li> <li>• Protection and increased funding for Black institutions</li> </ul>

What would implementation of ‘bold’ ideas look like?  
 What are trade-off among affected groups and objectives?  
 How can we compute and balance benefits and costs?

# DIVERSITY, EQUITY AND INCLUSION: HOW CAN THE DECISION SCIENCES AND STEM PROFESSIONS EVOLVE?

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# Engineering profession is seen by some as a barrier to diversity, equity and inclusion MJ1

According to Seron et al. (2018):

- Engineering education builds a *worldview*:
  - Technical prowess is more valued than social skills;
  - Discipline is understood as ‘pure’ and ‘objective’, distinct from ‘political’ and ‘cultural’ concerns
  - ‘Meritocracy’ and ‘individualism’ values are largely unquestioned
- Engineering practice emphasizes precision, efficiency and technological innovations over ethics, policy and social impacts
- Diversity and inclusion is understood to be a synonym for favoritism, bias and (selectively) lowered standards
- Concerns about marginalization detract from ‘real’ work
- Individual success or failure in the field is seen as (primarily) the outcome of one’s own efforts, skills and aptitudes rather than product (in part) of institutional and structural values and barriers

## Slide 34

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**MJ1**

Revise this slide according to Warren Powell and Brian Denton's comments before making presentation public.

Michael Johnson, 5/17/2018

**MJ2**

Discuss with Diversity, Equity and Inclusion Committee whether a version of this should be shared with INFORMS board and communities as official position of committee

Michael Johnson, 5/17/2018

# What have other professions done?

- **Computer science:** Theory of Computing Research Community Pledge for inclusiveness appeals for a change in attitudes and practice (<https://theorydish.blog/2018/03/27/a-pledge-for-inclusiveness-in-toc/>)
- **Economics:** Disproportionately low participation by traditionally underrepresented groups is understood to hamper the discipline, yielding institutional responses to broaden participation, change teaching and remove institutional barriers (Bayer and Rouse 2016)
- **Finance:** Survey of literature reveals lack of diversity in topics and methodological approaches; bias towards elite institutional sponsorship and citation-based measures of impact (Brooks and Schopohl 2018)
- **Urban Planning:** Awareness of centrality of discrimination and exclusion in education and practice has yielded institutional support for multiple interest groups and recognition of diversity, equity and inclusion in core educational topics

# INFORMS Committee on Diversity, Equity and Inclusion

## **Mission:**

Make INFORMS more accommodating and reflective of members from different backgrounds, perspectives and abilities, thereby enabling INFORMS to generate research and practice knowledge to improve an increasingly diverse society.

## **Statement on diversity and inclusion:**

“INFORMS values and seeks diverse and inclusive participation within the membership and profession it represents. To achieve this goal, INFORMS is committed to providing an environment that encourages and supports equal opportunity, free expression, freedom from discrimination, harassment and retaliation, full participation in all activities and leadership, and collaboration among people of different backgrounds.”

# Selected programs and activities

Program/Activity	How?	In order to...?
Measure and monitor levels of diversity within INFORMS and the profession	Measure diversity of: <ul style="list-style-type: none"><li>• INFORMS entities and activities;</li><li>• Educational institutions</li><li>• Employers</li></ul>	Identify areas of high achievement and areas for improvement
Create and recommend opportunities for under-represented groups to fully participate in the profession	Identify areas of participation, for example: <ul style="list-style-type: none"><li>• Organization leadership</li><li>• Educational programs</li><li>• Community outreach</li></ul>	Enable the profession to achieve organizational, commercial and social impact that reflects and supports societal diversity
Encourage INFORMS subdivisions to promote diversity and inclusion	Highlight and reward those that demonstrate the positive impact of under-represented groups with their subdivision	Enable diversity and inclusion to become part of subdivisions' routine practices and expectations

# Success measures

- Increased diversity within INFORMS' membership across many activities and functions
- Increased satisfaction among members of diverse groups that INFORMS is meeting their needs, and perception among general membership that INFORMS is supportive of diversity and inclusion
- Perception by board that funds, time and effort spent are commensurate with improvements in diversity and inclusion metrics



# STEM Inclusion Study 2017

- **Description:** National study of women, racial and ethnic minorities, persons with disabilities, and lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals working in the science, technology, engineering and math (STEM) workforce
- **Purpose:** Better understand processes of disadvantage; inform diversity and inclusion efforts across STEM-related entities and institutions
- **Authors:** Erin A. Cech, University of Michigan; Tom Waidzunus, Temple University
- **Method:** Survey of 15 – 20 STEM professional societies; statistical analysis
- **Funder:** National Science Foundation

