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Challenges and opportunity: An examination of barriers to postsecondary academic success

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Community colleges are a critical component of the U.S. higher education system, providing access to students from traditionally underserved communities. However, enduring challenges to completion stemming from educational, economic, and social inequities persist. Building on prior work that examines barriers to student success and their relationship to student outcomes, this descriptive study examines the relationship between students' time utilization, engagement with campus resources, financial and mental well-being, with academic persistence. Specifically, we examine the relative importance of these barriers on students' educational attainment. We find that the incidence of adverse mental health is comparable to 4-year undergraduate populations. The rates of food and housing insecurity are comparable to previous studies, though strikingly high. While a plurality of respondents engage with multiple campus resources, this engagement is unrelated to their propensity to remain enrolled or complete additional credits. Most notably, mental health conditions were negatively related to persistence and credit accumulation, while the relationship between academic outcomes and measures of food and housing insecurity was smaller and not significant. Our findings suggest that facilitating access to mental health supports is a prominent avenue for supporting student engagement and success.

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Challenges and opportunity: An examination of barriers to postsecondary academic success

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Abstract

Community colleges are a critical component of the U.S. higher education system, providing access to students from traditionally underserved communities. However, enduring challenges to completion stemming from educational, economic, and social inequities persist. Building on prior work that examines barriers to student success and their relationship to student outcomes, this descriptive study examines the relationship between students' time utilization, engagement with campus resources, financial and mental well-being, with academic persistence. Specifically, we examine the relative importance of these barriers on students' educational attainment. We find that the incidence of adverse mental health is comparable to 4-year undergraduate populations. The rates of food and housing insecurity are comparable to previous studies, though strikingly high. While a plurality of respondents engage with multiple campus resources, this engagement is unrelated to their propensity to remain enrolled or complete additional credits. Most notably, mental health conditions were negatively related to persistence and credit accumulation, while the relationship between academic outcomes and measures of food and housing insecurity was smaller and not significant. Our findings suggest that facilitating access to mental health supports is a prominent avenue for supporting student engagement and success.

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1. Introduction

Community colleges play a critical role in promoting educational equity by enrolling a disproportionately high number of low-income, racially minoritized, first-generation, immigrant, and older students. Nonetheless, student persistence and completion at community colleges remain ongoing challenges, particularly for students of color and students from lower-income families (Rodríguez-Hernández et al., 2020). Historically marginalized students often experience heightened barriers to postsecondary success, including being more likely to have inadequate academic preparation for college-level work, having increased dependence on financial aid to pay for their educational and personal expenses, and being the first in their families to attend college (Dynarski et al., 2022; Dynarski et al., 2023). These challenges underscore the importance of developing effective institutional supports and broader policies that strengthen student retention and completion at community colleges.

Shifting demographics in community colleges heighten this urgency. As the overall undergraduate population has contracted 15% from 2010 to 2021, the enrollment of Hispanic/Latino students has surged by 30%, leading to a significant transformation of the college student population (NCES, 2023). This growth, evidenced by the proliferation of Hispanic Serving Institutions (HSIs),[1] presents opportunities and challenges for the higher education landscape. Hispanic/Latino students have the second lowest degree attainment rates of any racial/ethnic group, behind Asian, White, and Black students (Ma & Pender, 2023). Acknowledging these stylized facts and the persistent barriers to

[1] Hispanic Serving Institutions (HSI's) is a designation for colleges serving 25% or more Hispanic/Latino students. The number of HSI's has nearly doubled in number from 311 to 572 in the same time period (Hispanic Association of Colleges and Universities, n.d.). Due to the rapid Hispanic/Latino college-aged population growth, most of the 400 'emerging' HSIs (student enrollments between 15% and 24.9% Hispanic), are projected to become HSI's within the next decade.

completion, it becomes crucial to enhance our understanding of students' perceptions of the challenges they face and the relationship between these factors and their academic success.

Previous work finds that although community college students face multiple challenges to completion, institutional support, financial aid, and other means-tested transfers can aid student success (Dynarski, Page, & Scott-Clayton, 2022). However, existing interventions primarily focus on addressing students' financial and academic needs to increase student engagement and persistence. Exploring the factors shaping student persistence–and understanding the relative importance and relationships across these factors–requires a comprehensive interdisciplinary conceptualization of student success (Perna & Thomas, 2006). This descriptive study adopts a multidimensional approach to examine numerous elements that contribute to early student persistence and credit accumulation. Specifically, we characterize a first-time, low-income community college student population and investigate the relationship between their early academic outcomes and time utilization, engagement with campus resources, financial and mental well-being.

To do this, we examine self-reported survey data complemented with rich administrative data records to provide a comprehensive portrait of factors linked to student outcomes. Specifically, we fielded a web-based survey of 599 community college students at two federally designated Hispanic-Serving Institutions (HSI), and we linked those records to participants' first-year academic and financial aid records. The self-reported measures include academic engagement (e.g., time spent studying), engagement with college (e.g., use of campus resources, interactions with faculty and advisors), financial stressors (e.g., housing and food insecurity), and mental well-being (e.g., anxiety, depression, and perceived stress). The administrative records provided by the community colleges

include information on participants' sociodemographic characteristics, prior academic preparation, postsecondary academic records, and financial aid receipt.

We use these rich data to answer the following research questions: (1) What is the state of first-time, low-income community college students' time utilization, engagement with campus resources, and financial and mental well-being? (2) How do these factors vary based on student attributes, such as sociodemographics? and (3) What are the relationships between students' behavior (i.e., time utilization, engagement with campus resources) and well-being (i.e., financial, mental health), and their early academic outcomes? As such, the current study builds on prior analyses by identifying the experiences of first-time, low-income students' struggles with housing and food insecurity and adverse mental health. A key contribution of this study is our ability to link these experiences to students' academic and work investments along with their educational records to provide an assessment of the relative importance of these factors on persistence and academic success. Critically, our descriptive study underscores the importance of access to mental health supports for community college attendees and lays important groundwork for future causal research on these supports.

We provide a comprehensive multidisciplinary review of the salient literature (Section 2) and describe a conceptual framework (Section 3) for understanding how these barriers interact with student performance. We describe our community college sample and the descriptive methods (Section 4), present our results (Section 5), and lastly, discuss our findings and identify areas for future scholarship (Section 6).

2. A Multidisciplinary Approach to Conceptualizing Student Success

This study incorporates multiple theoretical frameworks to enhance our understanding of the factors influencing community college students' early academic success. In doing so, we contribute to three distinct funds of knowledge–academic and campus engagement, financial well-being, and mental well-being–on factors that may mediate student academic success. We describe them briefly in turn.

2.1. Academic and Campus Engagement

A longstanding theory from Tinto (1975) suggests that student retention is positively associated with higher levels of academic and social integration. Tinto posited that academic integration occurs through grade performance and students' intellectual development during the college years, while social integration is realized through informal peer group associations, extracurricular activities, interaction with faculty and college administration, and a sense of community. Tinto argued that students and institutions share equal responsibility for the persistence process, with the classroom playing a central role. The level of learning and effort is linked to a student's degree of academic and social integration, emphasizing the connection between learning and integration. This theory, when viewed through an economic lens, highlights the mutual interest of students and institutions to maximize campus engagement for enhanced learning and persistence. Tinto's student persistence model has been broadly supported by a robust body of literature dating back to the early 1980s (e.g., Baumgart & Johnstone, 1977; Bean, 1980; Pascarella & Chapman, 1983; Pascarella & Terenzini, 1980).

