Research Report

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# Predicting College Completion of Students Who Take the ACT® With Accommodations

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## Conclusions

This study provides evidence that ACT® Composite scores may be a better predictor of first-year college GPA (FYGPA) and college degree completion than high school GPA (HSGPA) for students who test with accommodations (i.e., students with disabilities), and the use of both ACT scores and HSGPA together results in more accurate and informative predictions. Consistent with prior research, statistically significant interactions were observed between ACT scores and HSGPA across all the outcomes studied, indicating that the predictive strength of ACT Composite score increases as HSGPA increases (and vice versa). However, significant differences were found in the relationships among ACT Composite scores, HSGPA, and some of the outcomes for students who tested with accommodations than for students who tested without accommodations. ACT Composite scores and HSGPA may be capturing different aspects of college readiness and, when used in conjunction, should yield more accurate predictions of college outcomes than either measure alone. Future research is needed to replicate this study with other populations and to disentangle the effects of different types of disabilities and accommodations on predicting college outcomes.

## So What?

Previous research has shown that students with disabilities tend to graduate high school, enroll in college, and graduate college at lower rates than their peers. It is important to identify students who are likely to be successful in college and to identify those who are likely to be successful if they receive additional supports. This study provides evidence that ACT scores may be a better predictor of college success than high school GPA for students with disabilities, and the use of both ACT scores and high school GPA may provide better information about a students' likelihood of success than either measure alone.

## Now What?

This study found evidence that students with disabilities may be better served if postsecondary institutions use multiple measures, including standardized test scores, to assess their prior academic performance and levels of college readiness. However, in many cases, postsecondary institutions do not have information about students' disability status. They should, therefore, make use of multiple measures for all students to inform the institutions of the levels of preparation of each student and the potential need for additional resources students need to be successful in college. Once in college, students with disabilities should be encouraged to seek out appropriate supports or accommodations to ensure that they have equitable access to the curriculum and can adequately demonstrate their learning, which will increase their chances of success.

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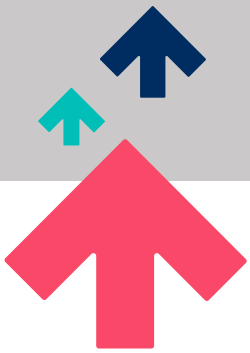


## Abstract

This study investigated the value of ACT Composite scores and high school GPA (HSGPA) in predicting first-year college GPA (FYGPA) and degree completion of students with disabilities who took the ACT with accommodations and enrolled at a two-year or four-year public institution in a single state in the southern US. Descriptive analyses found that students who tested with accommodations tended to have lower HSGPAs, lower ACT Composite scores, lower FYGPAs, and lower degree completion rates than their peers who tested without accommodations, which is a finding consistent with prior research. Students who tested with accommodations also tended to have higher correlations between ACT Composite scores and FYGPA than between HSGPA and FYGPA, whereas students who tested without accommodations tended to have higher correlations between HSGPA and FYGPA than between ACT Composite scores and FYGPA. Regression analyses found that models including only ACT Composite scores, accommodation status, and an interaction between ACT Composite scores and accommodation status as predictors were less likely to have statistically significant accommodations or interaction effects (two of seven outcomes). At the same time, all of the models that included HSGPA, accommodation status, and an interaction between HSGPA and accommodation status as predictors had significant interaction effects such that the increase in a given predicted outcome given a one-unit increase in HSGPA was greater for students who tested without accommodations than for students who tested with accommodations. Models including both ACT Composite score and HSGPA together as predictors improved model fit, and statistically significant interactions were found across all outcomes such that the relationship between ACT Composite score and each outcome increased as HSGPA increased, and vice versa. However, for several of the outcomes, significant three-way interactions or significant interactions between HSGPA and accommodations status meant that the increase in a given outcome as ACT Composite score and/or HSGPA increased was greater for students who tested without accommodations than students who tested with accommodations.

# Introduction

Students who take the ACT® test with accommodations for a disability report their intention of attending college at rates that are similar to students who take the ACT without accommodations (Moore & Schnieders, 2022). However, students with disabilities (SWD) may face barriers in their education, such as less access to a rigorous core academic curriculum or other accessibility issues (e.g., lack of access to accurate diagnosis or adequate classroom supports) that can impact both their college readiness and their access to further educational opportunities (Butrymowicz & Mader, 2017; Schwartz et al., 2019).

In high school, SWD tend to have a lower grade point average (HSGPA) and lower test scores than their peers without disabilities (Huh & Huang, 2016; Moore & Schnieders, 2022). SWD also tend to graduate high school at a lower rate than their peers. According to the National Center for Education Statistics (NCES, 2021), the percentage of SWD graduating high school (68%) was much lower than the national average (86%). The U.S. Bureau of Labor Statistics also reported that adults with a disability were less likely to complete high school compared to adults without a disability (79% vs. 90%; Bureau of Labor Statistics, U.S. Department of Labor, 2015).

After high school, SWD are less likely to enroll in postsecondary education, and of those who do attend college, their college graduation rates are lower compared to their peers without disabilities. For example, Shifrer and Freeman (2021) found that 48%–58% of SWD enrolled in college within three years of graduating high school, while the percentage for students without disabilities was 73%. A report from the National Longitudinal Transition Study also indicated that SWD attend postsecondary education at a lower rate overall when compared to their peers (60% vs. 67%), although some differences were found when comparing attendance by school type (Newman et al., 2011). SWD attended two-year colleges (44% vs. 21%) and vocational, business, or technical schools (32% vs. 20%) at a higher rate than their peers but attended four-year colleges at a lower rate (19% vs. 40%). In addition to lower enrollment rates, SWD tend to have lower first-year college GPA (FYGPA) than their peers (Huh & Huang, 2016). In terms of college degree completion, Newman et al. (2011) reported that SWD were less likely to complete a degree or program compared to the general population (41% vs. 52%), again with some differences by institution type: SWD were more likely than their peers to earn a degree at a two-year college (41% vs 22%) but less likely than their peers to earn a degree at a vocational, business, or technical school (57% vs. 65%) or a four-year college (34% vs. 51%). This is consistent with the U.S. Bureau of Labor Statistics data, which showed that only 16% of adults aged 25 and older with a disability completed at least a bachelor's degree, compared to 35% of adults without a disability (Bureau of Labor Statistics, U.S. Department of Labor, 2015).

ACT is committed to helping all students achieve educational and workplace success. The ACT test is a college readiness assessment comprised of four multiple-choice section tests (English, math, reading, and science) plus an optional writing test. The four subject tests are averaged into a Composite score. The ACT is used in college admissions (Wood, 2024; Yale, 2024), course placement (Vanderbilt University, 2024; Lake Superior College, 2024; Valencia College, 2024; Adams State University Colorado, 2024), scholarships (ACT, 2024a; Princeton Review, 2024), identifying college-ready students or students in need of additional resources to become

college ready (ACT, 2024b), and other opportunities. As such, it is important that the ACT is an accurate predictor of college success (e.g., college grades, degree completion) for all students, including students with disabilities who take the test with accommodations.

Accommodations are changes to test administration conditions such as timing (e.g., extra time), presentation (e.g., large print), response mode (e.g., speech-to-text), and/or setting (e.g., small group) that allow SWD to more accurately demonstrate their knowledge and skills (DePascale & Gong, 2020). SWD can request accommodations when they register to take the ACT, and accommodations are granted based on students' Individualized Education Program (IEP), Section 504 Plan, or other documentation (ACT, 2024c). Students who are English learners can also request a subset of accommodations called testing supports when they register to take the ACT, but these students are not the subject of this study.

One of the methods by which ACT demonstrates that the ACT test is an accurate predictor of college success is by conducting validity studies. Previous studies have looked at the predictive validity of the ACT in predicting success in college for general populations of students (i.e., either excluding SWD altogether or not disaggregating SWD when analyzing data and reporting findings), including FYGPA and degree completion. For example, Radunzel and Noble (2012) found that both ACT scores and HSGPA were effective predictors of degree completion at both two and four-year postsecondary institutions. Test scores increased prediction accuracy over HSGPA alone. ACT scores and HSGPA were indirectly related to college outcomes through FYGPA. The ACT College Readiness Benchmarks were also useful for predicting long-term college success (Allen, 2013; Allen & Radunzel, 2017).

Previous research has also examined differences in the predictive validity of the ACT for different subgroups. For example, Radunzel and Noble (2013) looked at differences across racial/ethnic, family income, and gender groups when using ACT Composite score (ACTC) and HSGPA to predict long-term college outcomes. Total group predictions based on ACTC overestimated college success of students from traditionally underserved racial/ethnic backgrounds, students from lower income families, and male students, and underestimated success of White students, students from higher income families, and female students. Greater over- and underprediction was found when using HSGPA alone instead of ACTC alone for race/ethnicity and income, but the opposite was found for gender. Using both ACTC and HSGPA increased prediction accuracy across student demographic groups. Sanchez (2013) found that across subgroups, using both ACTC and HSGPA together to predict successive levels of FYGPA resulted in greater prediction accuracy than either predictor alone. He also found slight overprediction of the probabilities of success of Hispanic, African American, and male students, and students from lower income families in models using both ACTC and HSGPA together. The patterns of over- and underprediction found by the ACT studies (Radunzel & Noble, 2013; Sanchez, 2013) were consistent with research on other college admissions assessments (Mattern et al., 2008), which revealed evidence of underprediction for female students and students whose best language was not English and overprediction for male, American Indian, African American, and Hispanic students.

Fewer studies have specifically looked at predicting college outcomes for students with disabilities taking the ACT with accommodations. Ziomek and Andrews (1996) predicted FYGPA for students with disabilities who took the ACT with accommodations. They found that SWD who tested with accommodations had lower ACT scores and lower FYGPA than students who tested without accommodations. They also found evidence of overprediction of FYGPA and lower correlations between predicted and actual FYGPA for students who tested with accommodations. Huh and Huang (2016) replicated and expanded Ziomek and Andrews' (1996) study, in which they used ACT scores, HSGPA, and both indicators together to predict FYGPA for students who tested with accommodations. The results showed that SWD tended to have lower ACT Composite scores, lower HSGPA, and lower FYGPA than students without disabilities. Additionally, they found that using ACT Composite score or HSGPA alone resulted in the overprediction of FYGPA for SWD. They also found that models including both ACT scores and HSGPA together resulted in better prediction of FYGPA than either indicator alone, with overprediction reduced or in some cases eliminated when both indicators were included.

Further, to our knowledge, the relationship between ACT scores and longer term college outcomes, such as degree completion, has not been studied for students who took the ACT with accommodations. In this study, we expand on the current literature by examining several cohorts of students who took the ACT and enrolled in a public two-year or four-year institution in a southern state in the US to answer the following research questions.

## Research Questions

1. To what extent does the ACT predict first-year college GPA and degree completion similarly (i.e., is the direction and magnitude of the relationship the same) for students who test with accommodations and students who test without accommodations?

2. To what extent does HSGPA predict first-year college GPA and degree completion similarly (i.e., is the direction and magnitude of the relationship the same) for students who test with accommodations and students who test without accommodations?

3. When used together, to what extent do both predictors together predict first-year college GPA and degree completion similarly (i.e., is the direction and magnitude of the relationship the same) for students who test with accommodations and students who test without accommodations?

4. Does joint use of ACTC and HSGPA improve prediction accuracy over the use of either predictor by itself?

## Hypotheses

Based on previous research, SWD who take the ACT with accommodations are expected to have lower college GPA and lower degree completion rates compared to students who take the ACT without accommodations. They are also expected to have lower ACT scores and lower HSGPAs compared to their peers, which will explain part of the differences in outcomes. We

hypothesize that much of the differences in outcomes for SWD are due to group differences in students' level of academic preparation (as measured by self-reported high school grades and ACT Composite scores) and demographic characteristics (i.e., race/ethnicity, gender, parent education, and family income). Therefore, we expect that HSGPA and ACT scores will be statistically significant predictors of college success (i.e., first-year GPA and degree completion) for students who test with or without accommodations; further, we expect that using both HSGPA and ACT scores together will improve prediction over either measure alone.

## Limitations of Data Sample

Note that throughout this paper our focus is on students who took the ACT with accommodations for disabilities (also referred to as students who tested with accommodations) rather than students with disabilities. While students who take the ACT with accommodations for disabilities are students with disabilities, not all students with disabilities take the ACT with accommodations. Because some students in the group testing without accommodations could be students with disabilities, the results should be interpreted in terms of the predictive validity of scores of students with disabilities who test with accommodations, not necessarily the predictive validity of scores of all students with disabilities.

We did not have information about the supports SWD may have received in college, which would influence the outcomes of interest in this study. For example, some students may choose not to report that they have a disability in college (Newman & Madaus, 2015), which may limit their opportunities to receive accommodations and may result in lower college grades relative to their performance in high school where they did receive accommodations.

Another limitation of this study was the lack of data about students' disabilities and accommodations received in high school. It was not clear which specific disabilities each student had and which accommodations they used when taking the ACT. A previous study (Moore & Schnieders, 2022) found a large amount of variation in ACT performance among students with different disability types (e.g., neurodevelopmental, physical/sensory, and psychological disabilities). The results of this study may differ by specific disabilities or combinations of disabilities. We were also unable to investigate the impact of specific accommodations. The number of students who tested with accommodations each year were also too small to investigate any potential cohort effects or differences in the results by cohort year.

The data we have was limited to students who enrolled at two-year and four-year public institutions in a single state, so we do not know the college outcomes of students who may have enrolled at (or transferred to) private institutions or out-of-state institutions.

There was some heterogeneity in the selectivity of institutions across the state, defined for the purpose of this study as the average ACT Composite scores of students enrolled at each institution. This could impact students' level of academic preparation at different institutions and therefore students' completion rates at different institutions. It could also impact the proportions of SWD attending different institutions. Hierarchical linear modeling (HLM) and cluster robust

standard error models were considered to account for institutional differences, but due to the small sample sizes of students who tested with accommodations at some institutions as well as the inclusion of transfer students in the long-term outcomes, we determined that it was not feasible nor essential to disaggregate or analyze results to take into account institutional differences. From a student success perspective, earning a higher FYGPA or earning a college degree is the outcome of interest regardless of the institution at which it was earned. While there may be institution-specific effects, the relationship of interest for this study is the predictive validity of ACT Composite scores and HSGPA, and the relevant point of time for prediction is when students take the ACT, before they have selected into different colleges.

## Study Sample

Table 1 contains the number of students in the study sample by institution type and accommodations status. The sample included 143,768 ACT-tested students who last took the ACT test in 11th (14%) or 12th grade (85%), graduated high school between 2008–2016, and enrolled full time at a public two-year or four-year public institution the fall after high school graduation in a single state in the southern United States for the college cohort years 2008–2009 to 2016–2017 (meaning students who graduated high school in the 2007–2008 school year and enrolled in college in the 2008–2009 school year, etc.). The numbers of students in the study sample by cohort year can be found in the Appendix, Table A1. ACT test dates ranged from September 2005 to June 2016.[1] The sample of postsecondary institutions where students enrolled included 22 two-year institutions and 10 four-year institutions. Students within a given cohort were followed through six years of college. The sample included students who enrolled from within the state (82%) and students who enrolled from out-of-state (18%). For students who were enrolled at more than one college during their first fall semester, the school in which they had greater numbers of credit hours attempted and credit hours earned was considered their primary enrolled college. In this sample, 2,659 (2%) students took the ACT with accommodations, while 141,109 (98%) students took the ACT without accommodations.

**Table 1.** Number of Students in the Study Sample by Institution Type and Accommodation Status

| Institution Type | No Accommodations | Accommodations | Total |
|---|---|---|---|
| 2-Year | 34,805 (25%) | 888 (33%) | 35,693 (25%) |
| 4-Year | 106,304 (75%) | 1,771 (67%) | 108,075 (75%) |
| Total | 141,109 | 2,659 | 143,768 |

Overall, 25% of students in the sample initially enrolled at a two-year institution and 75% enrolled at a four-year institution. Students who tested with accommodations were somewhat

[1] Ninety-six percent of students in the study sample took their last ACT test as part of the National Testing program, and 4% took the ACT as part of State and District testing. The state provided optional state-funded District testing during the 2008–2009 to 2014–2015 school years and began testing statewide in 2015–2016.

more likely to be enrolled at a two-year institution (33%) compared to students who tested without accommodations (25%).

## Transfer Students

Table 2 contains the number of colleges students attended across six years by accommodation status in the study sample. Transfer students were included in the study sample to maximize sample sizes. From a student success perspective, earning a certificate or degree is more important than where the degree was earned. For the purpose of this study, transfer students are limited to students who enrolled in one or more of the 22 studied institutions and then transferred to another of the studied institutions. Students who started at an institution outside of the 22 studied institutions and transferred into a studied institution or who began at one of the studied institutions but then transferred to an outside institution were not included in this study. When examining transfer patterns through six years of college, the majority of students in the study sample (66%) attended one college, while 27% attended two colleges and 7% attended 3 or more colleges. Patterns were similar for students testing with and without accommodations.

**Table 2.** Number of Colleges Attended Across Six Years, Students Testing With and Without Accommodations in Study Sample

| Number of Colleges Attended | No Accommodations | Accommodations | Total |
|---|---|---|---|
| 1 | 92,821 (66%) | 1,808 (68%) | 94,629 (66%) |
| 2 | 38,525 (27%) | 663 (25%) | 39,188 (27%) |
| 3 or more | 9,763 (7%) | 188 (7%) | 9,951 (7%) |

Table 3 contains the number of colleges students attended concurrently, by accommodation status, of those students who attended more than one college in the study sample. Of those students who attended more than one college across the six years observed for this study, most of them (87%) only attended one college at a given time. In other words, most students who attended more than one college were transfer students rather than dual-enrolled students. A smaller proportion attended two colleges concurrently (13%), and less than 1% of students attended more than two colleges concurrently. Patterns were similar for students testing with and without accommodations.

**Table 3.** Number of Colleges Attended Concurrently, of Students Testing With and Without Accommodations Attending More Than One College in the Study Sample Across Six Years

| Number of Colleges Attended Concurrently | No Accommodations | Accommodations | Total |
|---|---|---|---|
| 1 | 41,916 (87%) | 719 (84%) | 42,635 (87%) |
| 2 | 6,309 (13%) | 130 (15%) | 6,439 (13%) |
| 3 or more | 63 (0.1%) | 2 (0.2%) | 65 (0%) |

## Missing Data

This study relied on several self-reported variables, including gender, race/ethnicity, parent education, family income, and high school GPA (HSGPA). To minimize missing data, non-missing values were pulled from previous test administrations in cases where it was available, and for gender, missing values were also pulled from the college data files. HSGPA was derived where available based on student responses to items asking about courses taken and grades earned. A second self-report HSGPA item was used for students who did not provide course/grade information.[2] This second item asks for students' overall high school average and is an ordinal variable ranging from D− to D (0.5–0.9) to A− to A (3.5–4.0). The midpoint for each category was calculated for each range (e.g., 0.75 for D− to D, 3.75 for A− to A) and used to replace missing HSGPA. The correlation between this item and the self-reported HSGPA derived from courses taken and grades earned was 0.78.

After replacing missing data with self-report data from previous test administrations, there were still some students with missing demographic information and HSGPA. Table 4 contains the percentages of students with missing demographics and HSGPA information, overall and by accommodation status, after replacing missing data with self-report data. Students testing with accommodations were more likely to have missing self-reported information. Parent education in particular had a very high proportion of missing data across both students testing with and without accommodations; therefore, missing values were not imputed for this variable and a "parent education missing" category was included in the models, as will be described below.

