

**Ph.D. COMPLETION AND ATTRITION  
AT  
DUKE UNIVERSITY FOR COHORTS  
ENTERING BEFORE AND AFTER  
INTERVENTIONS**

Lewis M. Siegel  
NSF-CGS Dean in Residence  
Vice Provost, Duke University

NSF-CGS Workshop  
Arlington, VA  
March 31, 2008

# Faculty consensus on Graduate School goals and policies in early 1990's:

- Duke departments and programs should admit Ph.D. students based on their potential for highest quality scholarship rather than primarily to meet service needs of departments or faculty.
- Duke should provide adequate funding and minimize service requirements so that Ph.D. students can have time to be students and ***complete the degree*** in a reasonable period of time.

## **SOME ISSUES:**

- Many students did not know what they were getting into
  - Independence required in graduate vs. undergraduate education
  - Shock of discovering reality of academic job market
  - Actual chances of completion and length of time to degree
- Faculty relied heavily of using quantitative measures to screen applicants
  - High GRE and GPA cut-off scores used
  - Many applications not read carefully or at all
  - Too often poor fit between student and faculty interests
- Funding allocations for Ph.D. students designed to achieve maximum service at lowest cost

# INTERVENTIONS TO IMPROVE Ph.D. COMPLETION RATE AT DUKE AFTER 1995: BETTER INFORMED SELECTION

- **Reduce emphasis on GRE scores and GPA's** – data show poor correlation with completion– Carefully read entire application for all applicants.
- Emphasize demonstrated research experience
- **Transparency:** Put Duke data on placement, time to degree, completion rates in each program – student should know what (s)he is getting into
- Interview students before admitting them –Exchange information to learn “fit” rather than just sell program

# INTERVENTIONS TO IMPROVE Ph.D. COMPLETION RATE AT DUKE AFTER 1995: STUDENT FUNDING

- Institute 5-6 year funding guarantee at competitive stipend levels in all A&S units
- *Departments given (3 Year) budgets based on graduate education parameters, not service needs*
- Substantial reduction in student teaching loads; more fellowship and RA years - required downsizing of Hum/Soc Sci programs
- Give students choice in years 1 and 2 – do not bring in students tied to a specific research grant
- Encourage increased external support after year 2 in sciences

# INTERVENTIONS TO IMPROVE Ph.D. COMPLETION RATE AT DUKE AFTER 1995: IMPROVED PROGRAMS

- Field-specific symposia to introduce *career options* to Ph.D. students
- Enhanced student services; strong investment in *subsidizing child care* for graduate students
- Improved training in teaching
- Faculty mentoring awards

# DUKE vs. CGS BEFORE INTERVENTIONS

- In all fields (except Engineering) Duke 10 year completion rates greater than national average.
- In all fields (except Biological Sciences) Duke 10 Yr. Attrition Rates Greater than national average.
- In all fields, very few students continuing after 10 years as compared to national average

## DUKE vs. CGS: Cohorts A at 10 Years

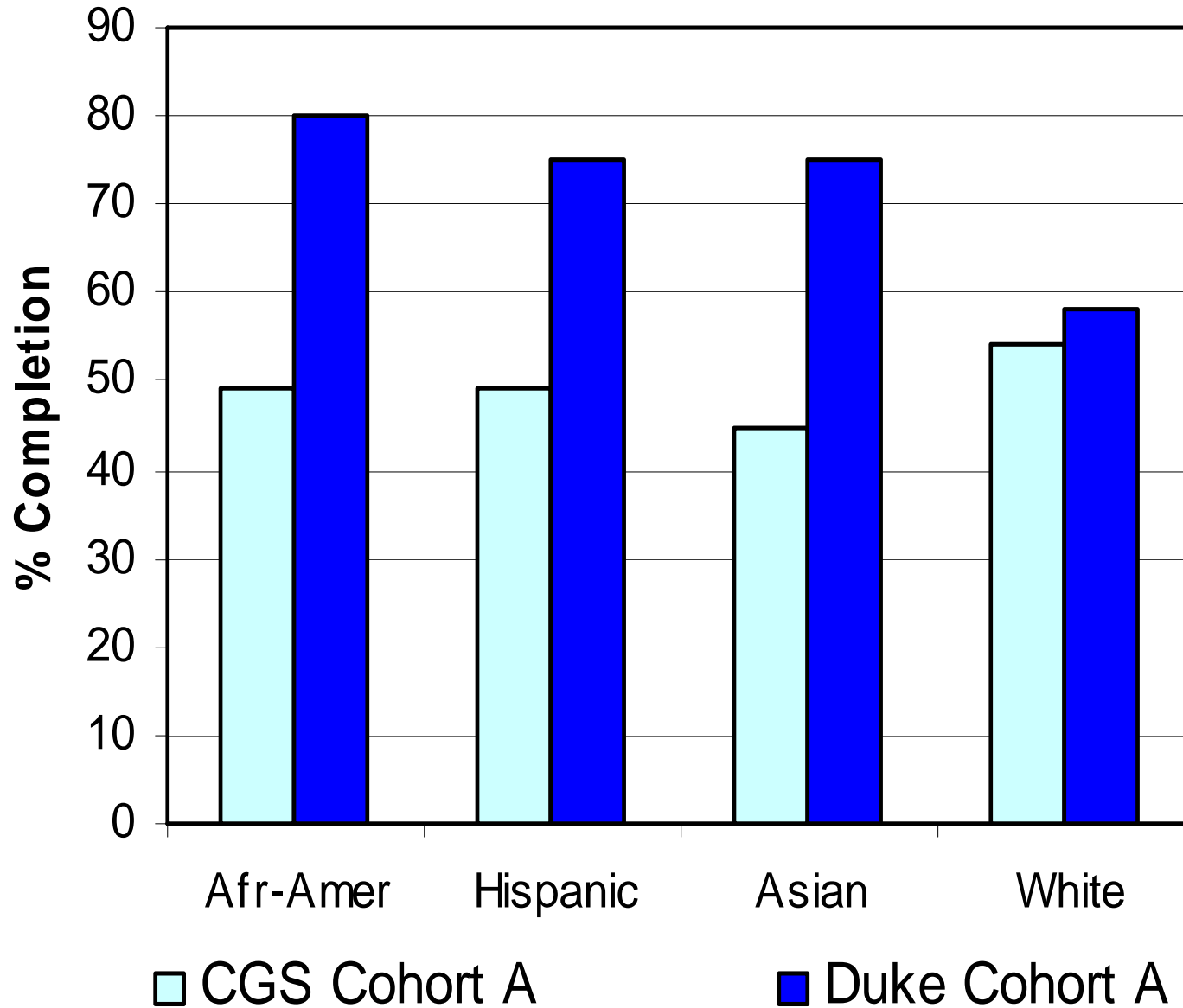
		% Completion		% Attrition		% Continuing	
		<u>Duke</u>	<u>CGS</u>	<u>Duke</u>	<u>CGS</u>	<u>Duke</u>	<u>CGS</u>
<b>Social Sciences</b>		61	56	37	27	2	17
<b>Humanities</b>		62	49	33	31	5	20
<b>Physical Sciences</b>		61	55	38	37	1	8
<b>Biological Sciences</b>		74	63	26	26	1	11
<b>Engineering</b>		62	64	38	27	0	9