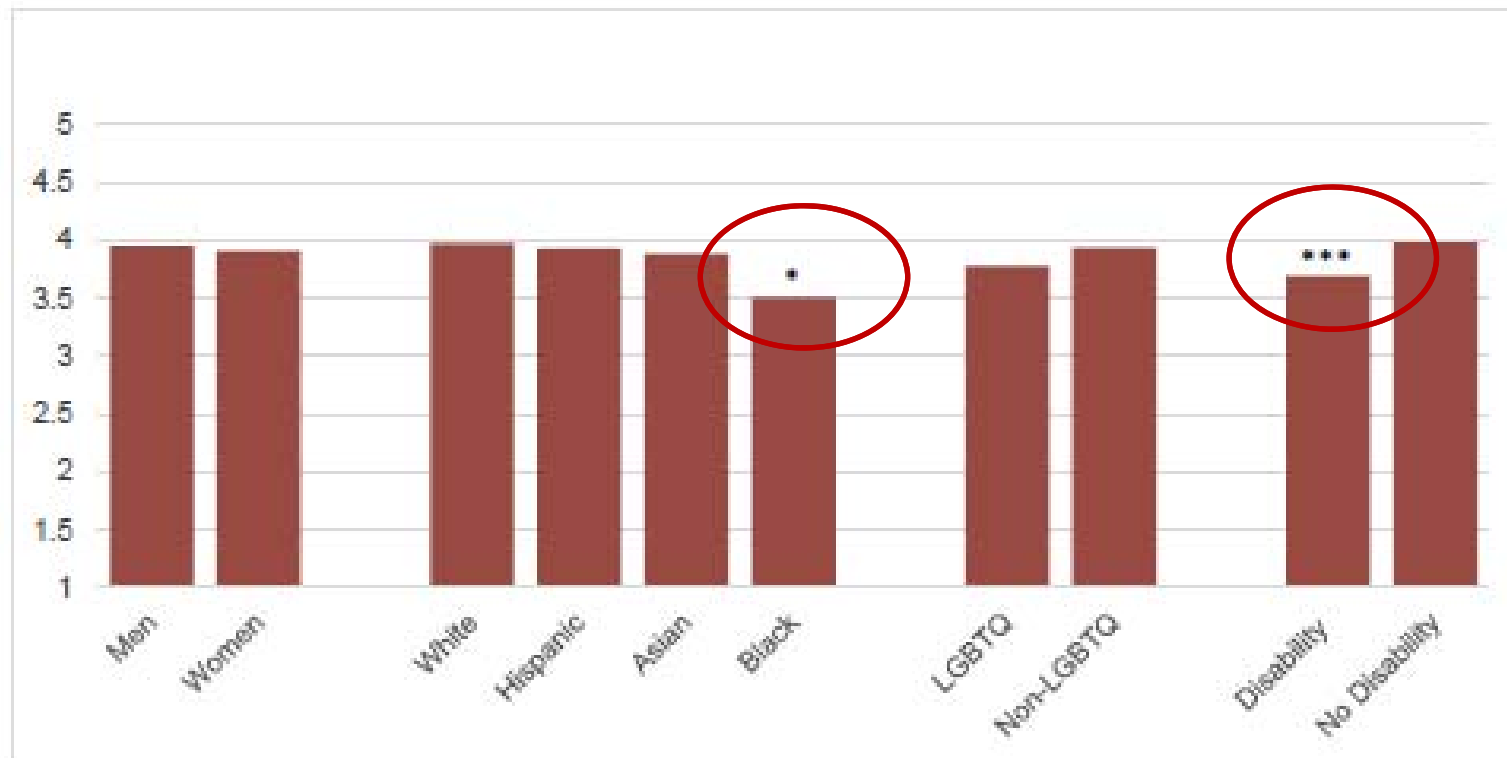
# Portrait of INFORMS membership

Demographic Characteristics	Percent of the Sample
Female	28.50%
Male	70.85%
Hispanic	6.88%
Asian	25.40%
Black	2.55%
White	60.89%
Other Race/Ethnicity	5.95%
LGBTQ	3.10%
Disability (physical, mental or emotional difficulty)	15.23%
Employed at University or College	50.66%
Employed in for-profit sector	30.98%
Employed in other sector	18.36%
Broad discipline category: Math/Statistics	18.20%
Broad discipline category: Engineering	42.67%
Broad discipline category: Administration & Management	16.11%
Broad discipline category: Other	23.02%

Cech and Waidzunus, 2017

Not so different from internal INFORMS surveys

“I feel like I fit in with other people in my workplace.”