**Table 4.** Percentages of Students Missing Demographics and HSGPA Information, Overall and by Whether Students Tested With Accommodations

| Student Characteristic | No Accommodations | Accommodations | Total |
|---|---|---|---|
| Missing Gender | 0.0% | 0.0% | 0.0% |
| Missing Race/Ethnicity | 2% | 17% | 2% |
| Missing Parent Education | 41% | 55% | 41% |
| Missing Income | 5% | 22% | 5% |
| Missing HSGPA | 2% | 18% | 2% |

Multiple imputation was used to estimate missing demographic information for the regression models. ACT Composite score and HSGPA were mean-centered prior to imputation. The MICE package in R (van Buuren & Groothuis-Oudshoorn, 2011) was used to perform the multiple imputation, analysis, and aggregation of results. All predictors and outcomes were included as imputation covariates to maximize the information used to impute missing data (Moons et al., 2006; Sterne et al., 2009). Data imputation and analyses were conducted separately for two-year and four-year models. Data were analyzed and the results combined across five imputed

[2] This field provided an estimated HSGPA for an additional 7% of students who tested without accommodations and 5% of students who tested with accommodations.

datasets using the pool() function. Details about the procedures used by the MICE package can be found at the R CRAN website.

# Study Design

## Predictors

The predictor variables used in this study are data collected from students who took the ACT, including ACT Composite scores, HSGPA, and student demographic variables.

- ACT Composite score, on a 1–36 scale. For students who took the ACT more than once and did not receive accommodations for any of their tests, their most recent score was used. In cases where students took the ACT at least once with accommodations, the most recent score that they obtained while testing with accommodations was used.

- Self-reported HSGPA, on a 0.00–4.00 scale. HSGPA is based on students' responses to questions about courses taken and grades earned in 23 common high school courses and are collected at the time students register to take the ACT. Self-reported grades earned were aggregated across the 23 courses, and the midpoints of a separate, single, ordinal measure of HSGPA ranging from D− to D (0.5–0.9) to A− to A (3.5–4.0) were used in cases of missing data about courses taken and grades earned.

- Student demographic variables, collected at the time students register to take the ACT (with the exception of gender, which was supplemented by information in the college data files in cases of missing data).

    - Gender: male or female (an "another gender" option was not available at the time the data were collected).

    - Race/ethnicity: Asian, Black/African American, Hispanic/Latino/Latinx, White, or other race/ethnicity (due to small sample sizes, American Indian/Alaska Natives, Native Hawaiian/Other Pacific Islanders, and students reporting two or more races were combined into an "other race/ethnicity" group).

    - Parent education: one or more parents completed at least some college, neither parent completed any college (i.e., less than high school or high school graduate/GED), or missing.

    - Family income: Less than $36,000, $36,000 to $60,000, $60,000 to $100,000, or greater than $100,000.

## Outcomes

The outcome variables used in this study are data collected from public two-year and four-year institutions in a single state in the southern United States.

- FYGPA: Cumulative first-year college GPA at the end of students' first-year spring semester at their primary-enrolled college. This outcome was examined separately for students enrolled at two-year and four-year institutions.
- Degree completion for students who initially enrolled at a four-year institution:
    - Earned a bachelor's degree within four years (on-time degree completion).
    - Earned a bachelor's degree within six years (150% time degree completion).
- Degree completion for students who initially enrolled at a two-year institution:
    - Earned a certificate or associate's degree within two years (on-time degree completion).
    - Earned a certificate or associate's degree within three years (150% time degree completion).
    - Earned a certificate or associate's degree or transferred to a four-year institution within three years and earned a bachelor's degree or remained enrolled at the end of year three.

Note that for simplicity, we refer to "associate's degree" as shorthand for "certificate or associate's degree" throughout the rest of the paper. Similarly, we also refer to "associate's degree or transferred to a four year institution" as shorthand for "certificate or associate's degree or transferred to a four-year institution within three years and earned a bachelor's degree or remained enrolled at the end of year three" throughout the rest of the paper.

# Analyses

## Descriptives

The mean, range, and standard deviations of ACT Composite scores, HSGPA, and FYGPA were calculated overall and by accommodation status and institution type (two-year and four-year). Distributions (percentages) of each student demographic category (gender, race/ethnicity, parent education, and parent income) were calculated overall and by accommodation status and institution type. Each of the degree completion outcomes (percentages) were also calculated overall and by accommodation status. Correlations were calculated among ACT Composite scores, HSGPA, and FYGPA, overall and by accommodation status and institution type.

## Regression Models

Linear regression was used to predict FYGPA, and logistic regression was used to predict degree completion. ACT Composite score and HSGPA were mean-centered prior to running the models to simplify the interpretation of the regression coefficients for the accommodation effect and to address multicollinearity of the predictor variables and interaction terms. Four models

were estimated for each outcome. Model 1 includes ACT Composite score, accommodation status, and an interaction between ACT Composite score and accommodation status. Model 2 includes HSGPA, accommodation status, and an interaction between HSGPA and accommodation status. Model 3 includes ACT Composite score, HSGPA, and accommodation status, as well as all two-way interactions and the three-way interaction amongst the predictors. Model 4 incorporates all the predictors used in Model 3 in addition to student demographic variables (gender, race/ethnicity, parent education, and family income). For this model, the reference groups are *female* for gender, *White* for race/ethnicity, *parent who attended at least some college* for parent education level, and *income less than $36,000* for family income. Table 5 contains the full list of predictor variables included in each of the models.

**Table 5.** Regression Models

| Model No. | Model Description | Variable |
|---|---|---|
| **Model 1** | **ACTC** | ACTC<br>Accommodations<br>ACTC * Accommodations |
| **Model 2** | **HSGPA** | HSGPA<br>Accommodations<br>HSGPA * Accommodations |
| **Model 3** | **ACTC + HSGPA** | ACTC<br>HSGPA<br>Accommodations<br>ACTC * Accommodations<br>HSGPA * Accommodations<br>ACTC * HSGPA<br>ACTC * HSGPA * Accommodations |
| **Model 4** | **ACTC + HSGPA + Student Demographic Variables** | ACTC<br>HSGPA<br>Accommodations<br>ACTC * Accommodations<br>HSGPA * Accommodations<br>ACTC * HSGPA<br>ACTC * HSGPA * Accommodations<br>Male<br>Asian<br>Black<br>Latinx<br>Other Race/Ethnicity<br>Parents No College<br>Parent Education Missing<br>Income $36,000–$60,000<br>Income $60,000–$100,000<br>Income $100,000+ |

## Plots

Plots were created to visually represent predicted outcomes for students testing with and without accommodations across the 5th and 95th percentiles of the ACT score scale (12–30 for four-year institutions and 12–25 for two-year institutions) and HSGPA scale (2.0–4.0). The 5th and 95th percentiles were based on the total group samples (students testing with and without accommodations) for each institution type.

## Model Fit

$R^2$ statistics were calculated to compare the proportion of variance explained by each of the linear regression models predicting FYGPA. A higher $R^2$ indicates that a greater proportion of the variance in a given outcome is explained by the predictors in the model. Two model fit statistics were examined to compare how well the data fit each of the logistic models predicting degree completion. Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are both measures of model fit that take into account the number of parameters in the model, and lower values indicate better fit.

## Residuals

Analysis of residuals was also conducted to examine the extent to which the outcomes of students who tested with or without accommodations were underpredicted, overpredicted, or accurately predicted. Residual analysis is a common method for estimating differential prediction for special-tested populations, in which the regression equations are estimated for the total group, and the resulting coefficients are applied to each group to obtain the predicted outcomes to be compared to the actual outcomes (Huh & Huang, 2016; Mattern et al., 2008; Ziomek & Andrews, 1996). For this analysis, the models were re-run excluding all accommodation effects and interaction effects including accommodation status as a predictor. Residuals are calculated by taking the model-based predicted outcome values subtracted from the actual outcome values. Residuals that are greater than zero (actual > predicted) indicate underprediction, and residuals that are less than zero (actual < predicted) indicate overprediction. Underprediction indicates that students earned a FYGPA that was higher than predicted or earned a degree at higher rates than predicted. Overprediction indicates that students earned a FYGPA that was lower than predicted or earned a degree at lower rates than predicted. Average residuals calculated by accommodation status provide estimates of whether the outcomes of students testing with accommodations were being systematically over- or underpredicted.

# Results

## Descriptives

Table 6 contains the percentages of students reporting each student demographic characteristic overall, by accommodation status, and by institution type. In general, the percentages were similar across institution type, except that compared to students who enrolled at two-year institutions, students who enrolled at four-year institutions were more likely to have parents who

attended at least some college (50% vs. 38%) and family incomes of above $100,000 (19% vs. 8%). There were some differences by accommodation status. Male students were more likely to have taken the ACT with accommodations, and students who tested with accommodations were more likely to omit race/ethnicity, parent education, and parent income.

**Table 6.** Percentages of Students in Each Demographics Category (Overall, by Accommodation Status, and by Institution Type)

| Student Characteristic | Total (%) | No Accomm. (%) | Accomm. (%) | 2-Year (%) | 4-Year (%) |
|---|---|---|---|---|---|
| Female | 56 | 56 | 43 | 58 | 55 |
| Male | 44 | 44 | 57 | 42 | 45 |
| Black/African American | 17 | 17 | 14 | 16 | 18 |
| American Indian/Alaska Native | 1 | 1 | 1 | 1 | 1 |
| White | 70 | 70 | 62 | 71 | 70 |
| Hispanic/Latino/Latinx | 5 | 5 | 4 | 7 | 5 |
| Asian | 2 | 2 | 1 | 1 | 2 |
| Native Hawaiian/Other Pacific Isl. | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Two or More Races | 3 | 3 | 2 | 3 | 3 |
| Race/Ethnicity Missing | 2 | 2 | 17 | 2 | 2 |
| Parents No College | 12 | 12 | 8 | 18 | 10 |
| Parents Some College | 47 | 47 | 38 | 38 | 50 |
| Parents Education Missing | 41 | 41 | 55 | 44 | 40 |
| Income Less Than $36,000 | 33 | 33 | 27 | 43 | 30 |
| Income $36,000–$60,000 | 22 | 23 | 16 | 25 | 22 |
| Income $60,000–$100,000 | 23 | 23 | 18 | 19 | 24 |
| Income $100,000+ | 17 | 17 | 17 | 8 | 19 |
| Income Missing | 5 | 5 | 22 | 6 | 5 |

Table 7 summarizes the ACT Composite scores of students in the study sample, overall, by accommodation status, and by institution type. Students who tested with accommodations tended to have lower ACT Composite scores than students who tested without accommodations, and students who attended two-year institutions tended to have lower ACT Composite scores than students who attended four-year institutions. Students who tested with accommodations and attended two-year institutions tended to have the lowest ACT Composite scores, while students who tested without accommodations and attended four-year institutions tended to have the highest ACT Composite scores. The difference in average ACT Composite scores between students testing with and without accommodations attending four-year institutions was smaller than the difference between students testing with and without accommodations attending two-year institutions (1.4 points vs. 2.7 points).

**Table 7.** ACT Composite Scores by Institution Type and Accommodation Status

| Institution Type | Accommodation Status | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|---|
| **2-Year Institutions** | No Accommodations | 18.9 | 3.7 | 9 | 34 |
| | Accommodations | 16.2 | 3.7 | 9 | 31 |
| | Total | 18.8 | 3.7 | 9 | 34 |
| **4-Year Institutions** | No Accommodations | 22.4 | 4.5 | 8 | 36 |
| | Accommodations | 21.0 | 5.0 | 10 | 35 |
| | Total | 22.4 | 4.5 | 8 | 36 |
| **All Institutions** | No Accommodations | 21.5 | 4.6 | 8 | 36 |
| | Accommodations | 19.4 | 5.1 | 9 | 35 |
| | Total | 21.5 | 4.6 | 8 | 36 |

Table 8 summarizes students' self-reported HSGPA overall, by accommodation status, and by institution type. Similar to the findings for average ACT Composite scores, students who tested with accommodations tended to have a lower HSGPA than students who tested without accommodations, and students who attended two-year institutions tended to have a lower HSGPA than students who attended four-year institutions. Also similar to the findings for ACT Composite scores, students who tested with accommodations and attended two-year institutions tended to have the lowest HSGPA, while students who tested without accommodations and attended four-year institutions tended to have the highest HSGPA. However, as can be seen in Table 8, in contrast with the findings for ACT Composite scores, the difference in average HSGPA between students testing with and without accommodations attending four-year institutions was larger (0.21 points) than the difference between students testing with and without accommodations attending two-year institutions (0.08 points).

**Table 8.** Self-Reported HSGPA by Institution Type and Accommodation Status

| Institution Type | Accommodation Status | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|---|
| **2-Year Institutions** | No Accommodations | 3.03 | 0.56 | 0.00 | 4.00 |
| | Accommodations | 2.95 | 0.63 | 0.50 | 4.00 |
| | Total | 3.03 | 0.56 | 0.00 | 4.00 |
| **4-Year Institutions** | No Accommodations | 3.37 | 0.51 | 0.00 | 4.00 |
| | Accommodations | 3.16 | 0.56 | 0.00 | 4.00 |
| | Total | 3.37 | 0.52 | 0.00 | 4.00 |
| **All Institutions** | No Accommodations | 3.29 | 0.55 | 0.00 | 4.00 |
| | Accommodations | 3.09 | 0.59 | 0.00 | 4.00 |
| | Total | 3.28 | 0.55 | 0.00 | 4.00 |

Table 9 summarizes students' FYGPA overall, by accommodation status, and by institution type. Similar to the findings for average ACT Composite scores and HSGPA, students who tested with accommodations tended to have lower FYGPA than students who tested without

accommodations, and students who attended two-year institutions tended to have lower FYGPA than students who attended four-year institutions. Students who tested with accommodations and attended two-year institutions tended to have the lowest FYGPA, while students who tested without accommodations and attended four-year institutions tended to have the highest FYGPA.

**Table 9.** FYGPA (Overall, by Accommodation Status, and by Institution Type)

| Institution Type | Accommodation Status | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|---|
| **2-Year Institutions** | No Accommodations | 2.57 | 0.94 | 0.00 | 4.00 |
| | Accommodations | 2.35 | 0.99 | 0.00 | 4.00 |
| | Total | 2.57 | 0.95 | 0.00 | 4.00 |
| **4-Year Institutions** | No Accommodations | 2.83 | 0.87 | 0.00 | 4.00 |
| | Accommodations | 2.55 | 0.91 | 0.00 | 4.00 |
| | Total | 2.83 | 0.87 | 0.00 | 4.00 |
| **All Institutions** | No Accommodations | 2.77 | 0.90 | 0.00 | 4.00 |
| | Accommodations | 2.49 | 0.94 | 0.00 | 4.00 |
| | Total | 2.77 | 0.90 | 0.00 | 4.00 |

Table 10 summarizes the percentages of students who initially enrolled at a two-year institution and earned an associate's degree in two years, earned an associate's degree in three years, or earned an associate's degree or transferred to a four-year institution in three years. Students who took the ACT with accommodations tended to have lower degree completion rates across the three outcomes than students who took the ACT without accommodations.

**Table 10.** College Degree Outcomes of Students Enrolled at 2-Year Institutions, Overall and by Accommodation Status

| Group | 2 Years (%) | 3 Years (%) | 3 Years or Transfer (%) |
|---|---|---|---|
| Total | 19 | 30 | 36 |
| No Accommodations | 19 | 30 | 37 |
| Accommodations | 14 | 24 | 28 |

Table 11 summarizes the percentages of students who initially enrolled at a four-year institution and earned a bachelor's degree in four years or in six years. Students who took the ACT with accommodations tended to have lower four-year degree completion rates than students who took the ACT without accommodations. However, the gap in bachelor's degree completion rates decreased when comparing four-year degree completion rates (a 9% gap) to six-year completion rates (a 6% gap).

**Table 11.** College Degree Outcomes of Students Enrolled at 4-Year Institutions, Overall and by Accommodation Status

| Group | 4 Years (%) | 6 Years (%) |
|---|---|---|
| Total | 30 | 51 |
| No Accommodations | 30 | 51 |
| Accommodations | 21 | 45 |

Table 12 contains correlations among ACT Composite scores, HSGPA, and FYGPA overall, by accommodation status, by institution type, and by accommodation status and institution type. The correlations between ACT Composite score, HSGPA and FYGPA were higher among students who attended four-year institutions than students who attended two-year institutions. In addition, the correlations were also higher among students testing without accommodations compared to students who tested with accommodations.

In general, correlations between ACT Composite scores and HSGPA tend to be somewhat higher than correlations between ACT Composite scores and FYGPA. Also, correlations between ACT Composite scores and FYGPA tend to be somewhat lower than correlations between HSGPA and FYGPA, which has been seen in several other studies and across other college admissions assessments (Huh & Huang, 2017; Mattern et al., 2008; Sanchez, 2013; Sawyer, 2010). Interestingly, higher correlations between ACT Composite and FYGPA than between HSGPA and FYGPA were found among students who tested with accommodations, regardless of the type of institutions they attended.

**Table 12.** Correlations Among ACT Composite, HSGPA, and FYGPA (Overall, by Accommodation Status, and by Institution Type)

| Institution Type | Accommodation Status | ACT, HSGPA | ACTC, FYGPA | HSGPA, FYGPA |
|---|---|---|---|---|
| **2-Year Institutions** | No Accommodations | 0.40 | 0.26 | 0.35 |
| | Accommodations | 0.15 | 0.19 | 0.17 |
| | Total | 0.39 | 0.26 | 0.35 |
| **4-Year Institutions** | No Accommodations | 0.54 | 0.47 | 0.51 |
| | Accommodations | 0.33 | 0.37 | 0.27 |
| | Total | 0.54 | 0.47 | 0.50 |
| **All Institutions** | No Accommodations | 0.55 | 0.43 | 0.48 |
| | Accommodations | 0.32 | 0.32 | 0.25 |
| | Total | 0.54 | 0.43 | 0.48 |

*Note.* All correlations statistically significant at $p < 0.0001$.

## Regression Models

In this section, we will use the results from the regression models to answer our research questions. In most cases, we present plots of the predicted probabilities of each outcome for each model (see Table 5), by accommodation status and ACT Composite score and/or HSGPA,

allowing us to visually interpret the statistically significant relationships among the predictors and outcomes (Appendix Tables A2–A8). When interpreting the results of the regression models, *p*-values less than 0.05 were considered statistically significant.

### *Research Question 1: To what extent does the ACT predict first-year college GPA and degree completion similarly (i.e., is the direction and magnitude of the relationship the same) for students who test with accommodations and students who test without accommodations?*

We examined this research question using Model 1, in which the predictors included ACT Composite score, accommodation status, and the interaction between ACT Composite score and accommodation status. Results of Model 1 are provided in Appendix Tables A2–A8. Given our use of a mean-centered ACTC variable and a 1/0 indicator variable for accommodations status, the model coefficients are interpreted as follows for the linear regression models predicting FYGPA:

- Intercept: the value of the outcome for students testing without accommodations who have an ACTC at the mean value
- ACTC: the change in the outcome for students testing without accommodations given a one-unit change in ACTC
- Accommodations: the difference in outcome between students testing with and without accommodations who have an ACTC at the mean value
- ACTC * Accommodations: the difference in the relationship between ACTC and the outcome between students testing with and without accommodations given a one-unit change in ACTC

The model coefficients are interpreted as follows for the logistic regression models predicting degree completion:

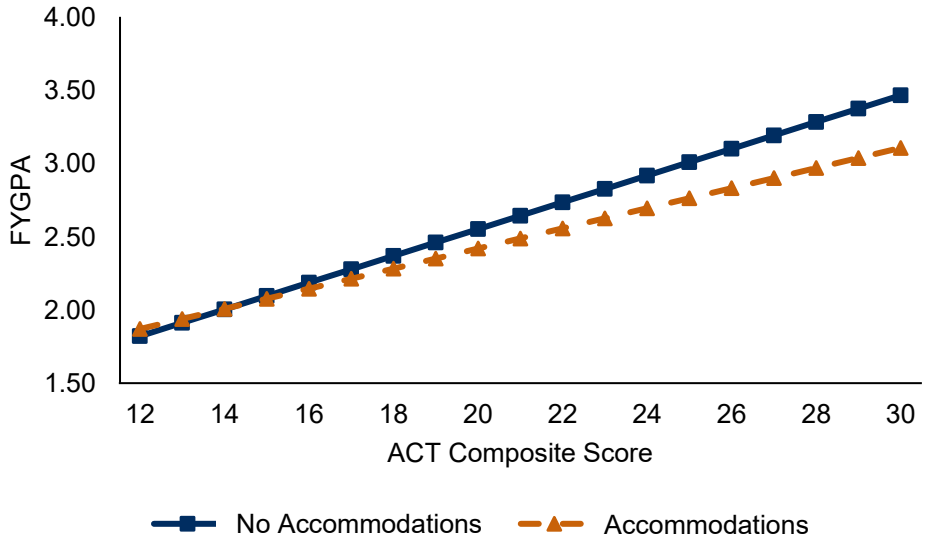
- Intercept: the log odds of the outcome for students testing without accommodations who have an ACTC at the mean value
- ACTC: the change in the log odds of the outcome for students testing without accommodations given a one-unit change in ACTC
- Accommodations: the difference in the log odds of the outcome between students testing with and without accommodations who have an ACTC at the mean value
- ACTC * Accommodations: the log odds difference in the relationship between ACTC and the outcome between students testing with and without accommodations given a one-unit change in ACTC

The following figures (Figure 1–7) present the relationships between each outcome and the predictors in Model 1.