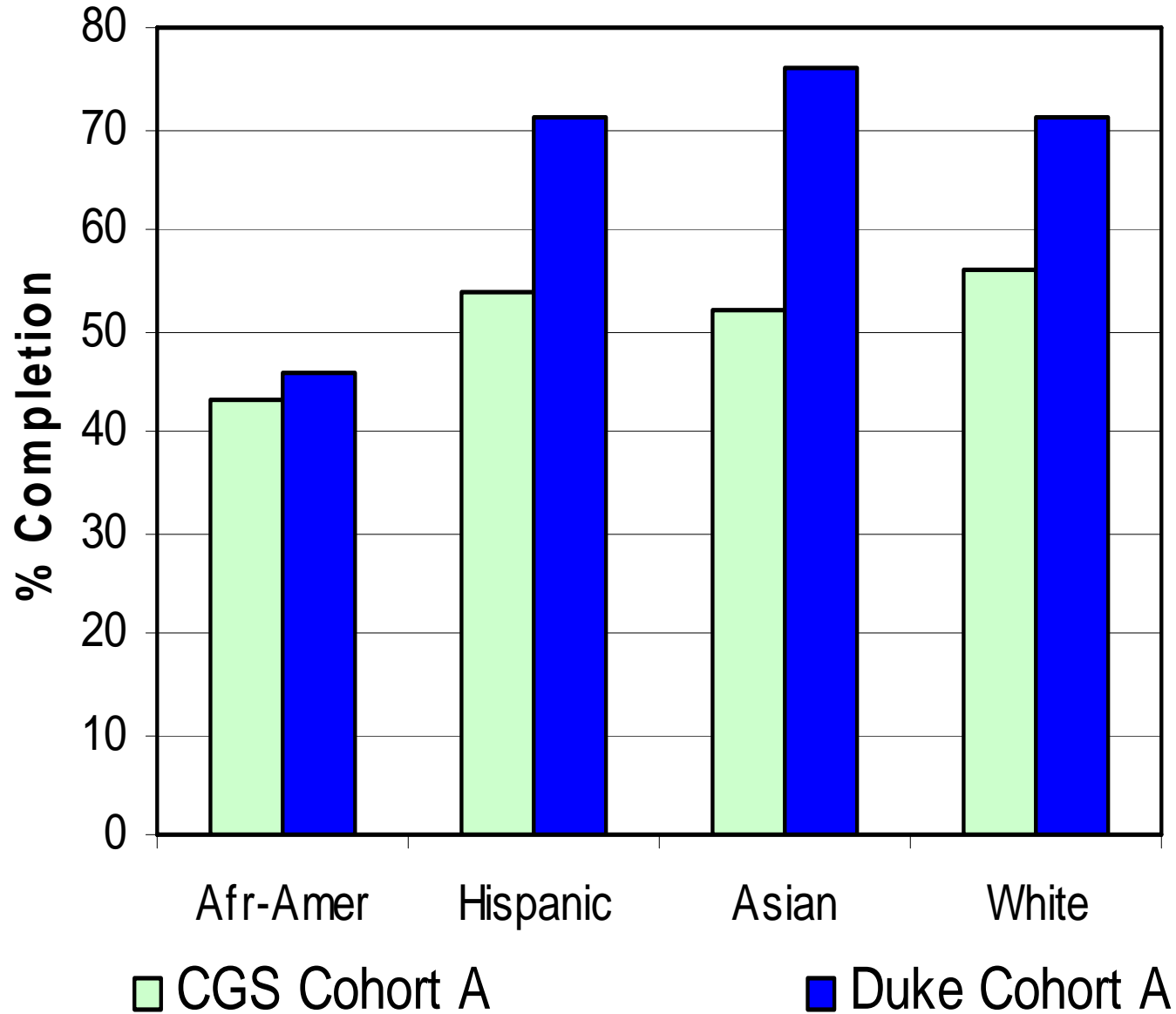
# DUKE vs. CGS BEFORE INTERVENTIONS

- Duke 10 year completion rates greater than the national average for Cohort A irrespective of ethnicity, gender, or citizenship status with the exception of female and *international* students in Engineering