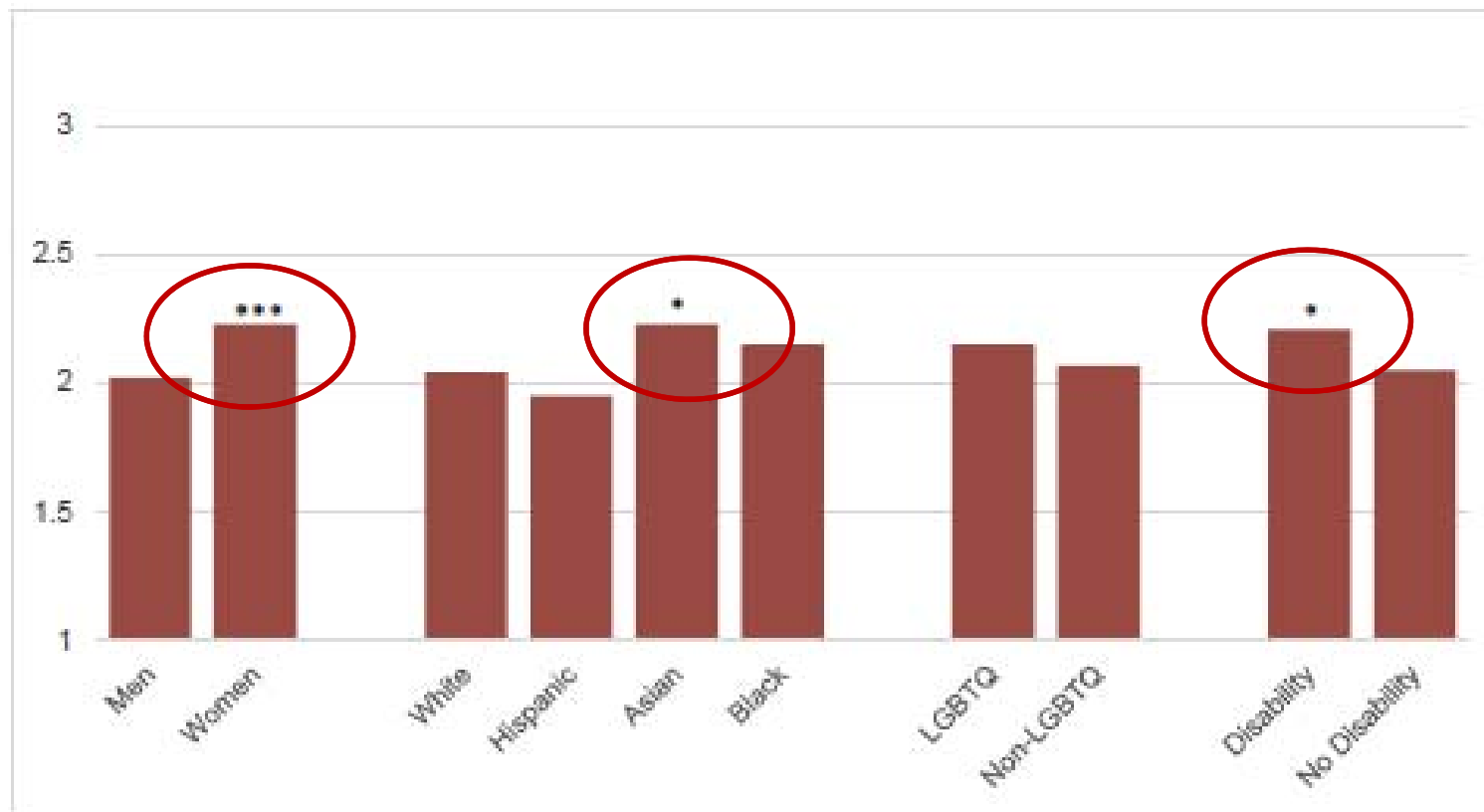


*Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. (1=strongly disagree to 5=strongly agree)*

Cech and Waidzunus, 2017

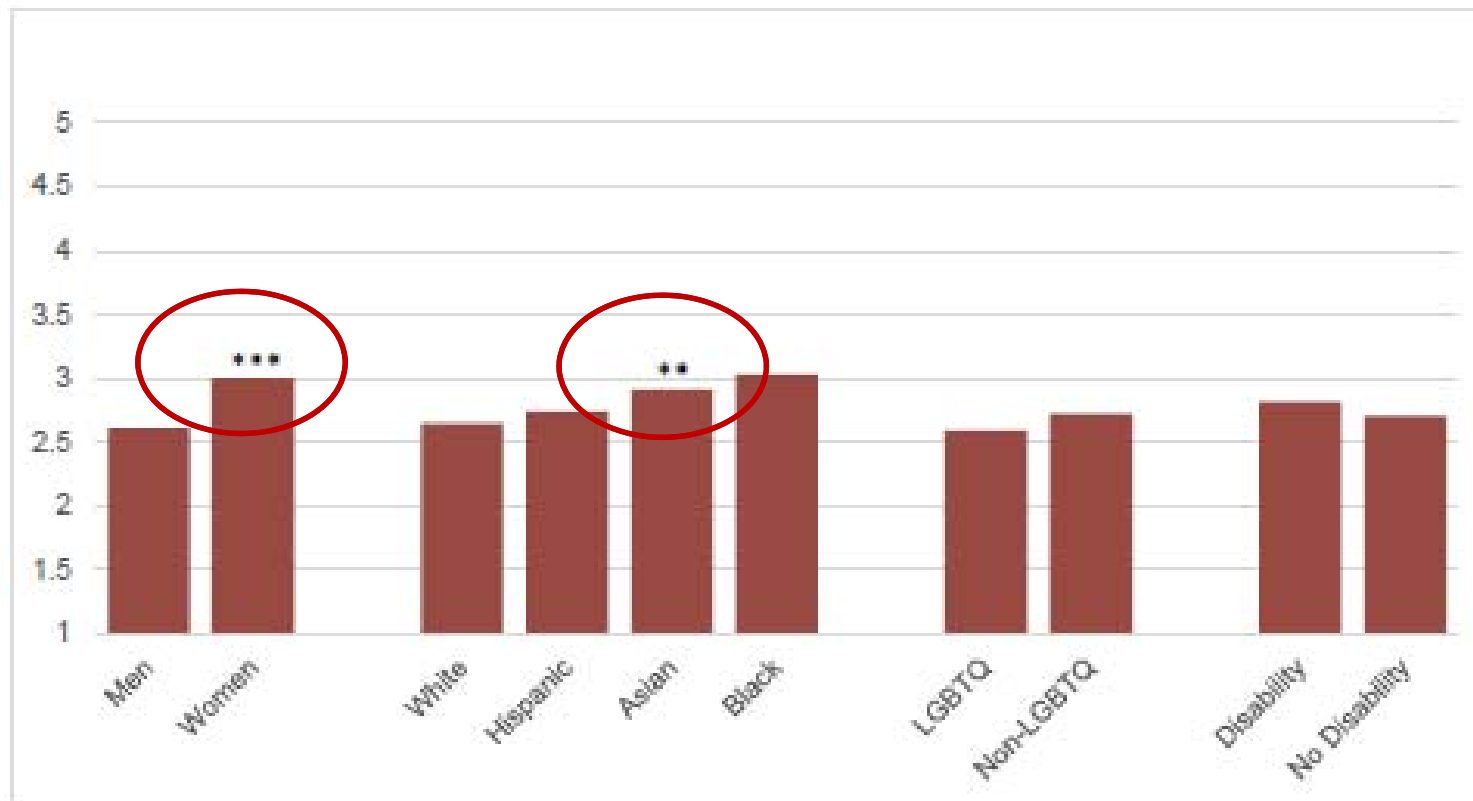
(\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , † $p < .10$ ,  
two-tailed test)

“I have read or heard insensitive comments in my workplace that I found offensive.”