How students spend their time (i.e., time utilization) is connected to student engagement, a comprehensive construct that comprises several aspects of academic and campus practices. As defined by Kuh (2003), student engagement embodies the commitment of time and effort that

students dedicate to their academic pursuits, linked to the policies and practices of their institutions.[2] It encompasses various dimensions, such as interaction with faculty, involvement in co-curricular activities, and peer interactions that are related to academic outcomes (Kuh, 2009; Pascarella & Terenzini, 2005). Both Kuh's engagement framework and Tinto's theory emphasize the role of student effort and supportive institutional environments. Time spent on campus and the effort put into studying and completing assignments are vital components of engagement. Engagement is not only associated with improved student academic outcomes (Kuh, Carini, & Klein, 2004) but may also help mitigate the adverse consequences of lower academic preparedness (Kuh et al., 2007).

More recent work by Gillen-O'Neel (2021), Ostrove and Long (2007) and Hurtado and Carter (1997), highlights the critical role of a sense of belonging in sustaining student engagement, especially for racially minoritized students, who are often first-generation and/or low-income students. This work underscores larger social forces (e.g., political and economic factors) that impact how students with limited educational and financial resources may have contrasting campus experiences compared to their better-resourced peers. Indeed, this premise is supported by Meeuwisse et al. (2010), who conducted a survey of 523 college students to explore their sense of belonging on campus. Importantly, the authors identified that for racially minoritized students, their sense of belonging on campus was primarily influenced by formal or structured interactions between students and teachers. In contrast, the sense of belonging for racial-majority-identifying students was predominantly shaped by informal relationships. These results support Tinto's theory, where both formal academic and informal social relationships are integral in shaping student retention.

[2] In our study, we specifically focus on the behavioral dimension of student engagement, corresponding to national assessments of the student experience (Kuh, 2009). Additionally, we acknowledge the correlation between the emotional and behavioral dimensions of student engagement, emphasizing their distinct nature and underscoring their significance for overall academic success (Li & Lerner, 2013).

However, they also highlight that these academic and social relationships develop differently based on student background, emphasizing the importance of understanding which attributes may influence how students experience college and their interactions with their institution.

Using nationally representative samples, previous studies have observed a decline in time dedicated to studying and attending classes in conjunction with increased time spent engaging in paid work over the last 50 years (Babcock & Marks, 2011; Darolia, 2014). This shift in time allocation is associated with negative impacts on students' campus engagement and academic success, particularly at higher work intensities, defined as 30 or more hours weekly (for a review, see Neyt et al., 2019). While employment during college may confer benefits by providing valuable experience in the form of soft skills such as time management and communication skills (Darolia, 2014), there is an ongoing debate about the potential opportunity cost, which emphasizes the drain on students' time and energy dedicated to academics (Ecton et al., 2023; Neyt et al., 2019).

While Tinto's theory offers valuable insights into student academic and campus engagement, it has a limitation. By placing a magnifying glass on student interactions with campus resources, it neglects other factors and external forces that can, in turn, affect students and shape institutional environments. This is particularly true for low-income, racially minoritized, first-generation students who may be more vulnerable to external shocks and may engage with the college experience in distinct ways (Melguizo, 2011). Perna and Thomas (2006) proposed conceptualizing college success as a longitudinal process that is influenced by four layers that include the internal student context and educational institutions but that also consider family and larger sociopolitical and economic forces. Drawing on literature from education, economics, psychology, and sociology, the authors emphasized the importance of the individual student's "situated context" to describe the confluence

of factors that can influence students' postsecondary choices and success. Perna and Thomas' (2006) recommendation to consider multiple theoretical perspectives in designing and examining programs and policies is increasingly reflected in more recent studies of programs and policies that mitigate barriers to student success (Dynarski, Page, & Scott-Clayton, 2022). These include attention to broader elements that mediate students' engagement with schooling.

2.2. Financial Well-being

While academic and campus engagement are important components of student persistence, students' engagement is also influenced by their financial resources. Food, housing, and financial insecurity remain pervasive issues that affect first-generation, low-income students' ability to complete college. Nearly 40% of community college students were low-income in 2020, 31% of whom were at or below the federal poverty line.[3] Not only does students' inability to access basic needs harm their physical health and well-being, but it also has negative implications for their academic performance. Scholars argue that students facing scarce resources have limited cognitive bandwidths because their attention and energy are directed away from schooling to prioritize securing basic necessities (Bowers & O'Neill, 2019; Hallett et al., 2019). Recent research has sought to understand the impacts of financial insecurity on students' academic outcomes.

The severity of housing insecurity among college students is associated with depressed educational outcomes. Broton (2021) quantified the relationship between student housing hardships and college retention and subsequent educational attainment. Using data from 3,000 low-income students in Wisconsin, Broton (2021) used descriptive analytic techniques and found that housing insecurity is,

[3] We use data from the National Postsecondary Student Aid Study: 2020 Undergraduate Students (NPSAS:UG). The variables used are PCTPOV and LEVE using NCES PowerStats computation.

unsurprisingly, correlated with a decrease in the probability of a student earning a 2.0 GPA and earning a bachelor's degree. This is a significant finding, as few studies have been able to examine the relationship between postsecondary academic outcomes and housing insecurity. While numerous studies have recognized the severity of housing insecurity for college students (Broton, 2020; Soria, 2023) and younger learners (Herbers et al., 2012), Broton's (2021) analysis suggests that housing insecurity directly hinders students' ability to engage with and succeed in postsecondary schooling.

The pathways that facilitate the relationship between housing insecurity and poor academic engagement and performance are multifaceted. Students experiencing housing insecurity often lack the financial capabilities to purchase resources needed for schooling. They cannot fully devote their attention to academics when housing is unstable. These pathways are described by Bowers and O'Neill (2019), whose literature review identified four channels through which housing insecurity leads to depressed academic outcomes. First, housing-insecure students experience significant trauma and emotional stress, especially when the housing insecurity relates to previous experiences of trauma such as family death or domestic violence. Secondly, students are unable to prioritize school when pressing concerns such as housing (or access to food) consistently present as immediate problems. Thirdly, students often experience a sense of alienation when they experience housing instability, particularly being unhoused, given the elevated social stigma. This led to students ignoring services, such as food pantries, to blend in with their peers. Fourthly, students reported viewing school as an opportunity to escape poverty but also found it difficult to consistently commit to college or identify college-provided services and supports for vulnerable students (Bowers & O'Neill, 2019).

These findings parallel the challenges for students facing food insecurity. Martinez and colleagues (2018), for example, found that among 8,705 California university students, food insecurity was associated with lower academic performance and mental health issues. Given the potential impacts of food and housing insecurity on student academic outcomes and mental health conditions, it is important to recognize both the widespread nature and severity of both forms of insecurity among the community college population. This is particularly true for HSI-designated community colleges, where the elevated poverty rates among Black and Hispanic/Latino populations nationally result in concentrations of economically vulnerable students (Creamer et al., 2022).

While numerous studies recognized and investigated these challenges among 4-year college students (Bruening et al., 2016; Chaparro et al., 2009; Goldrick-Rab et al., 2018; Martinez et al., 2018), the incidence of housing and food insecurity as experienced by community college students were not examined at scale until Broton and Goldrick-Rab (2018). This seminal work used national survey data from more than 30,000 4-year and 2-year college students to investigate their experiences with food and housing insecurity. They found significant variation in housing security by college sector—namely, students attending community colleges were statistically more likely to report housing challenges than 4-year college students. The disproportionate insecurities community college students face is critical, considering that nearly two of every five college students in 2020 were enrolled at a community college and over 60% of college students attended a community college at some point during their postsecondary careers.[4]

[4] Data come from the U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study: 2020 Undergraduate Students (NPSAS:UG). We utilize the variables EVER2PUB and LEVEL using NCES PowerStats.