### FYGPA at Four-Year Institutions

Figure 1 presents the predicted FYGPA of students who initially enrolled at a four-year institution by accommodation status, ACT Composite score, and their interaction for Model 1 (See Appendix Table A2 for tabled results). For this model, all of the effects were statistically significant. Both students who tested with or without accommodations showed increases in predicted FYGPA as ACT Composite score increased, but the rate of increase was higher for students who tested without accommodations. Predicted FYGPAs were similar for students who tested with or without accommodations with an ACT Composite score between 12 and 14, and the difference in predicted FYGPA increased as ACT Composite score increased. At an ACT Composite score of 12, students who tested with or without accommodations had a predicted FYGPA of approximately 1.82–1.87. At an ACT Composite score of 14, students who tested with or without accommodations had a predicted FYGPA of approximately 2.00–2.01. At an ACT Composite score of 30, students who tested with accommodation had a predicted FYGPA of approximately 3.11, and students who tested without accommodations had a predicted FYGPA of approximately 3.47.

**Figure 1.** Predicted FYGPA for Enrollees at Four-Year Institutions, Model 1 (ACT Composite)

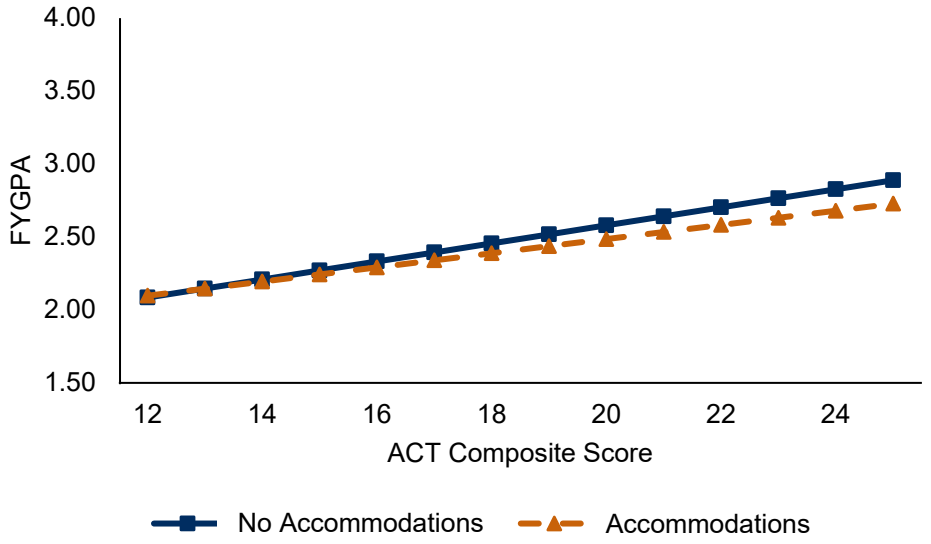



### FYGPA at Two-Year Institutions

Figure 2 presents the predicted FYGPA of students who initially enrolled at a two-year institution by accommodation status, ACT Composite score, and their interaction for Model 1 (See Appendix Table A3 for tabled results). A statistically significant effect was found for ACT Composite score such that, as ACT Composite score increases, predicted FYGPA increases. The effects of accommodation status and the interaction were not statistically significant, suggesting that the relationship between ACT Composite score and FYGPA at two-year institutions did not differ in a significant way between students testing with and without

accommodations. Students with an ACT Composite score of 12 had a predicted FYGPA of approximately 2.08–2.10, students with an ACT Composite score of 19 had a predicted FYGPA of approximately 2.44–2.52, and students with an ACT Composite score of 25 had a predicted FYGPA of approximately 2.73–2.89.

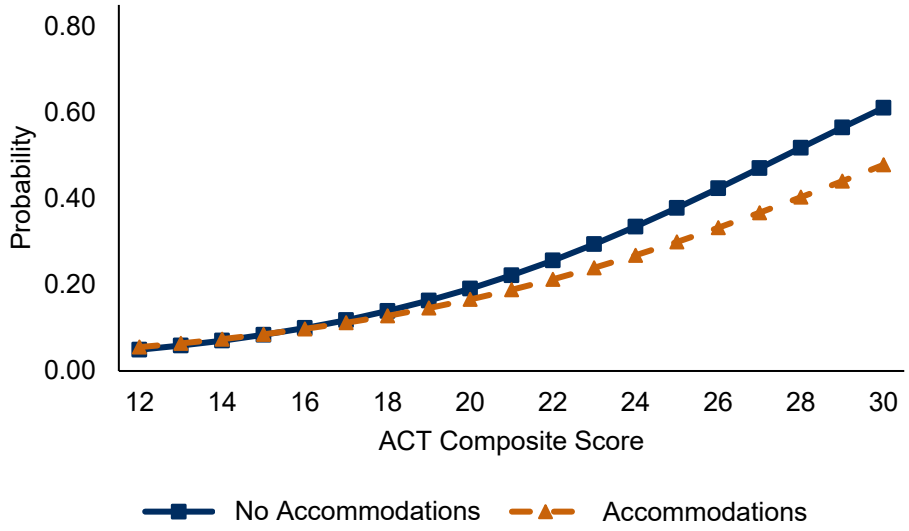
**Figure 2.** Predicted FYGPA for Enrollees at Two-Year Institutions, Model 1 (ACT Composite)




## Earning a Bachelor's Degree in Four Years

Figure 3 presents the predicted probabilities of earning a bachelor's degree in four years by accommodation status, ACT Composite score, and their interaction for Model 1 (See Appendix Table A4 for tabled results). For this model, all of the effects were statistically significant. Both students who tested with or without accommodations showed increases in the probability of degree completion as ACT Composite score increased, but the rate of increase depended on students' accommodations status, with a larger rate of increase for students testing without accommodations. At an ACT Composite score of 12, students who tested with or without accommodation had approximately a 0.05–0.06 probability of earning a bachelor's degree in four years. At an ACT Composite score of 22 (the mean ACT Composite score for students at four-year institutions was 22.4), students who tested with accommodations had approximately a 0.21 probability of earning a bachelor's degree in four years, and students who tested without accommodations had approximately a 0.26 probability of earning a bachelor's degree in four years. At an ACT Composite score of 30, students who tested with accommodation had approximately a 0.48 probability of earning a bachelor's degree in four years, and students who tested without accommodations had approximately a 0.61 probability of earning a bachelor's degree in four years.

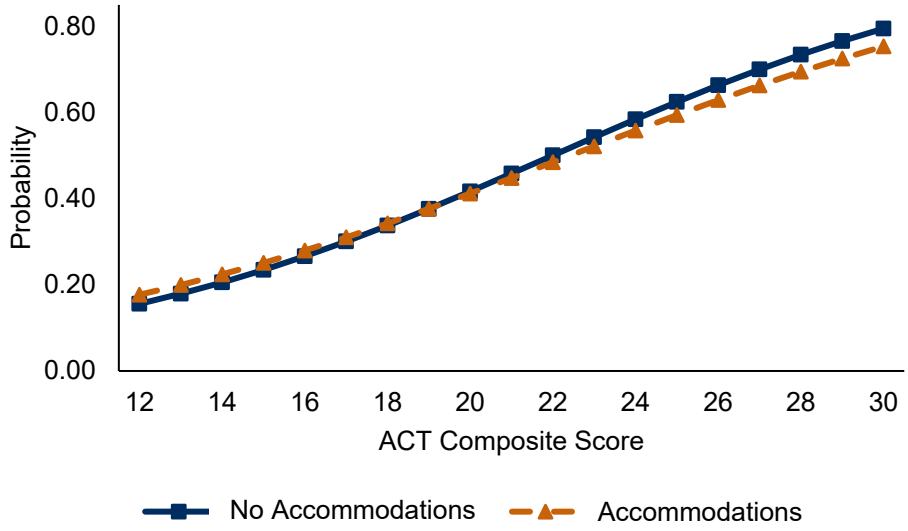
**Figure 3.** Predicted Probability of Earning a Bachelor's Degree in Four Years, Model 1 (ACT Composite)




## Earning a Bachelor's Degree in Six Years

Figure 4 presents the predicted probabilities of earning a bachelor's degree in six years by accommodation status, ACT Composite score, and their interaction for Model 1 (See Appendix Table A5 for tabled results). A statistically significant effect was found for ACT Composite score such that, as ACT Composite score increases, the probability of earning a bachelor's degree in six years increases. The effects of accommodation status and the interaction were not statistically significant, however, suggesting that the positive relationship between ACT Composite score and the six-year bachelor's degree rate did not differ in a significant way between students testing with and without accommodations. Students with an ACT Composite score of 12 had approximately a 0.16–0.18 probability of earning a bachelor's degree in six years, students with an ACT Composite score of 22 (the mean ACT Composite score for students at four-year institutions was 22.4) had approximately a 0.48–0.50 probability of earning a bachelor's degree in six years, and students with an ACT Composite score of 30 had approximately a 0.75–0.80 probability of earning a bachelor's degree in six years.

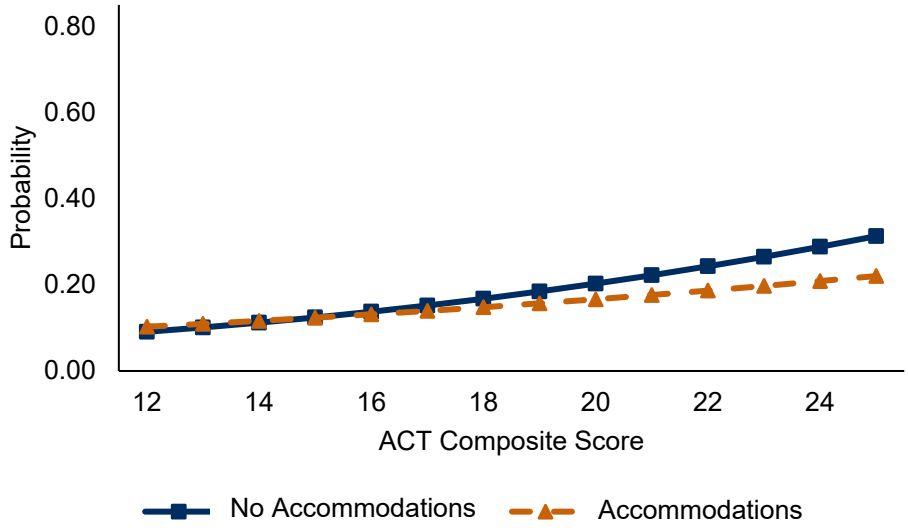
**Figure 4.** Predicted Probability of Earning a Bachelor's Degree in Six Years, Model 1 (ACT Composite)




## Earning an Associate's Degree in Two Years

Figure 5 presents the predicted probabilities of earning an associate's degree in two years by accommodation status, ACT Composite score, and their interaction for Model 1 (See Appendix Table A6 for tabled results). A statistically significant effect was found for ACT Composite score such that, as ACT Composite score increases, the probability of earning an associate's degree in two years increases. The effects of accommodation status and the interaction were not statistically significant, suggesting that the relationship between ACT Composite score and the two-year associate's degree rate did not differ in a significant way between students testing with and without accommodations. While Figure 5 suggests that the magnitude of the effect of ACT Composite score is greater for students testing without accommodations, the difference is not statistically significant. Students with an ACT Composite score of 12 had approximately a 0.09–0.10 probability of earning an associate's degree in two years, students with an ACT Composite score of 19 (the mean ACT Composite score for students at two-year institutions was 18.8) had approximately a 0.16–0.18 probability of earning an associate's degree in two years, and students with an ACT Composite score of 25 had approximately a 0.22–0.31 probability of earning an associate's degree in two years.

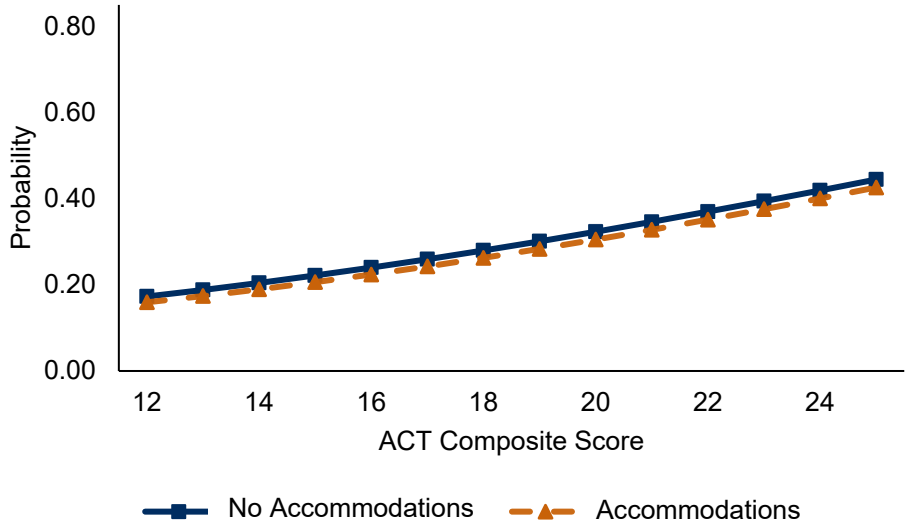
**Figure 5.** Predicted Probability of Earning an Associate's Degree in Two Years, Model 1 (ACT Composite)




## Earning an Associate's Degree in Three Years

Figure 6 presents the predicted probabilities of earning an associate's degree in three years by accommodation status, ACT Composite score, and their interaction for Model 1 (See Appendix Table A7 for tabled results). Similar to the two-year degree model, a statistically significant effect was found for ACT Composite score such that, as ACT Composite score increases, the probability of earning an associate's degree in three years increases. The effects of accommodation status and the interaction were not statistically significant, suggesting that the relationship between ACT Composite score and the three-year associate's degree rate did not differ in a significant way between students testing with and without accommodations. Students with an ACT Composite score of 12 had approximately a 0.16–0.17 probability of earning an associate's degree in three years, students with an ACT Composite score of 19 had approximately a 0.28–0.30 probability of earning an associate's degree in three years, and students with an ACT Composite score of 25 had approximately a 0.43–0.44 probability of earning an associate's degree in three years.

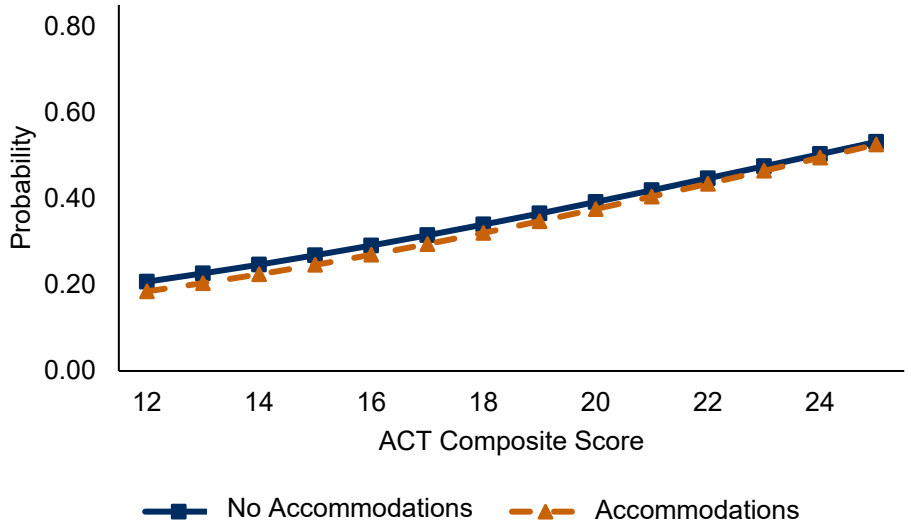
**Figure 6.** Predicted Probability of Earning an Associate's Degree in Three Years, Model 1 (ACT Composite)




## Earning an Associate's Degree or Transferring to a Four-Year Institution in Three Years

Figure 7 presents the predicted probabilities of earning an associate's degree or transferring to a four-year institution in three years by accommodation status, ACT Composite score, and their interaction for Model 1 (See Appendix Table A8 for tabled results). Similar to the two-year and three-year degree models, a statistically significant effect was found for ACT Composite score such that, as ACT Composite score increases, the probability of earning an associate's degree or transferring in three years increases. The effects of accommodation status and the interaction were not statistically significant, however, suggesting that the relationship between ACT Composite score and the three-year associate's degree or transfer rate did not differ significantly between students testing with and without accommodations. Students with an ACT Composite score of 12 had approximately a 0.18–0.21 probability of earning an associate's degree or transferring in three years, students with an ACT Composite score of 19 had approximately a 0.35–0.37 probability of earning an associate's degree or transferring in three years, and students with an ACT Composite score of 25 had approximately a 0.53 probability of earning an associate's degree or transferring in three years.

**Figure 7.** Predicted Probability of Earning an Associate's Degree or Transferring to a Four-Year Institution in Three Years, Model 1 (ACT Composite)




In summary, across all outcomes, ACT Composite score was a statistically significant predictor of FYGPA and degree completion, such that higher ACT Composite scores predicted higher FYGPA and higher degree completion rates for both students testing with and without accommodations. However, for the model predicting the FYGPA of students enrolled at four-year institutions and the model predicting bachelor's degree completion in four years, the relationship between ACT Composite score and each outcome was stronger for students who took the ACT without accommodations. Overall, these results indicate that the ACT Composite score was a statistically significant predictor for the college outcomes investigated in this study, and it predicted FYGPA and degree completion similarly for students who tested with or without accommodations for five of the seven outcomes; for the models predicting FYGPA of students enrolled at four-year institutions and the completion of a bachelor's degree in four years, students who tested with accommodations were predicted to have less favorable outcomes than students who tested without accommodations.

### *Research Question 2: To what extent does HSGPA predict first-year college GPA and degree completion similarly (i.e., is the direction and magnitude of the relationship the same) for students who test with accommodations and students who test without accommodations?*

We examined this research question using Model 2, in which the predictors included HSGPA, accommodation status, and the interaction between HSGPA and accommodation status. Results of Model 2 are provided in Appendix Tables A2–A8. Given our use of a mean-centered HSGPA variable and a 1/0 indicator variable for accommodations status, the model coefficients should be interpreted as follows for the linear regression models predicting FYGPA:

- Intercept: the value of the outcome for students testing without accommodations who have a HSGPA at the mean value

- HSGPA: the change in the outcome for students testing without accommodations given a one-unit change in HSGPA
- Accommodations: the difference in outcome between students testing with and without accommodations who have a HSGPA at the mean value
- HSGPA * Accommodations: the difference in the relationship between HSGPA and the outcome between students testing with and without accommodations given a one-unit change in HSGPA

The model coefficients are interpreted as follows for the logistic regression models predicting degree completion:

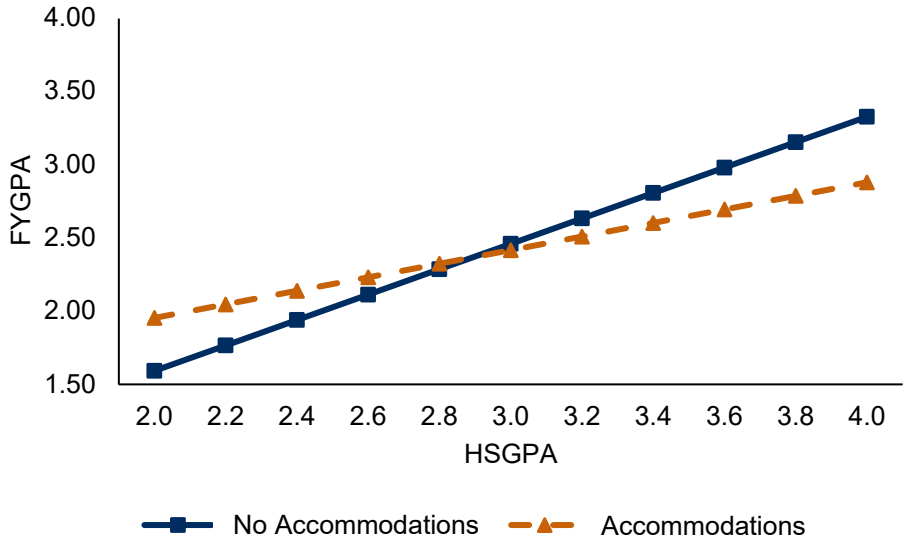
- Intercept: the log odds of the outcome for students testing without accommodations who have a HSGPA at the mean value
- HSGPA: the change in the log odds of the outcome for students testing without accommodations given a one-unit change in HSGPA
- Accommodations: the difference in the log odds of the outcome between students testing with and without accommodations who have a HSGPA at the mean value
- ACTC * Accommodations: the log odds difference in the relationship between HSGPA and the outcome between students testing with and without accommodations given a one-unit change in HSGPA

The following figures (Figure 8–14) present the relationships between each outcome and the predictors in Model 2.

