## Identifying Factors that Facilitate and Impede Student Success

cohort 2013 First-Time Freshmen College of Liberal Arts Data Team March 7, 2018

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## Guiding Principles



## Today's Focus

Froject design and sample
A Analytic Approach \#1: Regression Analyses (Steimetz and Stormes)
prele Analytic Approach \#2: Path Analyses (Bolkan)
inhif Analytic Approach \#3: Latent Class Analysis (Lanza)
$\Theta$ Next Steps

## Project Design

$\square$ Online Survey
Focus Groups

IR\&A Data Integration

## Steps in Creating Online Survey



## Survey Measures

## MOTIVATION

- Attitude: 4-year
- Self-efficacy: 4-year
- Attitude: 15 units
- Self-efficacy: 15 units
- Campus connections
- Grit: Cognitive control
- Important to family that I graduate


## OPPORTUNITY

- Advising quality
- Advising: 4-year
- \# Times changed majors
- \# of people responsible for (dependents)
- Experienced a family emergency
- Difficulty scheduling classes
- Commute time


## BACKGROUND

- Sex
- High School GPA
- SAT/ACT
- URM/NURM
- Remediation needs
- DSS


## Focus Groups

5 focus groups (60-90 minutes)


Personalized hand-delivered invitations
\$ Incentives
(0.) Theoretical sampling approach to data collection


## Sample

## 4343 <br> CSULB Cohort 2013 <br> First-Time Freshmen

## 972

Cohort 2013 FTF enrolled in Fall 2016 as CLA majors

Survey Sample

Focus Group Sample

## CSULB Freshmen Cohort 2013 Select Characteristics



| Other Characteristics | $\%$ |
| :--- | :---: |
| Female | 57.8 |
| First Generation To Attend | 31.9 |
| Pell Eligible | 51.0 |
| Remediation Needed | 29.8 |
| EOP Admission | 11.8 |
| LBUSD | 15.6 |
| International | 7.8 |
| Lived in CSULB Housing | 38.0 |

## College of Liberal Arts Survey Data Select Respondent Characteristics

## Survey Respondent Data

| Avg. Hours Worked per Week | 17.5 |
| :--- | :---: |
| Avg. Commute Minutes | 25.3 |
| Pays for College by Self | $39.3 \%$ |
| Contributes Money to Family | $13.3 \%$ |
| Lives with Parents/Grandparents | $65.3 \%$ |
| Has One or More Dependents | $10.7 \%$ |
| Plans to Attend Grad School | $29.3 \%$ |
| Has Job After Graduation | $9.5 \%$ |


| Institutional Data |  |
| :--- | :--- |
| Matched to Respondent Data |  |
| Female | $76.0 \%$ |
| First Generation to Attend | $42.0 \%$ |
| Pell Eligible | $66.6 \%$ |
| EOP Admission | $13.6 \%$ |
| LBUSD | $17.7 \%$ |
| Underrepresented Minority | $56.5 \%$ |
| Lived in CSULB Housing | $34.7 \%$ |

## Four-Year Graduation Rates CSULB Freshmen Cohort 2013



## Four-Year Graduation Rates (by entry college) CSULB Freshmen Cohort 2013



## Regression Methods



## Probability of 4-year Graduation

Example: How does being an underrepresented minority affect the probability of 4-year graduation, holding all other factors constant?

## What Factors Affect the Probability of Graduating Within 4 years?

$\checkmark$ Binary Logit Maximum Likelihood Estimation
$\square$ CSULB Freshmen Cohort 2013 (4,166 students)

College of Liberal Arts Survey (312 students)

$\checkmark$Reporting Results:

- Effects are interpreted as holding all other factors constant
- Effect sizes depend on levels of independent variables
- "Modifier" effects can be obtained by specifying independent variable values
- Only statistically-significant effects are reported ( $5 \%$ significance using single-tailed tests)


