

# **THE MASTER'S DEGREE: A CRITICAL TRANSITION IN STEM DOCTORAL EDUCATION**

Sheila Edwards Lange  
Vice President/Vice Provost  
University of Washington  
May 18, 2010

# Overview of Presentation



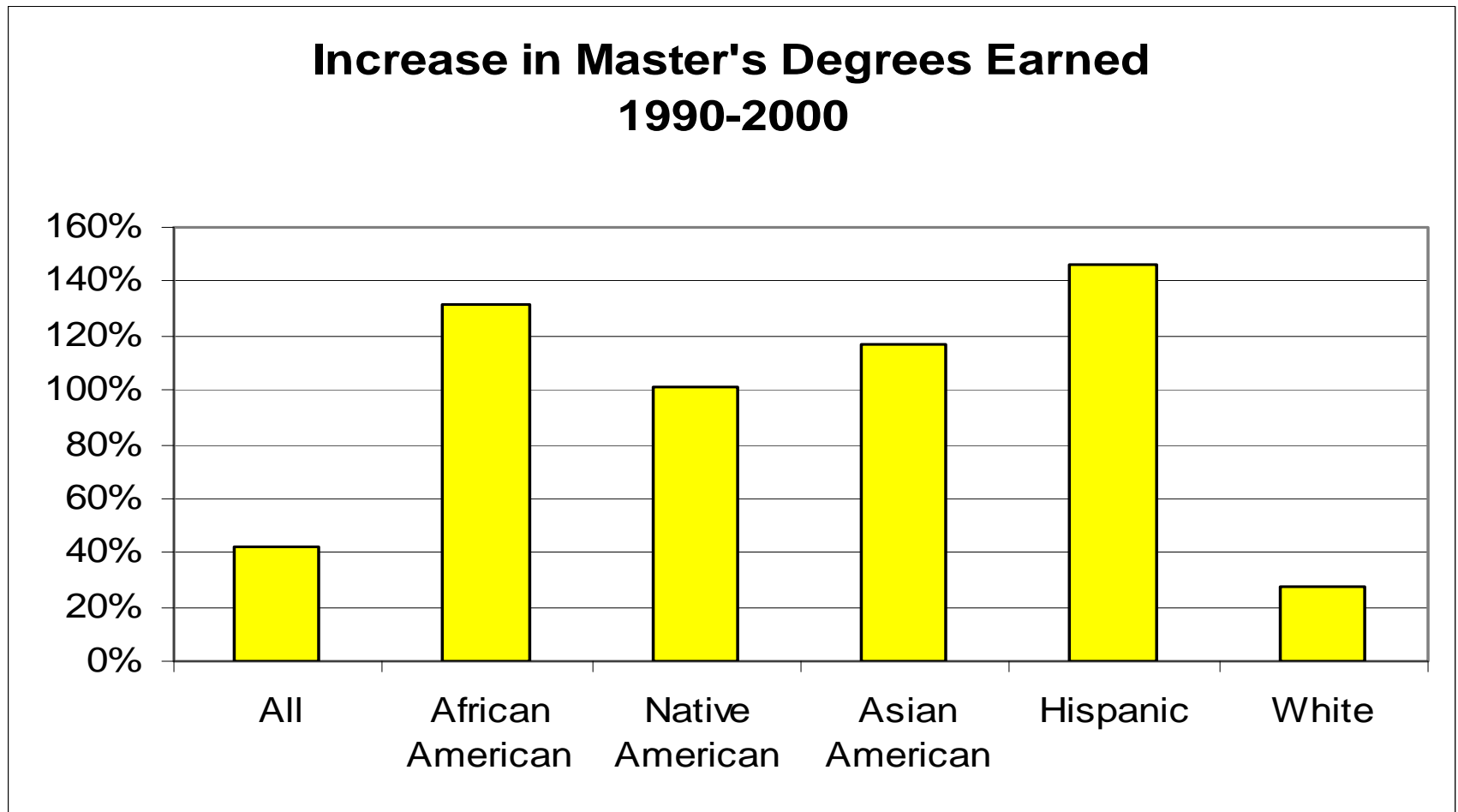
- **Growth in master's degrees**
- **Summary of dissertation research**
- **Implications of findings from research**