### FYGPA at Four-Year Institutions

Figure 8 presents the predicted FYGPA of students who initially enrolled at a four-year institution by accommodation status, HSGPA, and their interaction for Model 2 (See Appendix Table A2 for tabled results). For this model, all of the effects were statistically significant. Both students who tested with or without accommodations showed increases in predicted FYGPA as HSGPA increased, but the rate of increase depended on students' accommodation status. Students who took the ACT with accommodations and had a HSGPA below 2.9 tended to have a higher predicted FYGPA compared to students who tested without accommodations, and students who took the ACT with accommodations and had a HSGPA above 2.9 tended to have a lower predicted FYGPA compared to students who tested without accommodations. At a HSGPA of 2.0, students who tested with accommodations had a predicted FYGPA of approximately 1.95, and students who tested without accommodations had a predicted FYGPA of approximately 1.59. At a HSGPA of 2.9, both students who tested with or without accommodations had a predicted FYGPA of approximately 2.37. At a HSGPA of 4.0, students who tested with accommodations had a predicted FYGPA of approximately 2.88, and students who tested without accommodations had a predicted FYGPA of approximately 3.32.

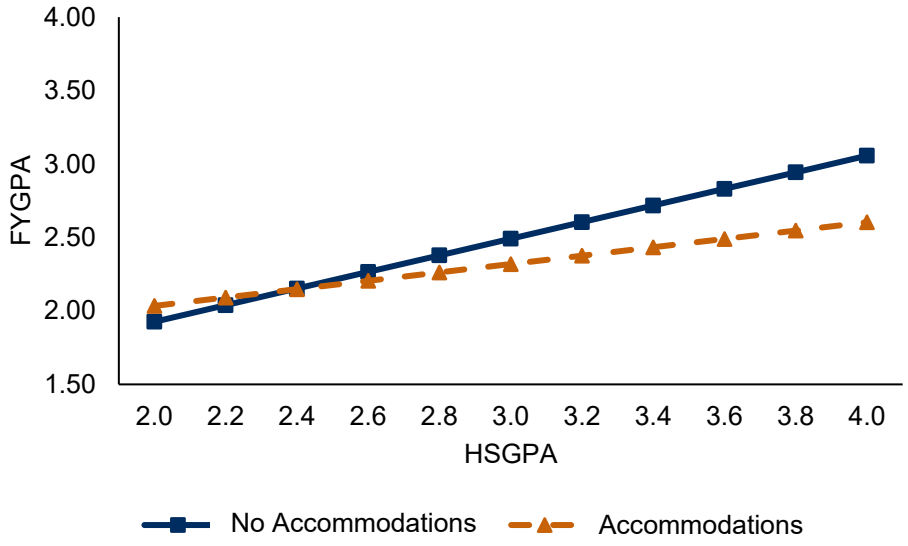
**Figure 8.** Predicted FYGPA for Enrollees at Four-Year Institutions, Model 2 (HSGPA)




## FYGPA at Two-Year Institutions

Figure 9 presents the predicted FYGPA of students who initially enrolled at a two-year institution by accommodation status, HSGPA, and their interaction for Model 2 (See Appendix Table A3 for tabled results). For this model, all of the effects were statistically significant. Both students who tested with or without accommodations showed increases in predicted FYGPA as HSGPA increased, but the rate of increase depended on students' accommodation status. Students who took the ACT with accommodations and had a HSGPA below 2.4 tended to have a higher predicted FYGPA compared to students who tested without accommodations, and students who took the ACT with accommodations and had a HSGPA above 2.4 tended to have a lower predicted FYGPA compared to students who tested without accommodations. At a HSGPA of 2.0, students who tested with accommodations had a predicted FYGPA of approximately 2.03, and students who tested without accommodations had a predicted FYGPA of approximately 1.93. At a HSGPA of 2.4, both students who tested with or without accommodations had a predicted FYGPA of approximately 2.15. At a HSGPA of 4.0, students who tested with accommodations had a predicted FYGPA of approximately 2.60, and students who tested without accommodations had a predicted FYGPA of approximately 3.06.

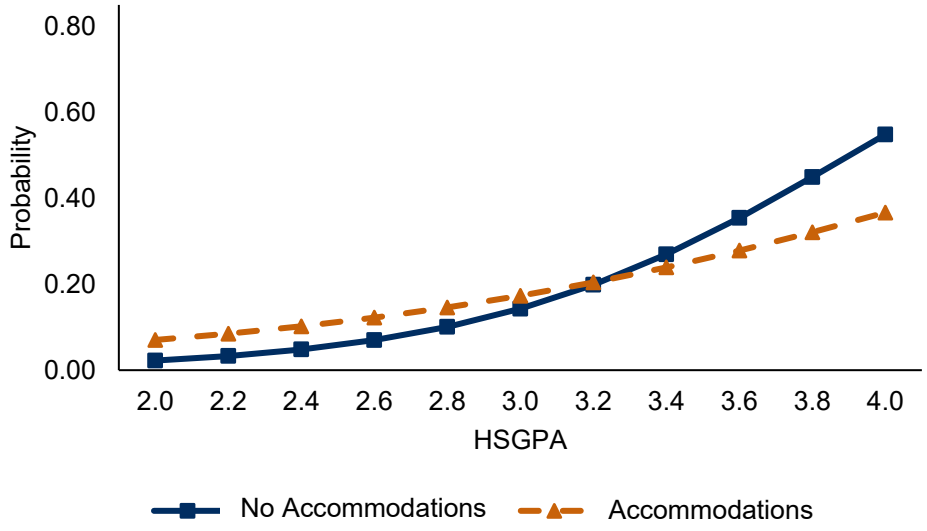
**Figure 9.** Predicted FYGPA for Enrollees at Two-Year Institutions, Model 2 (HSGPA)




## Earning a Bachelor's Degree in Four Years

Figure 10 presents the predicted probabilities of earning a bachelor's degree in four years by accommodation status, HSGPA, and their interaction for Model 2 (See Appendix Table A4 for tabled results). For this model, all of the effects were statistically significant. Both students who tested with or without accommodations showed increases in the probability of degree completion as HSGPA increased, but the rate of increase depended on students' accommodations status, with a larger rate of increase for students testing without accommodations. Students who took the ACT with accommodations and had a HSGPA below 3.2 tended to have a higher predicted probability of earning a bachelor's degree compared to students who tested without accommodations, and students who took the ACT with accommodations and had a HSGPA above 3.2 tended to have a lower predicted probability of earning a bachelor's degree compared to students who tested without accommodations. At a HSGPA of 2.0, students who tested with accommodations had approximately a 0.07 probability of earning a bachelor's degree in four years, and students who tested without accommodations had approximately a 0.02 probability of earning a bachelor's degree in four years. At a HSGPA of 3.2, both students who tested with or without accommodations had approximately a 0.20 probability of earning a bachelor's degree in four years. At a HSGPA of 4.0, students who tested with accommodations had approximately a 0.37 probability of earning a bachelor's degree in four years, and students who tested without accommodations had approximately a 0.55 probability of earning a bachelor's degree in four years.

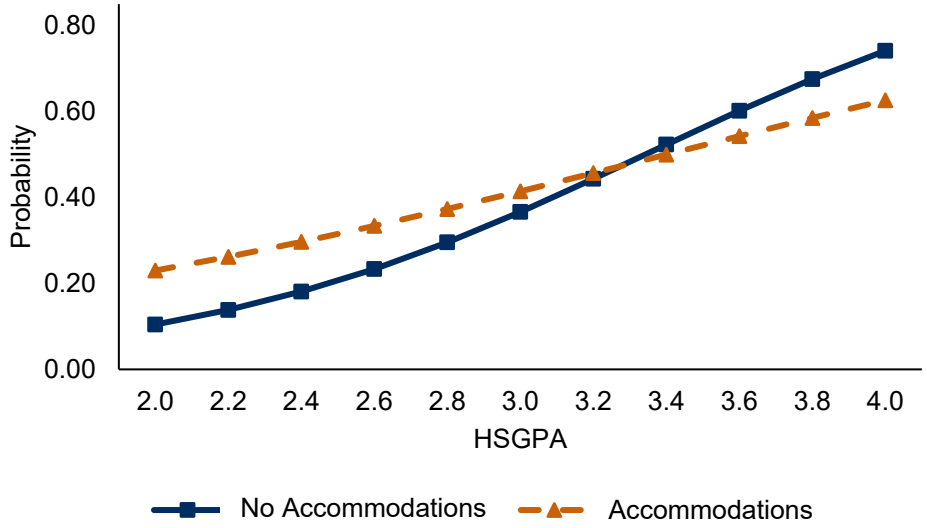
**Figure 10.** Predicted Probability of Earning a Bachelor's Degree in Four Years, Model 2 (HSGPA)




## Earning a Bachelor's Degree in Six Years

Figure 11 presents the predicted probabilities of earning a bachelor's degree in six years by accommodation status, HSGPA, and their interaction for Model 2 (See Appendix Table A5 for tabled results). For this model, there were statistically significant effects of HSGPA and the interaction between HSGPA and accommodation status, but the main effect for accommodation status was not statistically significant, suggesting that there was no significant difference in the predicted probability of the outcome between students testing with and without accommodations who had a HSGPA at the mean. Both students who tested with or without accommodations showed increases in the probability of degree completion as HSGPA increased, but the rate of increase depended on students' accommodation status, with a larger rate of increase for students testing without accommodations. Students who took the ACT with accommodations and had a HSGPA below 3.3 tended to have a higher predicted probability of earning a bachelor's degree compared to students who tested without accommodations, and students who took the ACT with accommodations and had a HSGPA above 3.3 tended to have a lower predicted probability of earning a bachelor's degree compared to students who tested without accommodations. At a HSGPA of 2.0, students who tested with accommodations had approximately a 0.23 probability of earning a bachelor's degree in six years, and students who tested without accommodations had approximately a 0.10 probability of earning a bachelor's degree in six years. At a HSGPA of 3.3, both students who tested with or without accommodations had approximately a 0.48 probability of earning a bachelor's degree in six years. At a HSGPA of 4.0, students who tested with accommodations had approximately a 0.63 probability of earning a bachelor's degree in six years, and students who tested without accommodations had approximately a 0.74 probability of earning a bachelor's degree in six years.

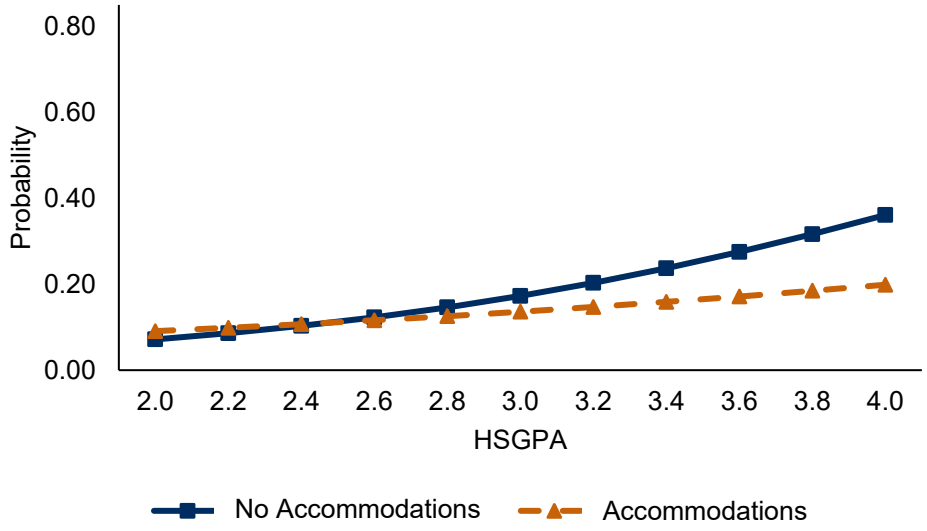
**Figure 11.** Predicted Probability of Earning a Bachelor's Degree in Six Years, Model 2 (HSGPA)




## Earning an Associate's Degree in Two Years

Figure 12 presents the predicted probabilities of earning an associate's degree in two years by accommodation status, HSGPA, and their interaction for Model 2 (See Appendix Table A6 for tabled results). For this model, all the effects were statistically significant. Both students who tested with or without accommodations showed increases in the probability of degree completion as HSGPA increased, but the rate of increase depended on students' accommodations status, with a larger rate of increase for students testing without accommodations. At a HSGPA of 2.0, students who tested with accommodations had approximately a 0.09 probability of earning an associate's degree in two years, and students who tested without accommodations had approximately a 0.07 probability of earning an associate's degree in two years. At a HSGPA of 2.6, both students who tested with or without accommodations had approximately a 0.12 probability of earning an associate's degree in two years. At a HSGPA of 4.0, students who tested with accommodations had approximately a 0.20 probability of earning an associate's degree in two years, and students who tested without accommodations had approximately a 0.36 probability of earning an associate's degree in two years.

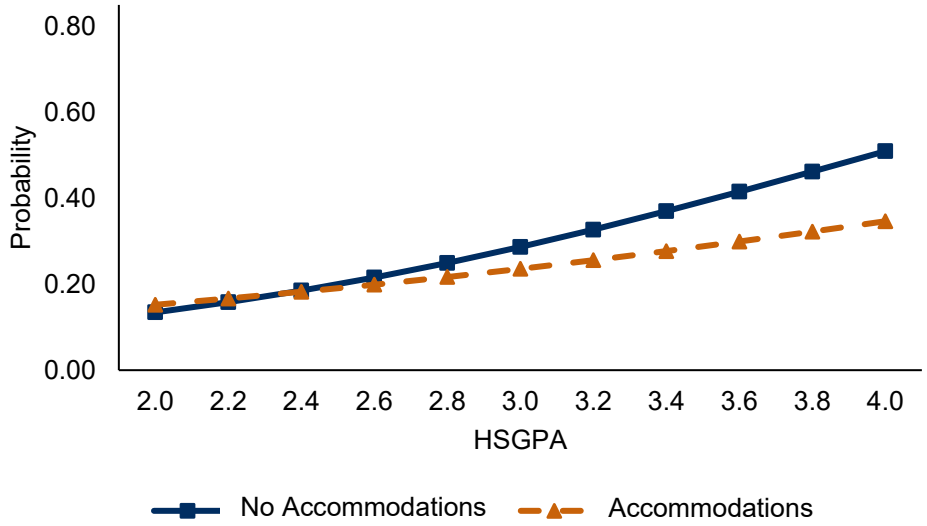
**Figure 12.** Predicted Probability of Earning an Associate's Degree in Two Years, Model 2 (HSGPA)




### Earning an Associate's Degree in Three Years

Figure 13 presents the predicted probabilities of earning an associate's degree in three years by accommodation status, HSGPA, and their interaction for Model 2 (See Appendix Table A7 for tabled results). Similar to the model predicting two-year degree completion, all the effects were statistically significant. Both students who tested with or without accommodations showed increases in the probability of degree completion as HSGPA increased, but the rate of increase depended on students' accommodations status, with a larger rate of increase for students testing without accommodations. At a HSGPA of 2.0, students who tested with accommodations had approximately a 0.15 probability of earning an associate's degree in three years, and students who tested without accommodations had approximately a 0.13 probability of earning an associate's degree in three years. At a HSGPA of 2.3, both students who tested with or without accommodations had approximately a 0.17 probability of earning an associate's degree in three years. At a HSGPA of 4.0, students who tested with accommodations had approximately a 0.35 probability of earning an associate's degree in three years, and students who tested without accommodations had approximately a 0.51 probability of earning an associate's degree in three years.

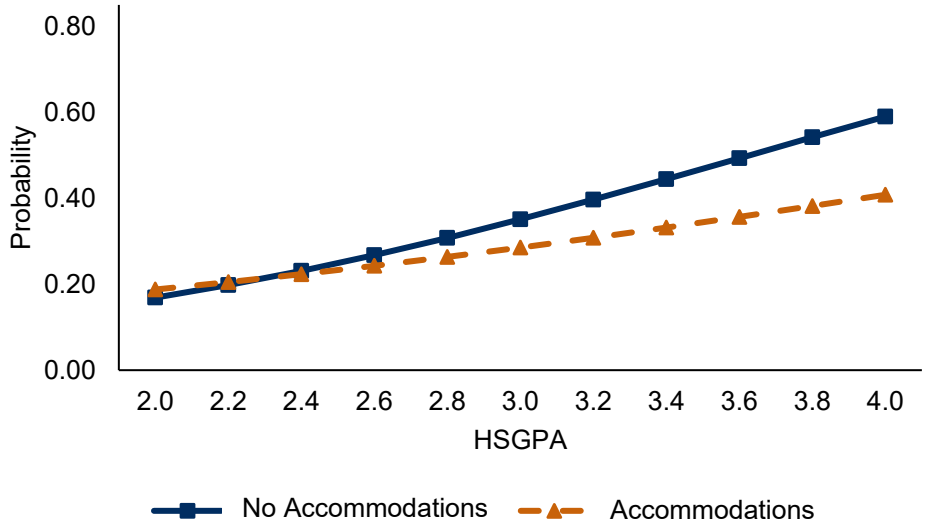
**Figure 13.** Predicted Probability of Earning an Associate's Degree in Three Years, Model 2 (HSGPA)




### Earning an Associate's Degree or Transferring to a Four-Year Institution in Three Years

Figure 14 presents the predicted probabilities of earning an associate's degree or transferring to a four-year institution in three years by accommodation status, HSGPA, and their interaction for Model 2 (See Appendix Table A8 for tabled results). Similar to the two-year and three-year degree models, all the effects were statistically significant. Both students who tested with or without accommodations showed increases in the probability of degree completion as HSGPA increased, but the rate of increase depended on students' accommodations status, with a larger rate of increase for students testing without accommodations. At a HSGPA of 2.0, students who tested with accommodations had approximately a 0.19 probability of earning an associate's degree or transferring in three years, and students who tested without accommodations had approximately a 0.17 probability of earning an associate's degree or transferring in three years. At a HSGPA of 2.2, both students who tested with or without accommodations had approximately a 0.20 probability of earning an associate's degree or transferring in three years. At a HSGPA of 4.0, students who tested with accommodations had approximately a 0.41 probability of earning an associate's degree or transferring in three years, and students who tested without accommodations had approximately a 0.59 probability of earning an associate's degree or transferring in three years.