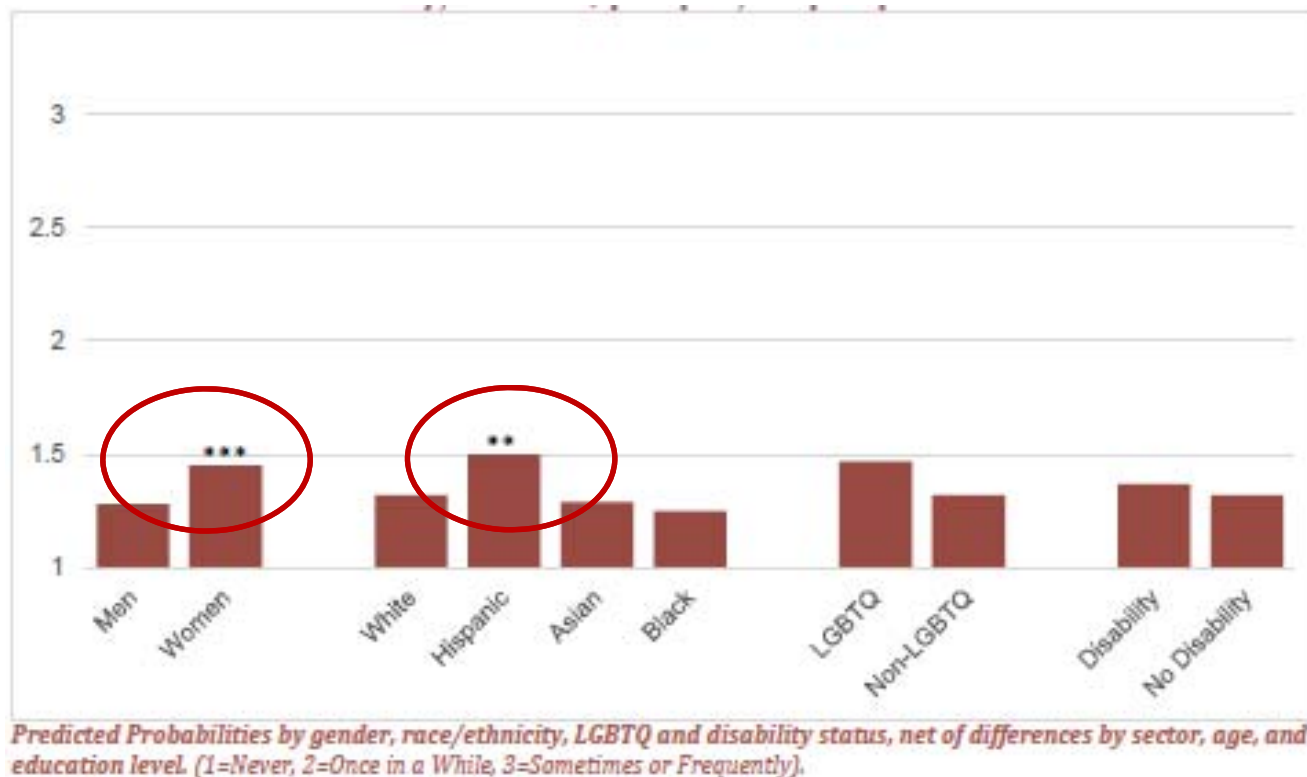
*Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. (1=Never, 2=At least once in the past year, 3=At least once a month or more)*

“I worry that my mistakes are more noticeable than the mistakes of others.”