# STEM Degrees by Race & Gender 2001

	BS	MS	PHD
Women	50.6%	43.8%	36.6%
African American	8.1%	5.1%	2.7%
Native American	0.7%	0.5%	0.3%
Asian American	8.8%	7.3%	6.5%
Hispanic/Latino	7.0%	3.9%	2.6%
White/Caucasian	67.7%	49.6%	50.0%
Non-resident Aliens	3.8%	28.8%	31.2%

Source: National Science Foundation (NSF 04-318 Tables 7& 10; NSF 04-311 Table 3)

# Growth in Master's Education



# Master's & Doctoral Education



- **Little is known about master's education and pathway to the doctorate**
- **Questions raised about whether master's degree is a diversion from or stepping stone to doctoral degree**
- **Is master's only institution source of talent loss or untapped reservoir?**

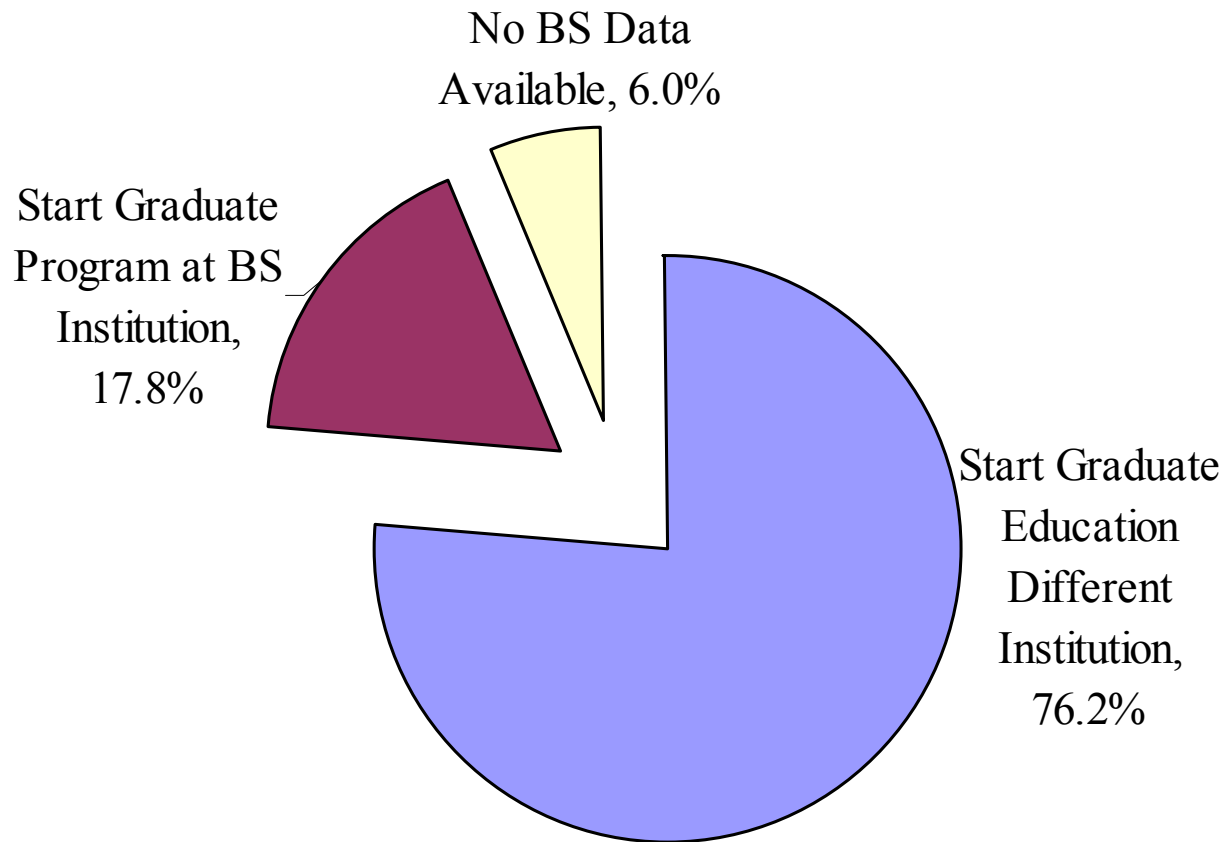
# Study Methodology

- **Survey of Earned Doctorates, 1998-2001**
- **Science and engineering fields only**
- **Stratified random sample, 400 from each racial category**
- **Pathways as institutional transitions between undergraduate, master's and doctoral degrees**
- **Chi-square analysis**