**Figure 14.** Predicted Probability of Earning an Associate's Degree or Transferring to a Four-Year Institution in Three Years, Model 2 (HSGPA)




In summary, across all the outcomes, HSGPA and the interaction between HSGPA and accommodation status were statistically significant predictors of FYGPA and degree completion. Across all the outcomes, the lines in the plots intersected such that students who had lower HSGPAs and tested with accommodations were predicted to outperform students with the same HSGPA who tested without accommodations (i.e., had higher predicted FYGPA and higher predicted degree completion rates), whereas students who had higher HSGPAs and tested with accommodations were predicted to underperform relative to students with the same HSGPA who tested without accommodations (i.e., had lower predicted FYGPA and lower predicted degree completion rates). For students enrolled at two-year institutions, the differences in outcomes (i.e., predicted FYGPA and associate's degree completion rates) between students who tested with or without accommodations were smaller for students with lower HSGPAs and more pronounced for students with higher HSGPAs, whereas for students enrolled at four-year institutions, there were more pronounced differences in outcomes between students who tested with or without accommodations at both ends of the HSGPA scale. Overall, these results indicate that HSGPA predicts FYGPA and degree completion somewhat differently for students who test with or without accommodations, and the nature of the relationship between accommodation status and the predicted outcomes differs depending on students' HSGPA. Specifically, across all the outcomes, the slopes were flatter for students who tested with accommodations than for students who tested without accommodations, suggesting that, compared to students who tested without accommodations, HSGPA does not discriminate as well for students who tested with accommodations in terms of who would have a higher FYGPA or earn a degree in college.

***Research Question 3: When used together, to what extent do both predictors together predict first-year college GPA and degree completion similarly (i.e., is***

***the direction and magnitude of the relationship the same) for students who test with accommodations and students who test without accommodations?***

We examined this research question using Model 3, in which the predictors included ACT Composite score, HSGPA, accommodation status, and interactions among these variables (i.e., three two-way interactions: ACT Composite score * HSGPA, ACT Composite score * accommodation status, and HSGPA * accommodation status; and one three-way interaction: ACT Composite score * HSGPA * accommodation status). Results of Model 3 are provided in Appendix Tables A2–A8. Given our use of mean-centered ACTC and HSGPA variables and a 1/0 indicator variable for accommodations status, the model coefficients should be interpreted as follows for the linear regression models predicting FYGPA:

- Intercept: the value of the outcome for students testing without accommodations who have an ACTC at the mean value and a HSGPA at the mean value
- ACTC: the change in the outcome for students testing without accommodations who have a HSGPA at the mean value given a one-unit change in ACTC
- HSGPA: the change in the outcome for students testing without accommodations who have an ACTC at the mean value given a one-unit change in HSGPA
- ACTC * HSGPA: the difference in the relationship between ACTC (or HSGPA) and the outcome for students testing without accommodations given a one-unit change in HSGPA (or ACTC)
- Accommodations: the difference in outcome between students testing with and without accommodations who have an ACTC at the mean value and a HSGPA at the mean value
- ACTC * Accommodations: the difference in the relationship between ACTC and the outcome between students testing with and without accommodations who have a HSGPA at the mean value given a one-unit change in ACTC
- HSGPA * Accommodations: the difference in the relationship between HSGPA and the outcome between students testing with and without accommodations who have an ACTC at the mean value given a one-unit change in HSGPA
- ACTC * HSGPA * Accommodations: the difference in the relationship between ACTC (or HSGPA) and the outcome between students testing with and without accommodations given a one-unit change in HSGPA (or ACTC)

The model coefficients are interpreted as follows for the logistic regression models predicting degree completion:

- Intercept: the logs odds of the outcome for students testing without accommodations who have an ACTC at the mean value and a HSGPA at the mean value

- ACTC: the change in the log odds of the outcome for students testing without accommodations who have a HSGPA at the mean value given a one-unit change in ACTC
- HSGPA: the change in the log odds of the outcome for students testing without accommodations who have an ACTC at the mean value given a one-unit change in HSGPA
- ACTC * HSGPA: the log odds difference in the relationship between ACTC (or HSGPA) and the outcome for students testing without accommodations given a one-unit change in HSGPA (or ACTC)
- Accommodations: the difference in the log odds of the outcome between students testing with and without accommodations who have an ACTC at the mean value and a HSGPA at the mean value
- ACTC * Accommodations: the log odds difference in the relationship between ACTC and the outcome between students testing with and without accommodations who have a HSGPA at the mean value given a one-unit change in ACTC
- HSGPA * Accommodations: the log odds difference in the relationship between HSGPA and the outcome between students testing with and without accommodations who have an ACTC at the mean value given a one-unit change in HSGPA
- ACTC * HSGPA * Accommodations: the log odds difference in the difference in the relationship between ACTC (or HSGPA) and the outcome between students testing with and without accommodations given a one-unit change in HSGPA (or ACTC)

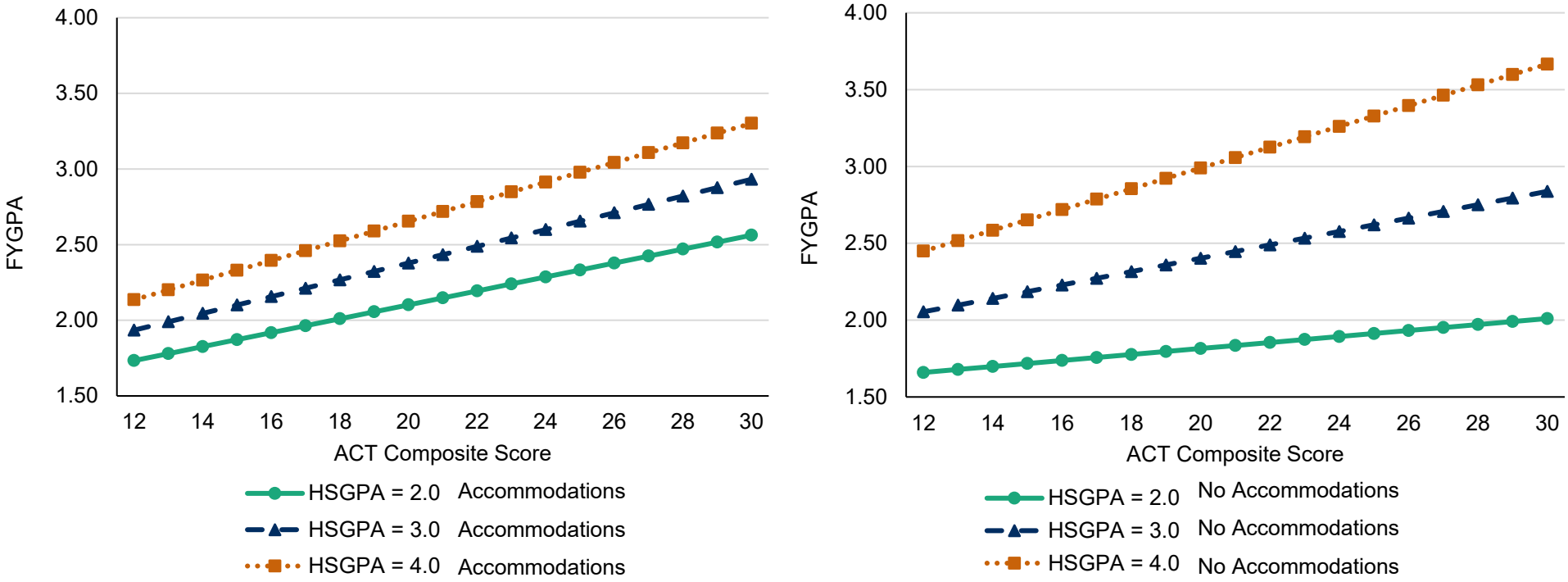
We also conducted a series of regression models, adding demographic variables as predictors in Model 4 (see Appendix Tables A2–A8). The predicted probabilities for Models 3 and 4 were nearly identical when using the reference groups for the demographic variables (female, White, parents attended at least some college, and family income below $36,000 per year). Similar results were found across all the outcomes, so for simplicity's sake, we only present Model 3 predicted probabilities in this section, as the figures for Model 4 look nearly identical (the specific values of the predicted outcomes would shift up or down depending on the specific demographic group of interest, but this is not the primary focus of this study). The following figures (Figures 15–21) present the relationships between each outcome and the predictors in Model 3.

### FYGPA at Four-Year Institutions

Figure 15 presents the predicted FYGPA of students who initially enrolled at a four-year institution by accommodation status, ACT Composite score, and selected values of HSGPA for Model 3 (See Appendix Table A2 for tabled results). Statistically significant effects were found for ACT Composite score, HSGPA, accommodation status, the interaction between HSGPA and accommodation status, the interaction between ACT Composite score and HSGPA, and the

three-way interaction among ACT Composite score, HSGPA, and accommodation status. A statistically significant three-way interaction means that the interaction between ACT Composite score and HSGPA differs for students who tested with or without accommodations. For both students who tested with or without accommodations, as either ACT Composite score or HSGPA increased, students' predicted FYGPA increased. As HSGPA increased, the relationship between ACT Composite scores and FYGPA increased, and conversely, as ACTC increased, the relationship between HSGPA and FYGPA increased. However, the positive interaction between ACTC and HSGPA on FYGPA was greater for students who tested without accommodations than for students who tested with accommodations. Students who tested without accommodations and had a HSGPA of 2.0 had the lowest predicted FYGPA across the ACT Composite scale, with a predicted FYGPA of 1.66 at an ACT Composite score of 12 and a predicted FYGPA of 2.01 at an ACT Composite score of 30. Students who tested without accommodations and had a HSGPA of 4.0 had the highest predicted FYGPA across the ACT Composite scale, with a predicted FYGPA of 2.45 at an ACT Composite score of 12 and a predicted FYGPA of 3.67 at an ACT Composite score of 30.

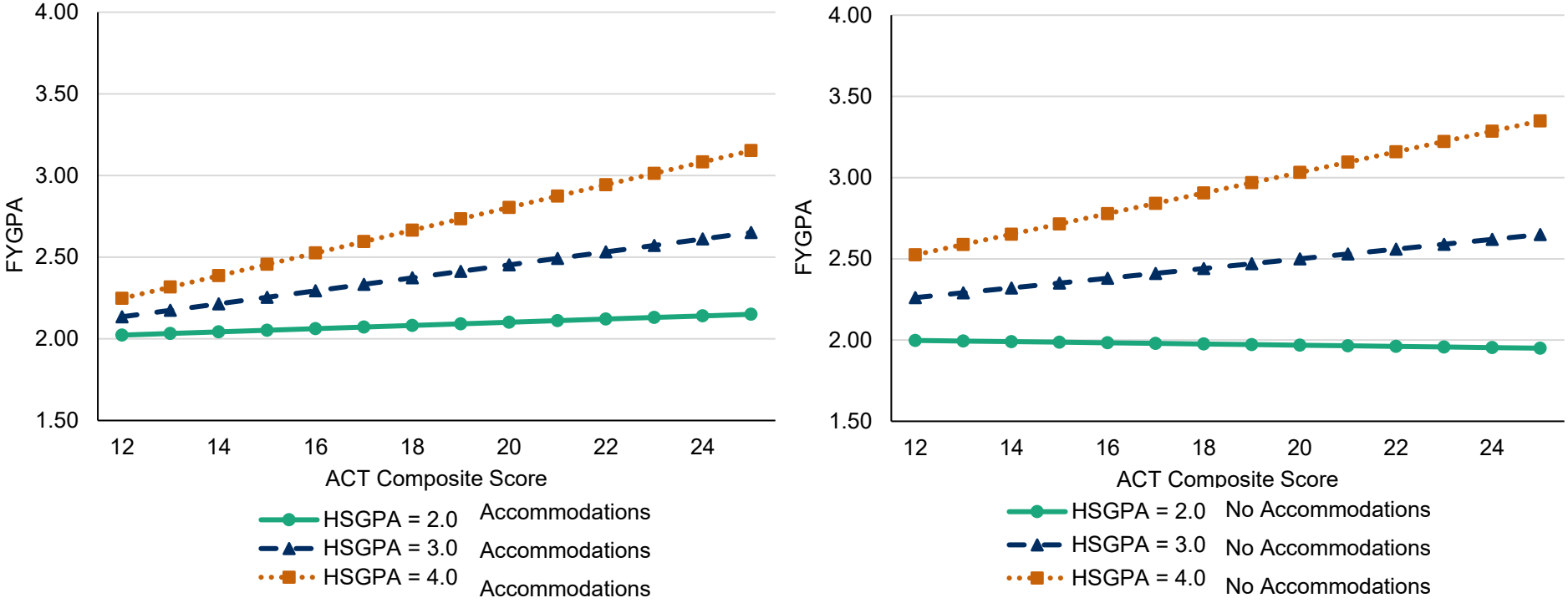
**Figure 15.** Predicted FYGPA for Enrollees at Four-Year Institutions, Model 3 (ACT Composite + HSGPA)



### FYGPA at Two-Year Institutions

Figure 16 presents the predicted FYGPA of students who initially enrolled at a two-year institution by accommodation status, ACT Composite score, and selected values of HSGPA for Model 3 (See Appendix Table A3 for tabled results). Statistically significant effects were found for ACT Composite score, HSGPA, the interaction between HSGPA and accommodation status, and the interaction between ACT Composite score and HSGPA. These findings suggest that the relationship between ACT Composite scores and FYGPA depends on the level of HSGPA. Conversely, the relationship between HSGPA and FYGPA depends on the level of ACTC, and the relationship between HSGPA and FYGPA depends on accommodation status. For students with a HSGPA of 2.0, the relationship between ACT Composite score and FYGPA was negative for those who took the ACT without accommodations, and it was roughly flat for those who took the ACT with accommodations. For all students with a HSGPA of 3.0 or 4.0, however, the relationship between ACT Composite score and FYGPA was positive. Moreover, the increase in FYGPA as ACT Composite score increased was greater as HSGPA levels increased, and conversely, the increase in FYGPA as HSGPA increased was greater as ACTC increased. The increase in FYGPA as HSGPA increased, however, was greater for students who tested without accommodations than for students who tested with accommodations. Students who tested without accommodations and had a HSGPA of 2.0 had the lowest predicted FYGPA across the ACT Composite scale, with a predicted FYGPA of 2.00 at an ACT Composite score of 12 and a predicted FYGPA of 1.95 at an ACT Composite score of 25. Students who tested without accommodations and had a HSGPA of 4.0 had the highest predicted FYGPA across the ACT Composite scale, with a predicted FYGPA of 2.52 at an ACT Composite score of 12 and a predicted FYGPA of 3.35 at an ACT Composite score of 25.

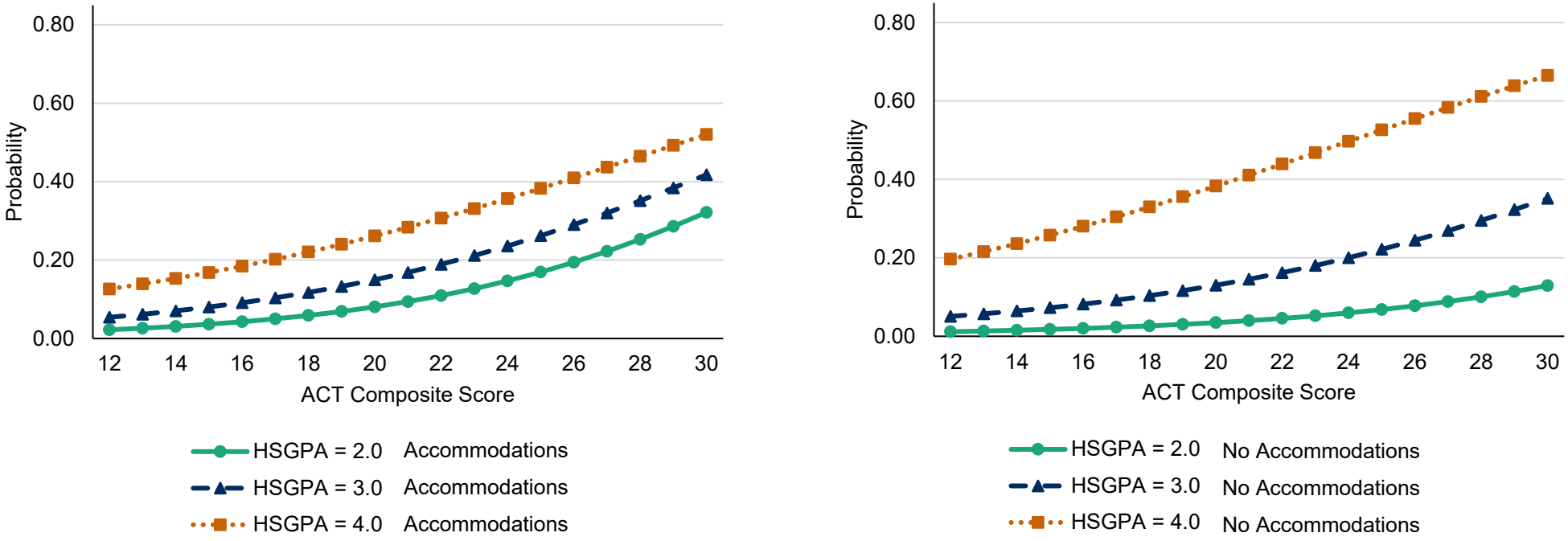
**Figure 16.** Predicted FYGPA for Enrollees at Two-Year Institutions, Model 3 (ACT Composite + HSGPA)



### Earning a Bachelor's Degree in Four Years

Figure 17 presents the predicted probabilities of earning a bachelor's degree in four years by accommodation status, ACT Composite score, and selected values of HSGPA for Model 3 (See Appendix Table A4 for tabled results). For this model, there were statistically significant effects of ACT Composite score, HSGPA, the interaction between HSGPA and accommodation status, and the interaction between ACT Composite score and HSGPA. The accommodations effect, the interaction between ACT Composite and accommodation status, and the three-way interaction were not statistically significant. As either ACT Composite score or HSGPA increased, the probability of earning a bachelor's degree in four years increased. As suggested by the statistically non-significant interaction between ACT Composite score and accommodation status and the statistically non-significant three-way interaction, the positive relationship between ACT Composite score and earning a bachelor's degree in four years is comparable between students testing with and without accommodations. The relationship between HSGPA and the probability of earning a bachelor's degree, however, is different for students who took the ACT with or without accommodations such that the increase in the probability of earning a bachelor's degree as HSGPA increases is greater for students who tested without accommodations than it is for students who tested with accommodations. Students who tested without accommodations and had a HSGPA of 2.0 had the lowest predicted probabilities of earning a bachelor's degree in four years across the ACT Composite scale, with a predicted probability of 0.01 at an ACT Composite score of 12 and 0.13 at an ACT Composite score of 30. Students who tested without accommodations and had a HSGPA of 4.0 had the highest predicted probabilities across the ACT Composite scale, with a predicted probability of 0.20 at an ACT Composite score of 12 and 0.66 at an ACT Composite score of 30.

