Modeling First Year Stop Out of Kalamazoo Promise Scholars: Mapping Influences of Socioeconomic Advantage and Pre-College Performance to College Performance and Stopping Out

A Presentation for Student Financial Aid Research Network (SFARN) National Conference

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June 12th, 2020

W.E. UPJOHN INSTITUTE FOR EMPLOYMENT RESEARCH

Agenda

- Introduction
- The Kalamazoo Promise
- Purpose
- Database, Sample, Missing Data
- Structural Equation Modeling
- Findings
- Recommendations

Introduction

- You make me Promises, Promises (Perna & Leigh, 2018)
  - Hundreds currently exist
  - More being developed
  - Terms are non-uniformed
    - First v. Last Dollar
    - One and Done v. Generous
    - Who gets the scholarship
    - How to keep the scholarship
- Research first centered on the effects of K-12 student behavior (Bartik & Lachowska, 2014), impacts to college access, and degree attainment (Bartik, Hershbein, & Lachowska, 2019).
- However the scope of research is shifting to explore persistence and experiences of Promise students while in college (Collier, Parnther, Fitzpatrick, Brehm, & Beach, 2019) – but these studies are limited.

Details of the Kalamazoo Promise

- Announced in 2005
  - Anonymous donors intended to
    - improve the Kalamazoo Public School (KPS) system,
    - bolster KPS students' postsecondary enrollment and persistence,
    - and lead to economic and community development

- Arguably one the most generous tuition-free policies
  - First Dollar (Applied before aid)
  - 10 years to use the scholarship or 130 credit hours
  - Full-time expectation (except in some cases) but no "one-and-done"
  - Covers between 65%-100% of mandatory tuition and fees
  - Can attend public and many private institutions in MI

Research Conducted on the Kalamazoo Promise

- K-12
  - Stemmed Out-Migration (Bartik & Sotherland, 2015) and likely generated in-migration (Hershbein, 2013)
  - Higher 3-8th Grade test scores (Barik et al., 2010)
  - Decline in student behavioral issues (Bartik & Lachowska, 2014)

- College Access
  - 90% of students eligible to access Promise funds have started college (W.E. Upjohn Institute, 2019)
  - Increased likelihood of KPS students' enrollment in any postsecondary institution within 6-months of high school graduation by 14-percent and enrollment in a 4-year institution by 23-percent (Bartik et al., 2019)
  - 64% of FRL students have accessed funds within 6-months of H.S. graduation (W.E. Upjohn Institute, 2019), pre-Promise just 41% of FRL students did
  - Kalamazoo Valley Community College has housed 43% of Promise enrollments while Western Michigan University has housed 32%.

Research Conducted on the Kalamazoo Promise

- First-Year Stop Out
  - HS Cohorts 06-17
  - High FY retention

Purpose

- More analyses are needed - particularly given the expansion of Promise scholarships, recent critiques of Promise policies' limitations (e.g. Jones & Berger, 2018) and relative policy implications

- This study employed structural equation modeling (SEM) to test whether and to which degree:
  (1) socioeconomic advantage (SES),
  (2) pre-college academic performance,
  (3) KPromise funding (ranging from 65% to 100% of tuition and fees),
  (4) enrollment into college within 6-months of graduating high school (referred to as "immediate college enrollment"),
  (5) first-year college performance influence a first-year stop out

- Furthermore, in recognizing that KPromise may be producing unique effects over time, we also tested two 5-year cohorts within the model – the 2006-2010 cohorts and the 2011-2015 cohorts, to identify similarities and unique trends

Data

- This study includes students' observed:
  - Kalamazoo Promise funding percentage (65%-100%),
  - 3-8th grade Math and English test scores (standardized scores),
  - free-and-reduced lunch status in high school,
  - high school GPA,
  - ACT comprehensive score,
  - Last known permanent residency zip code:
    - homeownership percentages
    - rates of bachelor's degree attainment from the 2017 five-year estimates of the American Community Survey (U.S. Census Bureau, 2019).
  - Immediate college enrollment
  - First-year college GPA