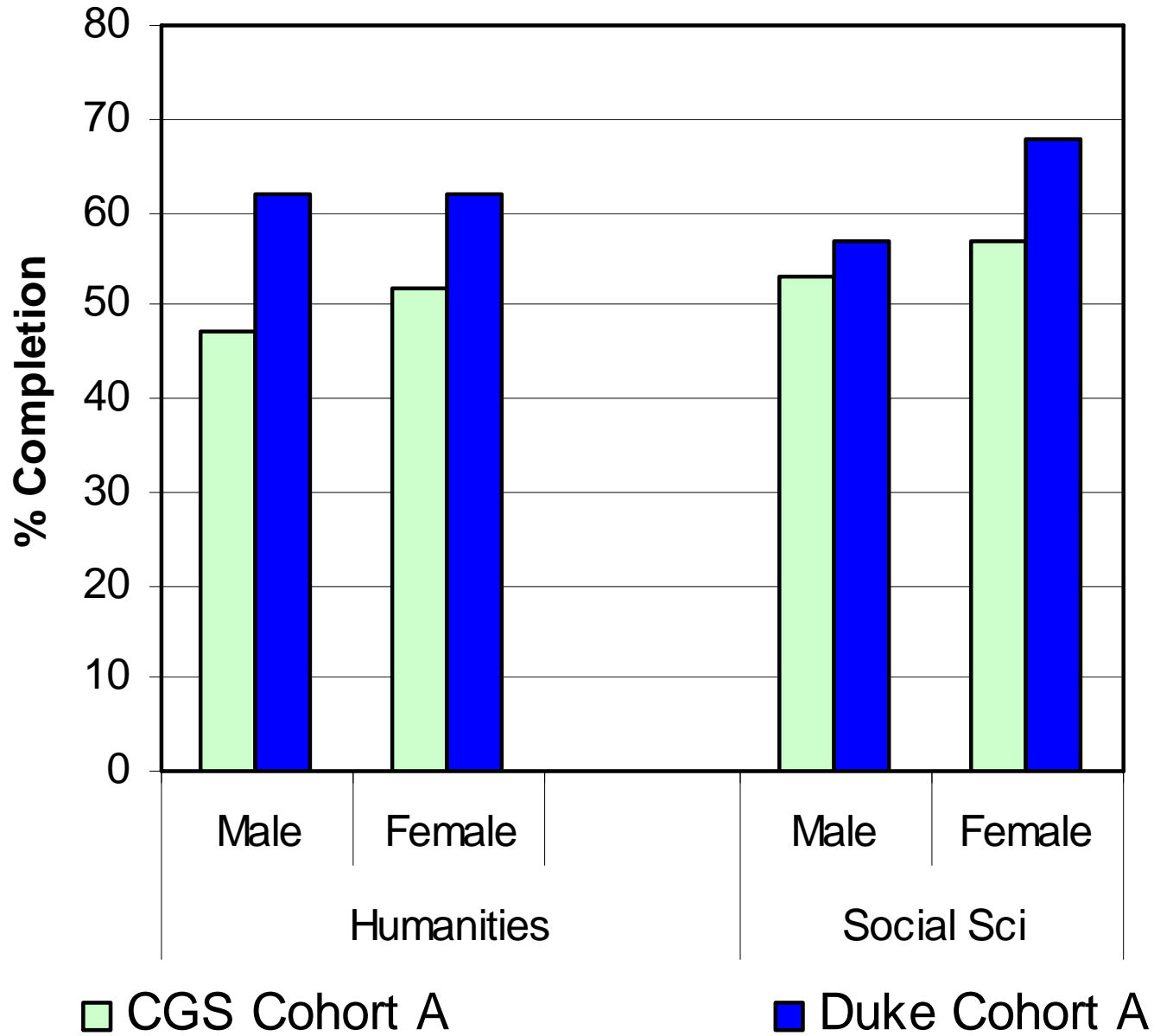
# SSH: COHORT A COMPLETION AT 10 YEARS BY ETHNICITY



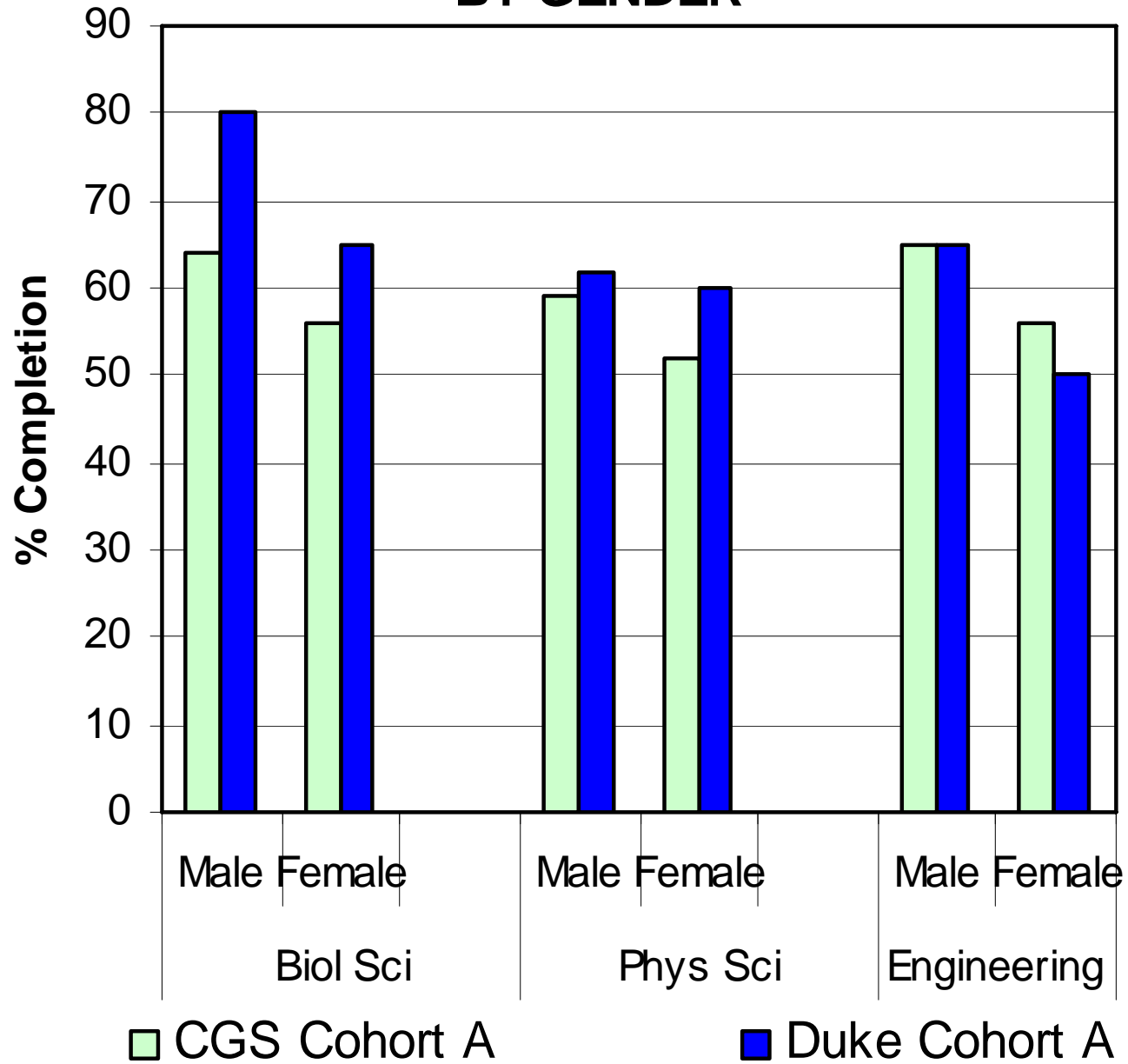
# SEM: COHORT A COMPLETION AT 10 YEARS BY ETHNICITY



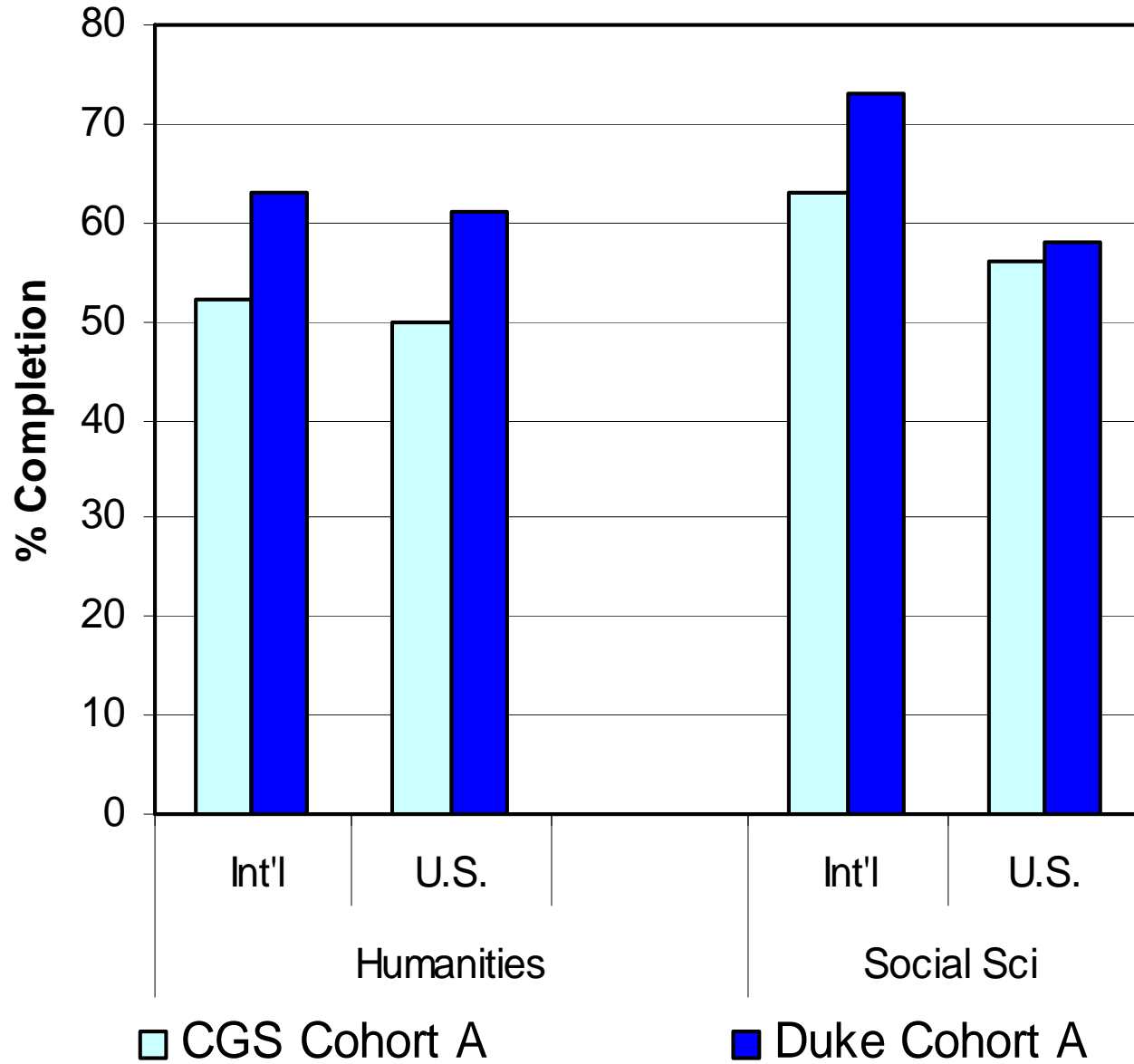
# SSH: COHORT A COMPLETION AT 10 YEARS BY GENDER



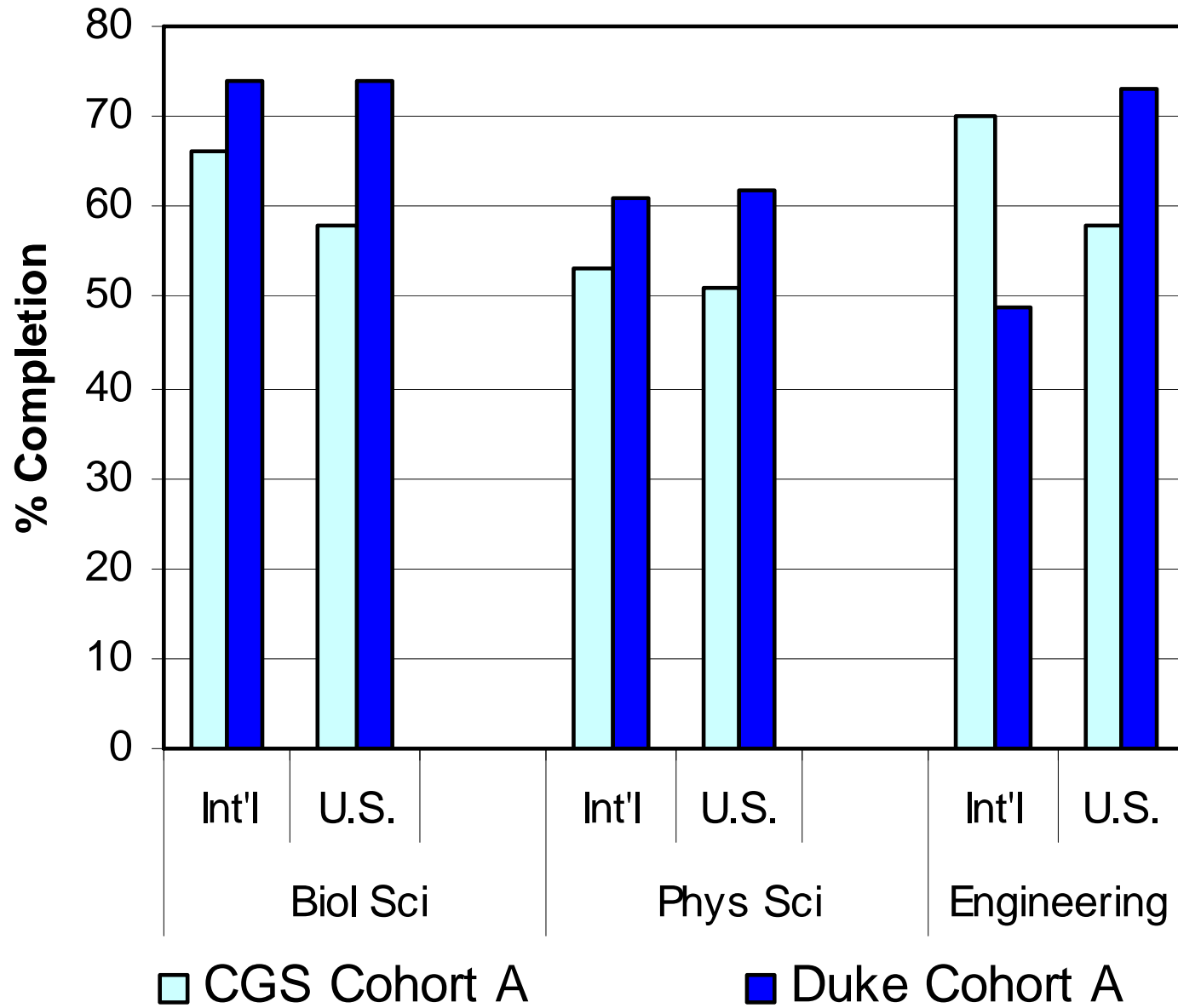
# SEM: COHORT A COMPLETION AT 10 YEARS BY GENDER