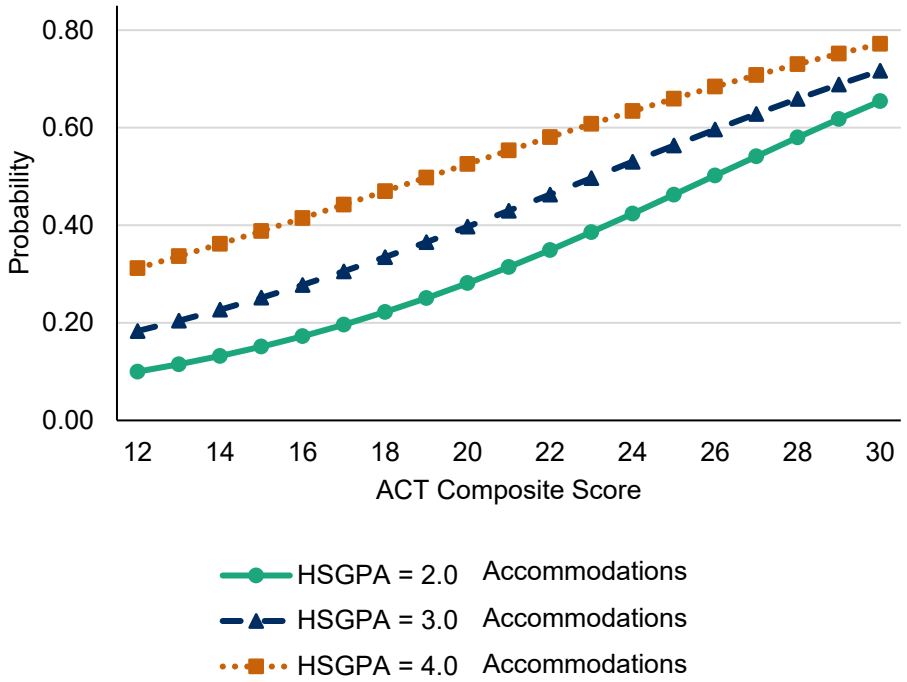
**Figure 17.** Predicted Probability of Earning a Bachelor's Degree in Four Years, Model 3 (ACT Composite + HSGPA)

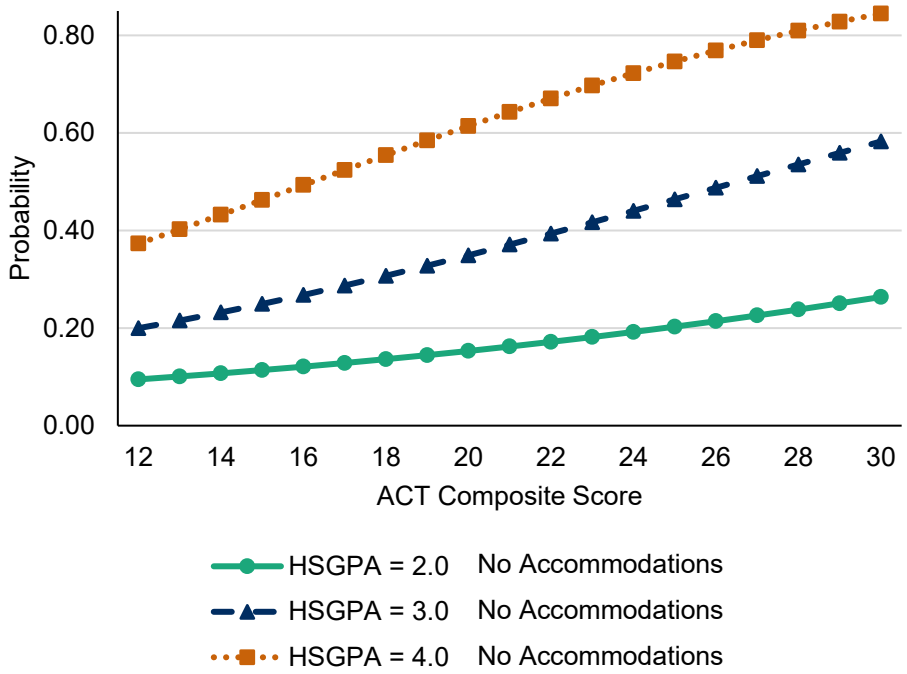


### Earning a Bachelor's Degree in Six Years

Figure 18 presents the predicted probabilities of earning a bachelor's degree in six years by accommodation status, ACT Composite score, and selected values of HSGPA for Model 3 (See Appendix Table A5 for tabled results). This model has statistically significant effects for ACT Composite score, HSGPA, the interaction between HSGPA and accommodation status, the interaction between ACT Composite and HSGPA, and the three-way interaction among ACT Composite, HSGPA, and accommodation status. A statistically significant three-way interaction means that the interaction between ACT Composite score and HSGPA differs for students who tested with or without accommodations. For both students who tested with or without accommodations, as either ACT Composite score or HSGPA increases, the probability of earning a bachelor's degree in four years increases, but the way in which ACT Composite scores and HSGPA jointly relate to the outcome is different for students who tested with or without accommodations. For students who tested with accommodations, the difference in the predicted probabilities across HSGPA levels decreases as ACT Composite score increases (e.g., smaller gaps in probabilities across HSGPA levels at an ACT score of 30 than at an ACT score of 12). For students who tested without accommodations, the difference in the predicted probabilities across HSGPA levels increases as ACT Composite score increases (e.g., larger gaps in probabilities across HSGPA levels at an ACT score of 30 than at an ACT score of 12). Students who tested without accommodations and had a HSGPA of 2.0 had the lowest predicted probabilities of earning a bachelor's degree in six years across the ACT Composite scale, with a predicted probability of 0.10 at an ACT Composite score of 12 and 0.26 at an ACT Composite score of 30. Students who tested without accommodations and had a HSGPA of 4.0 had the highest predicted probabilities across the ACT Composite scale, with a predicted probability of 0.37 at an ACT Composite score of 12 and 0.84 at an ACT Composite score of 30.

**Figure 18.** Predicted Probability of Earning a Bachelor's Degree in Six Years, Model 3 (ACT Composite + HSGPA)

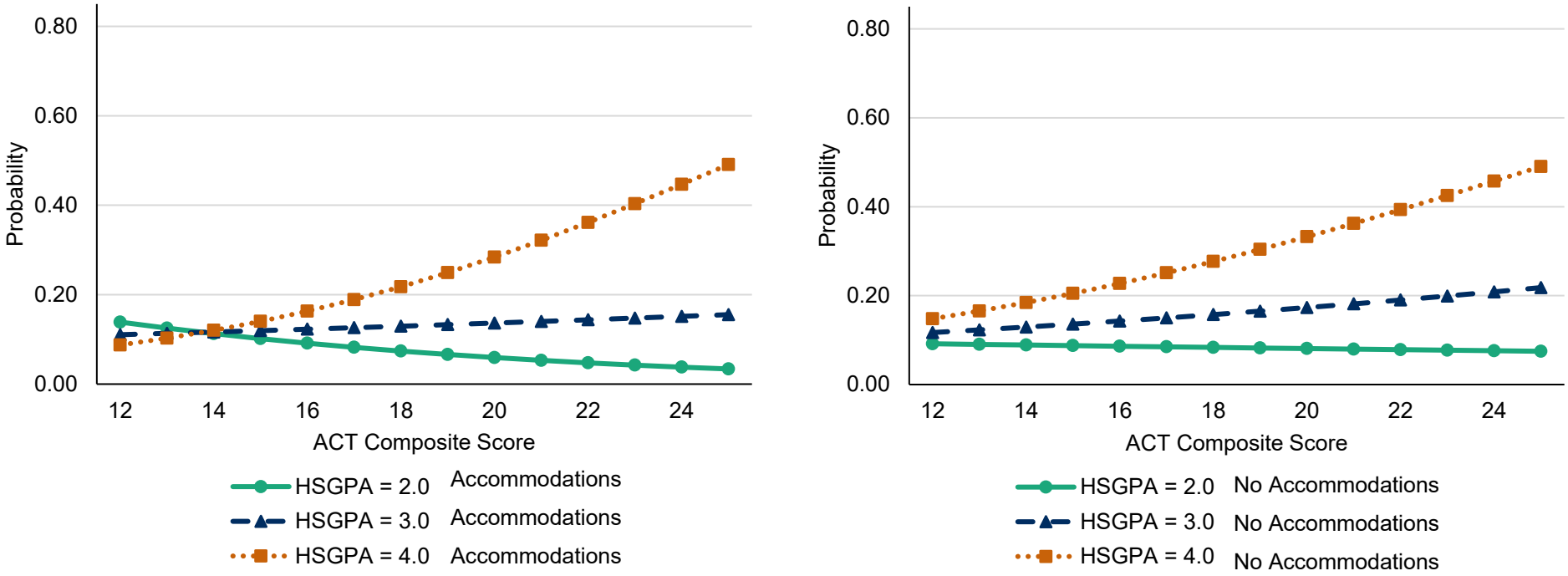


### Earning an Associate's Degree in Two Years

Figure 19 presents the predicted probabilities of earning an associate's degree in two years by accommodation status, ACT Composite score, and selected values of HSGPA for Model 3 (See Appendix Table A6 for tabled results). There were statistically significant effects for ACT Composite score, HSGPA, and the interaction between ACT Composite score and HSGPA. The accommodations effect, the two-way interactions with accommodation status, and the three-way interaction were all statistically non-significant, suggesting that the relationships between ACTC, HSGPA, and the outcome did not differ in a meaningful way between students testing with and without accommodations. While Figure 19 suggests differences in degree completion for students testing with and without accommodations, the differences are not statistically significant. Whereas students with a 3.0 or higher HSGPA were more likely to earn an associate's degree as their ACT Composite score increased, students with a HSGPA of 2.0 were less likely to earn an associate's degree as their ACT Composite score increased. This negative relationship between degree completion and ACT Composite scores for students with lower HSGPAs is a counterintuitive finding that will be further explored in the Discussion section. Students with a HSGPA of 2.0 who tested without accommodations had a predicted probability of 0.09 at an ACT Composite score of 12 and 0.07 at an ACT Composite score of 25. Students with a HSGPA of 3.0 who tested without accommodations had a predicted probability of 0.12 at an ACT Composite score of 12 and 0.22 at an ACT Composite score of 25. Students with a HSGPA of 4.0 who tested without accommodations had a predicted probability of 0.15 at an ACT Composite score of 12 and 0.49 at an ACT Composite score of 25.

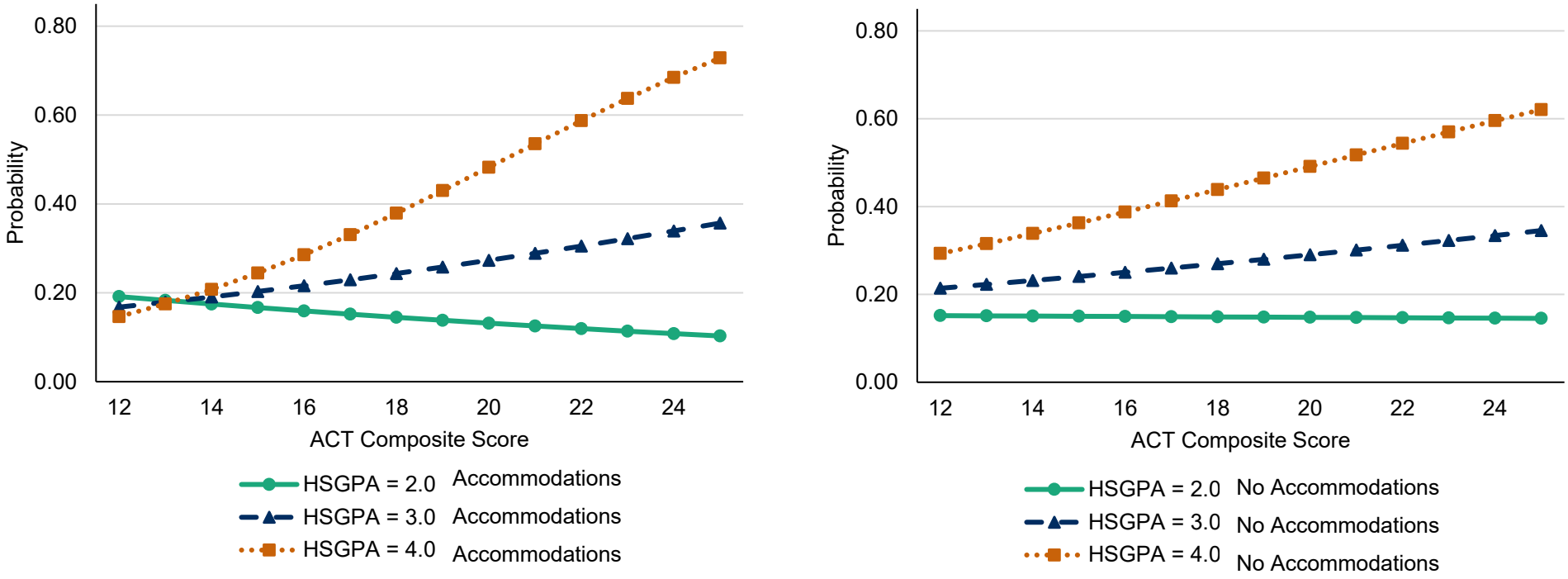
**Figure 19.** Predicted Probability of Earning an Associate's Degree in Two Years, Model 3 (ACT Composite + HSGPA)



### Earning an Associate's Degree in Three Years

Figure 20 presents the predicted probabilities of earning an associate's degree in three years by accommodation status, ACT Composite score, and selected values of HSGPA for Model 3 (See Appendix Table A7 for tabled results). There were statistically significant effects for ACT Composite score, HSGPA, and the interaction between ACT Composite score and HSGPA. The accommodations effect, the two-way interactions with accommodation status, and the three-way interaction were all statistically non-significant, suggesting that the relationships between ACTC, HSGPA, and the outcome did not differ in a meaningful way between students testing with and without accommodations. While Figure 20 suggests differences in degree completion for students testing with and without accommodations, the difference is not statistically significant. Students with a low HSGPA (2.0) who tested without accommodations showed no relationship between ACT Composite score and degree completion (with a predicted probability of 0.15 across the ACT Composite score range). Students with a 3.0 or higher HSGPA were more likely to earn an associate's degree as their ACT Composite score increased. Students with a HSGPA of 3.0 who tested without accommodations had a predicted probability of 0.21 at an ACT Composite score of 12 and 0.35 at an ACT Composite score of 25. Students with a HSGPA of 4.0 who tested without accommodations had a predicted probability of 0.29 at an ACT Composite score of 12 and 0.62 at an ACT Composite score of 25.

**Figure 20.** Predicted Probability of Earning an Associate's Degree in Three Years, Model 3 (ACT Composite + HSGPA)

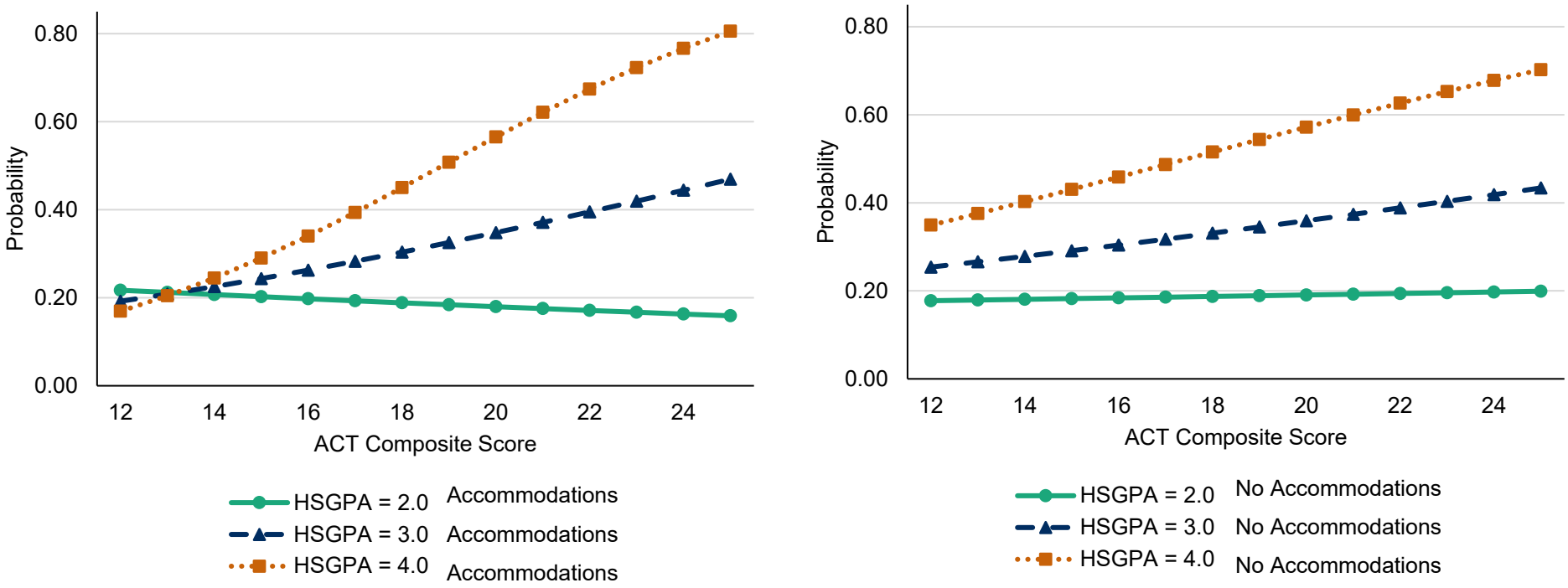


### Earning an Associate's Degree or Transferring to a Four-Year Institution in Three Years

Figure 21 presents the predicted probabilities of earning an associate's degree or transferring to a four-year institution in three years by accommodation status, ACT Composite score, and selected values of HSGPA for Model 3 (See Appendix Table A8 for tabled results). There were statistically significant effects for ACT Composite score, HSGPA, the interaction between ACT Composite score and HSGPA, and the three-way interaction among ACT Composite, HSGPA, and accommodation status. A statistically significant three-way interaction means that the interaction between ACT Composite score and HSGPA differs for students who tested with or without accommodations. For students who tested without accommodations, as either ACT Composite score or HSGPA increases, the probability of earning an associate's degree or transferring in three years increased, but the rate of increase across the ACT Composite score was higher as HSGPA levels increased. For students who tested with accommodations, there was a positive relationship between ACT Composite score and the probability of earning an associate's degree or transferring in three years for students with a HSGPA greater than 2.0, but there was a negative relationship between ACT Composite score and the probability of earning an associate's degree or transferring in three years for students with a 2.0 HSGPA. This negative relationship between degree completion and ACT Composite scores for students with lower HSGPAs is a counterintuitive finding that will be further explored in the Discussion section.

Students with a HSGPA of 2.0 who tested without accommodations had a predicted probability of 0.18 at an ACT Composite score of 12 and a predicted probability of 0.20 at an ACT Composite score of 25, and students with a HSGPA of 2.0 who tested with accommodations had a predicted probability of 0.22 at an ACT Composite score of 12 and a predicted probability of 0.16 at an ACT Composite score of 25. Students with a HSGPA of 3.0 who tested without accommodations had a predicted probability of 0.25 at an ACT Composite score of 12 and a predicted probability of 0.43 at an ACT Composite score of 25, and students with a HSGPA of 3.0 who tested with accommodations had a predicted probability of 0.19 at an ACT Composite score of 12 and a predicted probability of 0.47 at an ACT Composite score of 25. Students with a HSGPA of 4.0 who tested without accommodations had a predicted probability of 0.35 at an ACT Composite score of 12 and a predicted probability of 0.70 at an ACT Composite score of 25, and students with a HSGPA of 4.0 who tested with accommodations had a predicted probability of 0.17 at an ACT Composite score of 12 and a predicted probability of 0.81 at an ACT Composite score of 25.

**Figure 21.** Predicted Probability of Earning an Associate's Degree or Transferring to a Four-Year Institution in Three Years, Model 3 (ACT Composite + HSGPA)




In summary, for models that included both ACT Composite score and HSGPA, across all the outcomes, we found a significant interaction between ACT Composite scores and HSGPA, such that the relationship between ACT Composite score and outcomes (FYGPA or degree completion) became stronger as HSGPA increased (and likewise, the relationship between HSGPA and outcomes became stronger as ACT Composite score increased). This suggests that there is value in using both predictors over either predictor alone, especially when comparing high-performing students. In cases where there were statistically significant interactions among ACT Composite score, HSGPA, and accommodation status, the differences in outcomes between students who tested with or without accommodations tended to be more pronounced at higher ACT Composite scores and higher HSGPA levels than at lower ACT Composite scores and lower HSGPA levels.

As mentioned at the start of this section, Models 3 and 4 tended to produce very similar predicted values, so the plots were only presented for Model 3. However, it should be noted that some differences did emerge between Models 3 and 4 in terms of the specific predictors that were statistically significant. In the models predicting earning a bachelor's degree in four years, the interaction between ACT Composite score and HSGPA was statistically significant in Model 3 but not in Model 4. In the models predicting earning an associate's degree in two years, the accommodations effect was statistically non-significant in Model 3 but statistically significant in Model 4.

Also, while not a focus of this research study, in general, the coefficients for student demographic characteristics were in the direction expected based on previous research (Moore & Schnieders, 2022). With some exceptions, we found worse outcomes for male students (compared to female students), Black students (compared to White students), students whose parents did not attend college (compared to students whose parents attended at least some college), and students with family incomes below $36,000 (compared to students with higher family incomes). In addition, Asian students tended to have higher outcomes compared to White students.

### *Research Question 4: Does joint use of ACTC and HSGPA improve prediction accuracy over the use of either predictor by itself?*

To answer this research question, we examined model fit and the residuals for each outcome and model.

