UNIVERSITY OF MICHIGAN
Rackham Graduate School

AAAS/NSF
AGEP Evaluation Capacity Building 2008
Ph.D. Completion Project Monitoring Session
(September 19, 2008)

Ph.D. Completion
in a Comparative Context

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An Orientation to Ph.D. Completion Rate Analyses

- Data driven Ph.D. Completion Rate Studies – 20 years
  - University of California-Berkeley and University of Michigan (1987)
  - Mellon Foundation – In Pursuit of the Ph.D. (1991)
  - Mellon Graduate Education Project: 1991-2007 (early 1980s-2007 data, forthcoming book early 2009)
  - Nettles and Millett's Three Magic Letters: Getting to PhD (mid-1990s data)
  - CGS Ph.D. Completion Project: 2005-2009 (early 1992s to current data)
  - Forthcoming NRC Assessment of Research Doctorates (1996-97 to 2006 data)

Orientation to Ph.D. Completion Rate Analyses

Typical Aspects of Completion Rate Analyses:

1. Cohort based – cohorts in Ph.D. programs

2. Choices are made in defining cohorts to analyze, e.g., sufficient time passage to assess completion outcomes

3. Comparisons are made – within institution, to other institutions, and to other national bench-marking data

Orientation to Ph.D. Completion Rate Analyses

Summative Performance
(for example)

Overall Ph.D. Completion Rate is:

X%

e.g., 66%

Orientation to Ph.D. Completion Rate Analyses

Details are Important for Comparative Perspective:

Ph.D. Completion Rate is:

X%

Typically, based on particular <u>Entry Cohorts</u> allowing for Completion <u>as of</u> particular date, e.g., to June 2006

Question: What is lag time for completion from entry for included cohorts? E.g., 16 years for entrants of 1990-1991, 10 years for entrants of 1996-97

Question: Are aggregate completion rates needing to be 'normalized' for program size changes across time?

Orientation to Ph.D. Completion Rate Analyses

Alternatively,

Completion Rate with
'% Completed in 8 years or less' is:

X%

e.g., 60%

Orientation to Ph.D. Completion Rate Analyses

Ph.D. Completion Rate with
'% Completed in 8 years or less' is:

60%

Based on the Entry Cohorts – allowing for each entry cohort to have had 8 years to complete regardless of specific entry cohort year.

Question: How immediate are the entry cohorts, early data or most current available? E.g., 2001 entry cohort has had 8 years for completion as of June 2008.
Question: Again, do changes across time require 'normalizing' aggregate data?

