

***A Multivariate Study of Graduate Student
Satisfaction and Other Outcomes Within
Cooperative Research Centers***

Thesis Research

by

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Problem Statement

- Graduate students who participate in CRCs are perceived as having educational advantages
 - Advantages: experiential education
 - » Teamwork, multidisciplinary experiences, contact with industry
 - Center experiences and advantages to graduate students are for the most part speculative assumptions
 - More research needs to be conducted to better understand:
 - » How experiences in a center impact student's satisfaction



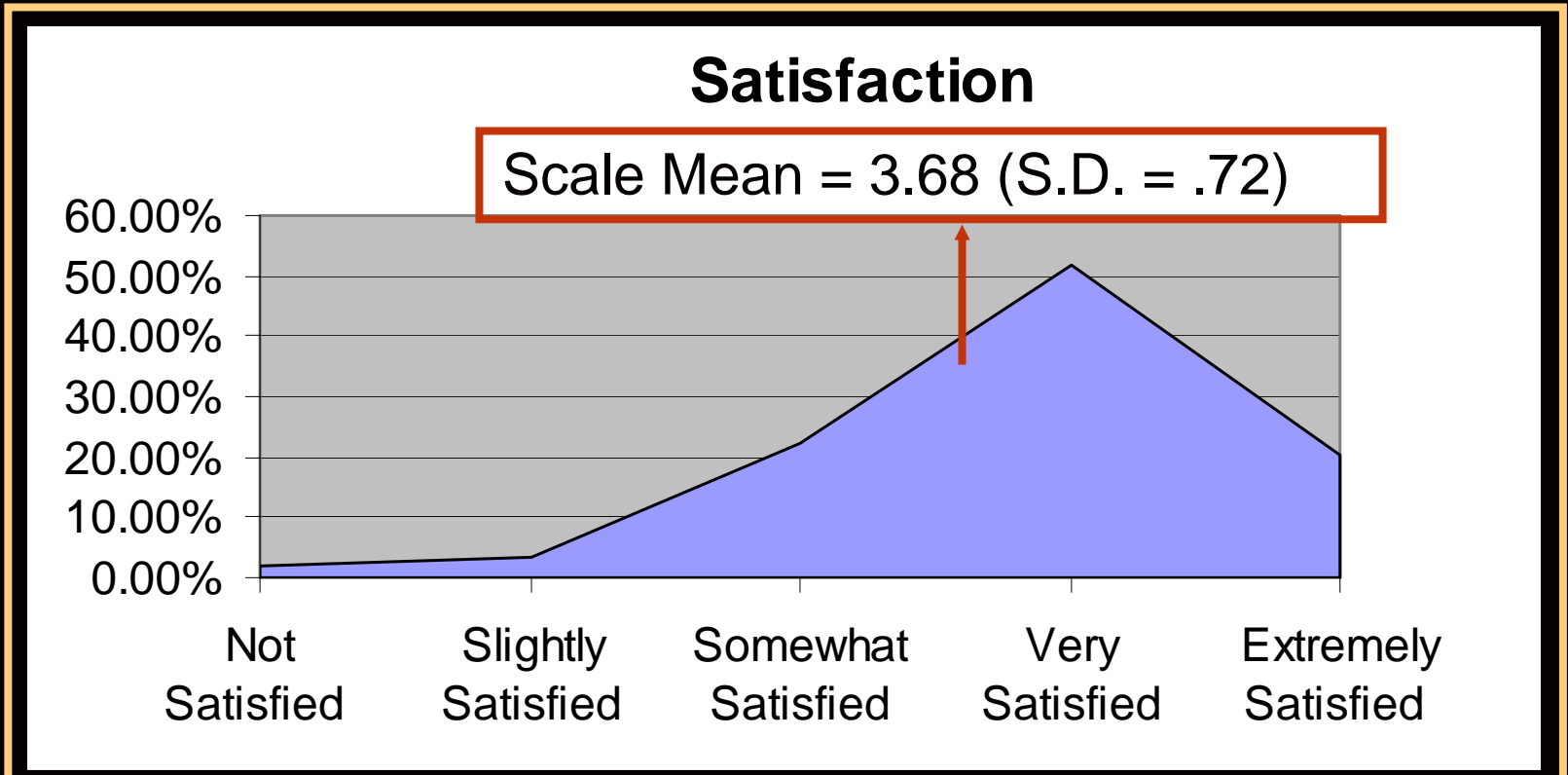
Past Research

- CRCs have a positive impact on student's training (e.g. Scott, C., Schadd, D. & Brock, D. (1991))
 - Center alumni were rated superior in job performance, being more prepared, and needing less training when hypothetically compared to their organizations' peers by themselves and their supervisors (Ailes, Roessner, & Feller, 1997; Parker, 1997; Fitzsimmons, Grad, & Lal, 1996; Scott, Schaad, & Brock, 1991)



Assumptions

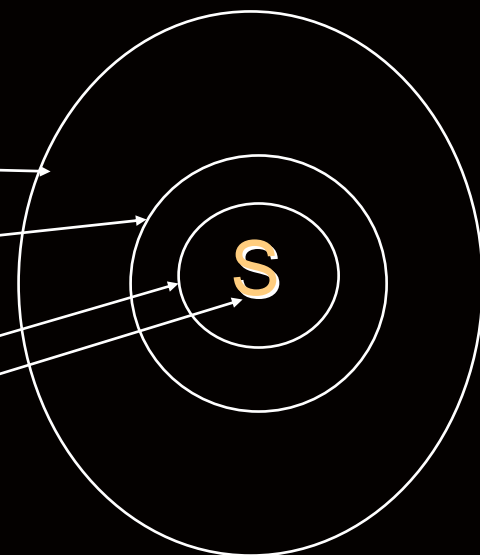
- The training experience provided by individual centers varies
- Those differences have the potential to affect student outcomes



Key Question

To what extent are these differences attributable to:

- Center-level factors
- Research group-level factors
- Advisor/Committee-level factors