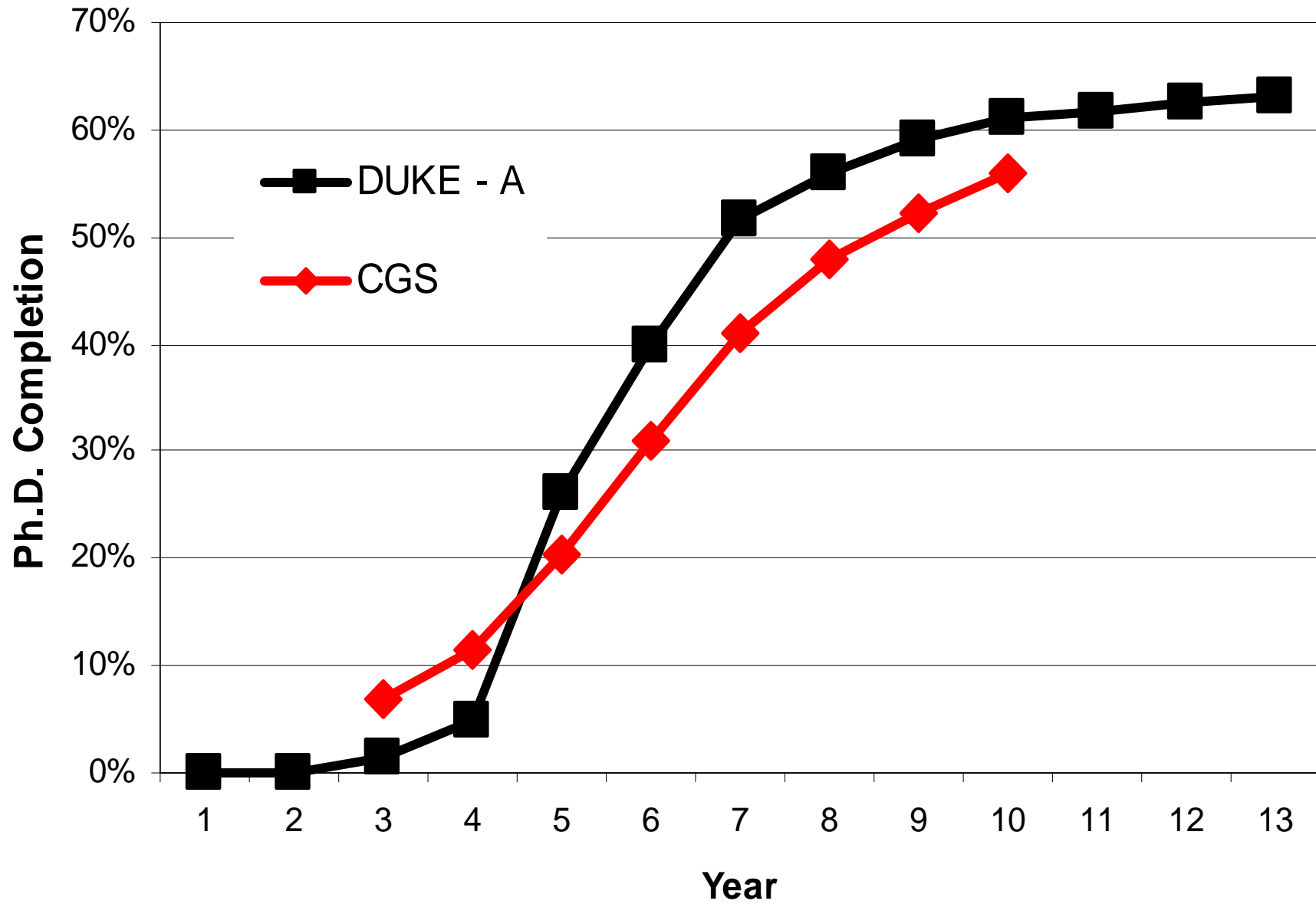
# SSH: COHORT A COMPLETION AT 10 YEARS BY CITIZENSHIP



# SEM: COHORT A COMPLETION AT 10 YEARS BY CITIZENSHIP

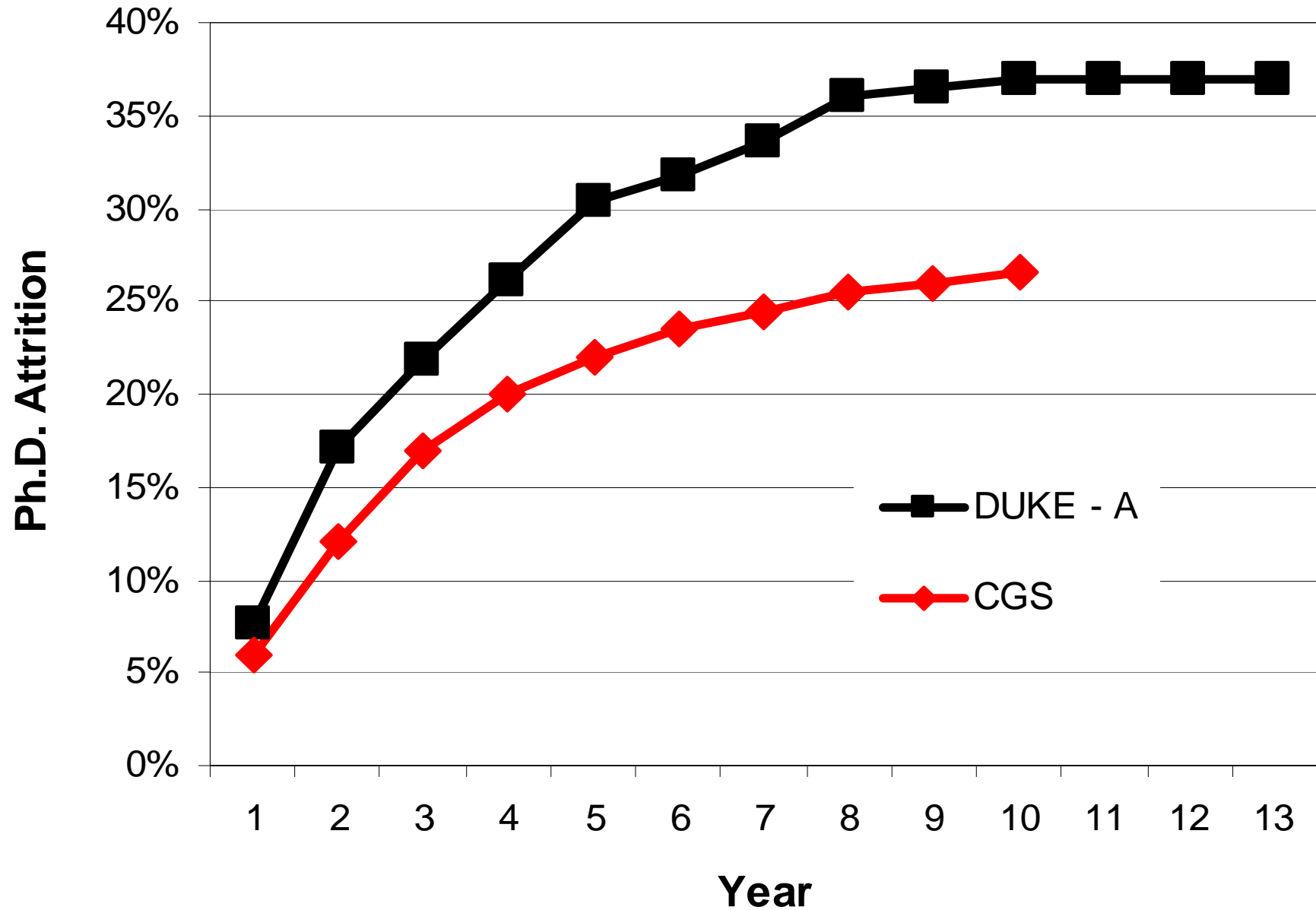


# SOCIAL SCIENCES: Ph.D. COMPLETION

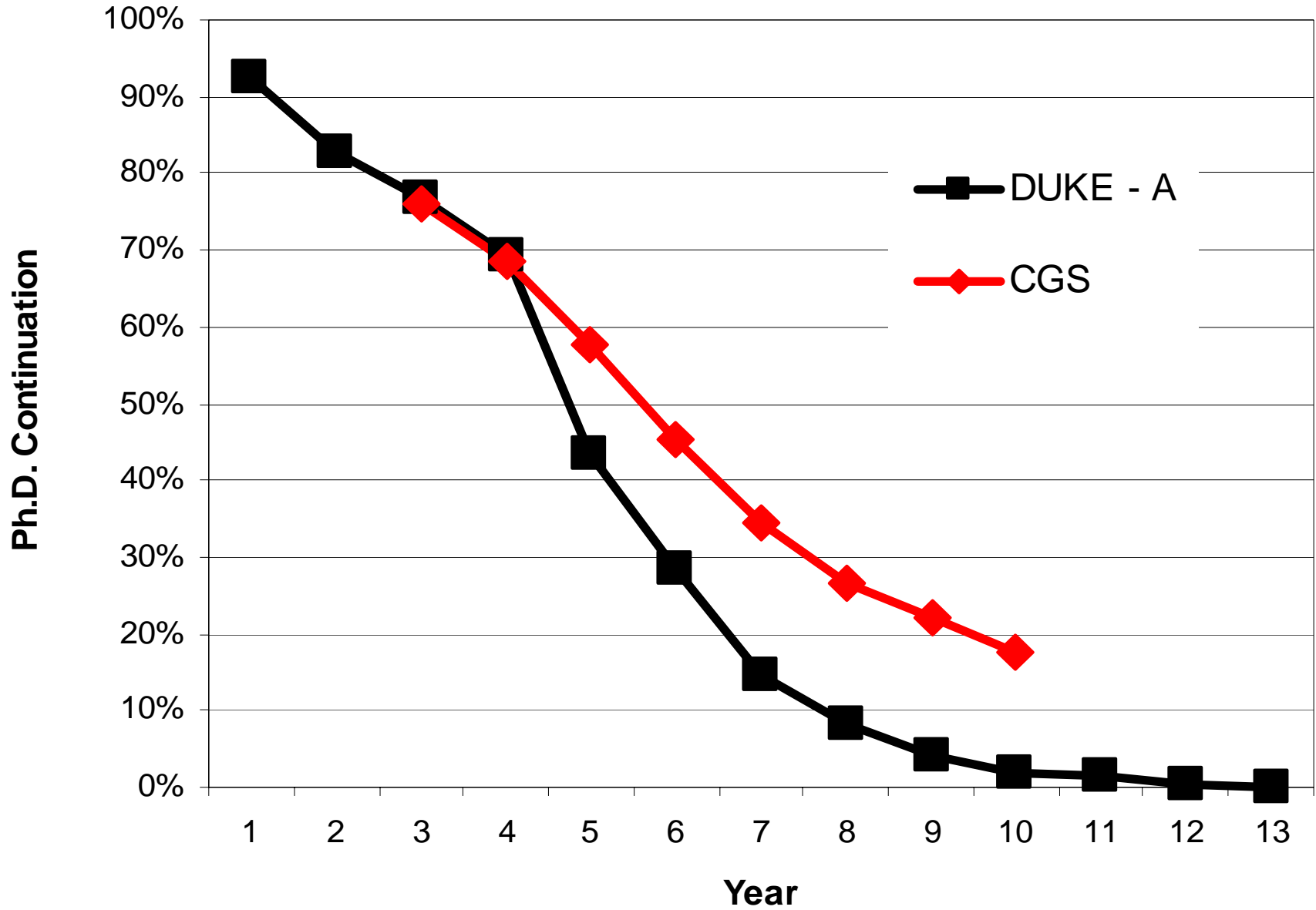




