Hello everyone, and welcome! Our presentation is An Analysis of Bachelor's Degree Attainment for Adult Students by Institutional Type. I'm Sean Riordan, Manager of Business Intelligence at Gateway Technical College. [John introduces himself] Our other colleagues couldn't be here to present, but are with us in spirit. Let's get started.

Research Question

For adult students aged 25 or older who expected to earn a bachelor's degree or higher, how does beginning at a public or private non-profit 2-year institution influence bachelor's degree attainment compared to those who begin at a public or private non-profit 4-year institution?

We used the 2012/17 Beginning Postsecondary Students Longitudinal Study to analyze how beginning at a 2-year institution influences the persistence of adult students compared to beginning at a 4-year institution. For adult students aged 25 or older who expected to earn a bachelor's degree or higher, how does beginning at a public or private non-profit 2-year institution influence bachelor's degree attainment compared to those who begin at a public or private non-profit 4-year institution?

Summary of Literature Review

- Adult students are a major component of higher education, comprising one third of undergraduate students enrolled in U.S. colleges and universities (Markle, 2015; NPSAS:16).
- Although the six-year completion rates for adult students have been increasing in recent years, these rates are lower than traditional-age students (Causey et al., 2020).
- Much of this research is focused on full-time, traditional-aged, residential college students and may not have identified the factors that are critical for understanding adult undergraduate student persistence.

Adult students, also referred to as nontraditional students, are defined by the single criterion of being aged 25 years or older. These students are a major component of American higher education, with one third of undergraduate students considered nontraditional. The majority of adult students begin their college careers at two-year institutions.

Although six-year completion rates for adult students have increased in recent years, they are still significantly lower than those of traditional age students. However, much of the research around persistence has focused on full-time, traditional students. Less is known about the factors that determine adult student retention.

Summary of Literature Review

- Many adult students begin their postsecondary education at community colleges with the goal of earning a bachelor's degree or higher.
- Transfer process presents its own set of barriers, including poor academic advising, insufficient academic preparation, and transition challenges, which can further hinder adult students' degree attainment (Dowd et al., 2008; Laanan, 2004, 2007; Melguizo et al., 2011; Schwehm, 2017; Townsend & Wilson, 2006; Wood & Moore, 2015).

The reasons nontraditional students choose to pursue higher education are varied, and are generally the product of characteristics inherent to adult students. Adult students frequently have existing family commitments, and are more likely to be married and/or have dependents who rely on them for financial support. As a result, adult students often work full-time jobs and are more likely to attend college on a part-time basis. The responsibilities they have to their education are in response to other life circumstances they face.

While there are a number of motivating factors for adult students to enroll in college, for many their objective is to complete a bachelor's degree program. Although the majority start at a two-year institution with the intent to transfer and earn a bachelor's degree, the transfer process presents additional barriers to degree completion for adult students.

Some of these barriers include poor academic advising, insufficient academic preparation, and transition challenges. This transfer adjustment process is intensified when entering a new environment among students who are demographically distinct (such as being older than non-transfer students, as adult

students are). These differences can complicate transfer students' level of comfort with engaging in campus activities, establishing relationships with other students, and their general social and academic integration. These challenges faced by adult students can further hinder their retention and degree attainment. Six years after enrolling, the majority of these students have not earned any postsecondary credential.

Logistic Regression Analysis

- Data from the Beginning Postsecondary Student Longitudinal Study (BPS) 12:17 were used to conduct logistic regression analyses.
- The goal was to determine if beginning at a 2-year institution as opposed to a 4-year institution influenced bachelor's degree attainment rates for adult students who expected to earn a bachelor's degree or higher.

We analyzed data from BPS 2012-2017, conducted by the National Center for Education Statistics at the U.S. Department of Education. This is a large, nationally representative sample survey of first-time beginning undergraduate students in the United States, collecting data on a variety of topics, such as persistence, transfer, degree attainment, demographic characteristics, and workforce entry. Data were collected from student surveys and administrative data sources. There were over 22,000 respondents in BPS 2012-2017, but because we limited our analysis to the students aged 25 or older who reported an expectation to earn a bachelor's degree or higher, our sample size was approximately 700 students.

We created a logistic regression model to determine if control and level of institution (2-year public or private non-profit; 4-year public; 4-year private non-profit) were associated with bachelor's degree attainment rates for adult students (age 25+) who expected to earn a bachelor's degree or higher.