Sample

- Kalamazoo Promise students from the 2006-2017 high school cohorts who enrolled in college and accessed Promise funds (*N*=5,642)
  - Leaned
    - Female (53%)
    - White (46%)
      - Black/African American (42%)
      - Hispanic Latino(a) (8%)
    - FRL eligible (53%)
  - Mean HS GPA was 2.65
  - Mean ACT score was 19.04
  - 82% immediately enrolled in college
  - First-Year college GPA was 2.09
  - Institutions of enrollment
    - KVCC – 46%
    - WMU – 22%
    - MI State – 8%
    - U of MI – 4%
  - Mean Bachelor's degree rate was 17%
  - Mean homeownership rate was 51% (across 15 census tracts)

Missing Data

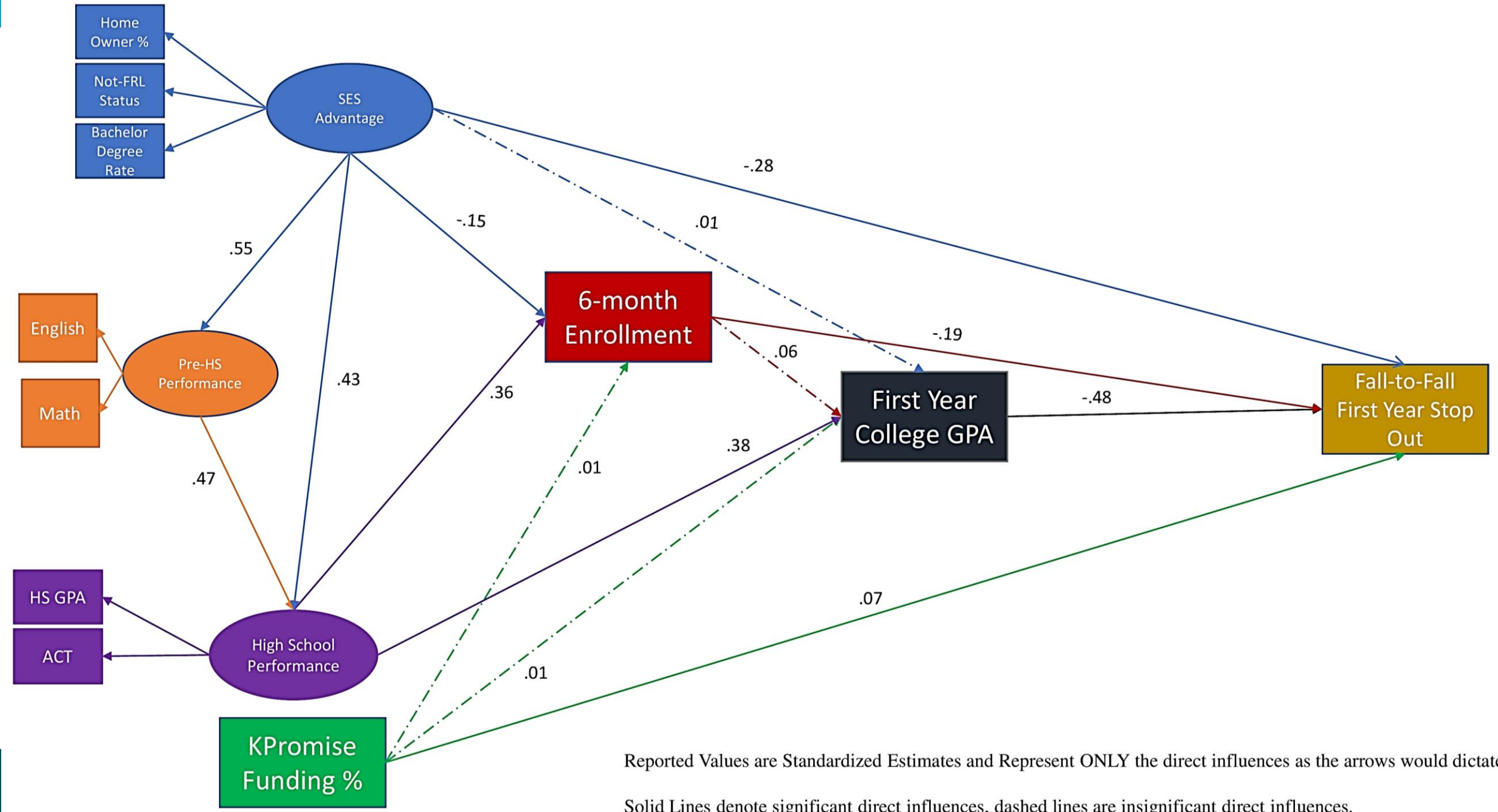
- Variables with missing data
  - neighborhood bachelor's degree and homeownership rates,
  - ACT comprehensive scores,
  - high school GPA,
  - pre-high school performance measurements