# SOCIAL SCIENCES: Ph.D. ATTRITION



# SOCIAL SCIENCES: Ph.D. CONTINUATION



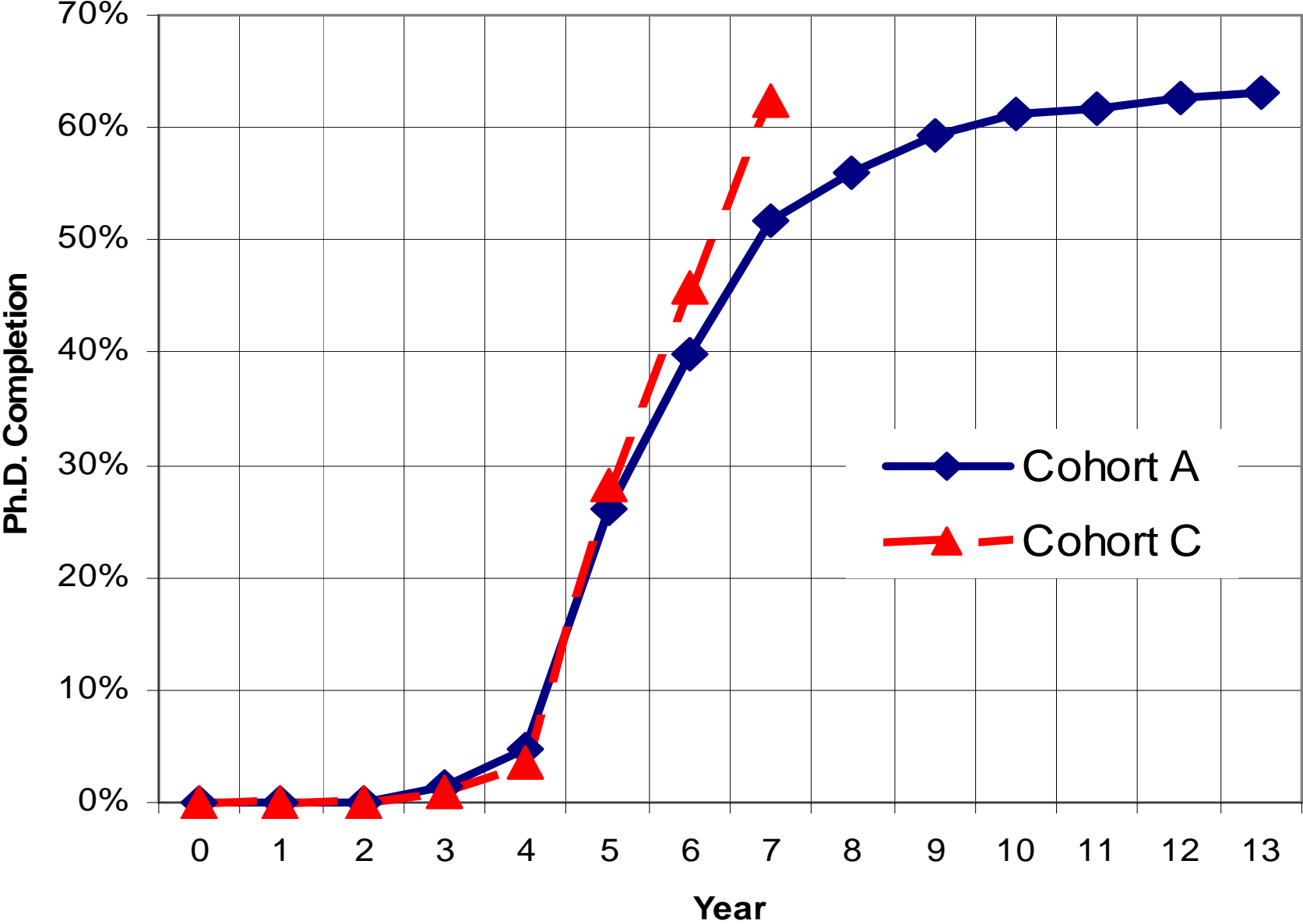
# **EFFECT OF INTERVENTIONS ON COMPLETION**

***Cohort A = Entering 1992-1994***

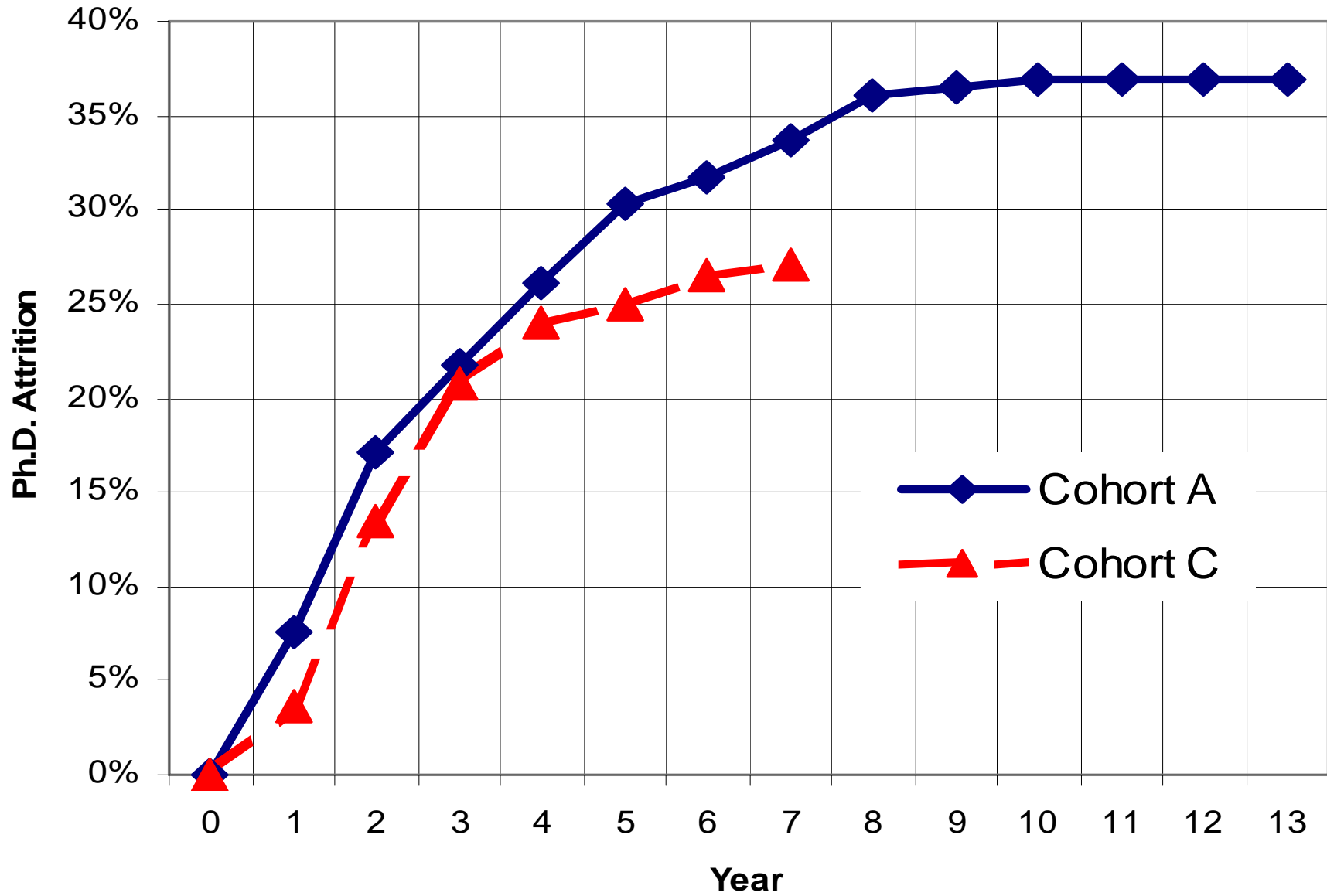
***VS.***

***Cohort C = Entering 1998-2000***

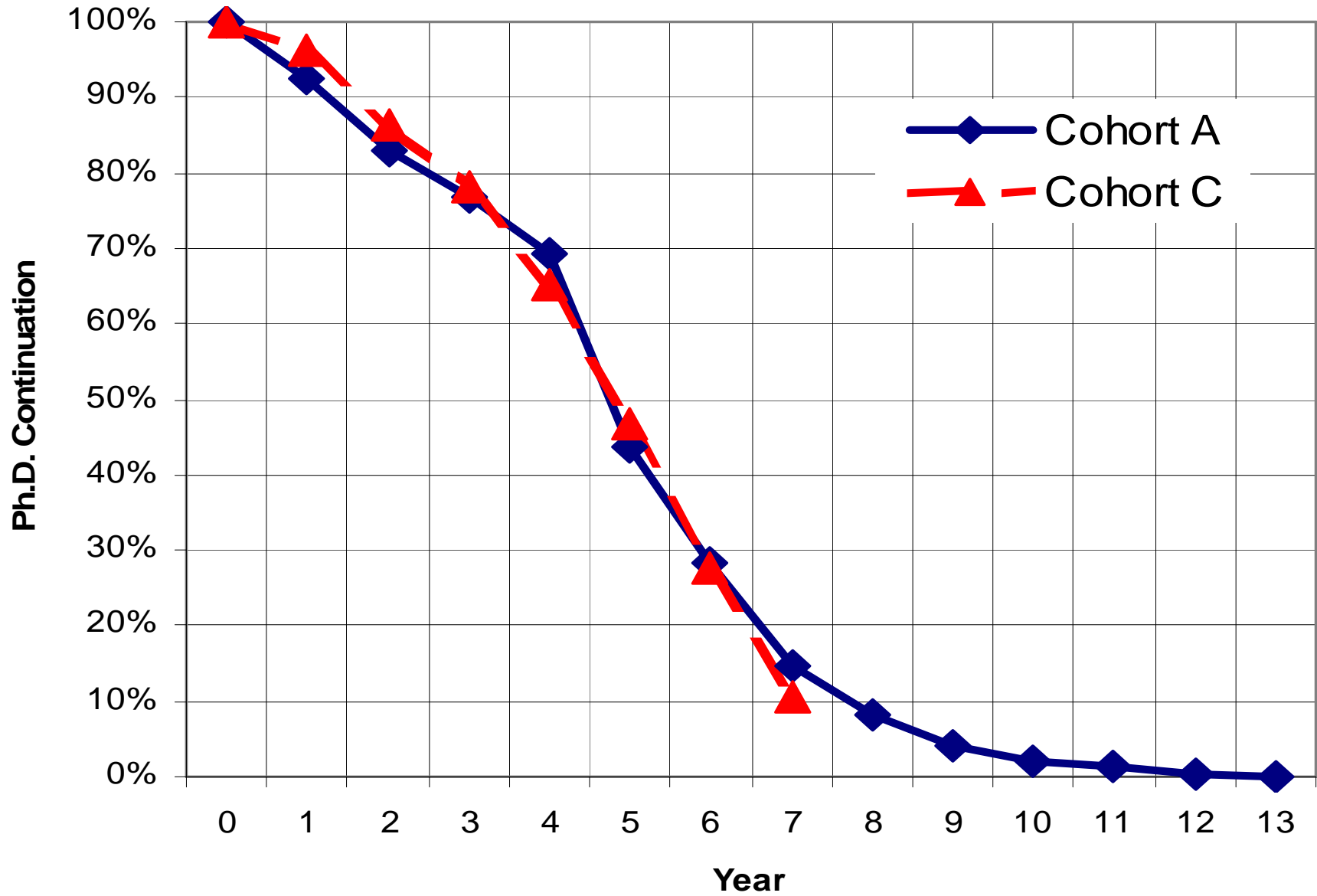