2.3. Student mental well-being

Research in behavioral economics, psychology, and neuroscience underscores the strong connection between financial stress and cognitive bandwidth, impacting individuals' ability to handle complex tasks (Genettian & Shafir, 2015; Lupien et al., 2009; Schilbach et al., 2016).Prolonged stress also causes harmful physical effects on students, such as hindering hippocampus-controlled tasks, including working memory and spatial learning (Lupien et al., 2009). These challenges escalate in the community college environment, hindering awareness of opportunities for engagement with campus resources (e.g., tutoring, writing support). For low-income, adult, and student-parent enrollees, additional responsibilities (e.g., caring for family members) and fewer financial resources compound the difficulties associated with student engagement (Castleman & Meyer, 2019). Furthermore, college attendance is associated with increased stressors in students' academic, relationships, and work demands, at a time when students take on increasing responsibilities in the transition to adulthood.

In addition to the environmental factors that may exacerbate adverse mental health conditions, young adulthood is also associated with the first onset of mental health disorders (Kessler et al., 2007). Anxiety is the highest-incidence mental health disorder among college students. Prior to the Covid-19 pandemic, around 11% of college students were classified as having high anxiety, with upwards of 38% to 55% of students reporting moderate to high anxiety and just under 10% reporting clinical symptoms of depression (Oswalt et al., 2020; Pedrelli at al., 2015). The numerous stressors present during college are also associated with a host of adverse conditions, including a higher prevalence of eating disorders, suicidality, and substance abuse compared to the adult, noncollege-student population. Despite the high incidence of mental health conditions among

college students, less than one-third of students who indicated they have a condition were actively receiving treatment (Oswalt et al., 2020).

Most studies that document the incidence of mental health conditions in the college student population rely on traditional-aged students enrolled at 4-year colleges. For example, a recent comprehensive review of trends in college student mental health and use of campus-based services included community college students in the sampling framework, yet community college students made up only 5.5% of the study sample, a gross underrepresentation considering that over one-third of college students attended a community college (Oswalt et al., 2020; U.S. Department of Education, 2020). In general, these studies found that before and during the Covid-19 pandemic, college students experienced higher levels of anxiety and depression in comparison to the general adult population (Hoyt et al., 2021; Khubchandani et al., 2016). While women, lower-income students, and nonheterosexual-identifying students tend to report higher levels of mental health concerns, the patterns associated with student race/ethnicity are mixed, with many studies suggesting that White and Asian students experience a higher prevalence of adverse mental health conditions (Hoyt et al., 2021; Ibarra-Mejia et al., 2022). Several studies conducted during the pandemic found decreasing levels of stress and anxiety, but they also noted that the cross-group disparities remained (Hoyt et al., 2021).

Though the prevalence of mental health concerns among college students is well documented, few studies have examined the experiences of community college students. A recent study by Lipson and colleagues (2021), which used data from the Healthy Minds Study (HMS), an annual cross-sectional survey, assessed and compared the mental health experiences of community college and 4-year college students. The sample included over 10,000 students from 23 community colleges and nearly

100,000 students from 133 4-year institutions from 2016 to 2019. Colleges voluntarily participated in the HMS, and administered questionnaires to assess depression, anxiety, eating disorders, financial stress, and general demographic information. Overall, they found a similar incidence of mental health problems across the 2 and 4-year sectors. Nevertheless, they also noted that community college students were less likely than 4-year students to participate in therapy or access mental health services on campus. The similar rates of mental health conditions across both sectors masked heterogeneity; traditional-age college student populations (i.e., ages 18–22) had higher rates of depression (42% vs. 37.3%), anxiety (36.3% vs. 31.4%), and other mental problems among traditional community college students compared to 4-year students. Moreover, self-reported financial stress was positively correlated with the incidence of mental health problems, and students reported that inadequate financial resources was the principal barrier to accessing mental health treatment (Lipson et al., 2020).

3. Theoretical Considerations

Community colleges' outsized role in the postsecondary landscape stands in surprising contrast with their overlooked status in research. Our review of the literature on barriers to community college student success raises two important themes. Firstly, student engagement with academics and campus life is influenced by multiple social, economic, psychological, educational, and political factors (e.g., federal and state policy). Considering any one of these factors in isolation may obscure the complex relationships that interact to influence student success. Secondly, community colleges serve students facing acute challenges in their academic preparation, available financial resources, and mental well-being. It is critical to understand the relative contributions of these barriers to

student success given the essential role community colleges play in increasing access for traditionally underserved student populations.

The existing literature suggests that student financial and mental well-being are related to two crucial aspects of student engagement: (a) academic engagement (e.g., time utilization) and (b) engagement with formal campus supports (e.g., use of campus resources, interactions with faculty and advisors). Furthermore, we hypothesize that these two dimensions of student engagement, along with the challenges related to well-being faced by community college students, will explain significant variation in students' early academic success. Although mental and financial well-being may influence early academic success, it remains uncertain how factors such as student attributes and academic preparedness contribute to this relationship. Thus, our analysis aims to examine this relationship, considering student characteristics that may be correlated with both well-being and engagement, and their association with early academic outcomes.

4. Data and Methods

4.1. Survey Administration

The target survey sample was chosen to represent the experience of first-time, low-income community college students who intended to enroll full-time (i.e., 9 or more credits) in the fall 2022. Our sample is drawn from two distinct community colleges that are federally designated HSIs in the northeastern United States. The research team solicited survey responses from 599 participants who had active consent on file (2.8% opt-out rate) and received 277 responses for an overall response rate of 46.2%. The survey was administered for 6 weeks from mid-November to early December 2022. Study participants received email and text message reminders to complete the online survey at

regular intervals throughout the survey administration period, and participants were compensated with a $50 Visa gift card. The survey covered various dimensions of students' profiles and experiences, including demographic information, work and academic experiences, and experiences with mental health, food, and housing insecurity. In Appendix Table 1 we provide summary statistics for the item-level questions.

We used two long-standing and vetted questionnaires to assess participants' mental well-being. First, we fielded the four-item Patient Health Questionnaire (PHQ-4) that covers the dimensions of depression and anxiety (Kroenke et al., 2009). These include feelings of nervousness, worry, depression, and a general feeling of disinterestedness. Respondents provide answers ranging from 0 to 4, with each progressively representing an increased frequency of anxiety or depression. We followed Kroenke and colleagues' scoring convention and classified respondents using separate binary indicators for whether they exhibit moderate to severe depression and/or anxiety. Second, we fielded the four-item Perceived Stress Scale (PSS-4) to measure participant stress levels. These include one's ability to control important things in life and one's confidence that they can handle personal problems (Cohen et al., 1983). Similar to the PHQ-4, respondents can provide answers ranging from 0 to 4, with each progressively representing an increased frequency of maladjustment. We followed Cohen et al.'s (1983) methods for scoring and created a binary indicator for participants exhibiting moderate to high stress levels.

To measure financial insecurity we relied on the U.S. Household Food Security Survey Module (Blumberg et al. 1999) and a questionnaire developed by The Hope Center for College, Community, and Justice (2021). The Food Insecurity Survey Module has six questions, each representing different dimensions of food insecurity, including lack of financial resources to afford food or skipping meals.