- Individual differences



Purpose of Research

- Purpose of Research
 - To explore benefits, experiences, and satisfaction of current graduate students in cooperative research centers
 - To identify key center mechanisms needed to achieve those educational benefits



Primary Research Question

- After controlling for significant demographic, student, and center characteristics, to what extent are center experiences and interactions significantly related to graduate students' ...
 - satisfaction with their center experiences?
 - perceived benefits (such as Advanced Technical & Problem Solving Skills and Soft Skills)?
 - organizational commitment?

Methodology

- Design
 - Predictive study: Multivariate regression
 - Web-based questionnaire
- Response Rate
 - Number of Centers: 34 (89%)
 - 528 sent out
 - 190 total (37% response rate)
- Analysis
 - Descriptive statistics
 - Exploratory factor analyses
 - Multivariate regressions (OLS, Logistic)

Individual Center Mechanisms to Outcomes

Predictors

Individual Characteristics
 •Gender, Age, Ethnicity, Citizenship
Student Characteristics
 •Funding, Department, Degree sought, GPA, Years at University, Terminal Degree, Job experience

Center Mechanisms
 •Multidisciplinary Center Experiences
 •Experiential Center Experiences
 •Formal Center Training Activities
 •Technical Project Involvement
 •Thesis/Dissertation Committee

Interactions: Industry, Center Director, Advisor, Students, etc.