# SOCIAL SCIENCES: DUKE University Ph.D. Completion Rates for Cohorts A and C



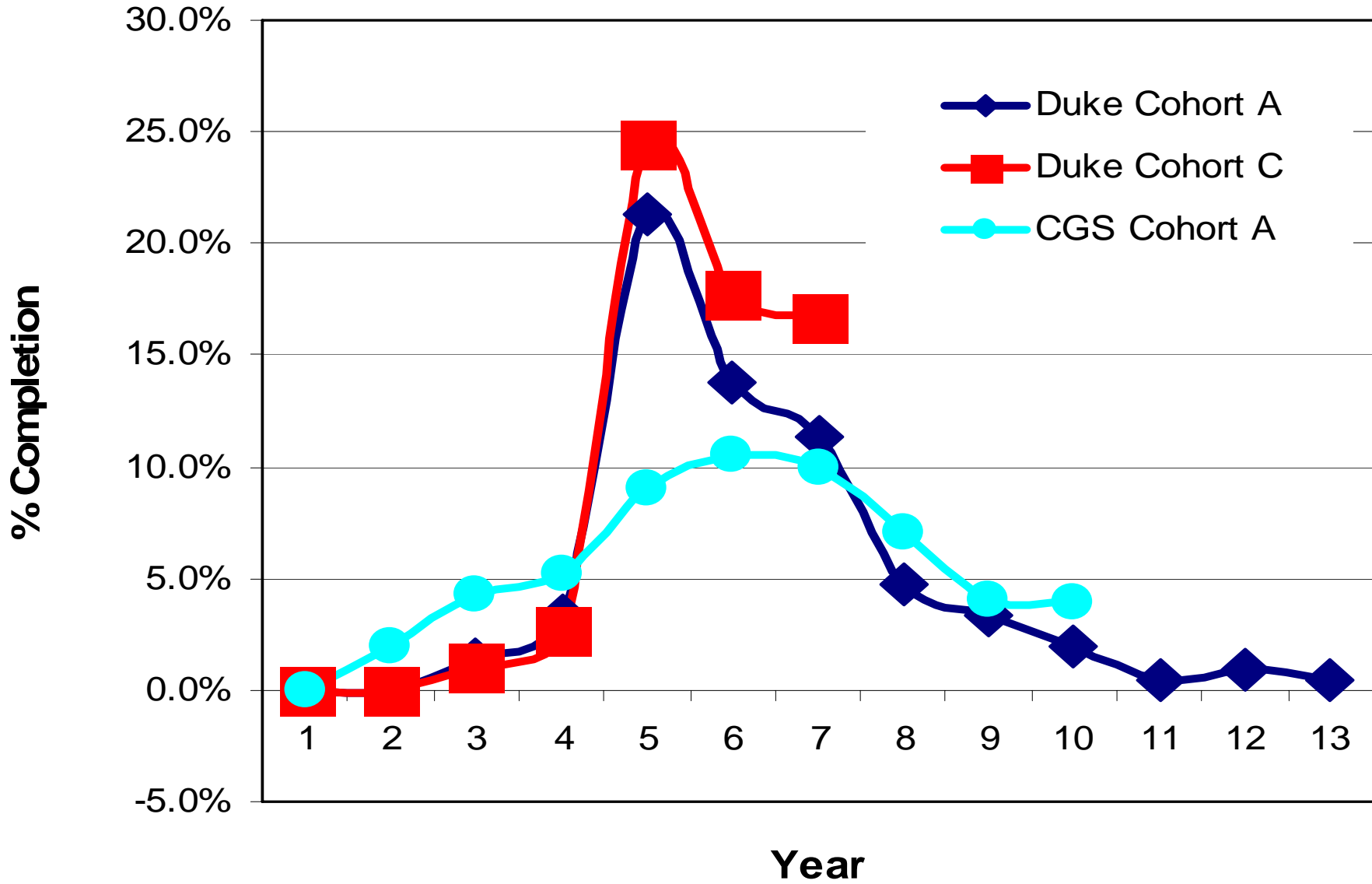
# SOCIAL SCIENCES: DUKE University Ph.D. Attrition Rates for Cohorts A and C



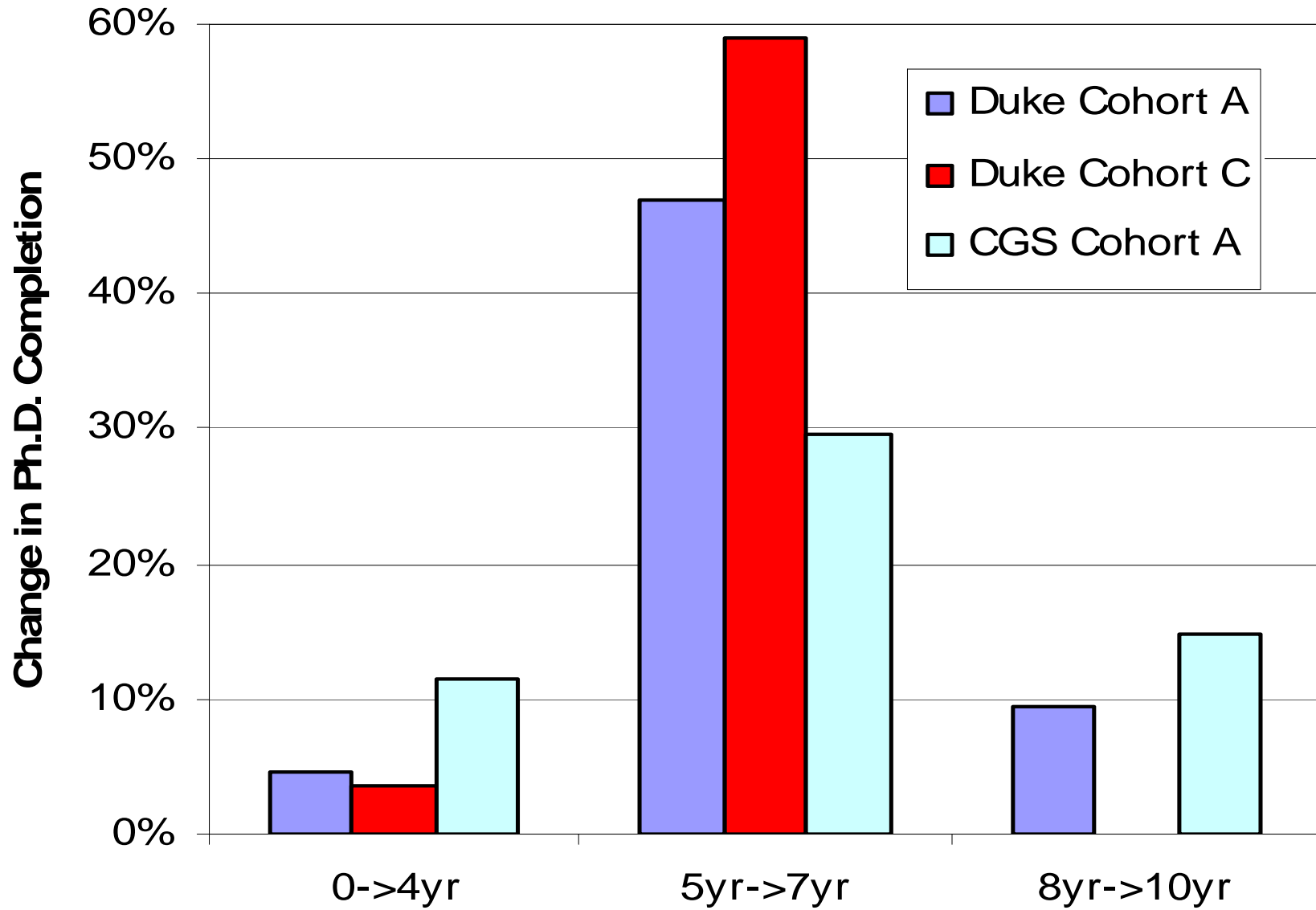
# SOCIAL SCIENCES: DUKE University Ph.D. Continuation Rates for Cohorts A and C