We followed the coding schematic and created a binary indicator to signify whether participants experienced any food insecurity (i.e., combined low and very low). The housing insecurity module similarly consists of six questions related to issues of housing safety, ability to pay rent/mortgage and utilities, and housing instability. The resulting indicator signifies that a participant experienced any level of housing insecurity.[5]

The additional areas of our survey covered students' time utilization related to their academic pursuits, paid work, and their participation in specific college-hosted activities. For time utilization, we ask students to report the typical number of hours spent preparing for, studying, and completing assignments for class; hours spent on campus; and hours spent working for pay. For those students who report not working for pay, we impute a value of zero for hours worked per week. We also Winsorize student self-reports due to the right-skewed nature of the original values, top coding the values at the 98th percentile (Beaumont & Rivest, 2009).

The research literature suggests that students' engagement with campus resources promotes student belonging and offers the academic support that community college students need to be successful (Miller & Weiss, 2022; Weiss et al., 2019). As such, we asked students whether they participated in eight types of practices offered by their campus: (a) advising on course selection and planning; (b) new student orientation; (c) advising on academic problems; (d) faculty office hours; (e) career assessment and counseling; (f) academic support or tutoring; (g) campus events (e.g., job fair, social event, guest speaker); and (h) career exploration programs or activities. These college practices align with the broader context of guided pathways reforms, which emphasize a holistic approach to

[5] A measure of housing insecurity was developed concurrently to this project by the Housing and Urban Development (HUD) administration and will be part of future iterations of the American Community Survey (Murdoch et al., 2023).

program design, advising, and student supports to enhance overall student success in community colleges (Jenkins et al., 2023). Students indicated whether they had participated, and we created a campus engagement scale that takes the mean of the number of activities the students reported participating.[6]

4.2. Methods

Our analysis examines the overall association between students' academic engagement, engagement with campus resources, financial and mental well-being, and early academic success. We first rely on descriptive statistics to describe these constructs among our first-time, low-income community college entrants. To address our second research question of whether student experiences differ by their attributes, we explored correlations between student characteristics (gender, dependency status, first-generation status), academic preparedness (enrollment in remedial coursework) and self-reported measures of campus and student engagement, and well-being.

Our main analyses are based on the relationships between students' mental well-being, student and campus engagement with their first year academic outcomes (RQ3). To offer insights into the extent to which students' academic and campus engagement may explain those relationships, we proceed in two stages. First, we examine the relationship between financial and mental well-being and student academic and campus engagement. Second, we introduce student academic and campus engagement in the regression models as predictors of early academic outcomes and note whether the relationships for mental and financial well-being change with the inclusion of these additional measures. We estimate the following model:

[6] We conducted an exploratory factor analysis and found that one primary factor is present for the eight activities, which supported our approach of condensing participation into one index. Furthermore, we found that the eight activities were associated with a Cronbach's alpha of 0.74, indicating acceptable reliability (Tavakol & Dennick, 2011).

$$(1)\ Y_{ij} = Well\text{–}being_{ij} + Academic_{ij} + Campus_{ij} + \mathbf{X}_{ij} + \delta_j + \varepsilon_{ij}$$

where we regress the outcome, Y, of student *i* at college *j*, on measures of students' academic engagement (i.e., time allocation), and campus engagement, and financial and mental well-being. Our dependent measures of early academic success are persistence and cumulative credits earned through the end of the spring term of their first year. These outcomes of interest are related to one-year early academic momentum metrics predictive of longer term outcomes (Attewell & Monaghan, 2016; Belfield et al., 2019; Fink et al., 2023;). The vector **X** includes rich measures of student baseline attributes from the administrative data, including age at entry, race/ethnicity, gender, and dependency status; measures of high school academic preparation (i.e., high school GPA and remedial course enrollment their first semester);and a measure of degree intent at entry (i.e., credit intensity, associate of arts or science degree). We also include controls for survey measurement error, including the controls for inattentiveness[7]. δ_j is an indicator for their campus of enrollment. In all estimates, we report Eicker-Huber-White robust standard errors.

Because our analysis is based on regression, the results we present reflect associations rather than causal relationships. Nevertheless, given our interest in examining the role of students' academic and campus engagement and well-being as predictors of early academic success, the use of descriptive statistics and regression models with comprehensive covariates is a suitable approach to address our research questions. We included controls for demographic and high school background and degree intent to reduce bias. However, it is possible that some of the observed patterns may be explained by omitted variables.

[7] We include indicators for completion that is unusually fast (i.e., less than 1 minute) capturing the fastest 10 percent of survey respondents and an indicator for unusually slow completion (i.e., more than 30 minutes) capture the slowest 10 percent of respondents. We also estimate models controlling for total duration in seconds and find qualitatively similar results.

4.3. Data and Analytic Sample

Our data come from two sources: (a) administrative academic and financial records from the participants' college of attendance and (b) the college student experience survey (see Appendix Tables 1 and 2). To construct our analytic sample, we began by purposely targeting a group of first-time, full-time intending, low-income college students. We partnered with two community colleges in fall 2022 and included (a) first-time students enrolled in 12 or more credits with an expected family contribution (EFC) of $2,000 or less and (b) first-time students enrolled in 9 to 11 credits with an EFC of $500 or less. We restricted the sample to students who were associate degree intending and enrolled full-time to focus on a population that was highly motivated and for whom the salient outcomes–namely, persistence and credit accumulation–would serve as appropriate outcome measures given students' initial educational goals. Overall, 555 students who met the enrollment criteria at both institutions had an EFC of zero. There were 62 additional students with higher EFC values (i.e., between $100 and $2,000), for a total invited study participant pool of 617 students. Of these, 18 students opted out of the study (2.9%), yielding a total analytic sample of 599 students. We characterize our survey respondent sample in two ways: first, we describe how they differ from the target sample; and, second, we compare the attributes of survey respondents to those of community college students nationally using data from the National Postsecondary Student Aid Study (NPSAS:20) of community college students who first enrolled in the fall of 2019, the most recent sample available.

Due to an overall survey response rate of 46.2%, there was a risk that the sample of respondents differed in meaningful ways from the targeted sample. In Table 1, we describe the mean characteristics of the survey respondents (n = 277; Column 1) and nonrespondents (n = 322; Column 2) and estimate regressions to formally test whether the two groups differed in terms of

their baseline attributes. As documented in Table 1, we find no differences in demographic characteristics between survey respondents and nonrespondents. They are broadly similar in terms of racial/ethnic identification, gender, dependency status, and age at entry. Just over half of the students entered with the intention of obtaining an associate of arts degree (vs. associate of science), and both groups enrolled in an average of approximately 12 credits in their first semester. The respondents and nonrespondents are, on average, 20 to 21 years of age. More females (61.7% vs. 55%) and more independent students (24.5% vs. 18.9%) responded to the survey, though these differences were not statistically significant at conventional levels. The financial aid profile of respondents was also broadly similar in terms of unmet need and aid offered. While there is a statistically significant difference in parents' adjusted gross income (AGI) of $3,500, we tested 21 baseline covariates, and parent AGI is the only attribute that demonstrates a difference (with a *p*-value of 0.021), and it is not significant when a multiple-comparisons adjustment is made.