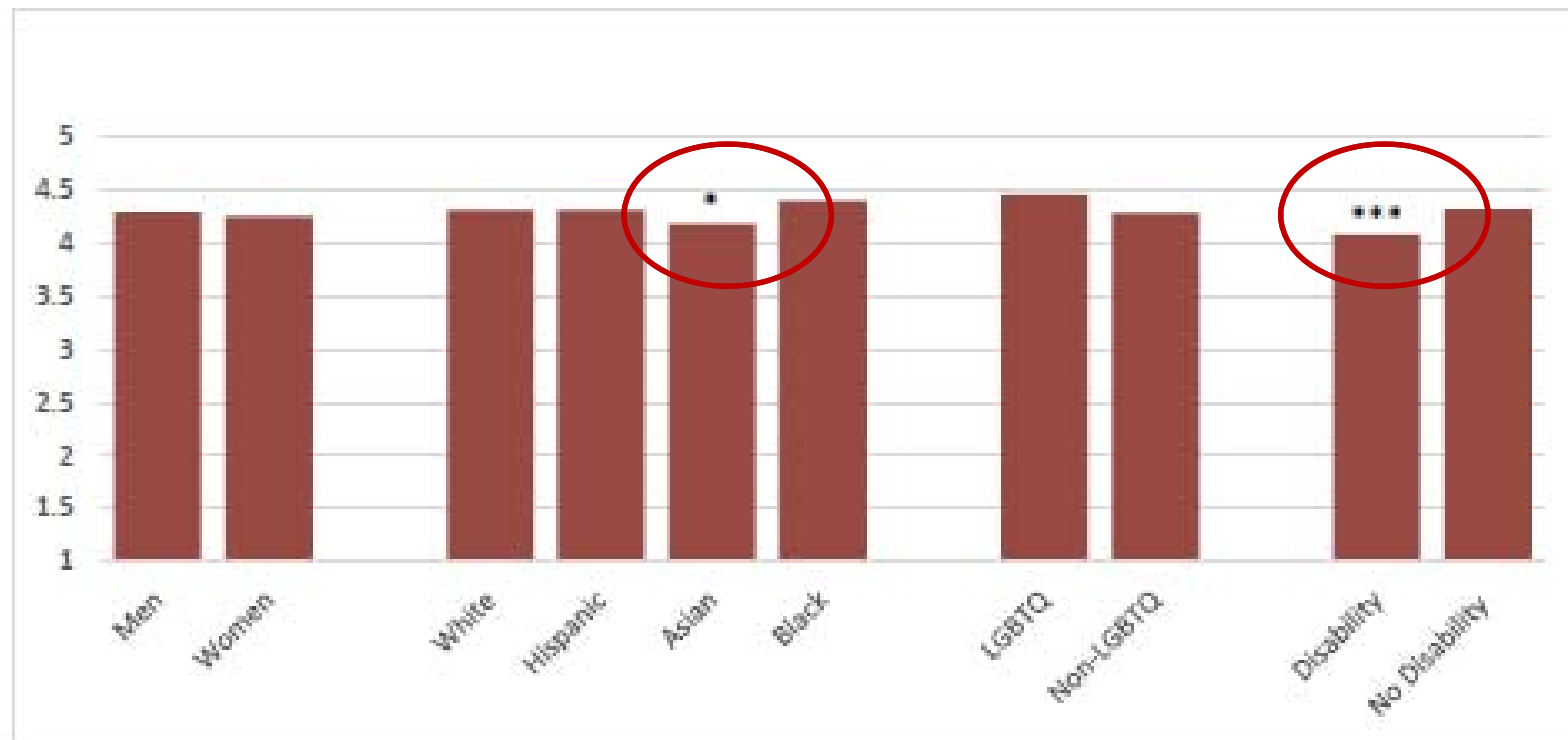
*Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. (1=strongly disagree to 5=strongly agree)*

“A co-worker makes a negative comment or joke about women, a racial/ethnic minority, LGBTQ people, or people with disabilities.”