# Social Sciences: Annual Rate of Completion of Ph.D. Program

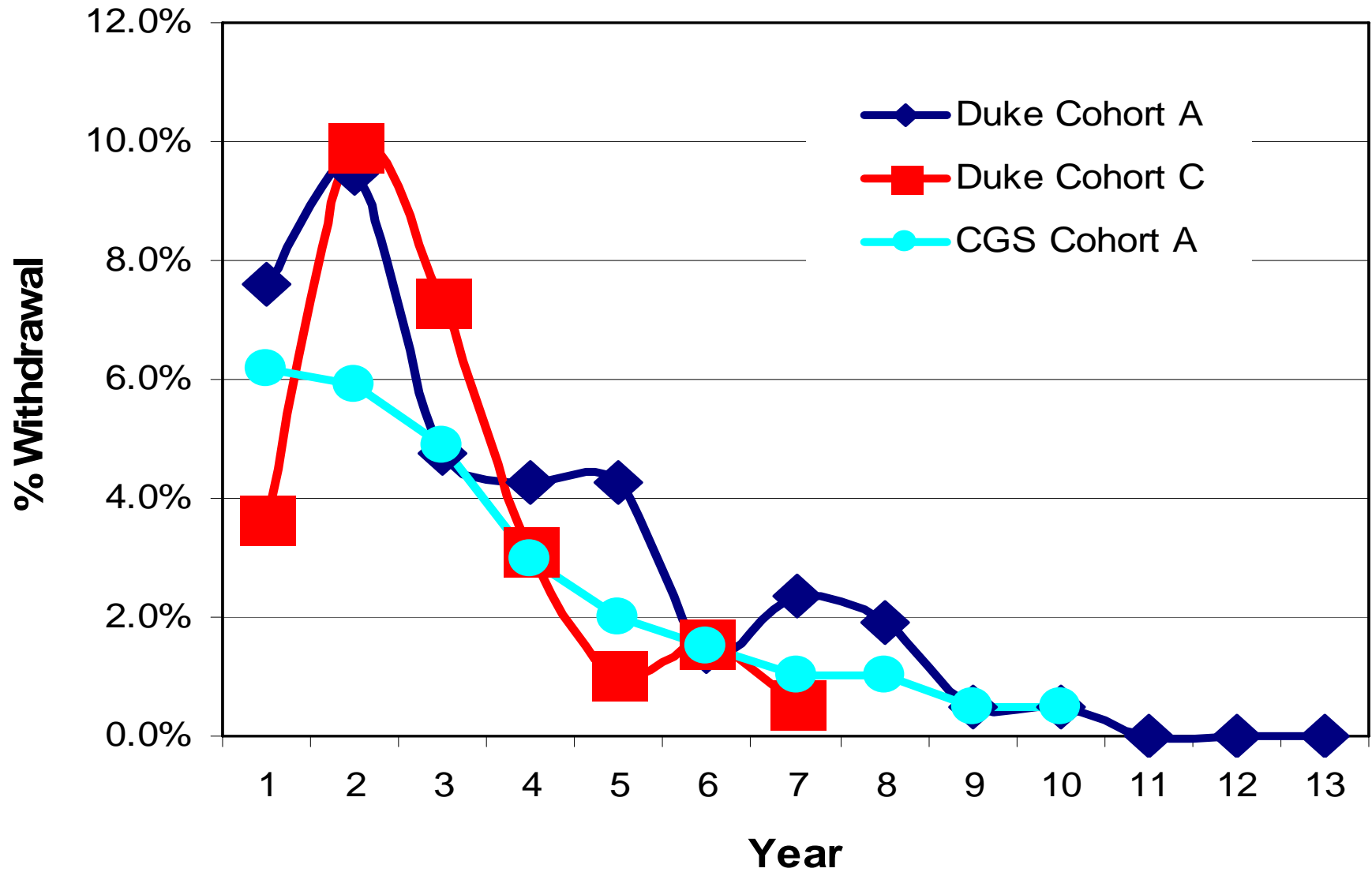


## SOCIAL SCIENCES Ph.D. COMPLETION: DUKE vs. CGS DATA

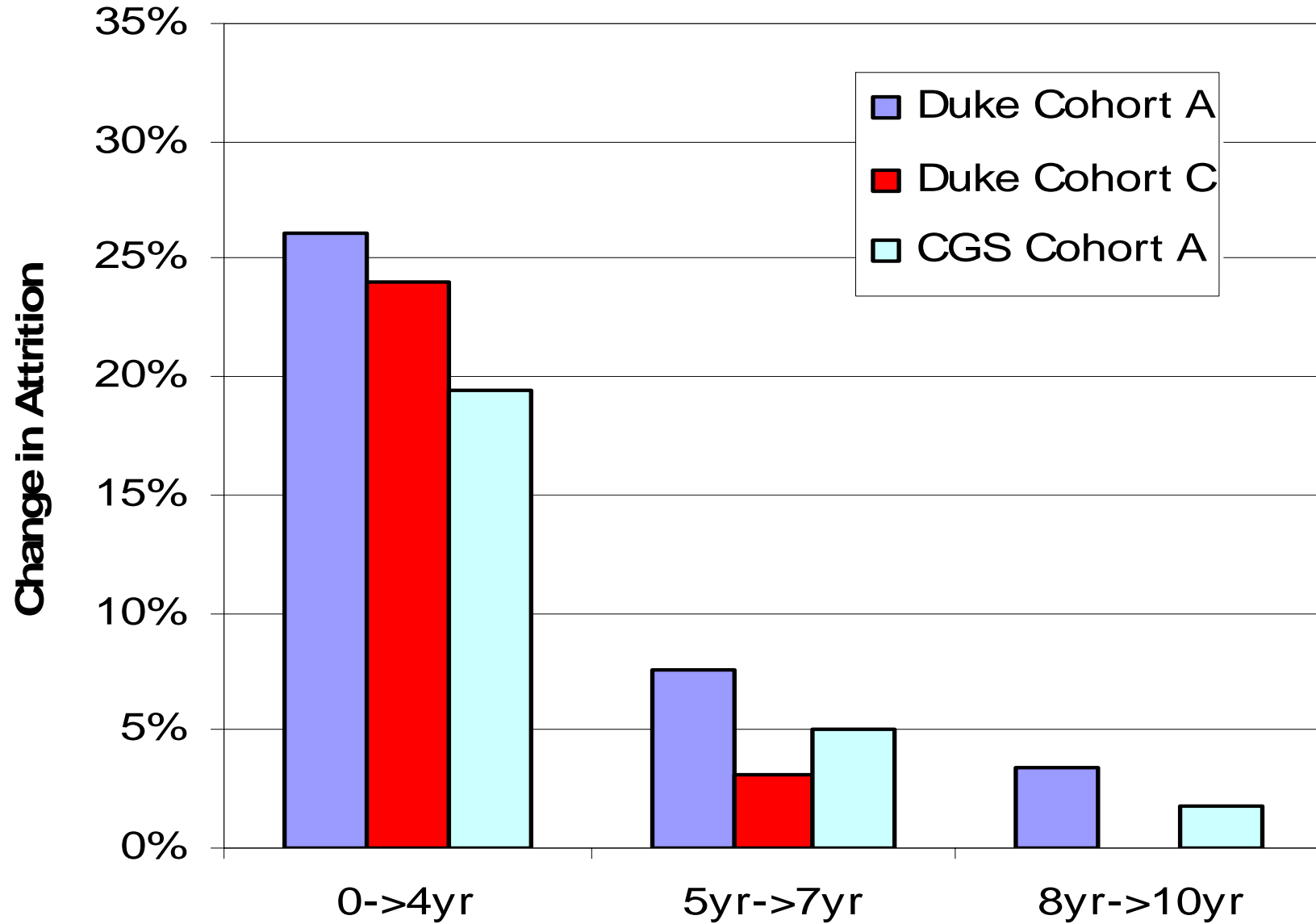




# Social Sciences: Annual Rate of Attrition from Ph.D. Program



## SOCIAL SCIENCES Ph.D. ATTRITION: DUKE vs. CGS DATA



## Increased 7 Yr. Completion, Reduced Attrition in Social Sciences

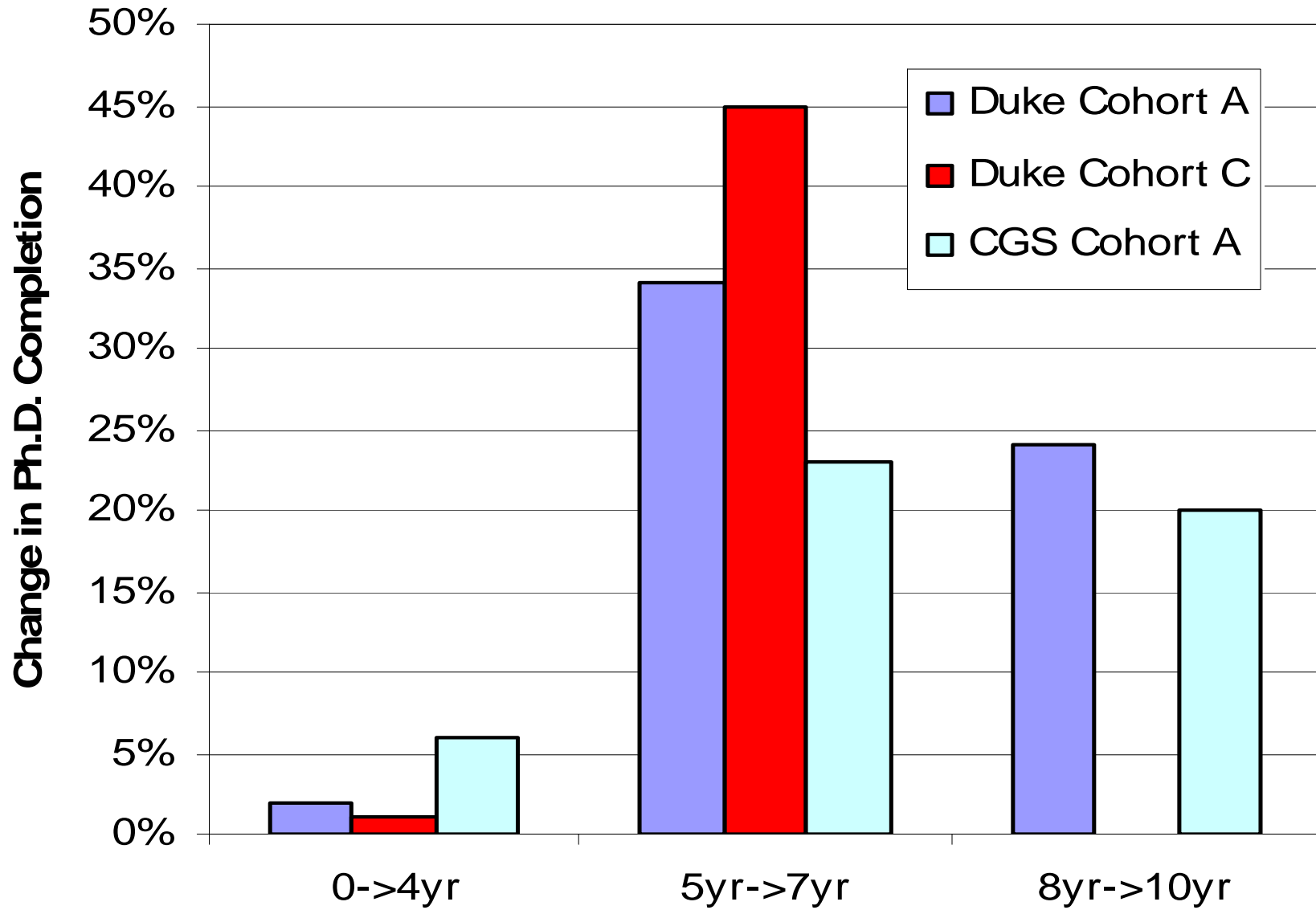
- - ECONOMICS, WHICH OPTS OUT OF MOST INTERVENTIONS, IS UNCHANGED

<u>Program</u>	1992-1994 Cohorts					1998-2000 Cohorts				
	<u>Matrics</u>	<u>%PhD</u>	<u>%Withdrew</u>	<u>%Cont</u>		<u>Matrics</u>	<u>%PhD</u>	<u>%Withdrew</u>	<u>%Cont</u>	
<b>Economics</b>	69	55%	41%	4%		55	56%	40%	4%	
Psychology	41	78%	15%	7%		31	74%	13%	13%	
Political Science	37	24%	32%	43%		41	56%	22%	22%	
Sociology	24	25%	50%	25%		25	52%	44%	4%	
Business	21	71%	29%	0%		26	88%	8%	4%	
Cult Anthropology	19	42%	42%	16%		14	43%	29%	29%	
<b>SOCIAL SCIENCES</b>	<b>211</b>	<b>51%</b>	<b>34%</b>	<b>15%</b>		<b>192</b>	<b>63%</b>	<b>27%</b>	<b>10%</b>	

# Increased 7 Yr. Completion, Reduced Attrition in Humanities

<u>Program</u>	<u>Matrics</u>	<b>1992-1994 Cohorts</b>			<b>1998-2000 Cohorts</b>			
		<u>%PhD</u>	<u>%Withdraw</u>	<u>%Cont</u>	<u>Matrics</u>	<u>%PhD</u>	<u>%Withdraw</u>	<u>%Cont</u>
History	55	24%	24%	53%	30	33%	37%	16%
Religion	44	43%	18%	39%	38	50%	11%	39%
English	40	37%	33%	30%	23	43%	22%	35%
Romance Studies	31	32%	39%	29%	24	21%	25%	54%
Literature	27	48%	11%	41%	24	46%	21%	33%
Music	17	35%	47%	18%	17	65%	18%	18%
Classics	15	40%	53%	7%	10	50%	50%	0%
Philosophy	12	50%	17%	33%	11	64%	27%	9%
Other Small	26	23%	38%	18%	13	31%	15%	54%
<b>HUMANITIES</b>	<b>267</b>	<b>35%</b>	<b>29%</b>	<b>36%</b>	<b>190</b>	<b>46%</b>	<b>23%</b>	<b>31%</b>

## HUMANITIES Ph.D. COMPLETION: DUKE vs. CGS DATA



# Relatively Little Change at 7 Yr. in many STEM Fields---

## Improvement in High TA Programs, but ENV, EOS, CEE Get Worse

<u>Program</u>	1992-1994 Cohorts					1998-2000 Cohorts				