## Probability of Four-Year Graduation

 CSULB Freshmen Cohort 2013 ( $n=4,166$ )| Factors associated with an <br> INCREASE in probability | An <br> increase of... | Implies an <br> increase of... |
| :--- | :---: | :---: |
| CSULB GPA | 0.1 points | $\mathbf{1 . 1 \%}$ points |
| Units attempted per semester | 1 unit | $\mathbf{9 . 5 \%}$ points |
| Percent of attempted units completed | $1 \%$ point | $\mathbf{1 . 4 \%}$ points |
| Percent of units taken online | $1 \%$ point | $\mathbf{1 . 6 \%}$ points |
| College units earned before entry | 3 units | $\mathbf{2 . 1 \%}$ points |
| CBA major at entry (vs. undeclared) |  | $\mathbf{5 . 8 \%}$ points |
| CHHS major at entry (vs. undeclared) |  | $\mathbf{4 . 6 \%}$ points |
| CLA major at entry (vs. undeclared) |  | $\mathbf{1 3 . 2 \%}$ points |

## Probability of Four-Year Graduation

 CSULB Freshmen Cohort 2013 ( $n=4,166$ )| Factors associated with a <br> DECREASE in probability | Implies a <br> decrease of... |
| :--- | :--- |
| Pell eligible | $\mathbf{2 . 7 \%}$ points |
| Remedial courses needed (2+) | $\mathbf{5 . 2 \%}$ points |
| LBUSD | $\mathbf{4 . 6 \%}$ points |
| COE major at entry (vs. undeclared) | $\mathbf{4 . 1 \%}$ points |

## Probability of Four-Year Graduation College of Liberal Arts Survey ( $n=312$ )

| Factors associated with an | Implies an <br> increase of... |
| :--- | :--- |
| INCREASE in probability | $\mathbf{1 0 . 9 \%}$ points |
| Female | $\mathbf{1 2 . 8 \%}$ points |
| First generation to attend | $\mathbf{7 . 6} \%$ points <br> for each unit |
| Units attempted per semester | $\mathbf{0 . 5 \%}$ points <br> for each hour |
| Hours worked per week | $\mathbf{1 1 . 9 \%}$ points |
| Lives with parents |  |

## Probability of Four-Year Graduation College of Liberal Arts Survey ( $\mathrm{n}=312$ )

$\left.\begin{array}{|lc|}\hline \begin{array}{l}\text { Factors associated with an } \\ \text { INCREASE in probability }\end{array} & \begin{array}{c}\text { Implies an } \\ \text { increase of... }\end{array} \\ \hline \text { Attitudinal factors measured on a 5-point scale }\end{array}\right]$

${ }^{〔}$ Why 4 years?

Honestly, I don't think
I could do 15 units or
18 units... Both my
parents are
undocumented and it's
like, do you need
college? I have a
different experience,
so I just take my time
with 12 units.

## Probability of Four-Year Graduation College of Liberal Arts Survey ( $\mathrm{n}=312$ )

## Factors associated with an INCREASE in probability

Implies an increase of...

Attitudinal factors measured on a 5-point scale

| Attitude toward 4-year graduation | $\mathbf{9 . 1 \%}$ points |
| :--- | :---: |
| Perception of self-efficacy | $\mathbf{1 1 . 0} \%$ points |
| Perception that advisor promotes <br> 4-year graduation | $\mathbf{3 . 1} \%$ points |
| Index of Grit—sustained focus | $\mathbf{4 . 8 \%}$ points |
| Other personal hardships <br> aside from physical, mental, financial... |  |

${ }^{G 6}$ My advisor walked me through the steps to graduate in 4 years. If there were any classes on my list that I did not have to take, she'd say, "Take this one instead; it will be better for what you are trying to do. $\mathrm{da}^{2}$

## Probability of Four-Year Graduation

 College of Liberal Arts Survey ( $\mathrm{n}=312$ )| Factors associated with a | Implies a <br> decrease of... |
| :--- | :---: |
| DECREASE in probability | $16.7 \%$ points |
| Underrepresented minority (URM) | $14.7 \%$ points |
| Math remediation needed | $6.9 \%$ points <br> for each switch |
| Number of times switched major | $10.9 \%$ points <br> for each |
| Number of dependents | $2.9 \%$ points <br> Percent of family expenses <br> contributed |