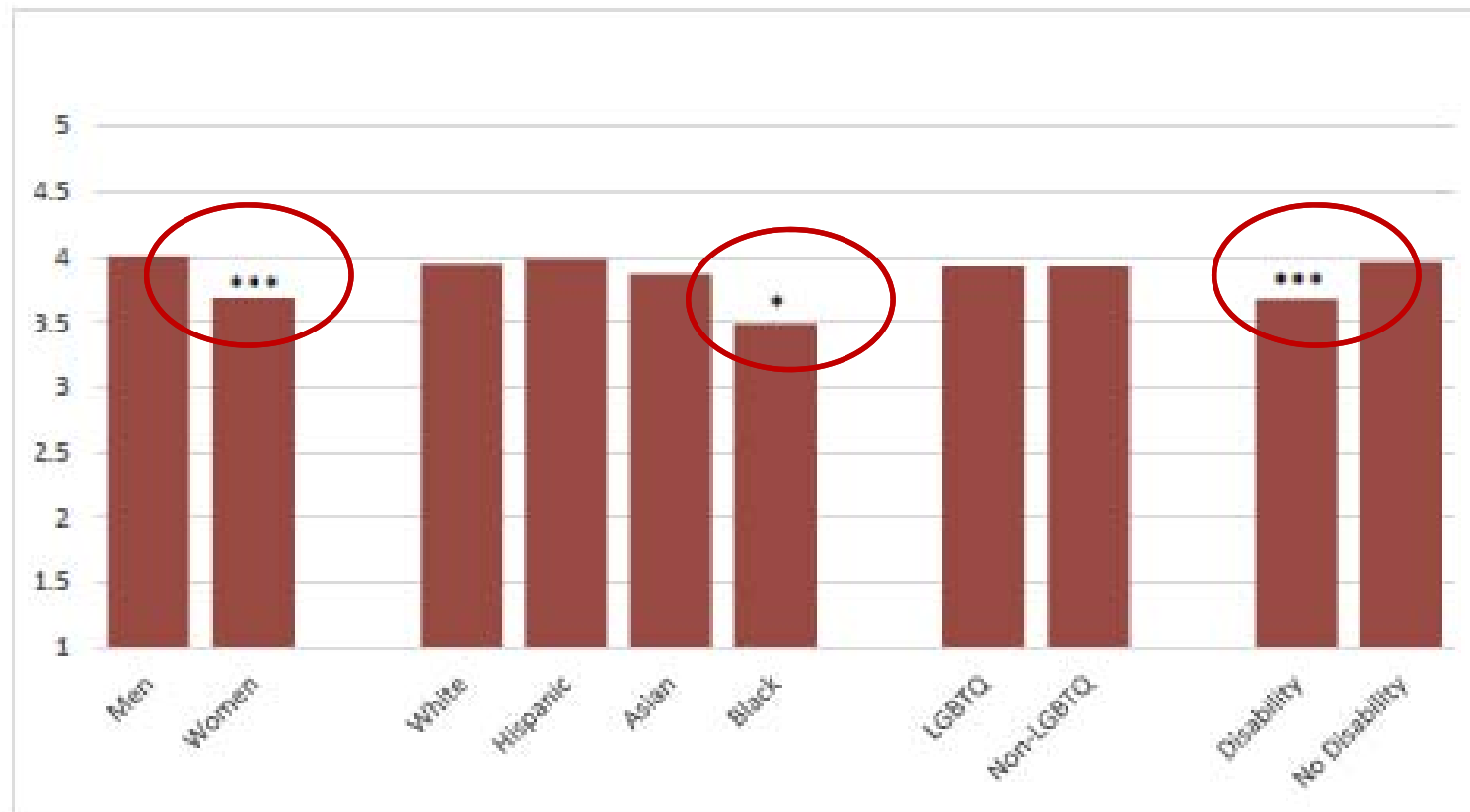
Cech and Waidzunus, 2017

“In my workplace, my work is respected.”



*Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. (1=strongly disagree to 5=strongly agree)*

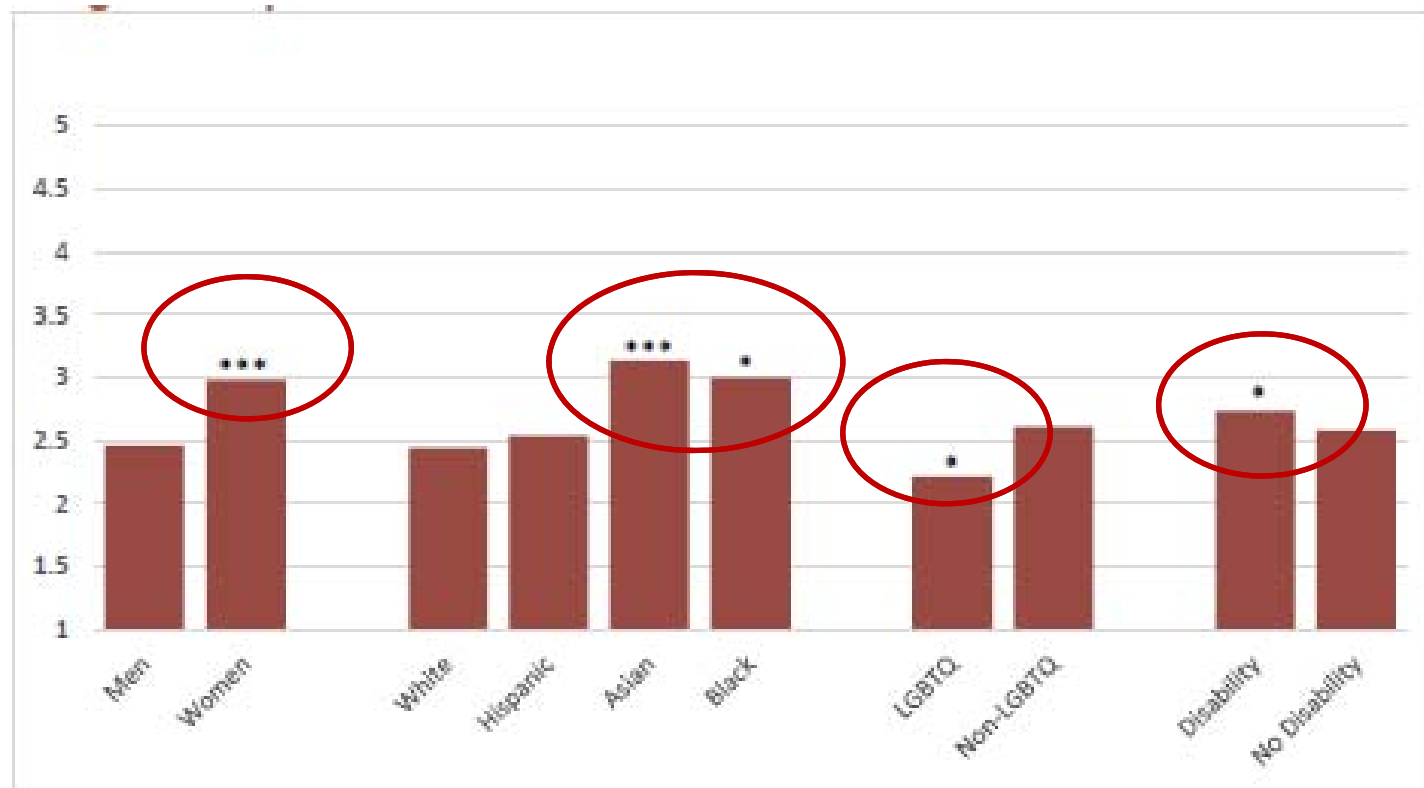
“I am held to the same standard as others for promotion and advancement.”



*Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. (1=strongly disagree to 5=strongly agree)*

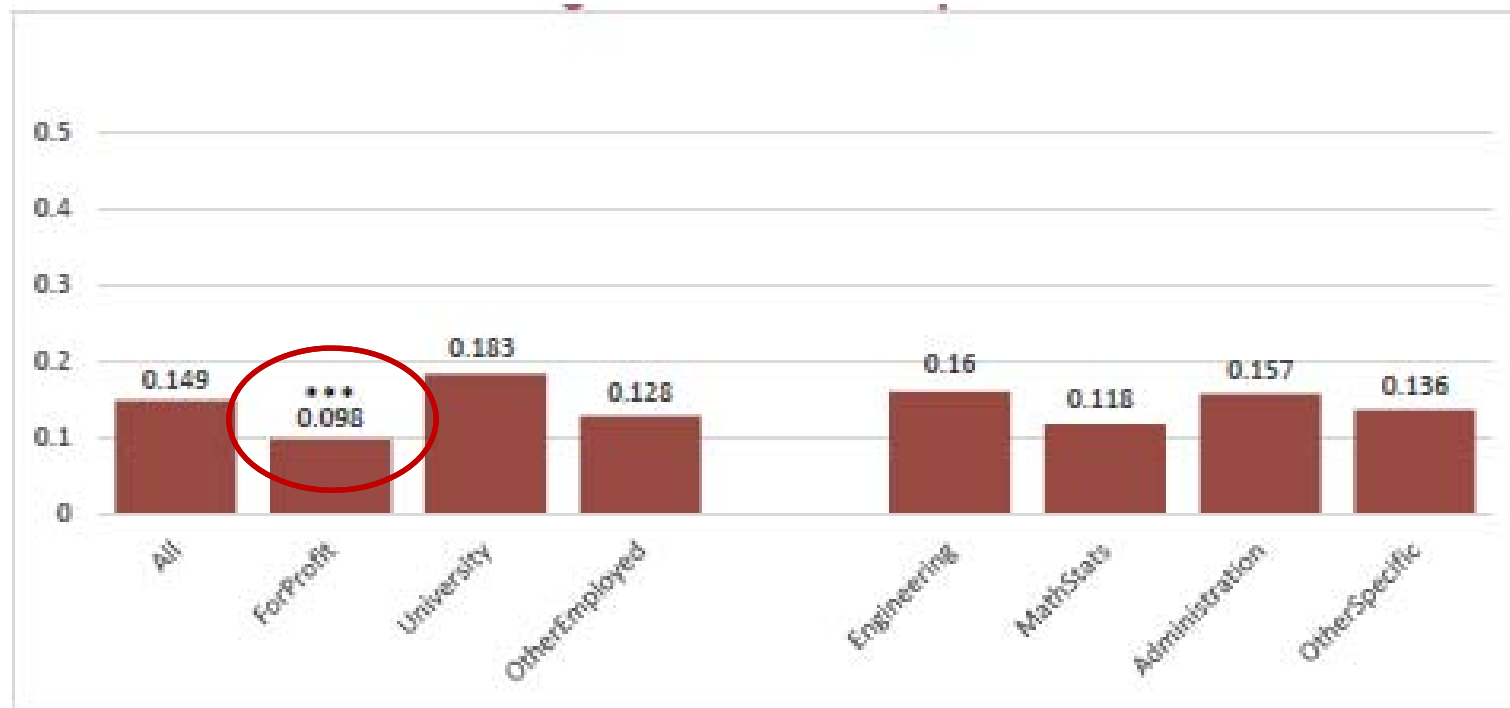


“I have to work harder than my colleagues to be perceived as a legitimate professional.”



*Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level (1=strongly disagree to 5=strongly agree)*

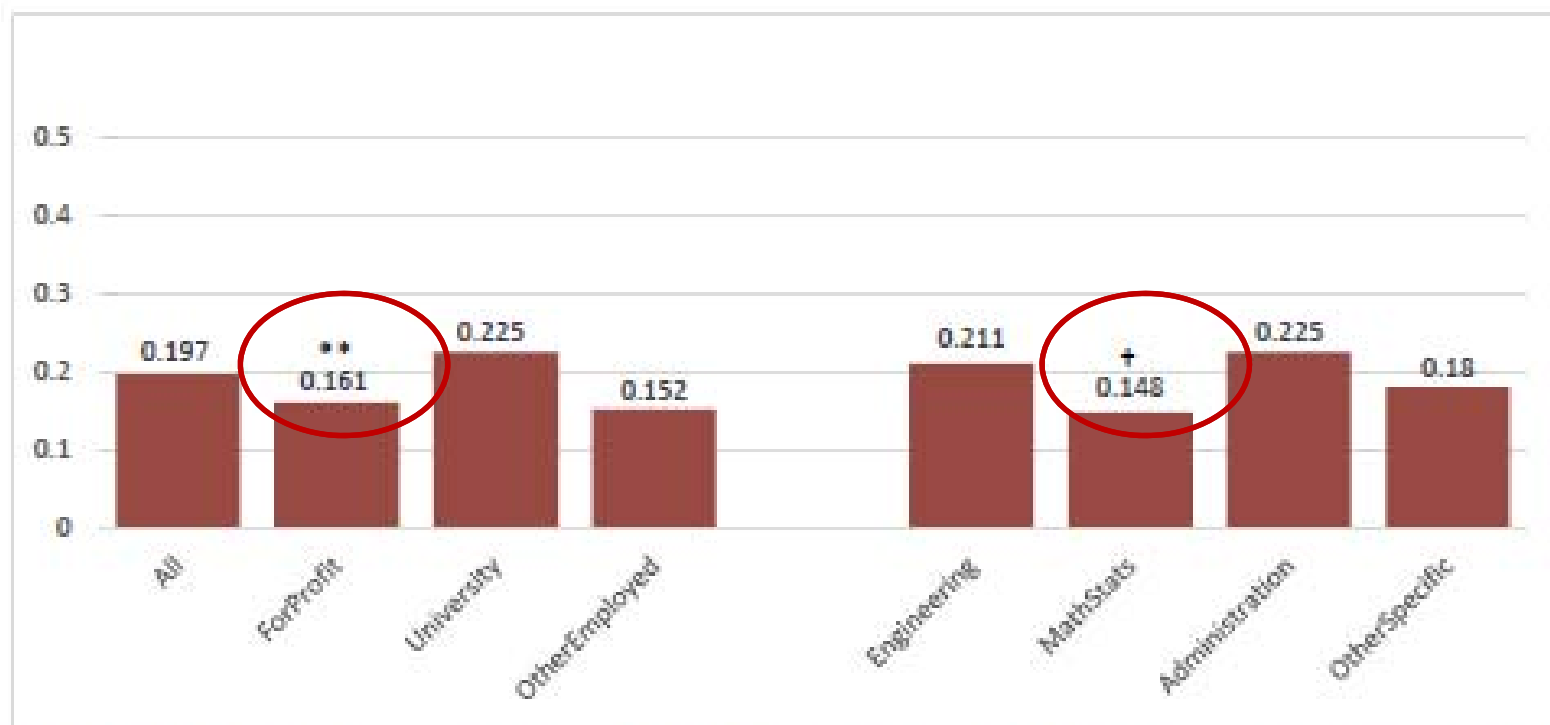
“Racial/ethnic minorities in my workplace must work harder than whites to convince colleagues of their competence.”