# Research Questions

- **What are graduate degree pathways to the doctorate?**
- **Do pathways differ by race & gender?**
- **Are women & URM more likely to earn a master's degree en route to the doctorate?**
- **What are institutional origins of master's degrees earned en route to the doctorate?**

# Doctoral Degree Pathways





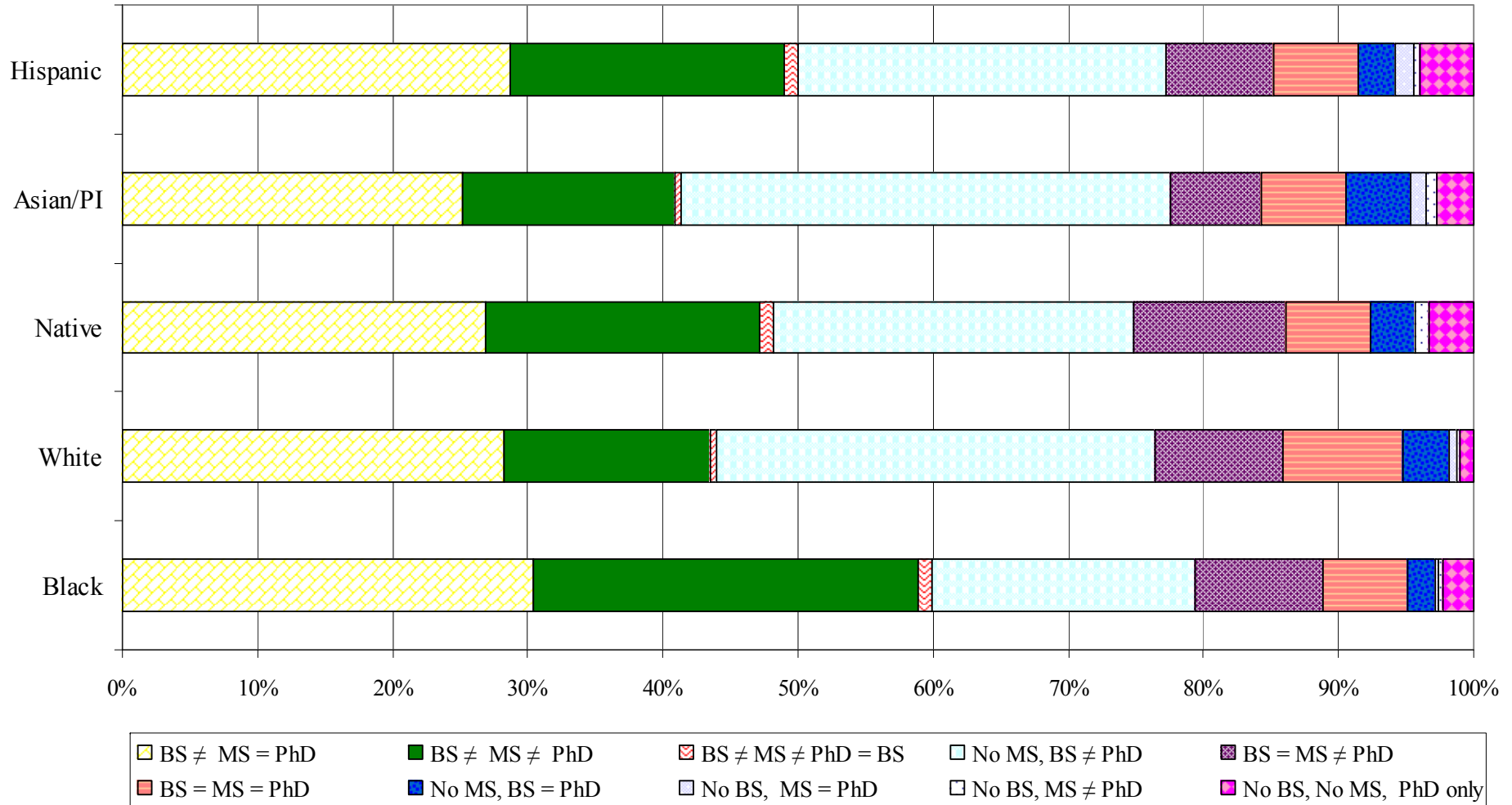
# Leave BS Institution to Begin Graduate Program