Individual Center

Process/Outcomes

Satisfaction

Perceived Benefits
 –Advanced Technical and Problem Solving Skills
 –Soft Skills

Organizational Commitment

Scholarly Achievement

Competitive Advantage

Career Goals

Formal Center Training Mechanisms

Item	Percentage of centers who offer activity (n = 34)	Mean level of involvement (Range 1-5) (n = 190)	Mean level of involvement if center has mechanism
Regular meetings with your project team	85.3	3.42	3.60 (n = 177)
Regular meetings with your entire center team	79.4	2.54	2.78 (n = 165)
Periodic center industrial advisory board (IAB) meetings	79.4	2.43	3.05 (n = 133)
Scientific/technical seminar series featuring outside speakers (e.g., professors, industry participants)	79.4	2.14	2.32 (n = 164)
Scientific/technical seminar series featuring student speakers (e.g., brown bag, student presentations)	64.7	2.25	2.88 (n = 126)
New academic courses sponsored or developed by the center or center faculty	26.5	1.38	2.30 (n = 56)
Co-op or Internship placements	29.4	1.3	1.84 (n = 68)
Workshops on "soft skills" or non-technical topics (e.g., teamwork, communication, career development, leadership)	14.7	1.23	2.63 (n = 27)
Mentoring (formal mentor assignments)	5.9	1.22	2.56 (n = 27)
Educational interventions targeted at youth (K-12) and sponsored by the center	5.9	1.18	2.30 (n = 27)

Testing the Level of Effects

- Intra-class correlation was used to test whether variance in various predictors was explained by center affiliation (e.g., were students within centers more alike than students across centers)
- This was not demonstrated
 - » Center-level groupings did not explain variance in key IVs
 - » Thus, cannot test for center-level effects
- All results represent individual-level prediction

Regressions: Satisfaction

	R Square = .44	
Satisfaction	B	Sig.
Gender (0 = Female, 1 = Male)	-0.15	0.01
Interactions: Advisor	0.20	0.00
Interactions: Industry Members	0.16	0.01
Technical Project Involvement	0.12	0.03
Multidisciplinary Center Experiences	0.22	0.01
Experiential Center Experiences	0.27	0.00

Regressions: Organizational Commitment

	R Square = .40	
Organizational Commitment	B	Sig.
Ethnicity: Caucaisan vs. Asian/Asian American	0.24	0.00
Interactions: Center Director	0.13	0.05
Multidisciplinary Center Experiences	0.19	0.01
Number of Departments on Thesis/Dissertation Committee: No Commmittee vs. One Department	0.19	0.01
Number of Departments on Thesis/Dissertation Committee: One Department vs. Two or More Departments	0.25	0.00
Experiential Center Experiences	0.35	0.00