Orientation to Ph.D. Completion Rate Analyses

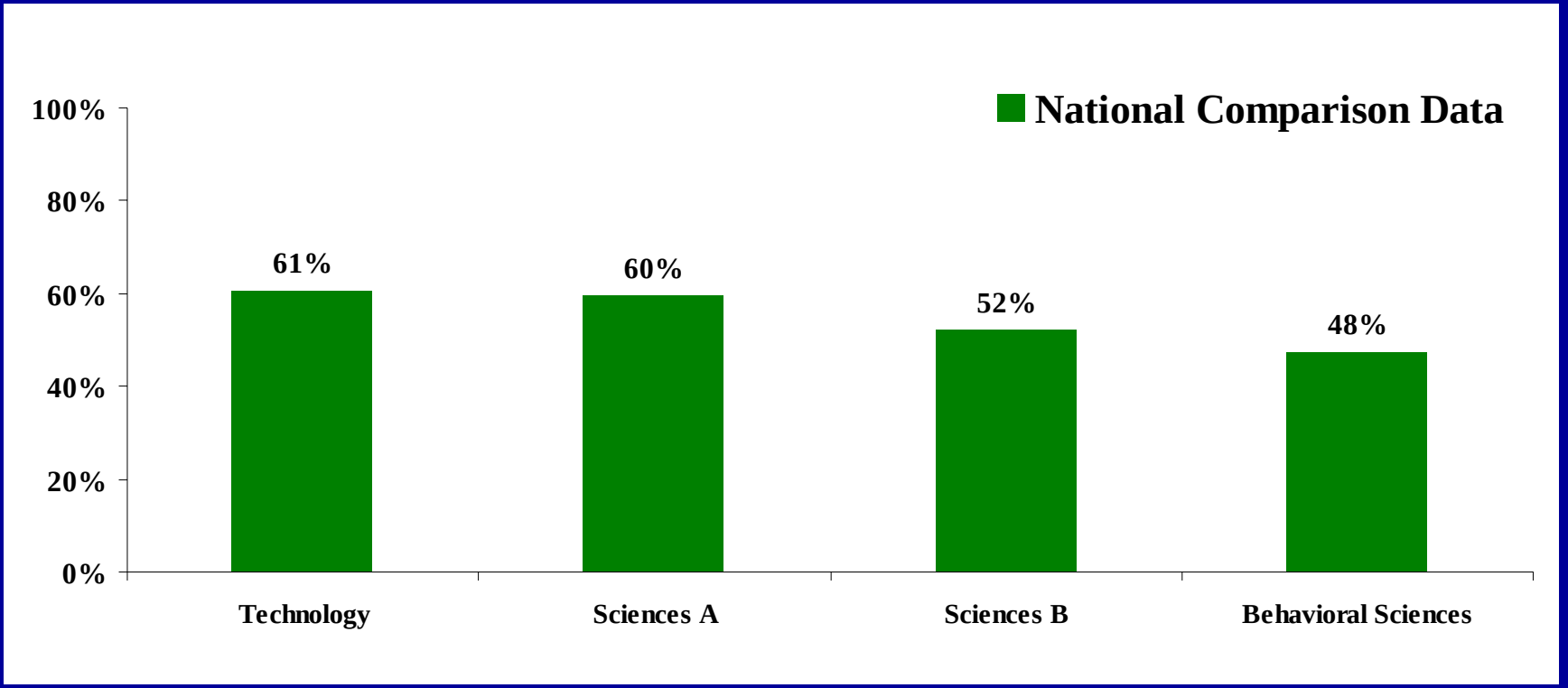
Aspects of Distinction in Completion Rates

1. Differences in Academic Fields are critical

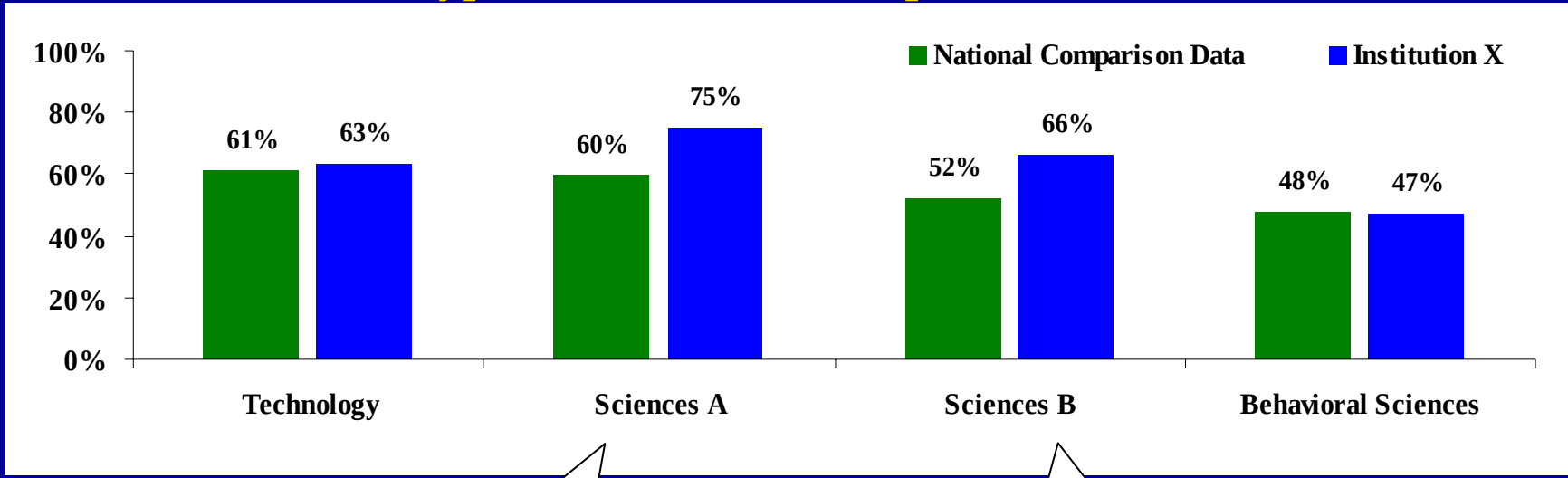
2. Differences in Students (demographic attributes) are critical

