

Modeling Student Academic Success: Does Usage of Campus Recreation Facilities Make a Difference?

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Presented at The National Symposium on Student Retention, Milwaukee September 24-26, 2007



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Project Background

- Growth of campus recreation
- Boom in Construction of Campus Recreational Facilities (CRF)
- Typical CRF Design and Features
- Value of CRF/Outcomes of CRF Usage



Project Background

- *Social Interaction*
- *Tinto's Theory of Student Departure*
- *Braxton & Hirschy: Communal Potential*



Project Background

CRF – High Communal Potential

- Social Interaction
 - Social Integration
 - Persistence
 - Academic Success



Research Questions

Is CRF usage associated with better academic performance and increased likelihood of being retained and graduating, above and beyond other important predictors of academic success?

- *First-term GPA*
- *First-year retention*
- *Graduating within 5 years*



Description of Data Set

- University of Minnesota-Twin Cities
 - A large, Midwestern, Doctoral-Extensive University
- First-time Full-time freshmen in fall 2001
- N=5,344

Variables in the Models

- Dependent variables “Success”
 - First-term GPA
 - First-year Retention
 - Graduating within five years



Variables in the Models

- Independent variable of “interest”
 - CRF Usage first-term
- Other independent variables
 - First-term academic performance
 - Academic preparedness
 - Athlete status
 - Demographics
 - Geographic/tuition residency
 - Financial need
 - First semester housing



Descriptive Statistics of the Sample (N=5,211)








Variables	Values	Mean	Std. Dev.	Variable Description (type of variable)
GPA	0-4	3.02	0.75	The first fall-term GPA (response variable)
Year 1 Retention	0-1	0.85	0.35	Returned in the second year (response variable)
Year 5 Graduation	0-1	0.58	0.49	If graduated by 5th year (response variable)
Ratio	0-1	0.95	0.16	Ratio of first term credits earned to attempted
W Count	0-4	0.117	0.36	Number of W (course withdrawals) first semester
C's Received	0-5	0.7	0.89	Number of C grades earned first semester
D's Received	0-3	0.123	0.38	Number of D grades earned first semester
Remedial Taken	0-1	0.11	0.31	If math remedial course taken first semester (dummy)
Remedial Failed	0-1	0.01	0.1	If failed remedial course first semester (dummy)
ACT/SAT Score	11-35	24.6	4.14	ACT composite score/SAT converted
Male	0-1	0.49	0.5	If Male (dummy)
American Indian	0-1	0.007	0.08	If American Indian (dummy)
Black	0-1	0.04	0.2	If Black (dummy)
Hispanic	0-1	0.019	0.14	If Hispanic (dummy)
Asian	0-1	0.1	0.3	If Asian (dummy)
International	0-1	0.012	0.11	If international student (dummy)
Reciprocity	0-1	0.267	0.44	If tuition reciprocity state (dummy)
Non-reciprocity	0-1	0.047	0.21	If non-tuition reciprocity state (dummy)
Pell Grant	0-1	0.17	0.38	If Pell grant eligible (dummy)
Off-campus Housing	0-1	0.25	0.43	If living off-campus first term (dummy)
Athlete	0-1	0.04	0.19	If student athlete (dummy)
CRF Count	0-154	9.93	15.36	Total number of visits to a Campus Recreation Facilities (CRF) first semester

Methods

- Multivariate approach
- Regression models
 - OLS: 1st term GPA
 - Logit: First-year retention and Graduation within five-years