Logistic Regression Analysis

Primary independent variables of interest:

- Control and level of first institution
  - Public 4-year
  - Private non-profit 4-year
  - Public or private non-profit 2-year[3]

Included the following control variables:

- High school GPA
- Gender
- Race/Ethnicity
- Parents' highest level of education
- Pell or non-Pell recipient
- Dependents
- Enrollment intensity
- Work intensity
- Academic confidence
- Academic advising

[3] Very few students attended private nonprofit 2-year institutions, so this institution type was grouped with public 2-year institutions.

Research surrounding student retention has been a staple of higher education literature for decades. However, there are many assumptions baked in to these retention models, as they are focused on full-time, traditional-aged, residential college students and may not have identified the factors that are critical for understanding adult undergraduate student persistence.
Bearing these key differences in mind, adult student retention models seek to incorporate elements related to adult students' college experiences.

Two studies provided the theoretical framework for our model. The first was Bergman, Gross, Berry, and Shuck's Theory of Adult Learner Persistence in Degree Completion Programs, whose model included student entry characteristics, external environment, and internal campus environmental characteristics. Of the three, campus characteristics were found to have the greatest effect on persistence. Their study also found that persistence rates were lower among students who felt their work and academics conflicted to a great extent. Financial aid and the ability to pay for their degree was also significant.

The second was Bean and Metzner's Conceptual Model of Undergraduate

Nontraditional Student Attrition. Their research found patterns in student departure among non-traditional adult students that differed from traditional college students, specifically that the former are more affected by factors that are external to the college environment than the latter. Social integration variables exist both internally and externally to the college, but the internal variables have little impact on retention, while the external variables are more predictive. The process of attrition was expected to be similar regardless of the type of institution.

With these theories underpinning our own study, we used a stepwise regression approach, starting with no control variables and adding variables to test model fit. Variables that substantively improved the model fit were included, whereas those that did not were left out. The dependent variable was a dichotomous variable indicating whether or not the student had attained a bachelor's degree. The independent variables in our model are shown on the slide.

Results

Table 1. Logistic Regression Analysis Predicting Bachelor's Degree Attainment of Adult Students

Predictor	B	e^B (odds ratio)	p-value	Odds Ratio 95% Confidence Interval	
				Lower	Upper
Intercept	-2.638	0.071	0.242	.001	6.024
Grade Point Average in High School					
≥ 3.0	1.034	2.813	0.426	.218	36.29
Skipped	1.120	3.066	0.316	.340	27.62
Female	-0.268	0.765	0.682	.211	2.78
Underrepresented Minority or More than One Race	-0.991	0.371	0.196	.082	1.68
First Generation Student	-0.221	0.802	0.868	.059	10.92
Academic Confidence in 2011-12: Strongly Agree	0.668	1.950	0.357	.468	8.12
Pell Grant in 2011-12	-0.779	0.459	0.250	.121	1.74
Dependents in 2011-12	-0.035	0.966	0.952	.311	3.00
Enrollment Spell (First): Intensity Through June 2017					
Full-Time	-0.616	0.540	0.312	.163	1.79
Part-Time***	-7.769	0.000	0.000	.000	.012
Work Intensity While Enrolled in 2011-12					
Part-Time	1.281	3.599	0.103	.769	16.84
Full-Time	0.357	1.429	0.629	.334	6.11
Used Academic Advising in 2011-12	0.586	1.797	0.437	.408	7.91
Control and Level of First Institution (IPEDS sector) 2011-12					
Public 4-Year	-0.291	0.748	0.829	.053	10.63
Private Non-profit 4-Year*	1.533	4.632	0.026	1.20	17.83

*p < .05. ***p < .001.

Enrollment Intensity

In comparison to mixed enrollment intensity, part-time enrollment during the first enrollment spell decreased the odds of a student obtaining a bachelor's degree to essentially zero.

Full-time enrollment did not lead to a statistically significant difference in the odds of a student obtaining a bachelor's degree compared to mixed enrollment intensity.

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This table shows regression coefficients and odds ratios for each independent variable in our logistic regression model.

Most of the variables are self-explanatory. We did have to group some categorical variables together due to error messages in PowerStats regarding small numbers of observations for certain dummy variables. For example, for race/ethnicity, we had to combine all underrepresented minorities into a single dichotomous variable, with whites and Asians combined as the reference group.