Critical Discipline Differences: National level Comparison Hypothetical Ph.D. Completion Data

‘% Completed in 8 years or less’



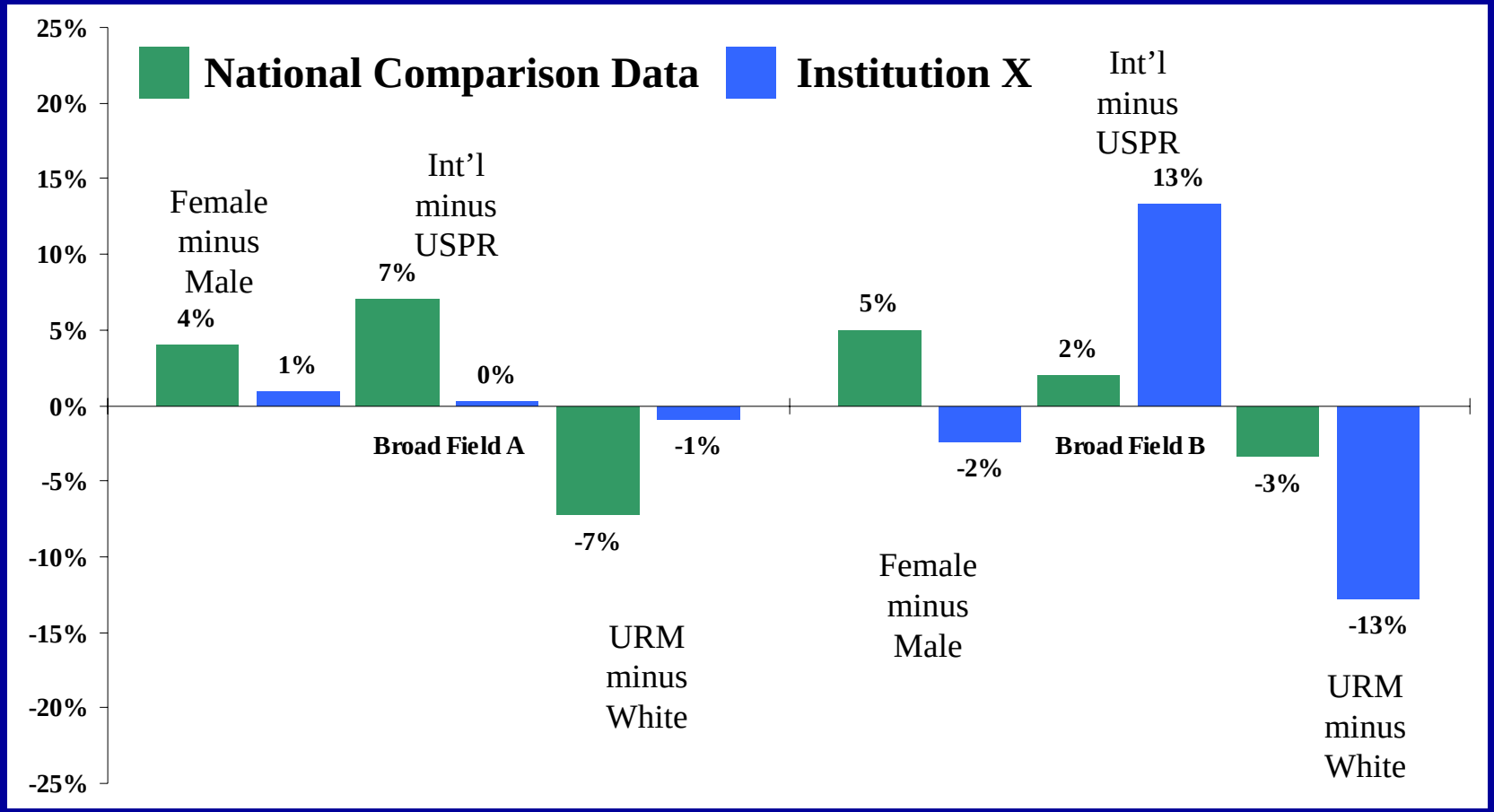
Critical Discipline Differences:
Comparison of National and Institution Data
Hypothetical Ph.D. Completion Data



Question: How comparable are aggregates? E.g., comparable in terms of included academic programs and the nature of those programs?