#### Model Fit

Table 13 contains the adjusted $R^2$ values for each of the linear regression models predicting FYGPA. $R^2$ is a measure of the percent of variance explained by the model, and higher values indicate more variance explained. For both the two-year and four-year enrollee models, we see that the $R^2$ is lower for the ACT Composite model, slightly higher for the HSGPA model, higher yet for the model containing both ACTC and HSGPA, and highest for the model when student demographic variables are included. Comparing the two-year and four-year enrollee models, we see that the $R^2$ values are higher for predicting FYGPA of four-year enrollees than they are for predicting FYGPA of two-year enrollees.

**Table 13.** Summary of $R^2$ (Percent of Variance Explained) Across Linear Regression Models

| Outcome | Model | R2 |
|---|---|---|
| **FYGPA, 4-Year Enrollees** | 1. ACTC | 0.22 |
| | 2. HSGPA | 0.25 |
| | 3. ACTC + HSGPA | 0.31 |
| | 4. ACTC + HSGPA + Demogs | 0.33 |
| **FYGPA, 2-Year Enrollees** | 1. ACTC | 0.06 |
| | 2. HSGPA | 0.11 |
| | 3. ACTC + HSGPA | 0.13 |
| | 4. ACTC + HSGPA + Demogs | 0.14 |

Table 14 contains the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values for each of the logistic models predicting college completion. For both AIC and BIC, lower values indicate better fit. Across all the degree completion outcomes, we see that the AIC and BIC estimates are largest for the ACT Composite (ACTC) models, slightly smaller for the HSGPA models, smaller yet when both ACTC and HSGPA are in the models, and smallest when student demographic variables are included in the models. This provides evidence that model fit is better when both predictors are in the model compared to either predictor alone and that accounting for student demographics further improves model fit.

**Table 14.** Summary of AIC and BIC (Model Fit) Across Logistic Regression Models

| Outcome | Model | AIC | BIC |
|---|---|---|---|
| **Bachelor's Degree in 4 Years** | 1. ACTC | 117,370.9 | 117,409.3 |
| | 2. HSGPA | 116,063.0 | 116,101.4 |
| | 3. ACTC + HSGPA | 111,990.3 | 112,067.0 |
| | 4. ACTC + HSGPA + Demogs | 109,589.7 | 109,762.3 |
| **Bachelor's Degree in 6 Years** | 1. ACTC | 136,319.3 | 136,357.6 |
| | 2. HSGPA | 134,887.7 | 134,926.0 |
| | 3. ACTC + HSGPA | 131,003.8 | 131,080.5 |
| | 4. ACTC + HSGPA + Demogs | 128,601.2 | 128,773.8 |
| **Associate's Degree in 2 Years** | 1. ACTC | 33,596.3 | 33,630.2 |
| | 2. HSGPA | 33,156.4 | 33,190.3 |
| | 3. ACTC + HSGPA | 32,697.0 | 32,764.9 |
| | 4. ACTC + HSGPA + Demogs | 32,285.8 | 32,438.5 |
| **Associate's Degree in 3 Years** | 1. ACTC | 42,625.0 | 42,658.9 |
| | 2. HSGPA | 41,845.9 | 41,879.8 |
| | 3. ACTC + HSGPA | 41,442.1 | 41,509.9 |
| | 4. ACTC + HSGPA + Demogs | 41,135.9 | 41,288.6 |
| **Associate's Degree or Transfer in 3 Years** | 1. ACTC | 45,414.3 | 45,448.3 |
| | 2. HSGPA | 44,631.4 | 44,665.4 |
| | 3. ACTC + HSGPA | 44,092.5 | 44,160.3 |
| | 4. ACTC + HSGPA + Demogs | 43,765.5 | 43,918.2 |

### Residuals

Table 15 contains the mean residuals for each outcome and model by accommodation status. The mean residuals for the linear regression models can be interpreted as the average difference between the observed FYGPA and the predicted FYGPA (on a 0.0 to 4.0 scale). The mean residuals for the logistic regression models can be interpreted as the average difference between the observed outcome (degree completion, a 0 or 1 binary outcome) and the predicted outcome (probability of degree completion, ranging from 0 to 1). The mean residuals for students testing without accommodations were small; all values were less than 0.005. Across all the models, the mean residuals were larger for students testing with accommodations and mostly negative, ranging from −0.04 to −0.15 for the FYGPA models and from 0.02 to −0.07 for the degree completion models. The negative mean residuals indicate overprediction, meaning that the actual outcomes of students who tested with accommodations were worse on average

than what their ACT Composite scores or HSGPA would predict. The model predicting earning a bachelor's degree in six years had positive mean residuals for Models 2, 3, and 4, indicating slight underprediction (0.01–0.02) of degree completion for students who tested with accommodations. Comparing Models 1, 2, 3, and 4 across outcomes, with the exception of the models predicting earning a bachelor's degree in six years, the models that included both ACT Composite score and HSGPA (Models 3 and 4) tended to have lower residuals (i.e., a smaller degree of systematic under- or overprediction) than the models that only included HSGPA (Model 2).

**Table 15.** Mean Residuals for Each Outcome and Model

| Outcome | Model | Mean Residual | |
|---|---|---|---|
| | | No Accommodations | Accommodations |
| **FYGPA, 4-Year Enrollees** | 1. ACTC | 0.00 | −0.15 |
| | 2. HSGPA | 0.00 | −0.11 |
| | 3. ACTC + HSGPA | 0.00 | −0.08 |
| | 4. ACTC + HSGPA + Demogs | 0.00 | −0.07 |
| **FYGPA, 2-Year Enrollees** | 1. ACTC | 0.00 | −0.04 |
| | 2. HSGPA | 0.00 | −0.15 |
| | 3. ACTC + HSGPA | 0.00 | −0.07 |
| | 4. ACTC + HSGPA + Demogs | 0.00 | −0.06 |
| **Bachelor's Degree in 4 Years** | 1. ACTC | 0.00 | −0.04 |
| | 2. HSGPA | 0.00 | −0.02 |
| | 3. ACTC + HSGPA | 0.00 | −0.01 |
| | 4. ACTC + HSGPA + Demogs | 0.00 | −0.01 |
| **Bachelor's Degree in 6 Years** | 1. ACTC | 0.00 | −0.01 |
| | 2. HSGPA | 0.00 | 0.01 |
| | 3. ACTC + HSGPA | 0.00 | 0.02 |
| | 4. ACTC + HSGPA + Demogs | 0.00 | 0.02 |
| **Associate's Degree in 2 Years** | 1. ACTC | 0.00 | −0.01 |
| | 2. HSGPA | 0.00 | −0.04 |
| | 3. ACTC + HSGPA | 0.00 | −0.02 |
| | 4. ACTC + HSGPA + Demogs | 0.00 | −0.02 |
| **Associate's Degree in 3 Years** | 1. ACTC | 0.00 | −0.02 |
| | 2. HSGPA | 0.00 | −0.05 |
| | 3. ACTC + HSGPA | 0.00 | −0.02 |
| | 4. ACTC + HSGPA + Demogs | 0.00 | −0.02 |
| **Associate's Degree or Transfer in 3 Years** | 1. ACTC | 0.00 | −0.02 |
| | 2. HSGPA | 0.00 | −0.07 |
| | 3. ACTC + HSGPA | 0.00 | −0.03 |
| | 4. ACTC + HSGPA + Demogs | 0.00 | −0.03 |

# Discussion

This study examined first-year college grade point average (FYGPA) and degree completion of students who took the ACT with or without accommodations and enrolled at a public two-year or four-year institution in a single state in the southern United States. The primary predictors of interest were ACT Composite score, high school GPA (HSGPA), and accommodations status; student demographic characteristics (race/ethnicity, gender, parent education, and parent income) were also included as model covariates. The outcomes of interest included FYGPA for students who initially enrolled at a four-year institution, FYGPA for students who initially enrolled at a two-year institution, four-year bachelor's degree completion, six-year bachelor's degree completion, two-year associate's degree or certificate completion, three-year associate's degree or certificate completion, and three-year associate's degree or certificate completion or transfer to a four-year institution. Descriptive, correlation, and regression analyses were used to answer the four research questions discussed below.

## Research Question 1: Does the ACT predict degree completion and first-year college GPA similarly for students who test with accommodations and students who test without accommodations?

ACT Composite score (Model 1) was a statistically significant predictor of all the outcomes examined in this study. For five of the seven outcomes, the models that included ACT Composite score, accommodation status, and the interaction between ACT Composite score and accommodation status did not have statistically significant accommodation or interaction effects. This suggests that ACT predicted college outcomes similarly for students who took the ACT with or without accommodations. For the two models with statistically significant interaction effects (FYGPA of students enrolled at four-year institutions and earning a bachelor's degree in four years), differences in predicted outcomes favoring students who tested without accommodations emerged as ACT Composite scores increased.

## Research Question 2: Does HSGPA predict degree completion and first-year college GPA similarly for students who test with accommodations and students who test without accommodations?

While testing with accommodations on the ACT should have no bearing on students' HSGPA, it can be used as an imperfect proxy for indicating that a student has disabilities that impact their performance in school. Statistically significant interaction effects were found for all the HSGPA models (Model 2). This indicates that the relationships between HSGPA and the outcomes of FYGPA and degree completion are different for students who tested with accommodations compared to students who tested without accommodations. Specifically, when comparing plots of the predicted outcomes by HSGPA, the slopes of the lines were flatter for students who tested with accommodations than for students who tested without accommodations, suggesting that HSGPA does not discriminate as well between students who tested with accommodations to identify who will be successful in college (i.e., earn a higher FYGPA, earn an associate's degree or a bachelor's degree) as it does for students who tested without accommodations.

Some interesting relationships were also found between accommodation status and HSGPA such that students testing with accommodations with lower HSGPA had higher FYGPA and higher degree completion rates compared to their peers testing without accommodations with the same HSGPA, whereas students testing with accommodations with higher HSGPA had lower FYGPA and lower degree completion rates compared to their peers with the same HSGPA. While students with low HSGPAs who tested with accommodations had higher FYGPAs and higher degree completion rates compared to students with the same HSGPA who tested without accommodations, the rates were still low overall (e.g., students who had a 3.0 HSGPA had less than a 0.2 probability of earning a bachelor's degree in four years regardless of whether they tested with accommodations (0.17) or without accommodations (0.14)).

## Research Question 3: When used together, do both predictors together predict degree completion and first-year college GPA similarly for students who test with accommodations and students who test without accommodations?

Statistically significant three-way interactions were found among ACT Composite scores, HSGPA, and accommodation status for three of the outcomes: FYGPA of students initially enrolled at a four-year institution, earning a bachelor's degree in six years, and earning an associate's degree or transferring in three years. For each of these models, the magnitude of the relationship between HSGPA and the outcome increased as ACT Composite score increased. Conversely, the magnitude of the relationship between ACT Composite score and the outcome increased as HSGPA increased, but the positive interaction between ACT Composite score and HSGPA was greater for students who tested without accommodations than for students who tested with accommodations.

In the cases where there was no significant three-way interaction, statistically significant interactions were found between ACT Composite scores and HSGPA as well as between HSGPA and accommodation status for two of the outcomes: FYGPA of students initially enrolled at a two-year institution and earning a bachelor's degree in four years. For both of these models, the increase in the outcome as HSGPA increased was greater for students who tested without accommodations than for students who tested with accommodations.

In the cases where there was no significant three-way interaction, statistically significant interactions were found between ACT Composite scores and HSGPA for two of the outcomes: earning an associate's degree in two years and earning an associate's degree in three years. As ACT Composite score increased, the magnitude of the effect of HSGPA increased. Conversely, as HSGPA increased, the magnitude of the effect of ACT Composite score increased, but no statistically significant differences were found between students testing with and without accommodations.

This study also included models that took into account student demographic variables, including gender, race/ethnicity, parent education, and parent income. While the inclusion of these

variables improved model fit and proportion of variance explained, they did not appreciably change the nature of the relationships between the predictors in this study.

## Research Question 4: Does joint use of ACTC and HSGPA improve prediction accuracy over the use of either predictor by itself?

Overall, it appears that using both ACTC and HSGPA together more accurately predicted FYGPA and degree completion of all students than using either measure alone. Models including both ACT Composite score and HSGPA together as predictors improved model fit over models with only one of those two measures. Models including both ACT Composite score and HSGPA together as predictors also showed smaller mean residuals for students who tested with accommodations (meaning less overprediction) for the models predicting FYGPA for students initially enrolled at a four-year institution and earning a bachelor's degree in four years over models with only one of the two measures.

## General Discussion

Overall, we found that students who took the ACT with accommodations tended to have lower college degree completion rates compared to students who tested without accommodations. However, they also tended to have lower ACT scores and lower HSGPA, indicating that they may have been less prepared for college, on average. This may be partly due to the fact that students with disabilities are less likely to complete core academic coursework (Moore & Schnieders, 2022).

After taking ACT Composite scores, HSGPA, and student demographic characteristics into account, some differences in FYGPA and degree completion were still found between students testing with or without accommodations given the same ACT Composite scores or same HSGPA, particularly for students with higher ACT scores and higher HSGPAs. As mentioned in the Introduction section, there could be differences in the college experiences of students who took the ACT with accommodations and those who took the ACT without accommodations, such as different supports or accommodations being utilized in college, which could impact college success. Differences in college success could also be due to other factors outside of academic and demographic factors (e.g., social engagement, financial concerns, work, or family responsibilities). Radunzel and Noble (2013) hypothesized that some of the differences they found in degree completion rates by gender and race/ethnicity may be due to noncognitive factors, tendencies to seek out and use support services, or differences in study skills.

One interesting finding from this study is that the correlations between ACT Composite scores and FYGPA were higher than the correlations between HSGPA and FYGPA for students testing with accommodations (See Table 12). This is contrary to the findings for students who tested without accommodations and the findings of other research on this topic, which showed that correlations between HSGPA and FYGPA are generally higher than correlations between ACT Composite scores and FYGPA (Huh & Huang, 2017; Mattern et al., 2008; Sanchez, 2013; Sawyer, 2010). This suggests that the ACT may be capturing some aspect of college readiness for students who test with accommodations that is not being captured by HSGPA and that ACT

Composite scores may be a better predictor of some college outcomes than HSGPA for students with disabilities who make use of accommodations on the ACT.

The results of this study were similar to the findings of Ziomek and Andrews (1996) and Huh and Huang (2016). Ziomek and Andrews (1996) found slight overprediction for students testing with accommodations in a model incorporating both ACT Composite score and HSGPA to predict FYGPA (−0.04), although it is unclear whether their study included only four-year institutions or both two- and four-year institutions. Huh and Huang (2016) also found evidence of overprediction of FYGPA for students who tested with accommodations, with mean residuals of −0.18 for a model comprising ACT Composite score alone, −0.08 for a model comprising HSGPA alone, and −0.05 for a model incorporating both ACT Composite score and HSGPA, although in their study it is also unclear whether their study included both two- and four-year institutions.

In the models predicting earning an associate's degree (in two years, in three years, or earning an associate's degree or transferring in three years) and predicting FYGPA of students who initially enrolled at a two-year institution based on both ACT Composite score and HSGPA, we found an unexpected negative relationship between ACT scores and each outcome for students with a low HSGPA. This is a counterintuitive finding, as we would expect a positive relationship between ACT scores and college grades and degree completion regardless of HSGPA. It is possible that a disproportionate number of students with high ACT scores and low HSGPAs transferred out of the state system, but due to limitations of the data, we only know that they did not earn a degree. Another explanation is that there were relatively few students who had low HSGPAs and high ACT scores, which may have added instability to the estimates. Research by Sanchez and Mattern (2018) found that ACT-tested students were more likely to have higher HSGPAs and lower ACT scores than to have higher ACT scores and lower HSGPAs. The poorer outcomes of students with low HSGPAs and high ACT scores could also be due to motivational factors. Students with low HSGPAs may also have lower behavioral skills, such as perseverance and study skills, which may also explain why they might be less likely to earn a higher FYGPA or a degree.

There are several limitations to our study. First, the sample of students who tested with accommodations in this study was small, which may have contributed to noise in the data such that there could be uncertainty in the estimates. Therefore, the estimated effects could be different upon replication of this study, and we encourage that this study be replicated with different samples of students. We could not disaggregate by accommodation type or disability type, and previous research indicates that students' performance on the ACT, their HSGPA, and likely their FYGPA vary a lot by both accommodation type and disability type. Also, given the amount of time that passed between measuring student performance on the ACT and HSGPA while students were in high school and the long-term outcomes such as six-year degree completion, many other life events or other factors could have occurred that would influence why a student may or may not earn a degree.

In conclusion, this study investigated FYGPA and degree completion for students who took the ACT with accommodations compared to students who tested without accommodations. Use of

both predictors produced better predictions than either predictor alone, but some differences in outcomes were found among students with high ACT scores and high HSGPA, favoring students who tested without accommodations. This study provides evidence that ACT scores may be a better indicator of college readiness than HSGPA for students who test with accommodations, but in general we recommend the use of both measures for better decision-making.

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# Appendix

**Table A1.** Number of Students in the Study Sample by Institution Type, Accommodation Status, and Cohort Year

| Cohort Year | No Accom. 2-Year | No Accom. 4-Year | Accom. 2-Year | Accom. 4-Year | Total |
|---|---|---|---|---|---|
| 2008–09 | 3,568 | 10,468 | 79 | 114 | 14,229 |
| 2009–10 | 3,975 | 10,334 | 77 | 139 | 14,525 |
| 2010–11 | 4,003 | 11,398 | 97 | 145 | 15,643 |
| 2011–12 | 4,083 | 12,151 | 98 | 209 | 16,541 |
| 2012–13 | 4,298 | 12,419 | 124 | 189 | 17,030 |
| 2013–14 | 4,428 | 11,967 | 102 | 196 | 16,693 |
| 2014–15 | 3,497 | 12,316 | 105 | 205 | 16,123 |
| 2015–16 | 3,483 | 12,683 | 90 | 277 | 16,533 |
| 2016–17 | 3,470 | 12,568 | 116 | 297 | 16,451 |

**Table A2.** Linear Regression Predicting FYGPA, Students Initially Enrolled at a Four-Year Institution

| Model | Variable | Estimate | SE | t statistic | *p*-value |
|---|---|---|---|---|---|
| **1. ACTC** | Intercept | 2.77 | 0.00 | 1034.72 | 0.000 |
| | ACTC | 0.09 | 0.00 | 164.57 | 0.000 |
| | Accommodations | −0.19 | 0.02 | −8.93 | 0.000 |
| | ACTC * Accommodations | −0.02 | 0.00 | −5.82 | 0.000 |
| **2. HSGPA** | Intercept | 2.77 | 0.00 | 1075.39 | 0.000 |
| | HSGPA | 0.86 | 0.00 | 175.17 | 0.000 |
| | Accommodations | −0.19 | 0.02 | −9.02 | 0.000 |
| | HSGPA * Accommodations | −0.40 | 0.04 | −11.37 | 0.000 |
| **3. ACTC + HSGPA** | Intercept | 2.74 | 0.00 | 917.00 | 0.000 |
| | ACTC | 0.05 | 0.00 | 78.69 | 0.000 |
| | HSGPA | 0.64 | 0.01 | 107.65 | 0.000 |
| | Accommodations | −0.12 | 0.02 | −5.76 | 0.000 |
| | ACTC * Accommodations | 0.01 | 0.00 | 1.54 | 0.124 |
| | HSGPA * Accommodations | −0.35 | 0.04 | −8.55 | 0.000 |
| | ACTC * HSGPA | 0.02 | 0.00 | 21.53 | 0.000 |
| | ACTC * HSGPA * Accommodations | −0.01 | 0.01 | −2.04 | 0.045 |
| **4. ACTC + HSGPA + Demographics** | Intercept | 2.83 | 0.01 | 432.58 | 0.000 |
| | ACTC | 0.05 | 0.00 | 64.59 | 0.000 |
| | HSGPA | 0.59 | 0.01 | 99.21 | 0.000 |
| | Accommodations | −0.11 | 0.02 | −5.04 | 0.000 |
| | ACTC * Accommodations | 0.01 | 0.00 | 1.31 | 0.193 |
| | HSGPA * Accommodations | −0.32 | 0.04 | −8.12 | 0.000 |
| | ACTC * HSGPA | 0.03 | 0.00 | 23.76 | 0.000 |
| | ACTC * HSGPA * Accommodations | −0.02 | 0.01 | −2.13 | 0.037 |
| | Male | −0.22 | 0.00 | −47.31 | 0.000 |
| | Asian | 0.10 | 0.02 | 5.70 | 0.000 |
| | Black | −0.08 | 0.01 | −8.81 | 0.000 |
| | Latinx | 0.05 | 0.01 | 4.02 | 0.000 |
| | Other Race/Ethnicity | −0.12 | 0.01 | −8.88 | 0.000 |
| | Parents No College | −0.06 | 0.01 | −6.49 | 0.000 |
| | Parent Education Missing | −0.06 | 0.01 | −11.44 | 0.000 |
| | Income $36,000–$60,000 | 0.05 | 0.01 | 6.43 | 0.000 |
| | Income $60,000–$100,000 | 0.09 | 0.01 | 12.76 | 0.000 |
| | Income $100,000+ | 0.12 | 0.01 | 16.16 | 0.000 |