## Probability of Four-Year Graduation College of Liberal Arts Survey ( $\mathrm{n}=312$ )

| Factors associated with a <br> DECREASE in probability | Implies a <br> decrease of... |
| :--- | :---: |
| Attitudinal factors measured on a 5-point scale |  |
| Concerns about money | $\mathbf{4 . 6 \%}$ points |
| Physical health concerns | $\mathbf{5 . 6 \%}$ points |
| Perception of advising quality | $\mathbf{1 1 . 5 \%}$ points |

> ${ }^{6}$ I had to use a credit card for a pretty big expense. Things happen so I was there to help out my parents. But now I worry about paying that off. $\partial$

## Which Factors Predict CSULB GPA?

$\checkmark$ Ordinary Least Squares Regression
$\square$ CSULB Freshmen Cohort 2013 (4,166 students)
( Reporting Results:

- Effects are interpreted as holding all other factors constant
- Effect sizes are given by coefficient values
- No "modifiers" or "interactions" are estimated
- Only statistically-significant effects are reported (5\% significance using single-tailed tests)


## CSULB GPA <br> CSULB Freshmen Cohort 2013 ( $\mathrm{n}=4,166$ )

| Factors associated with an <br> INCREASE in CSULB GPA | Implies an <br> increase of... |
| :--- | :--- |
| EOP Admission | $\mathbf{0 . 0 8}$ points |
| Athlete | $\mathbf{0 . 1 4}$ points |
| Female | $\mathbf{0 . 1 2}$ points |
| CLA major at entry (vs. undeclared) | $\mathbf{0 . 0 9}$ points |
| COED major at entry (vs. undeclared) | $\mathbf{0 . 2 2}$ points |
| COTA major at entry (vs. undeclared) | $\mathbf{0 . 1 6}$ points |
| College units earned before entry | $\mathbf{0 . 0 2}$ points <br> for each $\mathbf{3}$ units |

$\mathcal{G}^{\text {Because I }}$ did the EOP Summer Bridge Program, I met a lot people and now know all the different resources offered on campus.

## CSULB GPA <br> CSULB Freshmen Cohort 2013 ( $\mathrm{n}=4,166$ )

| Factors associated with a <br> DECREASE in CSULB GPA | Implies a <br> decrease of... |
| :--- | :--- |
| Underrepresented minority (URM) | $\mathbf{0 . 1 7}$ points |
| Pell eligible | $\mathbf{0 . 0 5}$ points |
| First generation to attend | $\mathbf{0 . 1 2}$ points |
| Remedial courses needed (2+) | $\mathbf{0 . 1 3}$ points |
| International student | $\mathbf{0 . 1 9}$ points |
| CBA major at entry (vs. undeclared) | $\mathbf{0 . 1 7}$ points |
| COE major at entry (vs. undeclared) | $\mathbf{0 . 1 6}$ points |
| CNSM major at entry (vs. undeclared) | $\mathbf{0 . 1 3}$ points |

## Path Analyses

$\checkmark$ Social Cognitive Theory: Environmental and personal factors predict performance

01 Self-efficacy (regarding 4-year graduation)
02 Expected outcomes (attitude toward graduating in 4 years)
03 Academic goals (short-term pursuit of 4 year graduation; i.e., units per semester)

04 Contextual influences (Advising, demographics, major switching)
These variables are not simply additive, instead they influence one another

## Path Analyses

## $\checkmark$ Variables for Consideration

| Variables OUTSIDE Students' <br> Immediate Control | Variables WITHIN Students' |
| :--- | :--- |
| Immediate Control |  |

Figure 1: Social Cognitive Career Theory Performance Model


Figure 2: Social Cognitive Model of Factors Influencing Students' Four-Year Graduation


Note: All paths are standardized, ${ }^{*}=p<.05,{ }^{* *}=p<.01$. Dashed lines represent nonsignificant path coefficients. 4-Year Graduation is scored 1 for students who graduated and 0 for students who did not. Sex is scored 1 for women and 0 for men. Ethnicity is scored 1 for White and Asian students, and 0 for Black and Hispanic students.