Question: What are the included academic programs – for National Comparison data? for Institution X?

Critical Demographic Differences:
Comparison of National and Institution Data
Hypothetical Ph.D. Completion Data
(Completion Rate Outcome Group Differences: Broad Field A & Broad Field B)



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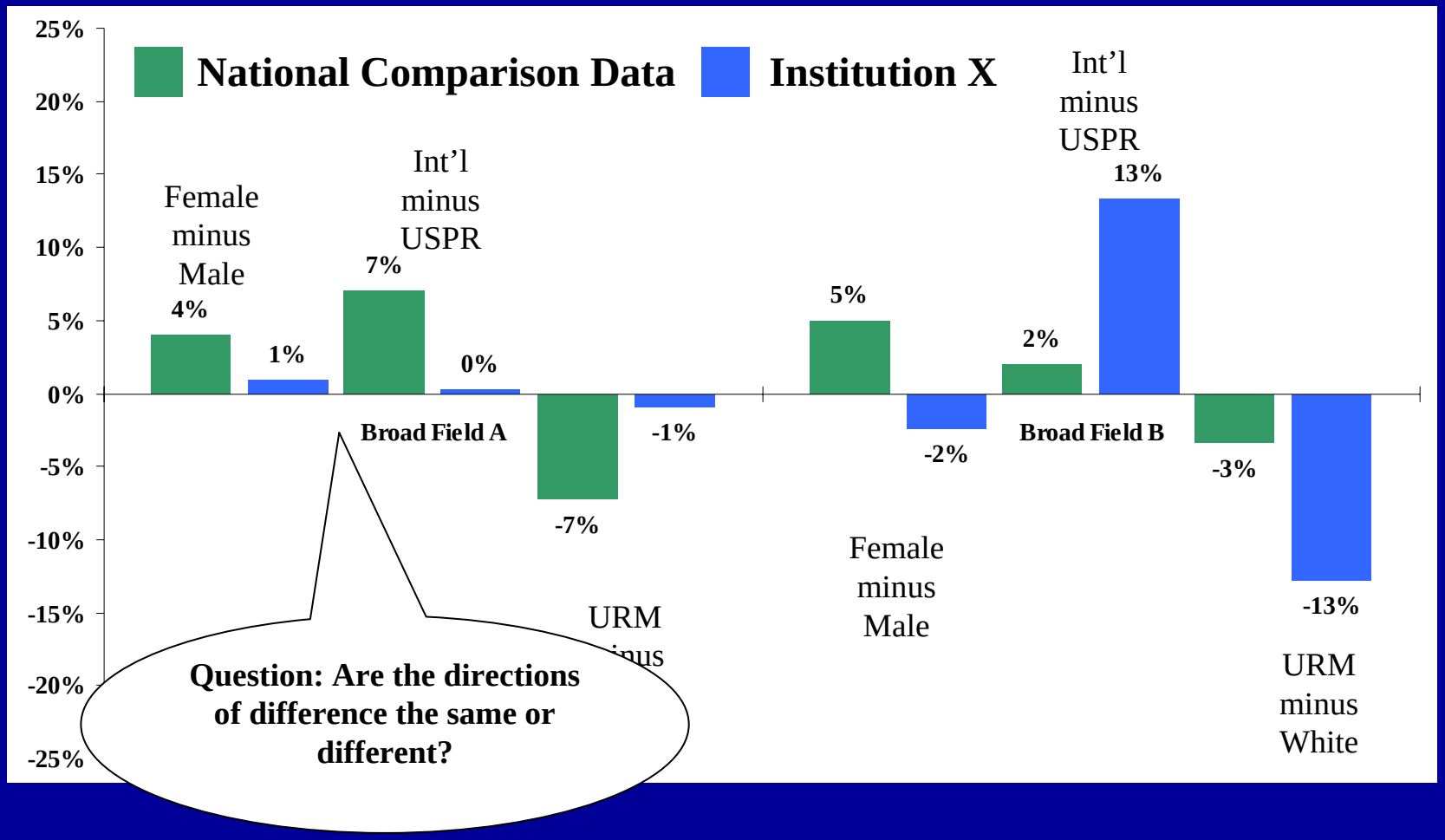