While odds ratios for the control variables generally aligned with prior theory and empirical studies (for example, students with high HS GPAs were more likely to graduate than students with low GPAs), most of the odds ratios were not statistically significant. The fact that we didn't detect significant odds ratios by GPA or Pell Status or some of the other commonly accepted predictors of student retention is potentially related to our small sample size causing low power in this study.

There were two significant predictors of bachelor's degree attainment in our model:

enrollment intensity and control and level of first institution. Part-time enrollment intensity decreased the odds of a student obtaining a bachelor's degree to essentially zero in comparison to mixed enrollment intensity (which was a mix of full-time and part-time enrollment). The odds ratio was .0004. In other words, the estimated odds were about 99.9% lower when enrolled exclusively part-time compared to mixed enrollment intensity. This isn't surprising because it's nearly impossible for a student enrolled entirely part-time to graduate with a bachelor's degree in the six-year BPS timeframe. Our model did not detect a statistically significant difference in the odds of an adult student obtaining a bachelor's degree when enrolled full-time compared to mixed enrollment intensity. This suggests that the message of college completion advocacy groups, such as Complete College America and its "15 to Finish" campaign, recommending increased enrollment intensity for greater persistence, may not be appropriate for adult students.

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Control & Level of First Institution

Students whose first institution was a **private non-profit** 4-year institution were more likely to obtain a bachelor's degree compared to students whose first institution was a public or private non-profit 2-year institution.

No statistically significant difference in the odds of bachelor's degree attainment were found between students beginning at a public 4-year institution compared to students beginning at a public or private non-profit 2-year institution.

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The other significant predictor in our model was control and level of first institution. The odds of obtaining a bachelor's degree were 4.6 times greater (or in other words, about 360% higher) for adult students whose first institution was a private non-profit 4-year institution compared to students who first attended a public or private non-profit 2-year. However, there wasn't a statistically significant difference in the odds of obtaining a bachelor's degree for adult students whose first institution was a public 4-year institution compared to those whose first institution was a public or private non-profit 2-year institution.

Measure of Fit

- The null model, only containing the intercept, had a log likelihood of -57704.18, while the full model including all predictor variables had a log likelihood of -41840.52, indicating a better fit for the full model. The Wald F-statistic for the full model is 2.132 (p = 0.01), supporting the predictive power of the full model over the null model.

Negative log-likelihood (Pseudo R^2) -2 log-likelihood	0.275
Log likelihood, intercept-only model	-57704.18
Log likelihood, full mode	-41840.52
Likelihood ratio (Cox-Snell)	.172
Likelihood ratio (Cox-Snell) Maximum	.496
Likelihood ratio (Estrella)	.198
Degrees of freedom for Wald	200
Number of categories	15
Wald F	2.132 (p = 0.01)

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Two common measures of overall model fit, the likelihood ratio test and the Wald-F statistic indicated that our model with predictor variables was a statistically significant better fit than not including any predictor variables. Similarly, the pseudo R^2 of 0.275 indicated that the variables in our model were moderately effective in predicting the outcome.

Conclusion

After controlling for a number of demographic, socioeconomic, and academic variables, beginning at a 2-year public or private non-profit institution does not have a negative influence on bachelor's degree attainment compared to starting at 4-year public institutions for adult students whose goal is to earn a bachelor's degree.

When examining enrollment intensity, full-time enrollment intensity does not increase the odds of persistence compared to mixed enrollment (full- and part-time) intensity for adult students. This may suggest that campaigns such as Complete College America's "15 to Finish" movement, which suggests that students enroll in 15 credit hours per semester to graduate in 4 years, may not be appropriate for adult students.

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While completion rates at community colleges are lower than those at public 4-year schools, once we controlled for demographic, socio-economic, and academic characteristics, we found that adult students were just as likely to attain their goal of earning a bachelor's degree when they started at community college as when they started at a public 4-year school. This is good news, as most adult students hoping to earn a bachelor's degree *do* start at community colleges, which are often the most accessible and affordable option.