- Three methods
  - Listwise deletion (left in appendix)
  - Mean centered (left in appendix)
  - k-Nearest Neighbor (*k*=75*, *k*=51, *k*=25)
    - Used profile attributes (high school, FRL, gender, ethnicity) to ID "nearest" neighbors
    - Must specify k, rule of thumb is square root of sample size (Lantz, 2015) which was k=75
    - The structure of the original dataset is preserved, and the method is non-parametric and therefore less likely to mis-specify models (Beretta & Santaniello, 2016)

Structural Equation Modeling (SEM)

- Structural Equation Modeling (SEM) is a technique used to examine the effect of one variable onto another and any indirect influences from one variable through another (Klem, 2000)

- Rules of SEM
  - Temporal sequencing
  - Variables must be statistically related to the outcome examined
    - Correlation Matrix
    - One violation based on theory – Promise funding percentage
  - Method must align with outcome
    - Weighted-least square means and variance adjusted approach (WLSMV)
    - WLSMV is a better approach than a Maximum Likelihood analysis; WLSMV produces more accurate factor loadings, interfactor correlations, and structural coefficient estimates (DiStefano & Morgan, 2014; Li, 2016).
  - Fit statistics are debated but should be CFI≥.95, TLI≥.95, RMSEA≤.06, and SRMR≤.08 (Hu & Bentler, 1998)



Reported Values are Standardized Estimates and Represent ONLY the direct influences as the arrows would dictate.

Solid Lines denote significant direct influences, dashed lines are insignificant direct influences.

Structural Equation Modeling (SEM) – Main Output

Table 1:
KPromise – Influences on First-Year Stop Out (Robust Standardized Coefficients Reported)

	Direct	Indirect	Total
Pre-High School Performance			
Socioeconomic Advantage	.55***		.55***
High School Performance			
Socioeconomic Advantage	.43***	.26***	.69***
Pre-High School Performance	.47***		.47***
Immediate College Enrollment			
Socioeconomic Advantage	-.15***	.16***	.01
Pre-High School Performance		.17***	.17***
High School Performance	.36***		.36***
KPromise Funding Percentage	.01		.01
First-Year College GPA			
Socioeconomic Advantage	.01	.16***	.16***
Pre-High School Performance		.18***	.18***
High School Performance	.38***	.02*	.41***
KPromise Funding Percentage	.01	.00	.01
Immediate College Enrollment	.06+		.06+
College Stop Out			
Socioeconomic Advantage	-.28**	.03	-.26***
High School Performance		-.25***	-.25***
KPromise Funding Percentage	.07**	-.01	.06*
Immediate College Enrollment	-.19***	-.03*	-.22***
First-Year College GPA	-.48***		-.48***
CFI		.97	
TLI		.97	
RMSEA		.04	
SRMR		.04	