**Table A3.** Linear Regression Predicting FYGPA, Students Initially Enrolled at a Two-Year Institution

| Model | Variable | Estimate | SE | t statistic | *p*-value |
|---|---|---|---|---|---|
| **1. ACTC** | Intercept | 2.50 | 0.01 | 494.95 | 0.000 |
| | ACTC | 0.06 | 0.00 | 38.30 | 0.000 |
| | Accommodations | −0.08 | 0.05 | −1.73 | 0.091 |
| | ACTC * Accommodations | −0.01 | 0.01 | −1.41 | 0.161 |
| **2. HSGPA** | Intercept | 2.51 | 0.00 | 509.01 | 0.000 |
| | HSGPA | 0.57 | 0.01 | 57.12 | 0.000 |
| | Accommodations | −0.18 | 0.04 | −4.98 | 0.000 |
| | HSGPA * Accommodations | −0.28 | 0.05 | −5.33 | 0.000 |
| **3. ACTC + HSGPA** | Intercept | 2.48 | 0.01 | 476.37 | 0.000 |
| | ACTC | 0.03 | 0.00 | 18.58 | 0.000 |
| | HSGPA | 0.49 | 0.01 | 47.68 | 0.000 |
| | Accommodations | −0.06 | 0.05 | −1.40 | 0.173 |
| | ACTC * Accommodations | 0.01 | 0.01 | 1.02 | 0.312 |
| | HSGPA * Accommodations | −0.18 | 0.07 | −2.62 | 0.010 |
| | ACTC * HSGPA | 0.03 | 0.00 | 13.94 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.00 | 0.02 | −0.23 | 0.817 |
| **4. ACTC + HSGPA + Demographics** | Intercept | 2.56 | 0.01 | 191.32 | 0.000 |
| | ACTC | 0.03 | 0.00 | 14.90 | 0.000 |
| | HSGPA | 0.46 | 0.01 | 44.14 | 0.000 |
| | Accommodations | −0.05 | 0.05 | −1.02 | 0.318 |
| | ACTC * Accommodations | 0.01 | 0.01 | 0.91 | 0.369 |
| | HSGPA * Accommodations | −0.15 | 0.07 | −2.22 | 0.029 |
| | ACTC * HSGPA | 0.04 | 0.00 | 14.91 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.00 | 0.02 | −0.25 | 0.807 |
| | Male | −0.14 | 0.01 | −12.91 | 0.000 |
| | Asian | 0.14 | 0.05 | 2.91 | 0.004 |
| | Black | −0.19 | 0.02 | −11.16 | 0.000 |
| | Latinx | 0.10 | 0.02 | 4.70 | 0.000 |
| | Other Race/Ethnicity | −0.12 | 0.03 | −3.97 | 0.000 |
| | Parents No College | −0.03 | 0.02 | −2.28 | 0.024 |
| | Parent Education Missing | −0.06 | 0.01 | −6.05 | 0.000 |
| | Income $36,000–$60,000 | 0.05 | 0.01 | 3.18 | 0.003 |
| | Income $60,000–$100,000 | 0.08 | 0.02 | 5.05 | 0.000 |
| | Income $100,000+ | 0.06 | 0.02 | 3.04 | 0.003 |

**Table A4.** Logistic Regression Predicting Earning a Bachelor's Degree in Four Years

| Model | Variable | Estimate | SE | t statistic | *p*-value |
|---|---|---|---|---|---|
| **1. ACTC** | Intercept | −0.99 | 0.01 | −131.78 | 0.000 |
| | ACTC | 0.19 | 0.00 | 107.92 | 0.000 |
| | Accommodations | −0.26 | 0.06 | −4.17 | 0.000 |
| | ACTC * Accommodations | −0.04 | 0.01 | −2.77 | 0.006 |
| **2. HSGPA** | Intercept | −1.06 | 0.01 | −131.76 | 0.000 |
| | HSGPA | 1.99 | 0.02 | 106.00 | 0.000 |
| | Accommodations | −0.13 | 0.06 | −2.11 | 0.035 |
| | HSGPA * Accommodations | −0.97 | 0.14 | −7.10 | 0.000 |
| **3. ACTC + HSGPA** | Intercept | −1.08 | 0.01 | −125.43 | 0.000 |
| | ACTC | 0.12 | 0.00 | 57.21 | 0.000 |
| | HSGPA | 1.39 | 0.02 | 67.57 | 0.000 |
| | Accommodations | −0.09 | 0.06 | −1.37 | 0.169 |
| | ACTC * Accommodations | 0.01 | 0.01 | 0.41 | 0.681 |
| | HSGPA * Accommodations | −0.76 | 0.15 | −5.10 | 0.000 |
| | ACTC * HSGPA | −0.01 | 0.00 | −2.86 | 0.004 |
| | ACTC * HSGPA * Accommodations | −0.02 | 0.03 | −0.55 | 0.582 |
| **4. ACTC + HSGPA + Demographics** | Intercept | −0.92 | 0.02 | −44.92 | 0.000 |
| | ACTC | 0.12 | 0.00 | 49.07 | 0.000 |
| | HSGPA | 1.27 | 0.02 | 59.86 | 0.000 |
| | Accommodations | −0.06 | 0.07 | −0.91 | 0.361 |
| | ACTC * Accommodations | 0.00 | 0.01 | 0.30 | 0.767 |
| | HSGPA * Accommodations | −0.70 | 0.15 | −4.64 | 0.000 |
| | ACTC * HSGPA | −0.01 | 0.00 | −1.11 | 0.269 |
| | ACTC * HSGPA * Accommodations | −0.02 | 0.03 | −0.75 | 0.453 |
| | Male | −0.46 | 0.02 | −30.11 | 0.000 |
| | Asian | 0.19 | 0.05 | 3.60 | 0.000 |
| | Black | −0.22 | 0.03 | −7.99 | 0.000 |
| | Latinx | 0.04 | 0.04 | 1.07 | 0.284 |
| | Other Race/Ethnicity | −0.35 | 0.04 | −8.63 | 0.000 |
| | Parents No College | −0.31 | 0.03 | −10.47 | 0.000 |
| | Parent Education Missing | −0.36 | 0.02 | −22.35 | 0.000 |
| | Income $36,000–$60,000 | 0.16 | 0.02 | 6.94 | 0.000 |
| | Income $60,000–$100,000 | 0.34 | 0.02 | 14.85 | 0.000 |
| | Income $100,000+ | 0.50 | 0.02 | 22.01 | 0.000 |

**Table A5.** Logistic Regression Predicting Earning a Bachelor's Degree in Six Years

| Model | Variable | Estimate | SE | t statistic | *p*-value |
|---|---|---|---|---|---|
| **1. ACTC** | Intercept | 0.07 | 0.01 | 10.09 | 0.000 |
| | ACTC | 0.17 | 0.00 | 106.11 | 0.000 |
| | Accommodations | −0.07 | 0.05 | −1.36 | 0.174 |
| | ACTC * Accommodations | −0.02 | 0.01 | −1.94 | 0.052 |
| **2. HSGPA** | Intercept | 0.04 | 0.01 | 5.93 | 0.000 |
| | HSGPA | 1.60 | 0.01 | 108.42 | 0.000 |
| | Accommodations | −0.07 | 0.05 | −1.32 | 0.186 |
| | HSGPA * Accommodations | −0.74 | 0.10 | −7.75 | 0.000 |
| **3. ACTC + HSGPA** | Intercept | 0.03 | 0.01 | 3.67 | 0.000 |
| | ACTC | 0.11 | 0.00 | 57.75 | 0.000 |
| | HSGPA | 1.15 | 0.02 | 67.90 | 0.000 |
| | Accommodations | 0.05 | 0.06 | 0.84 | 0.400 |
| | ACTC * Accommodations | 0.02 | 0.01 | 1.71 | 0.088 |
| | HSGPA * Accommodations | −0.69 | 0.11 | −6.30 | 0.000 |
| | ACTC * HSGPA | 0.03 | 0.00 | 8.04 | 0.000 |
| | ACTC * HSGPA * Accommodations | −0.05 | 0.02 | −2.32 | 0.021 |
| **4. ACTC + HSGPA + Demographics** | Intercept | −0.05 | 0.02 | −3.07 | 0.002 |
| | ACTC | 0.10 | 0.00 | 47.90 | 0.000 |
| | HSGPA | 1.08 | 0.02 | 61.21 | 0.000 |
| | Accommodations | 0.04 | 0.06 | 0.65 | 0.516 |
| | ACTC * Accommodations | 0.02 | 0.01 | 1.60 | 0.109 |
| | HSGPA * Accommodations | −0.66 | 0.11 | −5.99 | 0.000 |
| | ACTC * HSGPA | 0.03 | 0.00 | 8.80 | 0.000 |
| | ACTC * HSGPA * Accommodations | −0.05 | 0.02 | −2.42 | 0.016 |
| | Male | −0.32 | 0.01 | −22.80 | 0.000 |
| | Asian | 0.36 | 0.05 | 6.91 | 0.000 |
| | Black | 0.03 | 0.02 | 1.36 | 0.175 |
| | Latinx | 0.21 | 0.03 | 6.37 | 0.000 |
| | Other Race/Ethnicity | −0.32 | 0.04 | −8.94 | 0.000 |
| | Parents No College | −0.35 | 0.02 | −14.21 | 0.000 |
| | Parent Education Missing | −0.15 | 0.01 | −10.16 | 0.000 |
| | Income $36,000–$60,000 | 0.20 | 0.02 | 10.67 | 0.000 |
| | Income $60,000–$100,000 | 0.45 | 0.02 | 23.19 | 0.000 |
| | Income $100,000+ | 0.69 | 0.02 | 32.94 | 0.000 |

**Table A6.** Logistic Regression Predicting Earning an Associate's Degree in Two Years

| Model | Variable | Estimate | SE | t statistic | *p*-value |
|---|---|---|---|---|---|
| **1. ACTC** | Intercept | −1.51 | 0.01 | −105.22 | 0.000 |
| | ACTC | 0.12 | 0.00 | 31.36 | 0.000 |
| | Accommodations | −0.18 | 0.11 | −1.69 | 0.090 |
| | ACTC * Accommodations | −0.05 | 0.02 | −1.90 | 0.057 |
| **2. HSGPA** | Intercept | −1.54 | 0.01 | −104.09 | 0.000 |
| | HSGPA | 1.00 | 0.03 | 36.08 | 0.000 |
| | Accommodations | −0.30 | 0.10 | −2.98 | 0.003 |
| | HSGPA * Accommodations | −0.54 | 0.18 | −3.08 | 0.002 |
| **3. ACTC + HSGPA** | Intercept | −1.61 | 0.02 | −101.59 | 0.000 |
| | ACTC | 0.06 | 0.00 | 13.62 | 0.000 |
| | HSGPA | 0.78 | 0.03 | 26.11 | 0.000 |
| | Accommodations | −0.25 | 0.13 | −1.91 | 0.057 |
| | ACTC * Accommodations | −0.02 | 0.03 | −0.86 | 0.389 |
| | HSGPA * Accommodations | −0.03 | 0.23 | −0.15 | 0.878 |
| | ACTC * HSGPA | 0.07 | 0.01 | 10.46 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.07 | 0.05 | 1.55 | 0.122 |
| **4. ACTC + HSGPA + Demographics** | Intercept | −1.49 | 0.03 | −44.08 | 0.000 |
| | ACTC | 0.04 | 0.00 | 8.38 | 0.000 |
| | HSGPA | 0.78 | 0.03 | 25.58 | 0.000 |
| | Accommodations | −0.29 | 0.13 | −2.19 | 0.029 |
| | ACTC * Accommodations | −0.03 | 0.03 | −0.90 | 0.368 |
| | HSGPA * Accommodations | 0.06 | 0.23 | 0.24 | 0.811 |
| | ACTC * HSGPA | 0.09 | 0.01 | 11.89 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.08 | 0.05 | 1.63 | 0.104 |
| | Male | 0.20 | 0.03 | 6.84 | 0.000 |
| | Asian | −0.44 | 0.15 | −2.95 | 0.003 |
| | Black | −0.52 | 0.05 | −10.00 | 0.000 |
| | Latinx | −0.19 | 0.06 | −3.27 | 0.001 |
| | Other Race/Ethnicity | −0.38 | 0.08 | −4.52 | 0.000 |
| | Parents No College | −0.02 | 0.04 | −0.45 | 0.652 |
| | Parent Education Missing | −0.42 | 0.03 | −13.51 | 0.000 |
| | Income $36,000–$60,000 | 0.08 | 0.04 | 2.19 | 0.029 |
| | Income $60,000–$100,000 | 0.18 | 0.04 | 4.74 | 0.000 |
| | Income $100,000+ | −0.02 | 0.05 | −0.38 | 0.702 |

**Table A7.** Logistic Regression Predicting Earning an Associate's Degree in Three Years

| Model | Variable | Estimate | SE | t statistic | *p*-value |
|---|---|---|---|---|---|
| **1. ACTC** | Intercept | −0.86 | 0.01 | −72.11 | 0.000 |
| | ACTC | 0.10 | 0.00 | 32.04 | 0.000 |
| | Accommodations | −0.09 | 0.09 | −0.96 | 0.337 |
| | ACTC * Accommodations | 0.00 | 0.02 | 0.08 | 0.936 |
| **2. HSGPA** | Intercept | −0.88 | 0.01 | −72.16 | 0.000 |
| | HSGPA | 0.95 | 0.02 | 40.89 | 0.000 |
| | Accommodations | −0.28 | 0.08 | −3.41 | 0.001 |
| | HSGPA * Accommodations | −0.41 | 0.14 | −2.89 | 0.004 |
| **3. ACTC + HSGPA** | Intercept | −0.93 | 0.01 | −71.14 | 0.000 |
| | ACTC | 0.05 | 0.00 | 14.36 | 0.000 |
| | HSGPA | 0.79 | 0.02 | 31.73 | 0.000 |
| | Accommodations | −0.12 | 0.10 | −1.18 | 0.237 |
| | ACTC * Accommodations | 0.03 | 0.02 | 1.27 | 0.203 |
| | HSGPA * Accommodations | −0.05 | 0.19 | −0.24 | 0.808 |
| | ACTC * HSGPA | 0.05 | 0.01 | 8.86 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.08 | 0.04 | 1.91 | 0.056 |
| **4. ACTC + HSGPA + Demographics** | Intercept | −0.78 | 0.03 | −26.94 | 0.000 |
| | ACTC | 0.04 | 0.00 | 9.69 | 0.000 |
| | HSGPA | 0.76 | 0.03 | 30.03 | 0.000 |
| | Accommodations | −0.11 | 0.10 | −1.13 | 0.260 |
| | ACTC * Accommodations | 0.03 | 0.02 | 1.18 | 0.238 |
| | HSGPA * Accommodations | 0.03 | 0.19 | 0.13 | 0.895 |
| | ACTC * HSGPA | 0.06 | 0.01 | 9.88 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.08 | 0.04 | 1.95 | 0.052 |
| | Male | −0.06 | 0.02 | −2.35 | 0.019 |
| | Asian | −0.10 | 0.12 | −0.84 | 0.403 |
| | Black | −0.42 | 0.04 | −10.29 | 0.000 |
| | Latinx | 0.05 | 0.05 | 1.07 | 0.284 |
| | Other Race/Ethnicity | −0.33 | 0.07 | −4.70 | 0.000 |
| | Parents No College | −0.04 | 0.04 | −1.17 | 0.243 |
| | Parent Education Missing | −0.30 | 0.03 | −11.17 | 0.000 |
| | Income $36,000–$60,000 | 0.11 | 0.03 | 3.37 | 0.001 |
| | Income $60,000–$100,000 | 0.18 | 0.03 | 5.37 | 0.000 |
| | Income $100,000+ | 0.03 | 0.05 | 0.58 | 0.562 |

**Table A8.** Logistic Regression Predicting Earning an Associate's Degree or Transferring to a Four-Year Institution within Three Years

| Model | Variable | Estimate | SE | t statistic | *p*-value |
|---|---|---|---|---|---|
| **1. ACTC** | Intercept | −0.57 | 0.01 | −50.30 | 0.000 |
| | ACTC | 0.11 | 0.00 | 36.09 | 0.000 |
| | Accommodations | −0.08 | 0.09 | −0.94 | 0.349 |
| | ACTC * Accommodations | 0.01 | 0.02 | 0.45 | 0.650 |
| **2. HSGPA** | Intercept | −0.59 | 0.01 | −50.45 | 0.000 |
| | HSGPA | 0.98 | 0.02 | 44.27 | 0.000 |
| | Accommodations | −0.32 | 0.08 | −4.15 | 0.000 |
| | HSGPA * Accommodations | −0.43 | 0.13 | −3.28 | 0.001 |
| **3. ACTC + HSGPA** | Intercept | −0.63 | 0.01 | −50.86 | 0.000 |
| | ACTC | 0.06 | 0.00 | 18.35 | 0.000 |
| | HSGPA | 0.81 | 0.02 | 34.06 | 0.000 |
| | Accommodations | −0.10 | 0.09 | −1.05 | 0.292 |
| | ACTC * Accommodations | 0.04 | 0.02 | 1.88 | 0.060 |
| | HSGPA * Accommodations | −0.07 | 0.18 | −0.41 | 0.684 |
| | ACTC * HSGPA | 0.05 | 0.01 | 8.59 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.08 | 0.04 | 1.97 | 0.049 |
| **4. ACTC + HSGPA + Demographics** | Intercept | −0.59 | 0.03 | −21.44 | 0.000 |
| | ACTC | 0.05 | 0.00 | 13.10 | 0.000 |
| | HSGPA | 0.79 | 0.02 | 32.71 | 0.000 |
| | Accommodations | −0.13 | 0.09 | −1.38 | 0.169 |
| | ACTC * Accommodations | 0.04 | 0.02 | 1.74 | 0.081 |
| | HSGPA * Accommodations | −0.02 | 0.18 | −0.12 | 0.902 |
| | ACTC * HSGPA | 0.06 | 0.01 | 9.56 | 0.000 |
| | ACTC * HSGPA * Accommodations | 0.08 | 0.04 | 1.97 | 0.049 |
| | Male | 0.01 | 0.02 | 0.44 | 0.660 |
| | Asian | 0.07 | 0.11 | 0.63 | 0.532 |
| | Black | −0.30 | 0.04 | −7.83 | 0.000 |
| | Latinx | 0.12 | 0.05 | 2.54 | 0.011 |
| | Other Race/Ethnicity | −0.32 | 0.07 | −4.86 | 0.000 |
| | Parents No College | −0.11 | 0.03 | −3.34 | 0.001 |
| | Parent Education Missing | −0.25 | 0.03 | −9.82 | 0.000 |
| | Income $36,000–$60,000 | 0.17 | 0.03 | 5.57 | 0.000 |
| | Income $60,000–$100,000 | 0.31 | 0.03 | 9.54 | 0.000 |
| | Income $100,000+ | 0.26 | 0.04 | 5.78 | 0.000 |

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