OLS Model of First-term GPA

OLS(GPA)	Coef.	Sig.
ACT/SAT Score	0.0493	
Remedial Taken	0.0640	
Athlete	0.0325	
Male	-0.1790	
American Indian	-0.4041	
Asian	-0.0333	
Black	-0.1566	
Hispanic	-0.0947	
International	0.2857	
Reciprocity	-0.0228	
Non-Reciprocity	-0.0194	
Pell	0.0183	
Off-Campus Housing	-0.0673	
CRF Count	0.0046	
Constant	1.8713	

  signifies $p < .01$

Logit Probability Model
























$$P(y_j \neq 0) = \frac{\exp(x_j \beta)}{1 + \exp(x_j \beta)}$$



Logit Model : 1st Year Retention and Graduation within 5 years

1st Year Retention

5 Year Graduation

	Coefficient	Sig.	Coefficient	Sig.
Completion Ratio	3.2455		3.5631	
C's Received	-0.2587		-0.3814	
D's Received	-0.496		-0.6874	
W Count	-0.5445		-0.7156	
ACT/SAT Score	0.0141		0.0468	
Remedial Taken	-0.3652		-0.9965	
Remedial Failed	-0.5903		-0.8449	
Athlete	0.7786		0.1179	
Male	0.2792		-0.0682	
American Indian	-1.1544		-0.8626	
Asian	0.2722		-0.0131	
Black	0.3448		-0.2014	
Hispanic	-0.409		0.1729	
International	-0.1668		0.0123	
Reciprocity	-0.4105		-0.2254	
Non-Reciprocity	-0.8237		-0.4144	
Pell	-0.0298		-0.2921	
Off-Campus Housing	-0.3273		-0.3393	
CRF Count	0.0085		0.0073	
Constant	-1.1513		-3.5027	

  $P = < .01$



Predicted 1st Year Retention and Graduation within 5 Years for Alternative Values of Each Variable Holding All Other Variables at Baseline Values

	Baseline	Alterative	Retention	Change	Graduation	Change
Ratio	1	0.8	87%	-6%	64%	-14%
C's Received	0	1	91%	-2%	72%	-7%
D's Received	0	1	88%	-4%	65%	-14%
W Count	0	1	88%	-5%	64%	-14%
ACT/SAT Score	25	29	93%	0%	82%	3%
Remedial Taken	0	1	90%	-3%	58%	-21%
Remedial Failed ¹	0	1	83%	-10%	37%	-42%
Athlete	0	1	96%	4%	81%	2%
Male	0	1	94%	2%	77%	-1%
American Indian	0	1	80%	-13%	61%	-18%
Asian	0	1	94%	2%	78%	0%
Black	0	1	95%	2%	75%	-4%
Hispanic	0	1	89%	-3%	81%	3%
International	0	1	91%	-1%	79%	0%
Reciprocity	0	1	89%	-3%	75%	-4%
Non-Reciprocity	0	1	85%	-8%	71%	-8%
Pell	0	1	92%	0%	73%	-5%
Off-Campus Housing	0	1	90%	-3%	72%	-6%
CRF Count	10	25	93%	1%	80%	2%
		Baseline:	93%	0%	79%	0%
		Averages:	88%	0%	57%	0%
		Actual:	85%	0%	58%	0%

¹ Alternative for Remedial Failed also includes Remedial Taken set to 1.



Figure 1. Influence of Visits to a CRF on Probability of Returning for a Second Year