+$p \leq .10$, *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

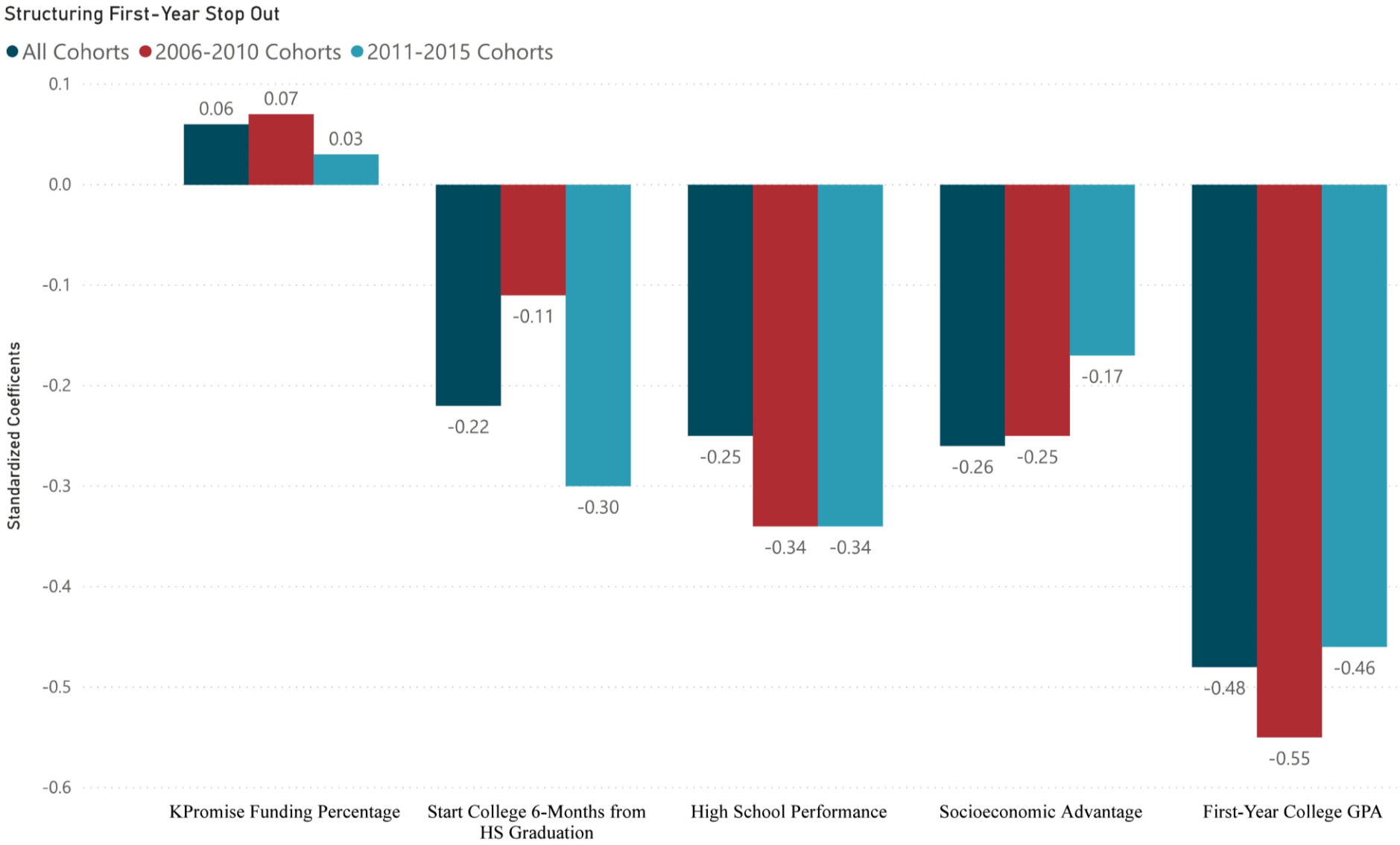
Structural Equation Modeling (SEM) – Cohort Comparisons

Table 3

KPromise – First-Year Stop Out Comparisons Between 06-10 to 11-15 Cohorts (Robust Standardized Coefficients Reported)