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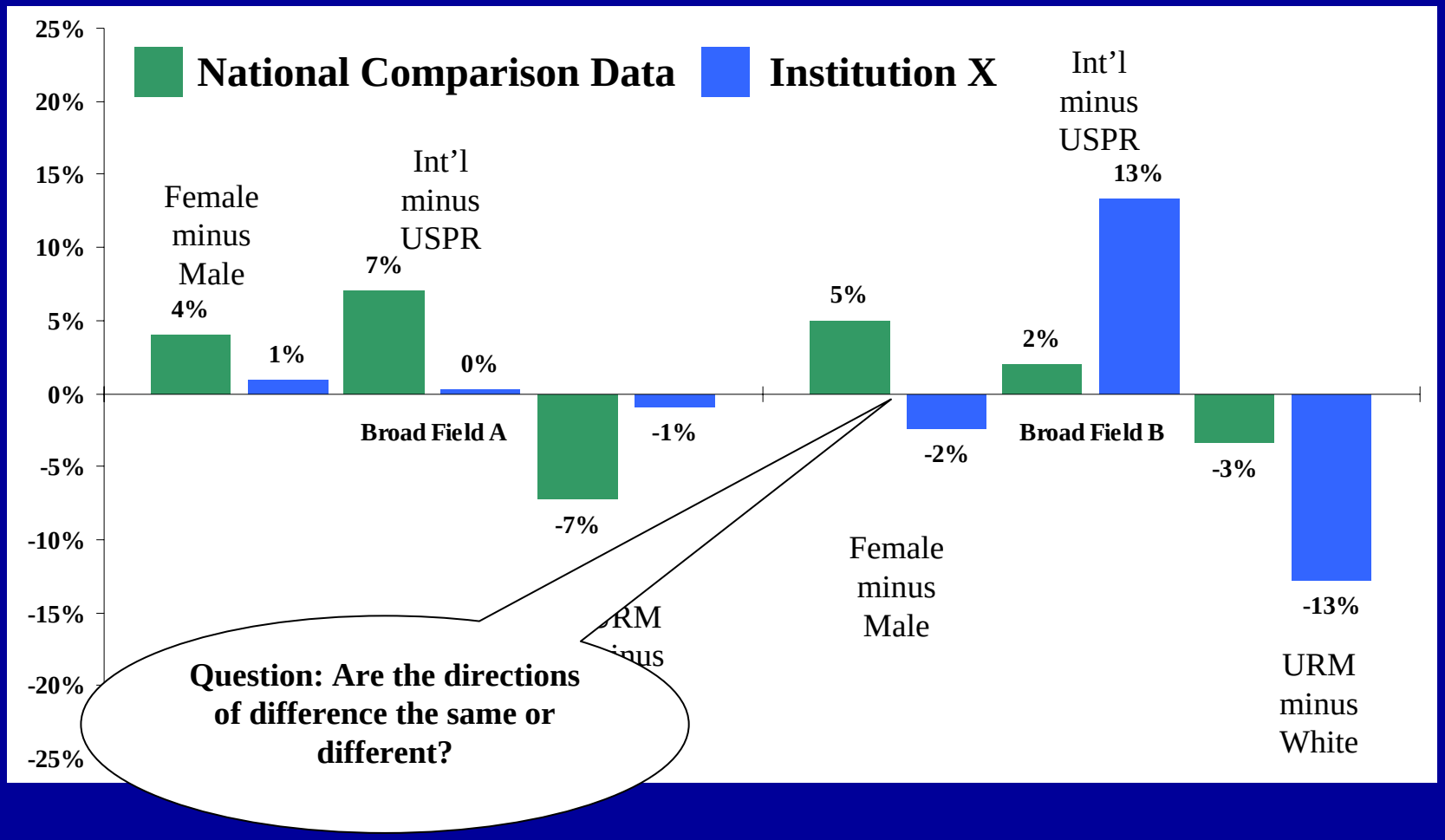