- No MS, BS  $\neq$  PhD (28.4%)
- BS  $\neq$  MS = PhD (27.2%)
- BS  $\neq$  MS  $\neq$  PhD (19.6%)
- BS  $\neq$  MS  $\neq$  PhD = BS (1.0%)

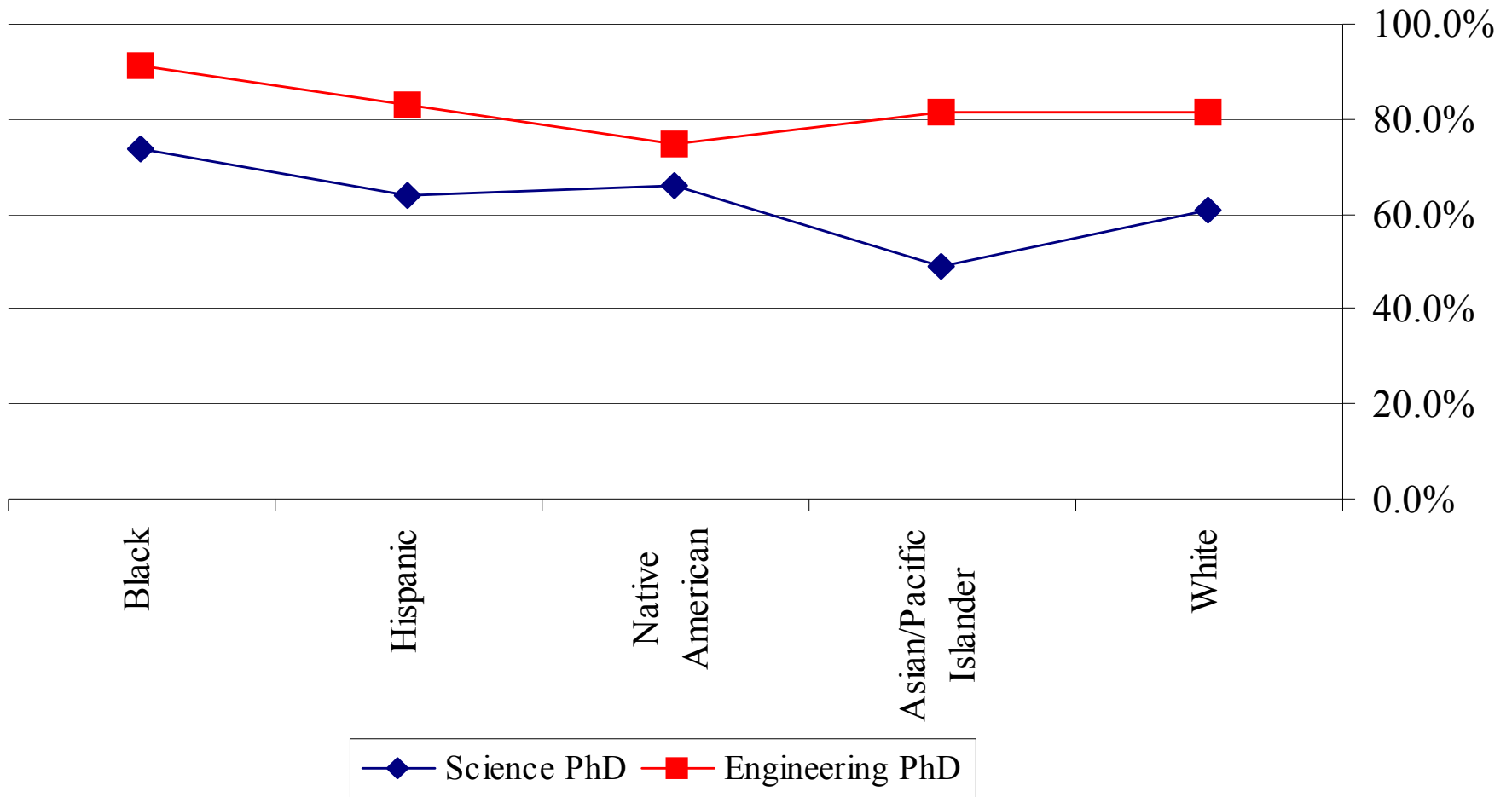
# Begin Graduate Program at BS Institution

- BS = MS  $\neq$  PhD (8.2%)
- BS = MS = PhD (6.2%)
- No MS, BS = PhD (3.5%)