*Predicted Probabilities by employment sector and by discipline. (proportion who agree between 0 and 1). University is the comparison category for sector; Engineering is the comparison category for discipline.*

Cech and Waidzunus, 2017

# Proportion who have witnessed persons being treated differently due to gender in last three years



*Predicted Probabilities by employment sector and by discipline. (proportion who agree, between 0 and 1). University is the comparison category for sector; Engineering is the comparison category for discipline.*

# Insights and recommendations

Key Finding	Recommendation
Women and racial/ethnic minorities report persistently more negative experiences compared to men and white respondents. Feelings of marginalization and experiences of exclusion are significantly more common among these populations than among white men.	Consider ways to help foster inclusion for women and people of color, as well as fostering open dialog about the ways that the STEM expertise of women and people of color are undermined in members' workplaces.
Disability status was a significant factor in a number of the marginalization and devaluation measures.	Consider programming and initiatives that allow persons with disabilities to articulate the ways in which the organization could better support them and promote their interests.
Respondents in university settings reported instances of differential treatment and bias toward disadvantaged groups significantly more frequently than respondents in other employment settings.	Explore departmental and institution-level factors that promote these patterns of bias at the local level. Enable organization members from different employment sectors to learn from one another.

# What does it all mean?

- Decision sciences provides a robust and multi-faceted source of models, methods and applications to address social issues of diversity, equity and inclusion. Actual successes and impacts, however, are relatively few in number
- The engineering profession presents substantial barriers to engaging diversity, equity and inclusion as a core concern
- By some measures, OR/MS/analytics is less unfriendly to underrepresented groups, and is making progress towards new practices in diversity, equity and inclusion

# Where do we go from here?

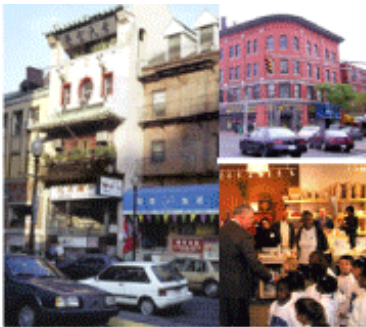
- Professions and disciplines (decision sciences; engineering; STEM) and sectors (education, research, practice) all have roles to play:
  - More explicit arguments in support of diversity, equity and inclusion
  - New standards and expectations to identify and address norms and values that marginalize underrepresented groups
  - Broader notion of what social problems are amenable to analysis, and how these problems can be solved
  - Support cross-disciplinary collaborations
  - Put individuals, communities and society at the center of knowledge production and innovative products and services
  - Increased engagement with communities and community-based organizations through volunteering (e.g. INFORMS' Pro Bono Analytics initiative)

# How can decision sciences, engineering and STEM be more welcoming of underrepresented groups?

- Make explicit connections between topics studied and values, experiences and life goals of students
- Critically evaluate and reflect on common assumptions of the discipline/field that may alienate certain groups
- Allow personal identities to accommodate (and interrogate) professional identities (“I am [...] and I practice [engineering field]” as distinct from “I am an engineer”)
- Name privilege
- Recognize oppression
- Cultivate allies



# Thank you!



Sources: Author (first row); Boston Main Streets Foundation, 2015 (second row)



# Resources

- American Economics Association Committee on the Status of Minority Groups in the Economics Profession:  
<https://www.aeaweb.org/about-aea/committees/csmgep>.
- Association of Collegiate Schools of Planning Committee on Diversity: <http://www.acsp.org/page/CommOnDiversity>.
- Institute for Operations Research and the Management Sciences Diversity and Inclusion Statement: <https://www.informs.org/About-INFORMS/Governance>.
- Institute for Operations Research and the Management Sciences Pro Bono Analytics home page:  
<http://connect.informs.org/probonoanalytics/home>.
- STEM Inclusion Study: <https://www.steminclusion.com/>.

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