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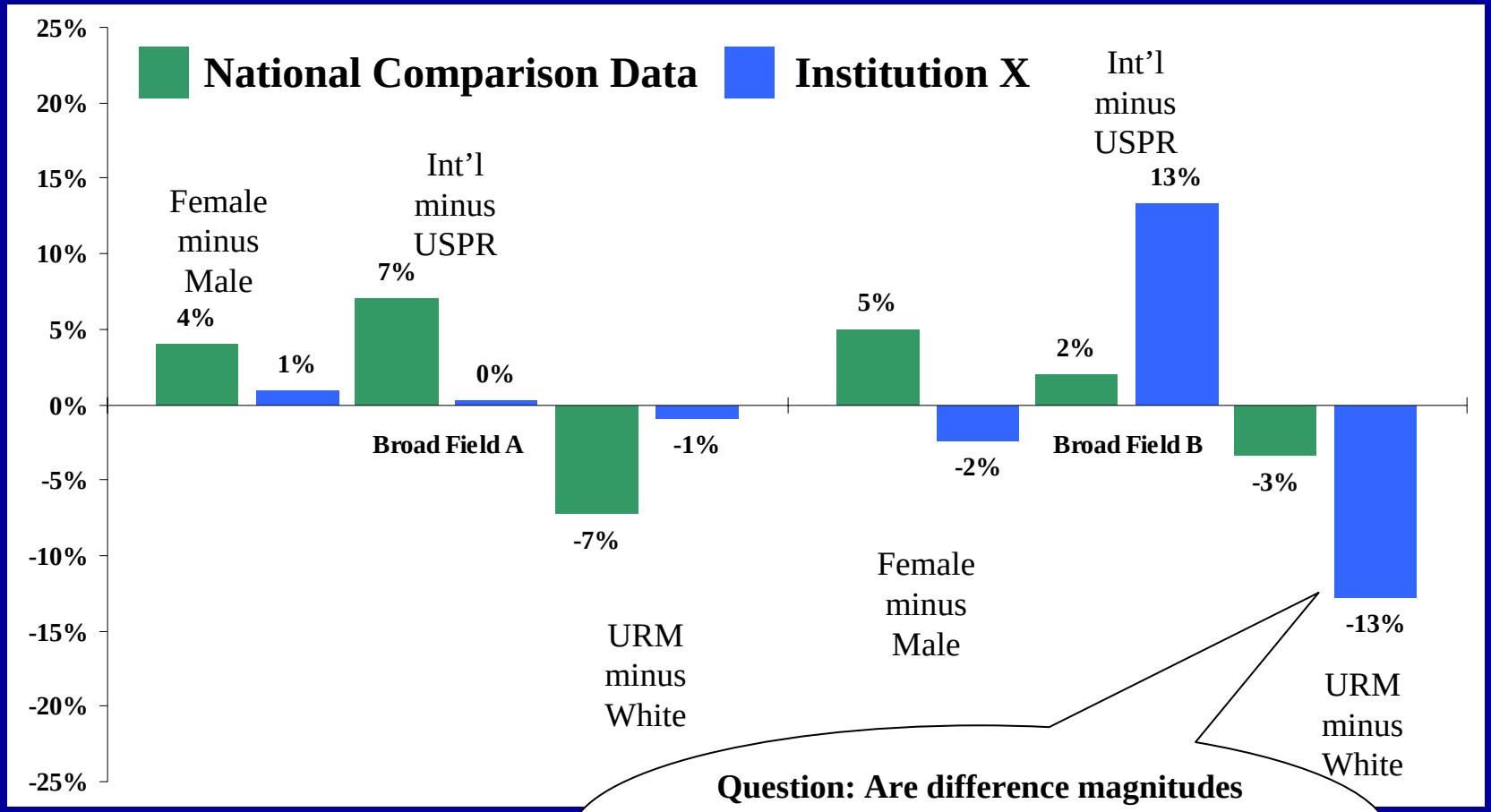

University X Ph.D. Programs

Successes and Challenges

Critical Differences: Program Successes and Challenges (Matrix for Comparing within Institution Program Data)

Successes: High % Completed, Short TTD

Challenges: Low % Completed, Long TTD

Median Time to Doctorate Degree (years) - TTD	% Completed in 8 yrs or less: HIGH	% Completed in 8 yrs or less: LOW
SHORT	Public Health A (76%, 4.7) Medical School A (84%, 5.3) Engineering A (78%, 5.3) Interdisciplinary Science A (73%, 4.7) Social Science A (82%, 5.3) Interdisciplinary Science B (75%, 5.7) Humanities A (51%, 6.7) Interdiscip. Humanities A (70%, 6.7)	*None*
LONG	Engineering B (100%, 6.0) Humanities B (56%, 8.3)	Medical School Field B (63%, 6.3) Public Health Field B (42%, 6.2) Physical Science A (54%, 7.3) Engineering C (51%, 6.2) Social Science B (30%, 8.3) Interdiscip. Humanities B (36%, 8.3) Humanities C (39%, 8.3) ities D (29%, 9.2)