Regressions: Perceived Soft Skills

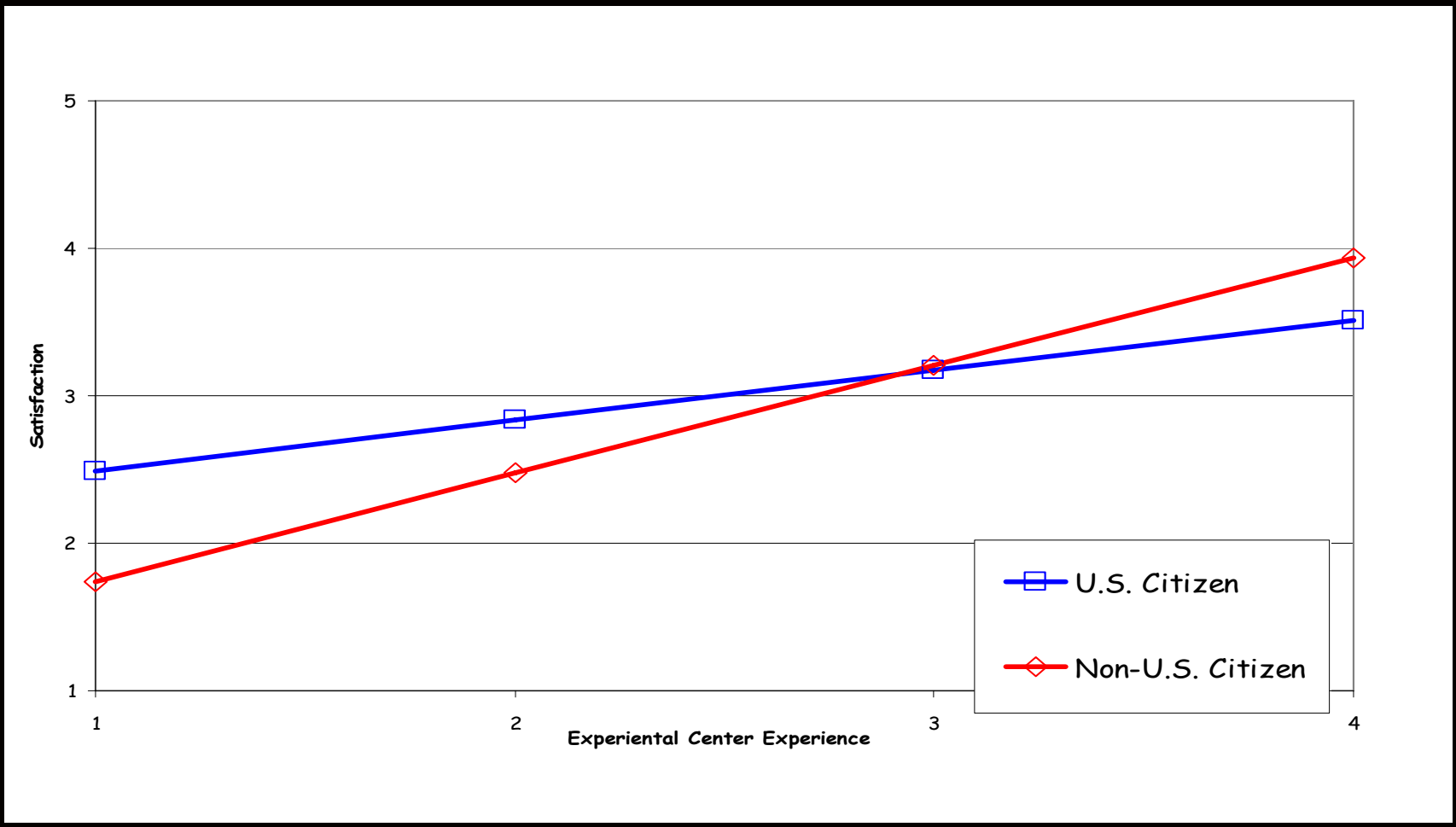


	R Square= .26	
Perceived Soft Skills	<i>B</i>	Sig.
Citizenship (0 = Non-U.S., 1 = U.S.)	0.17	0.01
Years at University	0.23	0.01
Interactions: Thesis/Dissertation Committee	0.12	0.07
Interactions: Industry Members	0.15	0.03
Technical Project Involvement	0.28	0.00