While our survey respondents do not differ on observable characteristics from the target sample, there are several notable differences compared to the national full-time community college student population. These differences may contribute to variability in academic performance, persistence, and interaction with campus resources between our sample and national student populations. In Column 5 of Table 1, we present summary statistics of the first-time, full-time student sample from the NPSAS:20, the most recent sample available. As expected, most of the sampled survey respondents identify as female (61.7%), which is reflective of the larger percentage of female (vs. male) students enrolled in U.S. community colleges. However, it is notable that there is greater parity (51.5%) in the national full-time first-time NPSAS:20 sample. The racial/ethnic identities of our study sample are diverse, with a large majority of the students (76.5%), identifying as members of groups historically underrepresented among postsecondary degree earners. Because both

participating colleges are federally designated HSIs, a large proportion (44.8%) of our sample identifies as Hispanic/Latino, compared to 27.9% nationally. Black–identifying students make up just over one-fifth of our sample, higher than the 11.9% nationally. White (14.1%), Asian (5.4%), and multiracial (2.5%) students make up lower proportions of our sample and are lower than national figures for Whites and multiracial students (46.2%, and 6.9%, respectively) though similar for Asians (5.6%). Nationally, Black and Hispanic/Latino students have historically lower rates of persistence and completion compared to White and Asian community college students (Dynarksi, Page & Scott-Clayton, 2022). While our survey respondent sample is made up of primarily dependent students (75.5% vs. 24.5% independent), nationally over 40% of community college attendees are independent. However, many of these independent students are enrolled part-time; our rates for full-time students are somewhat lower than the NPSAS 2020 sample (83% vs. 75.5% dependent). Previous research indicates that dependent community college students persist and complete at higher rates than independent students due primarily to their propensity for full-time enrollment. Lastly, our sample is much lower-income than community college attendees nationally. All of our survey respondents were Pell Grant–eligible, versus only 55% nationally. Furthermore, our survey respondents received an average Pell Grant of $3,099 for the fall semester, compared to $2,015 per semester for those receiving a Pell Grant nationally.

While the students in our sample are more likely to identify with historically marginalized racial/ethnic groups and experience low incomes that are associated with depressed educational attainment, our sampled population has two protective attributes as well. First, students in our sample were enrolled full-time for an average of 12 credits. Higher enrollment intensities are predictive of above-average persistence and completion rates for community college students (Crosta, 2014; Weiss et al., 2019). Second, all of the students in our sample intended to complete an

associate degree. Deciding what type of degree to pursue is a critical first step for students to then plan and execute their educational goals because numerous studies have found that community college students are less likely to have concrete goals such as degree intention (Scott-Clayton, 2015).

5. Results

5.1. Academic engagement and engagement with campus resources, financial and mental well-being

We document self-reported measures of students' academic engagement, mental and financial well-being, and campus engagement in Table 2. Students reported spending an average of 13.54 hours per week studying and preparing assignments for class. Recent National Center for Education Statistics survey programs of postsecondary students do not record measures of time spent studying; however, previous research has documented that the time spent studying outside of class by full-time 4-year college students has decreased significantly over time, from 40 hours per week in 1961 to 27 hours per week in 2004 (Babcock & Marks, 2011). Given that our sample consists of full-time students (mean credit enrollment of 12 units), students' weekly reported hours studying represent a sizeable 50% reduction from 2004 figures. Students reported spending an additional 6 hours per week on campus, on average, attending class and participating in other campus-based activities. This represents a similar reduction in time spent in class compared to Babcock and Marks' (2011) analysis, which estimated that full-time students spent almost 16 hours attending class in 1981 and just 13 hours in 2004.

For our sample, 10% of students worked part-time, 44% worked full-time, and 46% did not have a job. The average hours per week worked, 13.54 hours, corresponds with research documenting trends in full-time college students' time spent engaging in the labor market. Just 27% of full-time

4-year students worked in 1961 whereas 52% engaged in paid work in 2004 (Babcock & Marks, 2011). Darolia (2014) documented average hours worked for full-time students in the early 2000s from the U.S. Bureau of Labor Statistics' National Longitudinal Survey NLSY97 at approximately 15 hours per week, similar to our findings. For community college students enrolled for the first time nationally in 2019-20 (NPSAS:20), students report working an average of nearly 20 hours per week. These findings suggest that while the general number of hours worked has increased over time, the low-income first-time community college students in our sample did not engage in paid work at rates exceeding current norms and are likely working at lower intensities despite their financial disadvantage.

Considering that more than half of the students in our sample engage in paid work and that their time spent on campus is lower than previous cohorts of full-time students, we might expect reduced campus engagement. In survey responses about participation in eight types of campus-provided activities, the average respondent reported engaging in about half of those activities (i.e., $0.503 \cong 4$ of 8 activities). Students had higher rates of engaging in activities to support their initial academic planning: 80% participated in advising on course selection and planning, and 64% attended new student orientation. Students were less likely to report attending career exploration activities (33%) or campus events such as a social event or guest speaker (35%).

The prevalence of adverse mental health conditions is elevated in our sampled population compared to adult noncollege populations but is in line with reports from undergraduate students at 4-year institutions. Anxiety is the most prevalent, at 38.2%, followed by depression at 34.6%. Although the PHQ-4 is a rapid screener that does not confer a medical diagnosis, it is a leading indicator for individuals who may require follow-up care with mental health professionals. Recent estimates

suggest between 38% and 58% of college students experience clinical levels of anxiety disorders (Oswalter et al., 2020; Ibarra-Mejia et al., 2022). Just over 26% of our sample reported experiencing moderate to high levels of stress, which is lower than the averages reported for 4-year undergraduate students (39%–46%; Center for Collegiate Mental Health, 2016; LeViness et al., 2017). In another study, Ibarra-Mejia and colleagues (2022) sampled students at a 4-year HSI that was 90% Hispanic and 80% female with a mean age of 24, and administered health questionnaires to assess anxiety, depression, and stress levels in the fall of 2020. They found prevalence rates of 53.1% for anxiety and 37.3% for stress; rates of perceived stress were nearly 50% higher than other studies of young adults prior to the pandemic.

Our respondents also reported that access to basic needs, specifically food and housing, is precarious and in line with national reports documenting concerning levels of financial insecurity. Nearly 41% of our sample reported some level of food insecurity, which corresponds with a 2020 national survey conducted by The Hope Center that found that 39% of community college students experienced some food insecurity (Goldrick-Rab et al., 2021). This measure includes skipping meals and not being able to afford nutritious food. Nearly 60% of our respondents indicated at least some level of housing insecurity, including difficulty paying utility bills or rent, living in unsafe conditions, or having to move frequently. The Hope Center national survey reported that 48% of respondents indicated experiencing housing insecurity. The rate for our sample is somewhat higher and may reflect the relatively more expensive housing market in the northeast compared to nationally.

For this study our focal outcomes are persistence and credits accumulated. Specifically, we find that 99.3% of survey respondents were enrolled at the end of the fall term, and that 82.3% completed the spring semester, with an average of 14.8 credits earned during their first year. Given that students

enrolled in just over 12 credits in the fall semester and 10 credits in the spring, end-of-year credit accumulation indicates that failing and/or withdrawing from courses is common. The average GPA of respondents is relatively low: 2.49 in the fall and 2.39 in the spring (see Appendix Table 2 for an exhaustive list of academic measures).

5.2. Student differences in academic engagement, engagement with campus resources, and financial and mental well-being

Our second research question, which investigates the relationship between student attributes and their behaviors, yields several interesting findings. We examine whether student racial/ethnic identification, gender identity, dependency status, or remedial course-taking during their first semester in college is associated with differential time investments in academics, work, and time spent on-campus. First, we find that female students report spending more hours studying and preparing for class than their male peers (Figure 1). Interestingly, enrolling in more credits (15 or more credits) is not associated with greater academic time investments. Lastly, respondents' time spent on-campus and working for pay is not associated with any sociodemographic characteristics within this distinct (i.e., very low-income, first-time) college student population.

We find that there is variation in measures of financial well-being. Not surprisingly, we find a statistically significant ($\Delta = 0.24$, $p < .01$) difference in reports of housing insecurity for independent students, who are more likely to be responsible for housing costs and the head of their own household units (Figure 2a). Overall levels of food insecurity are approximately 40%, and there were no differences with respect to race/ethnicity, gender, dependency status, or remedial course taking. Previous work has found higher rates of housing insecurity amongst Black-identifying students compared to Hispanic/Latino and other groups (Goldrick-Rab et al., 2021), however, we document

no differences amongst our sample. Nonetheless, our findings confirm previous work suggesting that older students, who are more likely to be independent, experience strikingly high levels of financial insecurity.