	<u>Matrics</u>	<u>%PhD</u>	<u>%Withdrew</u>	<u>%Cont</u>		<u>Matrics</u>	<u>%PhD</u>	<u>%Withdrew</u>	<u>%Cont</u>	
<b>Biomedical Science</b>	177	67%	21%	18%		176	66%	23%	17%	
<b>A&amp;S Biology</b>	74	53%	36%	12%		58	71%	22%	7%	
<i>Environment</i>	32	75%	19%	6%		34	50%	38%	12%	
<b>BIOLOGICAL SCIEN</b>	<b>273</b>	<b>64%</b>	<b>25%</b>	<b>11%</b>		<b>278</b>	<b>63%</b>	<b>27%</b>	<b>10%</b>	
<b>Chemistry</b>	51	65%	31%	4%		63	75%	22%	3%	
<b>Physics</b>	41	62%	35%	3%		40	58%	35%	7%	
Computer Science	37	51%	43%	5%		48	48%	46%	6%	
Math	22	45%	50%	5%		30	60%	27%	13%	
Statistics	18	78%	22%	0%		19	79%	21%	0%	
<i>Earth &amp; Ocean Sci</i>	15	53%	47%	0%		11	45%	55%	0%	
<b>PHYSICAL SCIENCE</b>	<b>184</b>	<b>60%</b>	<b>36%</b>	<b>4%</b>		<b>211</b>	<b>62%</b>	<b>32%</b>	<b>6%</b>	
Biomedical Engineerin	41	75%	15%	10%		47	80%	13%	6%	
<i>Mechanical Engineeri</i>	47	62%	36%	2%		34	65%	15%	21%	
<i>Electrical &amp; Compute</i>	38	53%	42%	5%		68	50%	44%	6%	
<i>Civil &amp; Environmental</i>	34	35%	62%	3%		26	30%	65%	4%	
<b>ENGINEERING</b>	<b>160</b>	<b>58%</b>	<b>37%</b>	<b>5%</b>		<b>175</b>	<b>58%</b>	<b>33%</b>	<b>9%</b>	

# Effects on Ethnicity, Gender, and Citizenship Completion by Broad Field

- In SSH fields, completion rates for all groups increased in Duke Cohort C vs. A.
- In SEM fields, previous low rates for females and international students in Engineering increased significantly, but effects on other groups were modest.
- ***Completion rates for females increased significantly*** in all fields except Physical Sciences. (*Effect of child care subsidy???*)

# Final observations:

- National data provides important benchmarks for individual programs.
- Improvements in selection and funding of Ph.D. students and introduction of targeted support systems (e.g., child care) are correlated with significantly improved Ph.D. completion rates
- BUT: Many things changed in addition to selection and funding---which changes really affect Ph.D. completion? = ***CGS Ph.D. Completion Project***