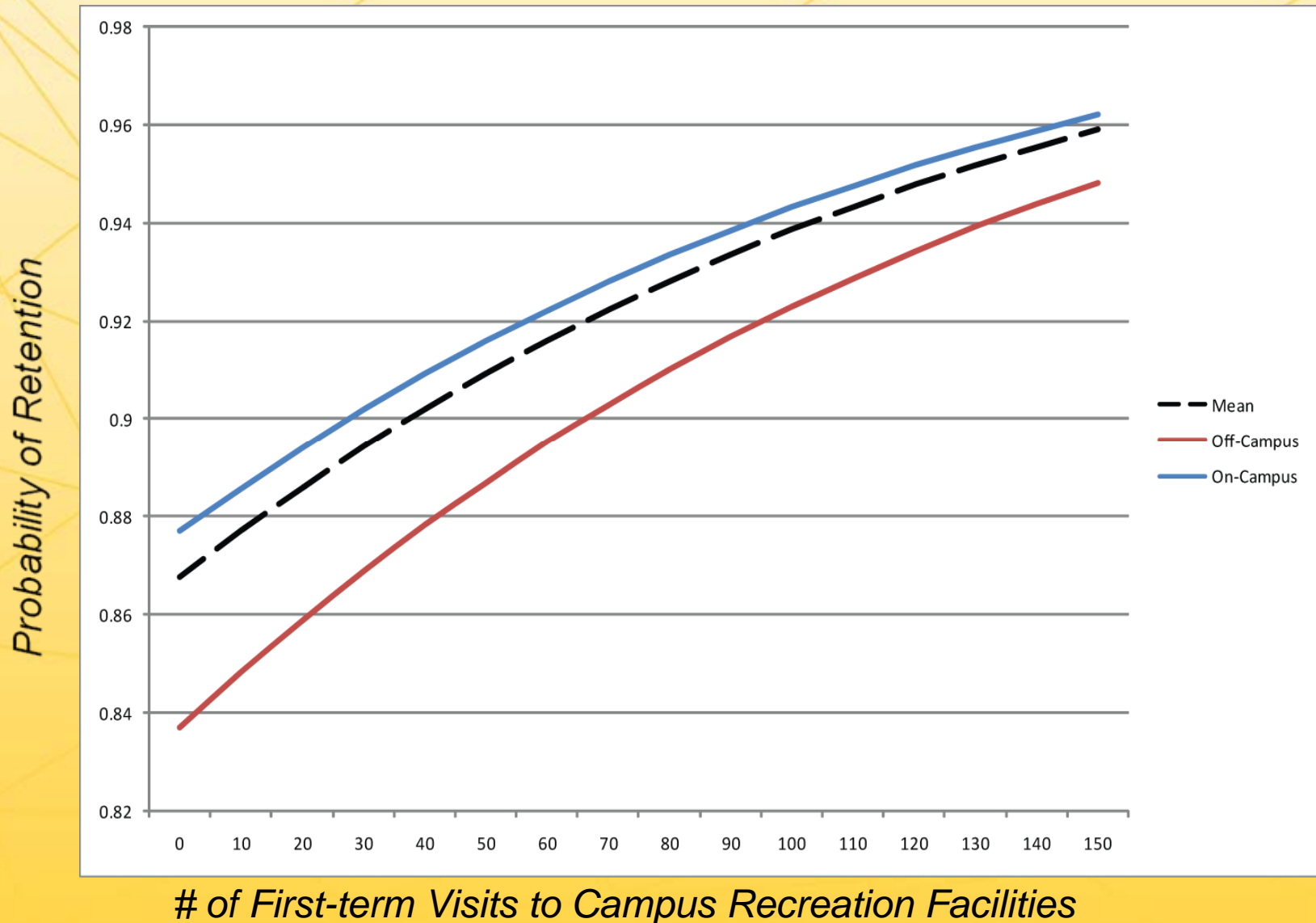
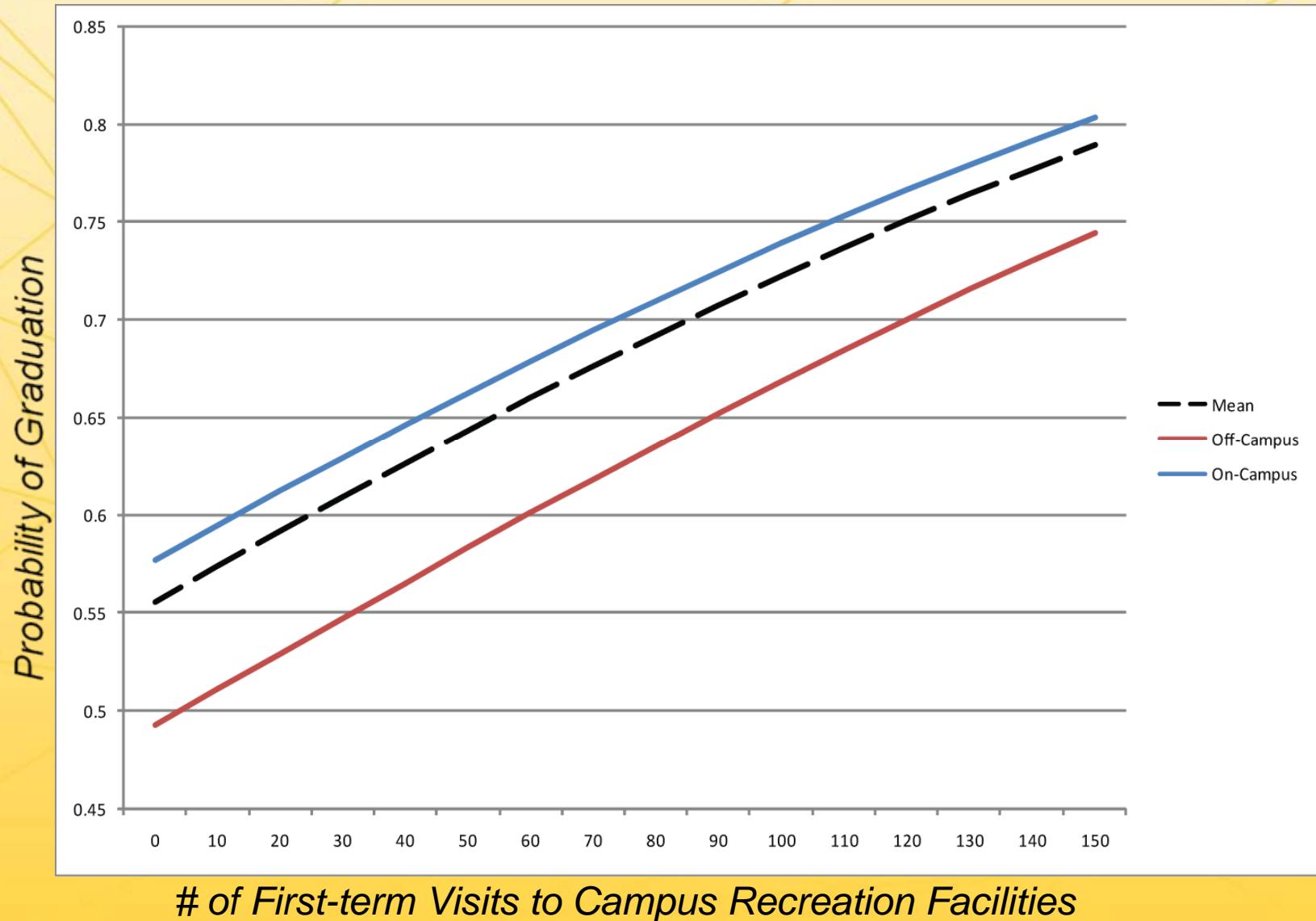


Figure 2. Influence of Visits to a CRF on Probability of Graduating within Five Years



Summary of Model Results

Area	Predictor	GPA	Retention	Graduation
Academic	Ratio	X	↑	↑
	W's	X	↓	↓
	D's	X	↓	↓
	C's	X	↓	↓
	ACT	↑		↑
	Remedial			↓
Social	Off-campus	↓	↓	↓
	CRF	↑	↑	↑
	Athlete		↑	
Geographic	Non-reciprocity		↓	↓
	Reciprocity		↓	↓
	International	↑		
Financial	Pell			↓
Demographic	Male	↓	↑	
	Am. Indian	↓	↓	
	African Am.	↓		



 $P = < .01$



Policy Implications

- Academic performance in the first term is critical for future success
 - Academic support
- Integration into the broader university community.
 - On-campus housing
 - Promote CRF usage/impact CRF planning
 - Other engagement activities



Future research

- Adding more extensive recent data may help in identifying issues related to social integration (e.g. living learning communities, freshmen seminars, etc.)
 - Six-year graduation
- Incorporate time-varying effects (CRF usage over career)
- Incorporate different methodologies (e.g. SEM)



Questions?



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