While other analyses (i.e., Hoyt et al., 2021) that examined racial and ethnic differences found that White and Asian college students report higher incidence of mental health conditions, for our sample, Black-identifying students reported higher rates of depression and stress. Figure 2b shows depression and stress for the different racial/ethnic groups along with the overall sample rate. While Asian students' rates of depression are similar to those of Black respondents, the difference is not statistically significant due to the small subsample size (n = 15). Previous studies have documented a higher prevalence of mental health issues for females (e.g., Oswalt et al., 2020, Mejia-Ibarra et al., 2022). Analogous to prior work, we show that female respondents in our sample reported higher rates of anxiety ($\Delta = 0.18$, $p < .001$) and depression ($\Delta = 0.18$, $p < .001$) compared to their male peers (Figure 2c).

5.3. Association between academic engagement, engagement with campus resources, financial and mental well-being, and early academic outcomes

Our third research question explores the relationship between students' financial and mental well-being, their academic and campus engagement in the first semester, and how these factors relate to subsequent academic outcomes in the first year. We begin by exploring the relationship between financial and mental well-being and students' spring persistence. Column 1 in Table 3 shows results when we include measures of financial and mental well-being and control for demographics and high school academic preparation, degree intent at entry, survey measures, and an indicator for the

community college attended.[8] Our results suggest that financial and mental well-being were not related to student persistence. In addition to understanding the relationship between well-being and persistence, in Columns 2-4 we explored whether financial and mental well-being is related to academic and campus engagement and whether student engagement is associated with well-being and the likelihood of persisting in college. Interestingly, we found that hours spent on campus and working for pay were significantly related with persistence while engagement with campus resources was not. An additional hour spent on campus per week is associated with two additional students persisting in college. The coefficient for anxiety, but not elevated stress or depression, significantly increased from $b = -0.06$ ($p > 0.10$) in Column 1 to $b = -0.11$ in Column 2 ($p < 0.10$) and further rose by about 1 percentage point ($p < 0.05$) with the inclusion of measures of campus engagement. Despite its weak significance, student anxiety is associated with a 12 percentage point lower likelihood of persisting through the end of the spring term. These findings align with our conceptual model, highlighting that academic engagement, specifically the time spent on campus, contributes to the relationship between mental well-being and the likelihood of persisting in college. As shown in Appendix Table 4, the regression-adjusted correlations indicate a significant relationship between mental well-being and both hours spent on campus and campus engagement. Notably, students experiencing anxiety tend to dedicate more time on campus ($b=0.44$, $p<0.05$), whereas those experiencing depression exhibit lower engagement with campus resources ($b=-0.09$, $p<0.10$).

Irrespective of the inclusion of measures of financial insecurity, the presence of mental health concerns, or measures of campus engagement, we consistently find that hours spent working for pay per week has a negative correlation with persistence. This is consistent with prior evidence that

[8] We re-estimate our models omitting all students who have missing survey responses in Appendix Table 3 and find qualitatively similar results.

suggests that working, particularly at higher intensities, while enrolled has a negative association with academic success (Ecton et al., 2023; Neyt et al., 2019).

In Table 4 we present analogous models to Table 3 for regression results that summarize our findings for the number of cumulative credits earned through Spring Year 1. In Column 1, we examine the relationship between student financial and mental well-being and cumulative credits earned. Unlike our persistence findings, those experiencing depression complete, on average, one less course in their first year compared to their counterparts without depressive symptoms. This relationship increases somewhat with the inclusion of academic and campus engagement measures. For anxiety and stress, while the relationships with credits earned are not statistically significant, the direction of the estimates is, unsurprisingly, negative. Elevated levels of mental health concerns are associated with diminished academic progress. In terms of academic engagement, we find that an additional hour spent studying and completing assignments per week is associated with 0.18 additional credits earned.[9] Likewise, an extra hour spent on campus has a similar positive association with credits earned.

To understand the relative importance of the different barriers to success and early indicators of students' educational attainment, we estimate Shorrocks-Shapley decompositions. These results, presented in Figure 3, take an order-free approach to apportioning explained variance across the full set of covariates (i.e., R-squared statistic decompositions). Overall, between 21% and 32% of the variation in early student outcomes is explained by the observable factors we include in our models. Most (41%) of the variation in persistence is explained by factors that colleges are not able to influence through their practices and supports, such as student compositional differences in

[9] We re-estimate our model excluding participants with missing survey responses and find similar patterns in Appendix Table 5.

demographics, high school academic preparation, and degree intent. Students' academic engagement and our measures of financial and mental well-being uniquely explain over 50% of the variation in student persistence.

Our results for credit accumulation follow a similar pattern. Student compositional differences at the point of entry explain 53% of the variation in credits earned. However, controlling for engagement with campus resources explains only 3% of the variation, whereas our measures of academic engagement and well-being explain most of the remaining variation (39%). These results suggest that mental well-being is a stronger predictor of credit accumulation than campus engagement.

6. Discussion

Our study builds on prior analyses by identifying the experiences of first-time, low-income community college students' experiences with housing and food insecurity and adverse mental health conditions. A key contribution of this study is our ability to link these experiences to students' educational records and self-reported assessments of academic and campus engagement. These unique linkages allow us to provide an assessment of the relative importance of these factors on student persistence and credit accumulation. Our results suggest that there is a muted association between engagement with campus resources and early academic outcomes. This is consistent with critiques of Tinto's theory, which have pointed out its limited consideration of external factors that can influence both students and institutions (Perna & Thomas, 2006; Melguizo, 2011). Notably, financial and mental well-being explain a larger share of the variance in students' outcomes compared to students' engagement with traditional campus resources (i.e., orientation, tutoring, office hours).

Next, we provide several important insights into the adversity first-time college students face, their use of traditional institutional supports, and how these factors are related to their academic success. First, we identify notable variation between our study population of first-time, low-income community college students and other college student populations. Consistent with prior research, these students reported higher levels of financial insecurity (i.e., food and housing) than studies documenting financial insecurity among students attending 4-year colleges. Secondly, rates of stress, depression, and anxiety are similar to the elevated rates of 4-year undergraduate populations, although both populations experience higher rates of mental conditions than noncollege populations. Thirdly, amongst our homogenous sample of low-income students (i.e., average EFC of $103), we find that financial well-being and campus engagement are not related to student persistence and credit accumulation though students' time investments in studying and time spent on-campus are positively related to persistence. Lastly, and most striking, we find that adverse mental health is associated with lower persistence and credit accumulation. Our findings suggest that facilitating access to mental health supports is a prominent avenue for supporting student behaviors (i.e., time spent studying, engaging with on-campus activities etc.) that can catalyze increased engagement and academic success.

These results have important implications for community college practitioners, policymakers and the research community to augment efforts to support students' basic needs and corresponding efforts to promote academic completion. First, targeted interventions must be based on a vetted assessment of students' needs. Critically, prior research suggests that despite similar incidence of mental health conditions, community college students are less likely to receive treatment compared to 4-year students due primarily to financial barriers (Lipson et al., 2021). Administering rapid mental health screeners such as the PHQ and PSS and providing connections to providers and services for those

demonstrating a need for a clinical evaluation may improve student mental wellbeing and their ability to engage fully with work, academics, and relationships. The absence of primary care and counseling centers at commuter campuses may also hinder access. Wellness centers on campus may provide space and resources for students to develop coping strategies (i.e., active lifestyles, accessing professional support) that address how extensively mental health conditions can serve as barriers to academic success. Second, typical campus engagement offerings such as advising and student orientation may be critical venues for matching students with tailored supports to increase their engagement and subsequent success (Melguizo et al., 2021). We find that a plurality of students attend new student orientation (64.4%) and participate in academic advising for course planning and selection (79.7%), suggesting that existing mechanisms for student interaction can be leveraged to provide comprehensive supports that attend holistically to student needs.