## Latent Class Analysis

There is no single student characteristic that has a high accuracy of predicting four-year graduation

Person-centered Approach: Latent Class Analysis (LCA) used to identify latent classes of characteristics, behaviors, symptoms, etc.

Identify underlying patterns of student characteristics linked to lower and higher likelihood of four-year graduation

LCA identified classes/subgroups and estimated the probability of graduating in four years based on class membership

## Method

01 Fall 2013 CLA Cohort ( $N=972$ )
02 Selected 11 student demographic characteristics from IR\&A data

03 Student characteristics were evaluated (and recoded to categorical responses)
04. Best-fitting class model identified (added covariates and outcomes to assess association with particular latent classes)
$1^{\text {st }}$ Generation College
$\checkmark$ Pell-Eligible
$\checkmark$ EOP
$\checkmark$ Region (local)
$\checkmark$ LBUSD
$\checkmark$ High School GPA
$\checkmark$ Residential Housing
$\checkmark$ Remedial
$\checkmark$ College at Entry
$\checkmark$ Probation
$\checkmark$ Department at Exit

Fall 2013 CLA Cohort ( $\mathrm{n}=972$ )
Institutional Research Student Characteristics Identified Subgroups Using Latent Class Analysis


- Exit Other Dept

■ Region Tier 4/ GPA 4.0 and above/ Entry Other College/ Exit SOC

■ Parents Grad College/ Region Tier 3/ GPA 3.5 to 3.99/ Entry Undeclared/ Exit - PSYC

■ Parents Some College/ Region Tier 2/ LBUSD/ Residential/ Pell Eligible/ EOP/ Remedial/ Probation/ GPA 3.0 to 3.49/ Entry CLA/ Exit HDEV

■ Parents No College/ Region Tier 1/ Non-LBSUD/ Non-Residential/ Non-Pell/ Non-EOP/ NonRemedial/ Non-Probation/ GPA 2.5 to 2.99/ Entry HHS/ Exit COMM

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Institutional Research Student Characteristics Identified Subgroups Using Latent Class Analysis


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- Parents Some College/ Region Tier 2/ LBUSD/ Residential/ Pell Eligible/ EOP/ Remedial/ Probation/ GPA 3.0 to 3.49/ Entry CLA/ Exit HDEV

■ Parents No College/ Region Tier 1/ Non-LBSUD/ Non-Residential/ Non-Pell/ Non-EOP/ NonRemedial/ Non-Probation/ GPA 2.5 to 2.99/Entry HHS/ Exit COMM

Fall 2013 CLA Cohort ( $\mathrm{n}=972$ )
Institutional Research Student Characteristics
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- Parents Some College/ Region Tier 2/ LBUSD/ Residential/ Pell Eligible/ EOP/ Remedial/ Probation/ GPA 3.0 to $3.49 /$ Entry CLA/ Exit HDEV
- Parents No College/ Region Tier 1/ Non-LBSUD/ Non-Residential/ Non-Pell/ Non-EOP/ NonRemedial/ Non-Probation/ GPA 2.5 to 2.99/Entry HHS/ Exit COMM


## Fall 2013 CLA Cohort (n=972)

## Institutional Research Student Characteristics Identified Subgroups Using Latent Class Analysis




Students in Class 4 had a significantly lower likelihood of graduating in 4 years than any other subgroup


Students in Class 4 had a significantly lower likelihood of graduating in 4 years than any other subgroup


Students in Class 4 had a significantly lower likelihood of graduating in 4 years than any other subgroup

## Next Steps

01 Present current findings to various stakeholders
02 Publish findings in peer-reviewed journals
${ }_{03}$ Conduct additional analyses

- Expand our definition of student success; examine other outcome variables
- Why do students leave CSULB? (survival analyses)
- How do migration patterns into CLA affect student success?
- Are CLA internship practices inclusive?

04 Implement data-informed practices and programming