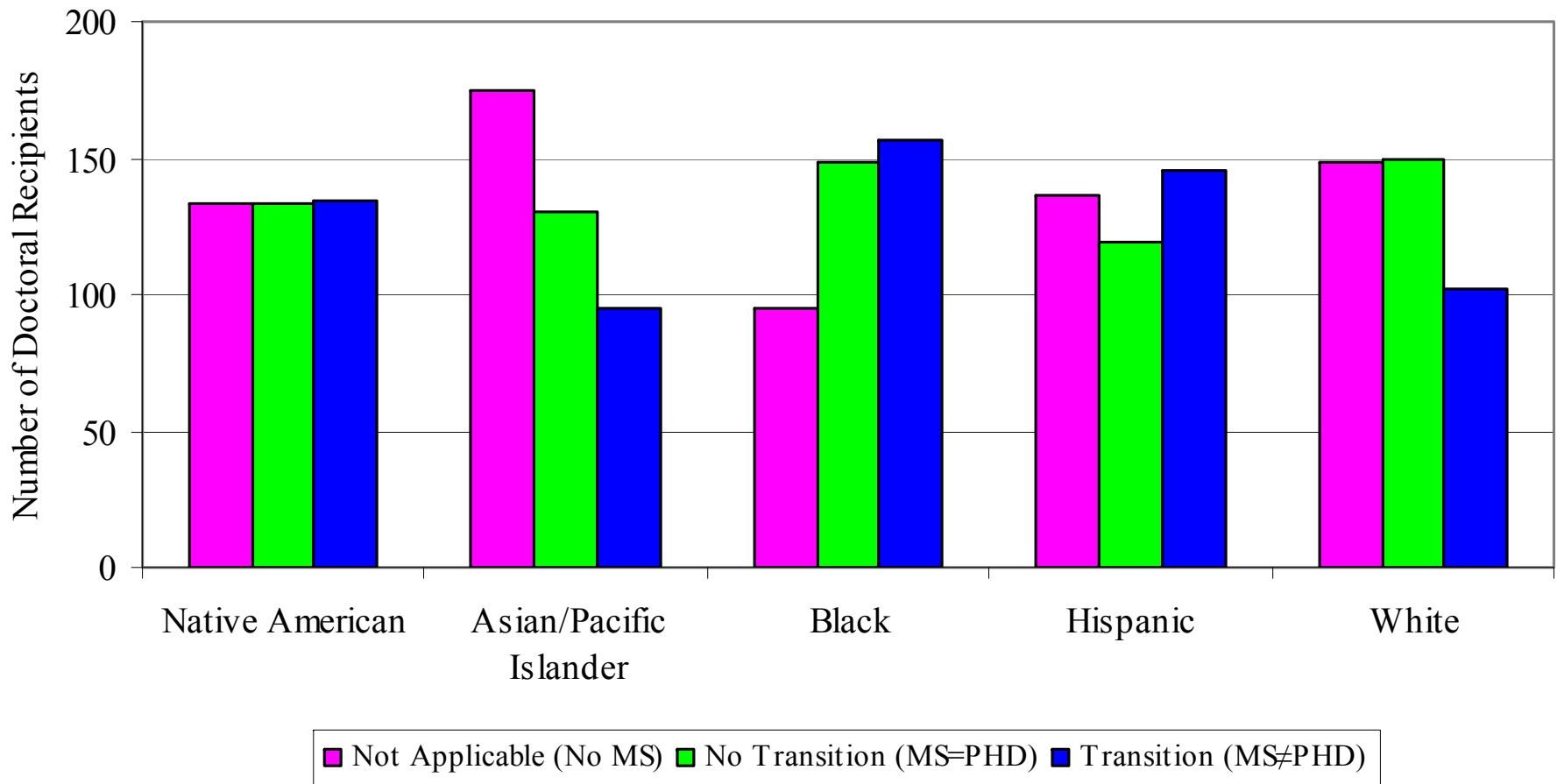
# Differences by Race/Ethnicity



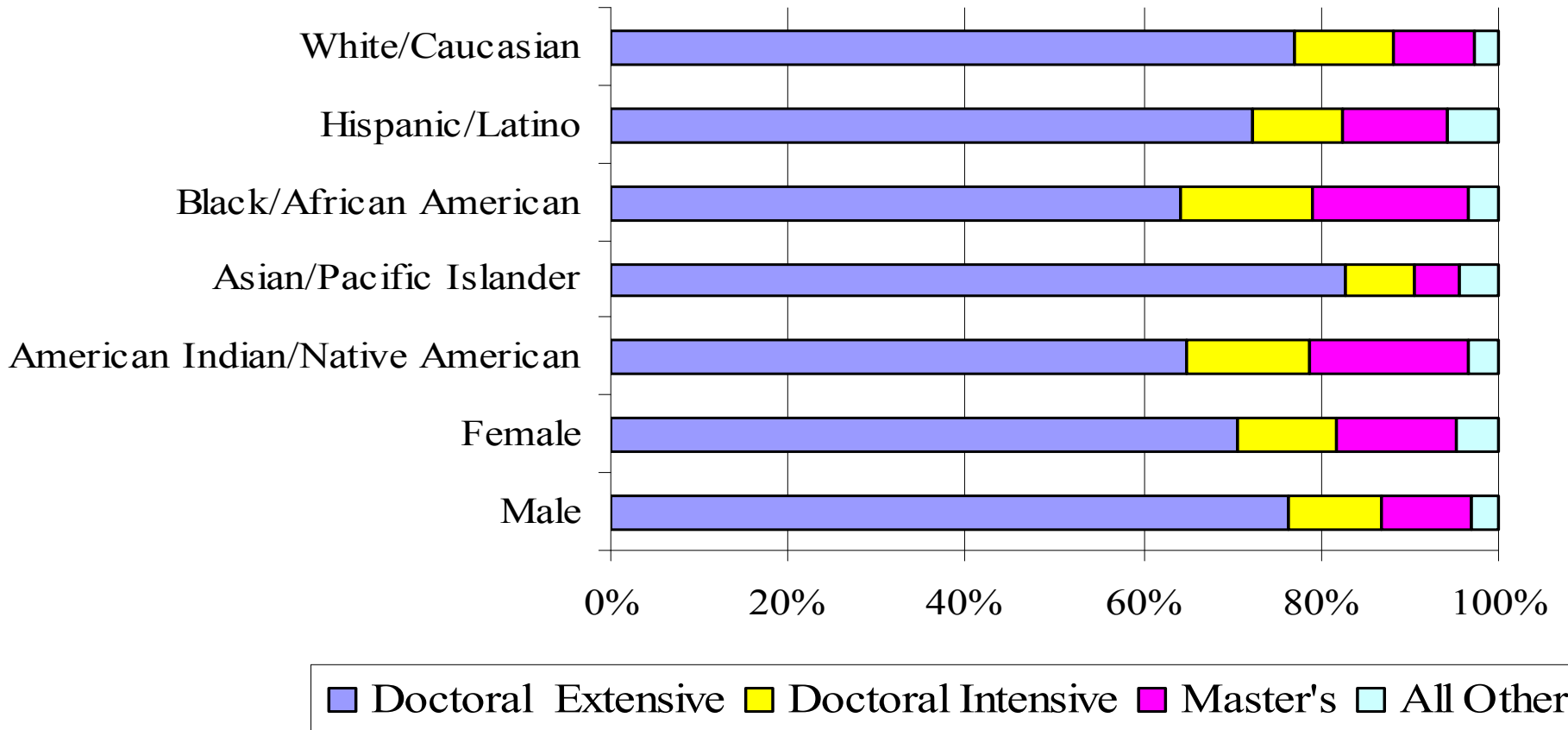
# Master's Degrees En Route



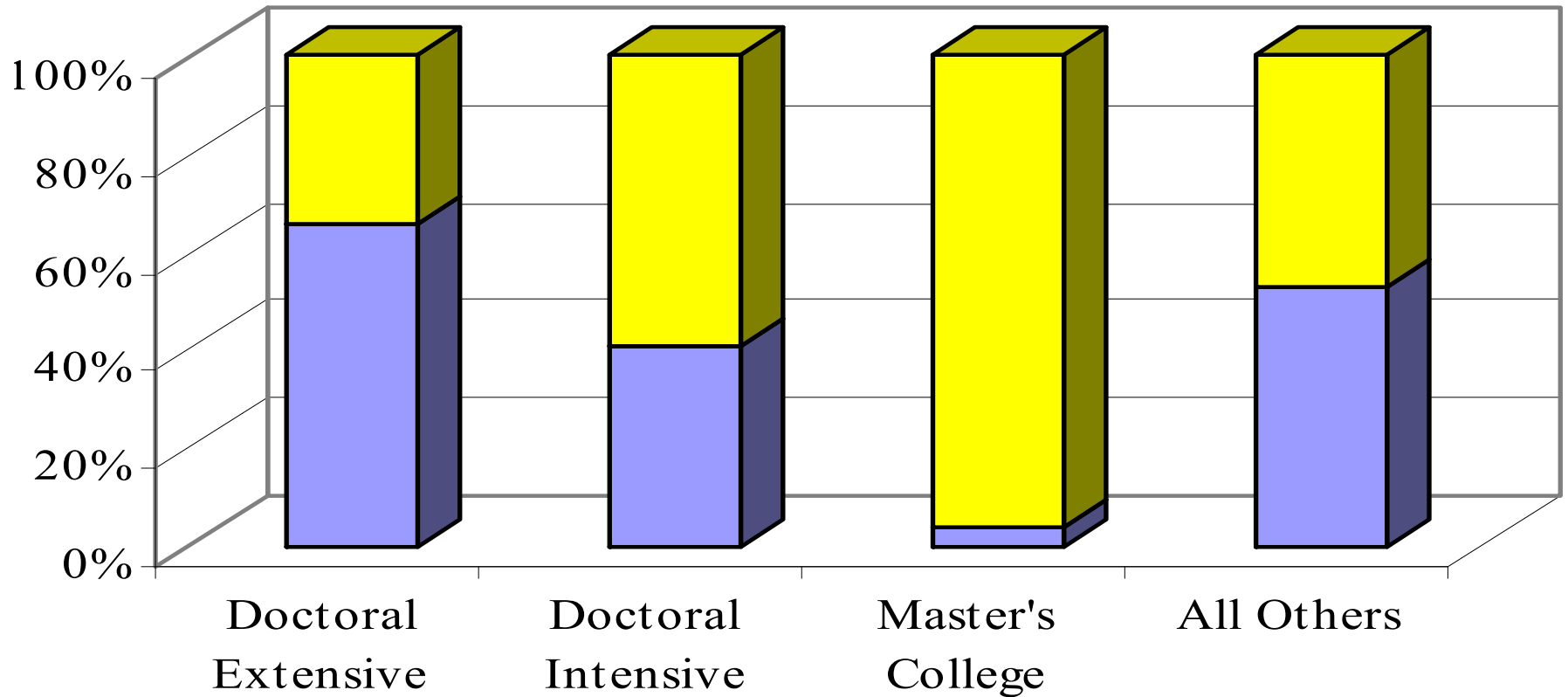
# Transitions Experienced



# Master's Institution Carnegie Classification



# Institutional Origins



**Carnegie Classification of Master's Institution**

■ MS=PhD ■ MS≠PhD

# Summary

- **Gender pathway differences are not significant**
- **Although Carnegie classification of master's degrees earned by women differ, there are no gender differences in proportion who earn master's degrees en route to the doctorate**
- **URM students take significantly different pathways to the doctorate and are more likely to earn the BS, MS and PhD at three different institutions**



# Summary

- **URM students are significantly more likely to earn a master's degree en route to the doctorate**
- **Carnegie classification of master's institutions URM students are significantly different than White/Asian students**
- **URM students more likely to experience transition between master's and doctoral degrees**
- **Transitions are not unique to master's only institutions**

# Issues Raised by Study

- **Transition between the master's and PhD is neither accounted for nor explained by existing theoretical models of graduate degree progress**
- **We do not know why students transition or what factors hinder and facilitate transition**
- **Attrition literature treats transition as drop-out**
- **We do not know to what extent social and academic integration occurs in master's programs**