Critical Differences: Program Successes and Challenges (Matrix for Comparing within Institution Program Data)

Median Time to Doctorate Degree (years) - TTD

% Completed in 8 yrs or less

	HIGH	LOW
SHORT	Public Health A (76%, 4.7) Medical School A (…%, 5.3) Engineering A (78%, …) Interdisciplinary Science A (73%, 4…) Social Science A (82%, …) Interdisciplinary Science B (75%, …) Humanities A (51%, 6…) Interdiscip. Humanities A (70%, 6.7)	
LONG	Engineering B (100%, 6.0) Humanities B (56%, 8.3)	(63%, 6.3) Public Health Field B (42%, 6.2) Physical Science A (54%, 7.3) Engineering C (51%, 6.2) Social Science B (30%, 8.3) Insterdiscip Humanities B (36%, 8.3) Humanities C (39%, 8.3) Humanities D (29%, 9.2)

Process: Placement within context, e.g., similar group of disciplines, e.g., within disciplinary group. High – within top quartile (highest percentages), Low – lowest quartile (lowest percentages) of contextually appropriate comparison group. Highlighting extremes.

Critical Differences: Program Successes and Challenges
(Matrix for Comparing within Institution Program Data)

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Transition to Orientation to Data Report Design

Special Comparative Report: Orientation

Data Report: Orientation

	Institution X Program		COMPARE TO PEER DATA: Program X e.g., forthcoming NRC Completion data		IDENTIFY GROUP DIFFERENCES: Institution X Percentage point difference in completion rates		
	Total N	**% Completed in 8 yrs or less**	**Median % Completed**	**Max % Completed**	**Female minus Male**	**Int'l minus USPR**	**URM minus White**
Academic Program A	20	65%	46%	*83%*	10%	-8%	-4%

Special Comparative Report: Orientation

Outcomes data – Ph.D. Completion Rates from Entry

Institution X's Academic Program data, Peer Comparison Data (selected Peers or available National data), and within Institution X Program Data – Group Comparisons

	Institution X Program		**COMPARE TO PEER DATA: Program X e.g., forthcoming NRC Completion data**		**IDENTIFY GROUP DIFFERENCES: Institution X Percentage point difference in completion rates**		
	Total N	**% Completed in 8 yrs or less**	**Median % Completed**	**Max % Completed**	**Female minus Male**	**Int'l minus USPR**	**URM minus White**
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Special Comparative Report: Orientation

Display concerns: Are there sensitivities involved, e.g., volume of cases in data, disclosure concerns -- issues requiring special annotation?

	Institution X Program		**COMPARE TO PEER DATA: Program X e.g., forthcoming NRC Completion data**		**IDENTIFY GROUP DIFFERENCES: Institution X Percentage point difference in completion rates**		
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Special Comparative Report: Orientation

Define: Doctoral Entry Cohort (e.g., 1995/96-1999/00 entrants)

	Institution X Program		**COMPARE TO PEER DATA:** Program X e.g., forthcoming NRC Completion data		**IDENTIFY GROUP DIFFERENCES:** Institution X Percentage point difference in completion rates		
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Special Comparative Report: Orientation

% age of Entry Cohort Completing Ph.D. in 8 years or less after entry

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Special Comparative Report: Orientation

Institution X is excluded from the Median and Max measures

	Institution X Program		**COMPARE TO PEER DATA: Program X e.g., forthcoming NRC Completion data**		**IDENTIFY GROUP DIFFERENCES: Institution X Percentage point difference in completion rates**		
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Special Comparative Report: Orientation

Peer Comparison - also %age of Entry Cohort Completing Ph.D. in 8 years or less after entry

(Issue: could be slightly different Entry Cohort, e.g., 1996-97 – 1998-99. Key – to develop reporting with available data that is relatively consistent for comparison purposes, but to also highlight substantive concerns as applicable)