We conclude by emphasizing that although our analysis is exploratory and descriptive in nature, it points to a need for careful evaluation of multi-dimensional interventions that assess individual student needs and provide the appropriate supports in scalable formats that can contribute to larger evidence-based changes in advancing postsecondary success. Researchers should partner with community colleges to study initiatives to support student mental health. Our study also draws attention to well-documented demographic trends, such as declining community college enrollments exacerbated by the pandemic and labor market dynamics. As these enrollment declines persist and Hispanic/Latino student numbers increase, researchers, policymakers, and institutions must address the multifaceted challenges faced specifically by students from low-income and racially minoritized backgrounds. Nonetheless, we acknowledge lack of generalizability to a broader population as a study limitation. Because this study focused on highly motivated, low-income students at 2-year HSIs, we were limited by the absence of variation in student financial well-being, hindering our

ability to detect meaningful correlations with student outcomes. Ultimately, our descriptive analyses emphasizes the need for further research that explores how college initiatives aimed at enhancing mental and financial well-being may influence students' academic outcomes.

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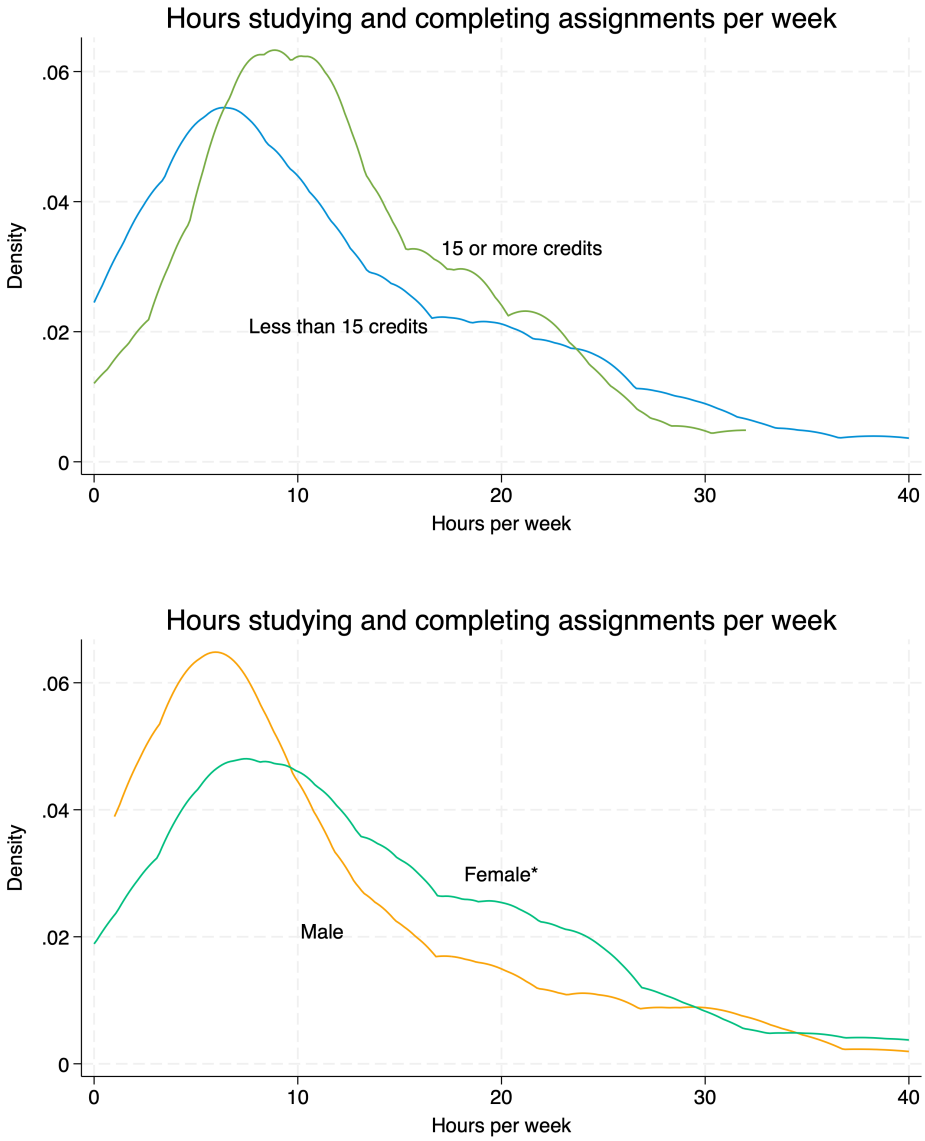

Figure 1. Hours spent studying and completing assignments for class

Notes: The figure contains density graphs of self-reported hours spent studying by select demographics. N=232 non-missing responses. The self-reported hours are winsorized at the 98th percentile. The mean hours reported for females is 14.5 hours compared to males at 11.9 and is statistically significantly different (p=0.014). For those enrolled in 15 or more credits at baseline, mean hours reported was 14.5 and for less than 15 credits was 13.4 hours. This difference was not statistically significant (p=0.936)