# Why Is This Important?

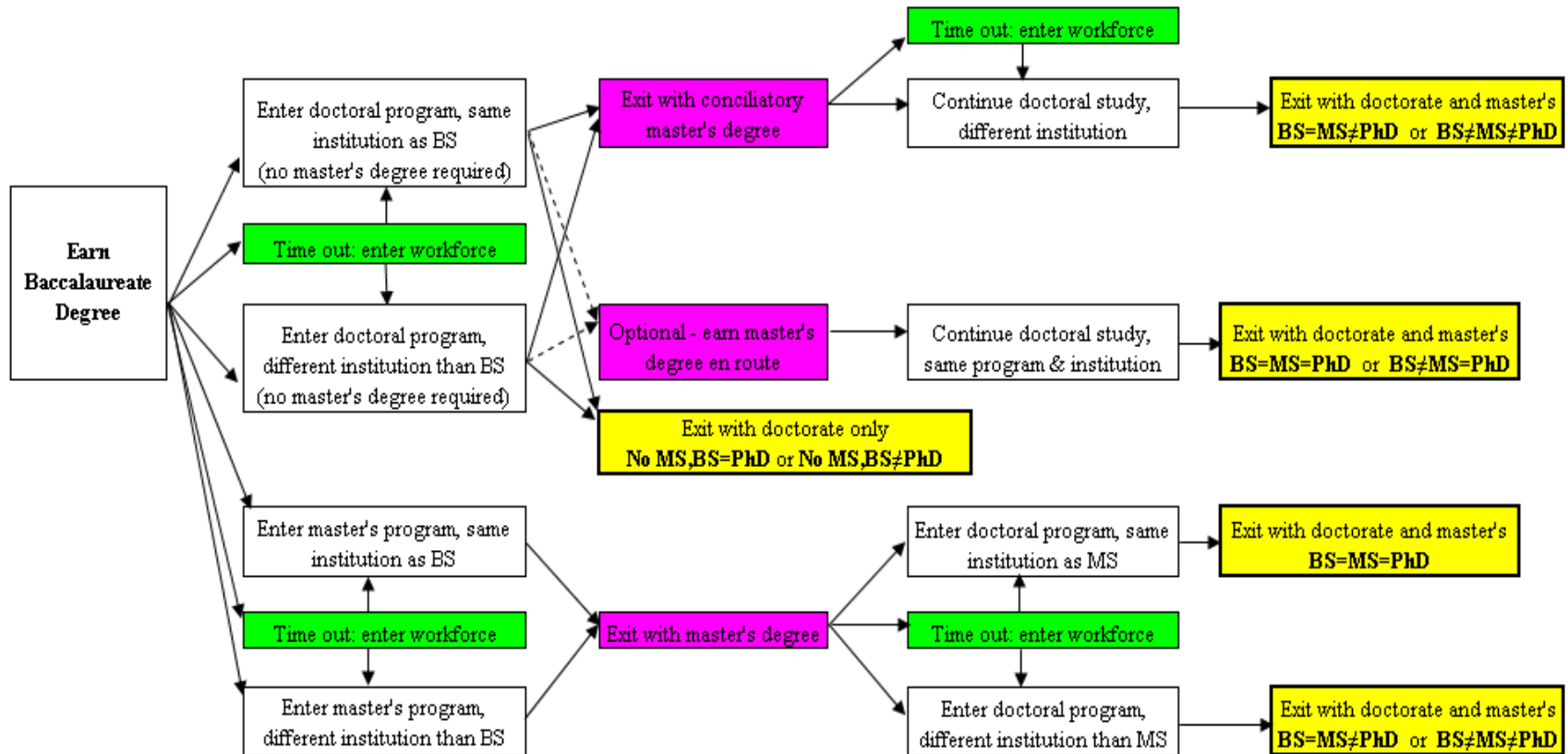
- **Resources and recruitment programs structured at undergraduate level**
- **Women and URM may be concentrated in less selective undergraduate and master's institutions which impacts access to doctoral institutions**
- **Earning master's degree first can impact eligibility for funding of doctoral program**
- **Time to degree is longest for students who transition between master's and doctoral degree**

# Time for Change



- **Master's degree is untapped resource, and any loss of URM talent that occurs is due negligence**

## A New Model: Doctoral Pathways and Levels of Degree Progress



Level 1: Initiation to graduate education	Level 2: Transition and Development of Competence
Establish membership in academic community	Continue knowledge acquisition through additional coursework
Establish relationships with peers and faculty advisors	Develop academic research competencies
Accept discipline and graduate education norms	Attain doctoral candidacy
Commit to career goals	Review and revise career goals
Establish relevancy of further study to career goals	Strengthen membership in and connections to academic community
Begin acquisition of knowledge & competencies needed for doctoral study	Resolve conflicts between goals & family/community
Learn to negotiate conflicts between career goals and family/community	Conduct and defend dissertation research

# Limitations & Further Research

- **Non-response or no master's degree – variable is incomplete, master's institution used instead**
- **Does not address questions about students who do not continue on to doctorate**
- **Does not provide us with information about why students transition between master's and doctoral degrees**