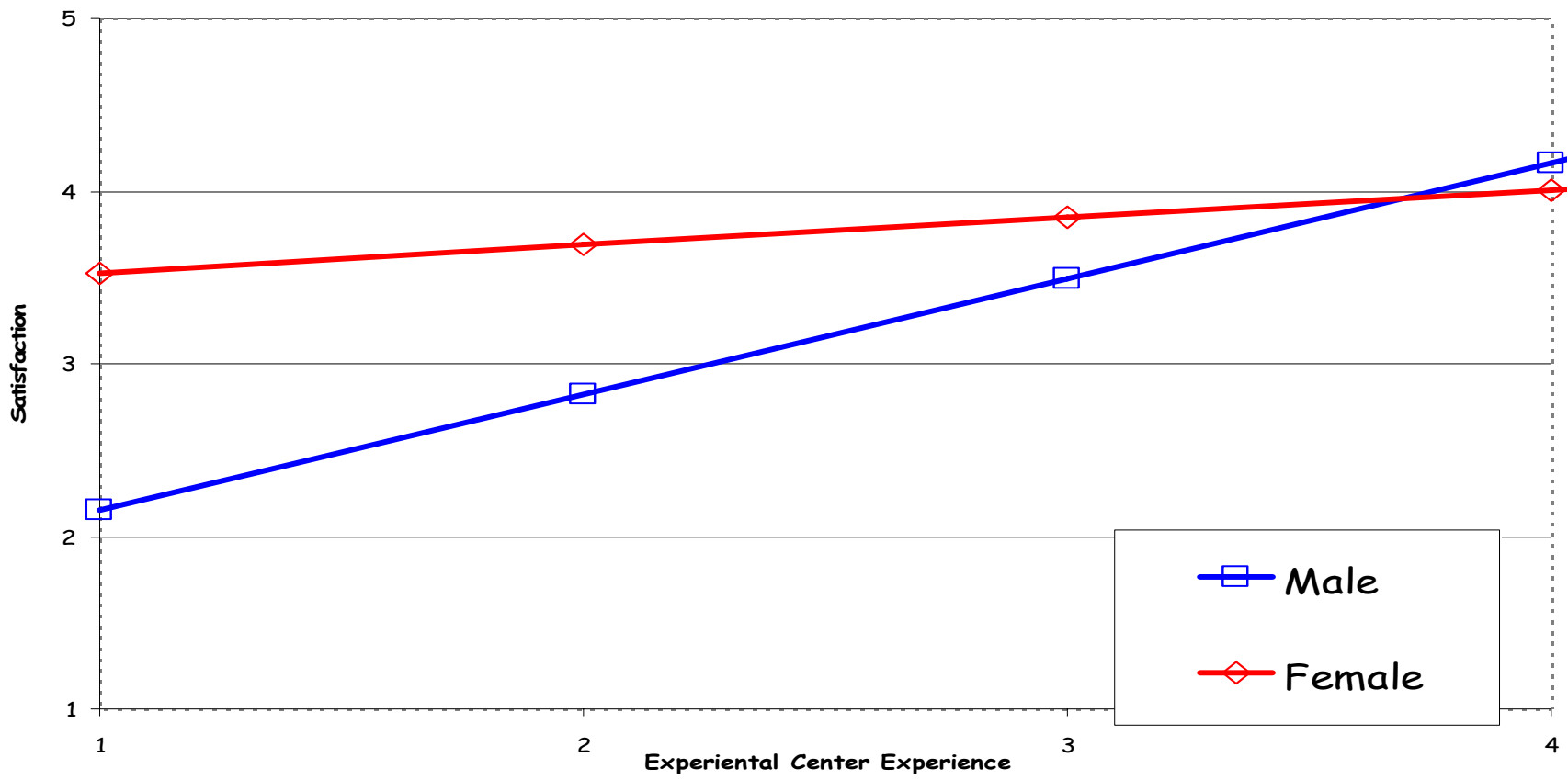
Regressions: Perceived Advanced Technical and Problem Solving Skills

	R Square = .36	
Perceived Advanced Technical and Problem Solving Skills	B	Sig.
Years at University	0.17	0.06
Interactions: Thesis/Dissertation Committee	0.13	0.05
Number of Departments on Thesis/Dissertation Committee: One Department vs. Two or More Departments	0.16	0.08
Number of Departments on Thesis/Dissertation Committee: No Committee yet vs. One Department	0.22	0.01
Technical Project Involvement	0.23	0.00
Multidisciplinary Center Experiences	0.27	0.00

Relationship of Satisfaction and Experiential Center Experiences for Citizenship



Relationship of Satisfaction and Experiential Center Experiences for Gender



Conclusions

- Consistent and Powerful Outcome Predictors
 - Experiential Center Experiences
 - » Satisfaction, Organizational Commitment
 - Multidisciplinary Center Experiences
 - » Satisfaction, Perceived Advanced Technical and Problem Solving Skills, Organizational Commitment
 - Technical Project Involvement
 - » Satisfaction, Perceived Advanced Technical and Problem Solving Skills, Perceived Soft Skills
- Intriguing Predictors
 - Interactions with Industry, Center Director, Advisor, Committee
- Effects may depend on type on individual characteristics
- Student experiences predict outcomes but center groupings do not
 - Effects may lie at research group and/or advisor level

Practical Implications

- Center should build on traditional educational practices
 - Interactions with advisor and committee
- Center's educational standards should have:
 - Increased opportunities to interact with industry members
 - Increased collaboration with multiple disciplines
 - Experiential/hands on opportunities
 - Exposure to more of the project's technical aspects
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