Full-time enrollment intensity did not lead to a statistically significant difference in the odds of an adult student obtaining a bachelor's degree compared to mixed enrollment intensity. A number of well-meaning state and federal policymakers – and institutions -- continue to encourage students to increase the number of their credit hours per semester, driven in part by Complete College America's "15 to Finish" campaign and its push for policies that encourage 15 credit hours per semester. "15 to Finish" might be effective for *traditional* undergraduate students, but we need more nuance around messaging and policy-making for *nontraditional* students. We also shouldn't mistake correlation for causation. For many students, enrollment intensity and degree attainment can be impacted by affordability,

outside work and family commitments, academic preparation, and so on. There are many potential confounding variables that we need to be aware of before making generalizations.

Limitations

- Sample size
- Time length of the BPS survey

Next Steps

- Further analysis that will incorporate additional explanatory variables such as institutional selectivity and interaction terms.

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There are several limitations in our study. We had a relatively small sample size after filtering the BPS dataset down to address our research question (about 700 students). The small sample size presented some analysis problems in PowerStats. As previously mentioned, we had to combine certain categorical variables together, like underrepresented minorities, instead of modeling outcomes for individual minority categories.

The analysis is also probably underpowered – meaning there could be differences in attainment that we couldn't detect – for example, by Pell status or GPA. We might also see *differences* by community college and public 4-years if we had a larger sample. The underpower issue is also causing large variance of estimates. Even though we detected a significant effect for private 4-year institutions, it's difficult to estimate how large this effect was because the 95% confidence interval for the odds ratio was between 1.2 and 17.8.

Another limitation was the 6-year longitudinal time frame of the BPS study. We would need a longer time length to understand attainment rates for part-time students. This restriction of range problem might also be affecting the odds ratios

for mixed enrollment intensity. Some mixed enrollment students likely take longer than six years to earn a bachelor's degree. If the BPS time-frame were extended, we might detect a higher level of bachelor's degree attainment for the mixed enrollment students.

For next steps, our team is considering applying for a restricted-use data license so that we can model interaction terms, which we were unable to do in PowerStats. We suspect that there are potential interaction effects, such as enrollment intensity and level of institution; and enrollment intensity and work intensity. For example, descriptive statistics revealed that students at 2-year institutions were more likely to graduate when enrolled with mixed intensity than full-time intensity, but students at 4-year institutions were less likely to graduate when enrolled with mixed intensity than full-time intensity. We also hypothesize that work intensity may moderate the effect of enrollment intensity on bachelor's degree attainment.

Thank you!

Descriptive Analysis

Figure 1. *Demographic and Socioeconomic Frequencies*[1]

[1] Some categories do not total to 100% due to reporting standards not being met.

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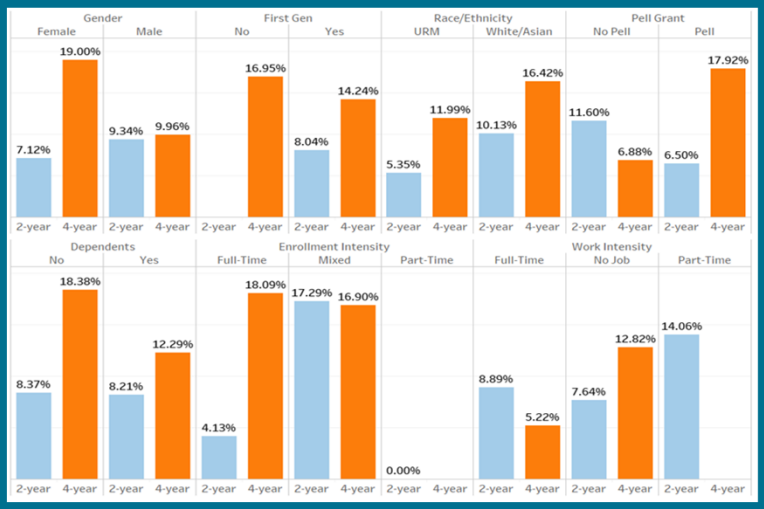
Demographic and socioeconomic characteristics of adult students (age 25+) who expected to earn a bachelor's degree or higher by 2-year and 4-year institution (BPS:12/17).

Descriptive Analysis

Figure 2. *Bachelor's Degree Attainment Rates for Adult Students by 2-Year and 4-Year Institutions*[2]



[2] Some categories have no data due to reporting standards not being met.

Bachelor's degree attainment rates for adult students who expected to earn a bachelor's degree or higher by 2-year and 4-year institution (BPS:12/17).