	All Cohorts (k=75)			Early Cohorts (06-10)			Later Cohorts (11-15)		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Pre-High School Performance									
Socioeconomic Advantage	.55***		.55***	.43***		.43***	.62***		.62***
High School Performance									
Socioeconomic Advantage	.43***	.26***	.69***	.65***	.07*	.72***	.22***	.44***	.66***
Pre-High School Performance	.47***		.47***	.15*		.15*	.72***		.72***
Immediate College Enrollment									
Socioeconomic Advantage	-.15***	.16***	.01	-.05	.15*	.09*	-.24*	.12*	-.12
Pre-High School Performance		.17***	.17***		.03+	.03+		.39***	.39***
High School Performance	.36***		.36***	.22***		.22***	.54***		.54***
KPromise Funding Percentage	.01		.01	.01		.01	.05		.05
First-Year College GPA									
Socioeconomic Advantage	.01	.16***	.16***	-.09	.38***	.29***	.00	.09***	.09*
Pre-High School Performance		.18***	.18***		.09*	.09*		.27***	.27***
High School Performance	.38***	.02*	.41***	.58***	.01	.60***	.37***	-.01	.36***
KPromise Funding Percentage	.01	.00	.01	.02	.00	.02	.02	-.00	.02
Immediate College Enrollment	.06+		.06+	.04		.04	-.02		-.02
First-Year College Stop Out									
Socioeconomic Advantage	-.28**	.03	-.26***	-.30***	.05	-.25***	-.25***	.07+	-.17***
High School Performance		-.25***	-.25***		-.34***	-.34***		-.34***	-.34***
KPromise Funding Percentage	.07**	-.01	.06*	.08*	-.01	.07+	.05+	-.02	.03
Immediate College Enrollment	-.19***	-.03*	-.22***	-.09*	-.02	-.11***	-.31***	.01	-.30***
First-Year College GPA	-.48***		-.48***	-.55***		-.55***	-.46***		-.46***
CFI		.97			.98			.99	
TLI		.97			.98			.98	
RMSEA		.04			.03			.04	
SRMR		.04			.10			.10	

+$p \leq .10$, *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$


Structuring First-Year Stop Out
All Cohorts
2006-2010 Cohorts
2011-2015 Cohorts
Standardized Coefficents
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
0.06
0.07
0.03
-0.22
-0.11
-0.30
-0.25
-0.34
-0.34
-0.26
-0.25
-0.17
-0.48
-0.55
-0.46
KPromise Funding Percentage
Start College 6-Months from HS Graduation
High School Performance
Socioeconomic Advantage
First-Year College GPA

So what?

- Given the influence of socioeconomic advantage on students' academic performance academic interventions aimed to bolster these outcomes must also attempt to bridge gaps associated with socioeconomic advantage.

- As pre-college performance impacted college performance and persistence, academic interventions should be employed before college – ideally, in grade school.

- Neither socioeconomic advantage nor the percentage of KPromise funding influenced a college enrollment immediately after high school graduation – further illustrating the importance of Promise in widening access.

- As the Kalamazoo Promise matured, unique outcomes were produced – notably in lessening the influence of socioeconomic over high-school, an immediate college enrollment, college performance, and a first-year stop out.

What Next?

- Testing cohorts 2016-2019 cohorts – new supports added after 2015
- Examining models by race
- SEM analyses are meant to be tested – we encourage other Promise researchers to test our model and generate comparisons
- Additional Data
  - Financial Aid variables (e.g. Pell, Loans)
  - Student non-cognitive attributes, social adjustment, basic needs (see - Bowman et al., 2019; Collier et al., 2020)
  - Institutional data

Acknowledgements

- The Kalamazoo Promise
  - Bob Jorth
- Kalamazoo Public School District
  - Cindy Green
- W.E. Upjohn Institute
  - Brad Hershbein
- Friends
  - Carson Byrd
  - Carrie Bosch