	Institution X Program		**COMPARE TO PEER DATA: Program X e.g., forthcoming NRC Completion data**		**IDENTIFY GROUP DIFFERENCES: Institution X Percentage point difference in completion rates**		
	Total N	**% Completed in 8 yrs or less**	**Median % Completed**	**Max % Completed**	**Female minus Male**	**Int'l minus USPR**	**URM minus White**
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Special Comparative Report: Orientation

The 'Median % Completed in 8 years or less' offers a central tendency measure for performance comparison purposes

	Institution X Program		**COMPARE TO PEER DATA: Program X e.g., forthcoming NRC Completion data**		**IDENTIFY GROUP DIFFERENCES: Institution X Percentage point difference in completion rates**		
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Special Comparative Report: Orientation

Provision of 'Max % Completed' suggests potential goal for improvement where Institution X's % Completed is less

	Institution X Program		**COMPARE TO PEER DATA:** Program X e.g., forthcoming NRC Completion data		**IDENTIFY GROUP DIFFERENCES:** Institution X Percentage point difference in completion rates		
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Format note: use italicized values for special notes

Special Comparative Report: Orientation

Differences in percentages between Institution X's groups' % Completed in 8 yrs or less ('-' value means 1st listed group did worse than the 2nd, e.g., Intl worse than USPR.

	Institution X Program		**COMPARE TO PEER DATA: Program X e.g., forthcoming NRC Completion data**		**IDENTIFY GROUP DIFFERENCES: Institution X Percentage point difference in completion rates**		
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Format note: shaded cells represent special notes, e.g., relevant cohort sizes less than 5 in this report in Institution X. CAUTION is urged in interpretations where cells are shaded due to population size concerns.

Normalizing Completion Rates Example

- Here's a web definition: (statistics) To reduce to variations by excluding irrelevant aspects.

- *After we properly **normalize** the measurements with respect to age, gender, geography and economic considerations, there remains little evidence of a difference between the two groups.*

Normalizing Completion Rates Example

- Let's say that we were going to compare the completion rate for the 1980-1985 entering cohort to that of the 1995-2000 entering cohort.
- We'd construct a table at the program level that included the completion rate for the earlier cohort, the completion rate for the later cohort, and the enrollment for the later cohort.
- We'd then calculate the overall weighted average by using the enrollment distribution for the later cohort for BOTH calculations.
- We would have restated the 1980-85 completion rate to represent the 1995-2000 enrollment distribution.

Normalizing Completion Rates Example

- Here's a simple example. University X has only two doctoral programs, Program A and Program B.
- In 1980, 20 students entered Program A and only 10% of them completed. 20 students entered Program B and 90% completed. The completion rate for University X was 50%.
- In the next 20 years, nothing changed at University X except size. The programs didn't do anything differently and didn't get any better or any worse.
- In 2000, 10 students entered Program A and only 10% of them completed. 40 students entered Program B and 90% completed. The completion rate for University X was 74%.
- If we don't normalize the completion rate, we will draw an erroneous conclusion. We would think that the University's completion rate had improved from 50% to 74% when in fact the completion rate hadn't improved in any of its programs.
- Normalizing would have us restate either the 1980 or the 2000 rate so that the weighting by program is the same in both calculations. In 1980, each program represented 50% of enrollment. In 2000, Program A represented 20% and Program B represented 80%. It doesn't matter which way we restate although convention often has us restate the older figure.
- For University X, the overall completion rate for the 2000 cohort was 74% and that is exactly the same as the completion rate for the 1980 cohort restated on the basis of 2000 weightings.

Normalizing Completion Rates Example

- Normalizing is a technique that could overcome one of the difficulties that arises when one tries to compare completion rates across institutions. Completion rates differ by discipline and disciplines are represented in differing amounts in different institutions.

- To create a good comparative figure across institutions, one would want to normalize the rates. The approach in a case such as this might rest on a larger sample to provide the weighting basis. Every institution's overall completion rate would be restated to represent the enrollment distributions in total.

- For instance, if engineering students represent 20% of the total student population across all universities, then each university's engineering completion rate would represent 20% of its normalized rate. The practical application of this is more difficult because you have to decide what to do for those institutions that don't have engineering programs.

  That last point is important for our work because we'll face the same issue for programs that weren't in existence in whatever completion rate data set we use for the earlier point in time.