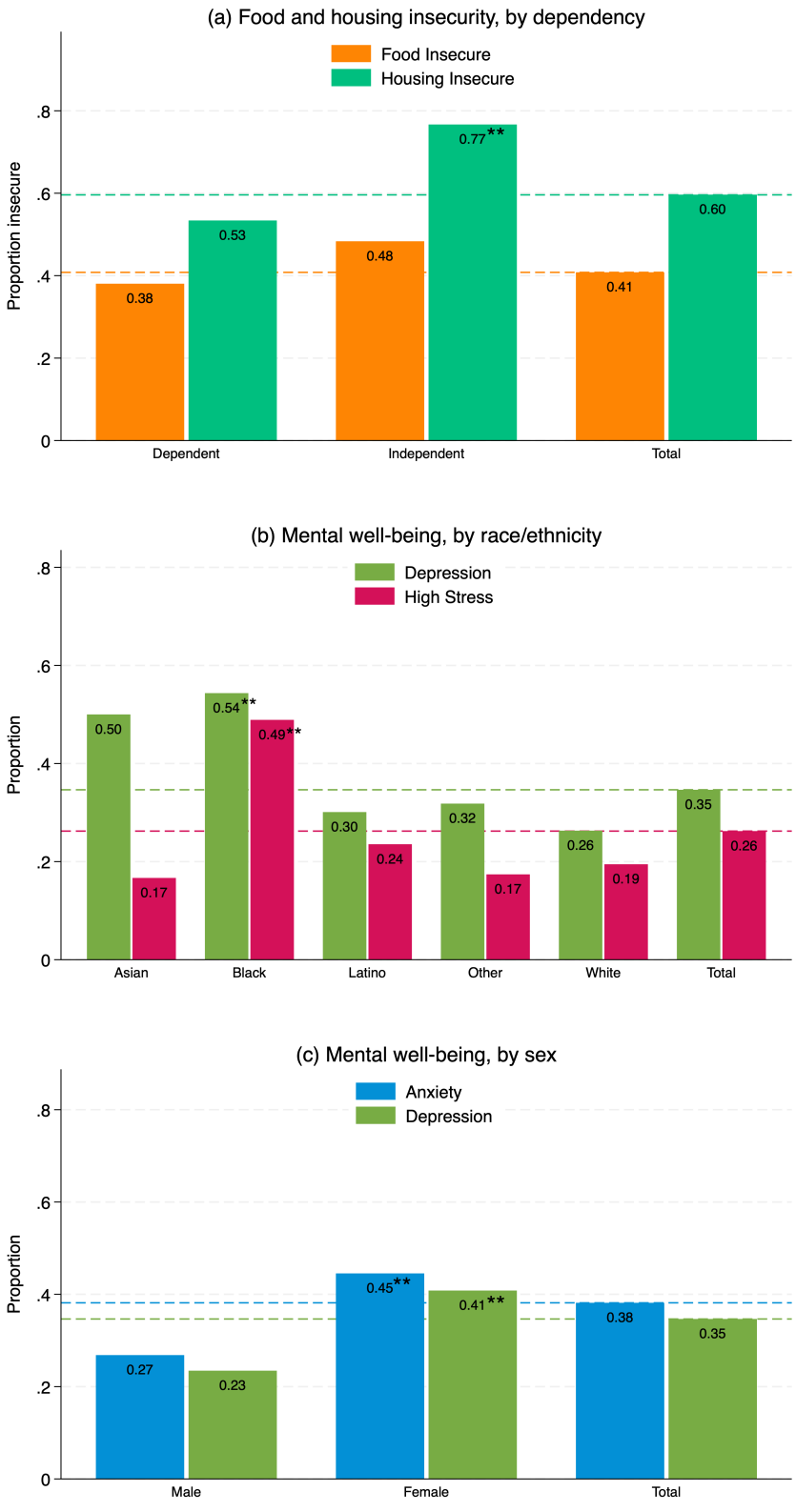

Figure 2. Financial and mental well-being by select demographics

Notes: The figure contains bar graphs of self-reported measures of well-being. Panel (a) includes proportions of respondents reporting food and housing insecurity by dependency status and for the overall survey respondents (n=223). The middle panel (b) shows self-reported rates of depression and high stress by racial/ethnic group and for the overall survey respondents (n=228 and 225, respectively). The bottom panel (c) shows self-reported rates of anxiety and depression by sex and for the overall survey respondents (n=228). Statistically significant differences are denoted by double asterisks.

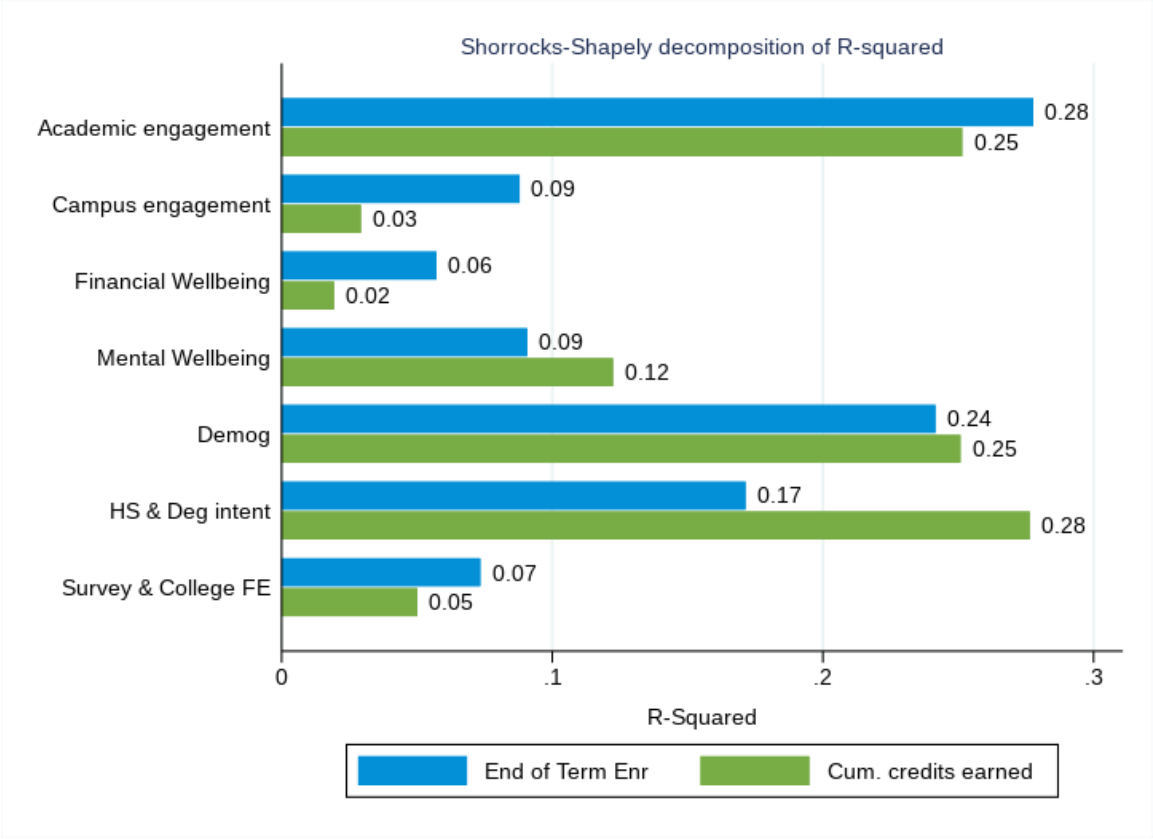

Figure 3. Shorrocks-Shapely decomposition from linear regression models

Notes: The figure contains the results of a Shorrocks-Shapely decomposition of the R-squared from linear regression models in Table 3, Column 4 (blue) and Table 4, Column 4 (green) of end-of-term spring enrollment and accumulated credits at the end of spring term. Each model controls for students' time utilization, campus engagement, financial and mental well-being, student demographics and survey measures (e.g., time spent on survey), and college fixed effects.

Table 1: Summary Statistics and Balance of Survey Respondents

	(1)	(2)	(3)	(4)	(5)
	Respondents	Non-Respondents	Difference	p-value	NPSAS:2020
Demographic Information					
Age at entry	21.3	20.5	0.352	0.261	20.1
Hispanic/Latino	0.448	0.528	-0.064	0.116	0.279
Black/African American	0.231	0.180	0.033	0.312	0.119
White	0.141	0.115	0.037	0.172	0.462
Asian	0.054	0.062	-0.008	0.691	0.056
Multiracial	0.025	0.016	0.009	0.460	0.069
American/Alaskan Native	0.004	0.003	-0.000	0.925	0.012
Hawaiian/Pacific Islander	0.004	0.000	0.003	0.319	0.005
Unknown Race/Ethnicity	0.094	0.093	-0.007	0.752	-
Independent	0.245	0.189	0.044	0.193	0.170
Female	0.617	0.550	0.063	0.106	0.515
Financial Information					
Unmet Need ($)	8931	9187	-205.737	0.138	-
Aid Offered ($)	7283	6726	211.107	0.084	4188
Student AGI ($)	12124	9783	291.356	0.865	27231
Missing Student AGI	0.751	0.730	0.042	0.219	0.338
Parent AGI ($)	23273	26587	-3554.272*	0.021	76614
Missing Parent AGI	0.426	0.357	0.024	0.467	0.067
High School Academic Information					
High School GPA	2.69	2.66	0.036	0.036	-
Missing High School GPA	0.509	0.438	0.034	0.374	-
College Academic Information					
Credits (Enrollment Intensity)	12.15	12.18	-0.012	0.943	-
Intended AA Degree	0.531	0.525	-0.012	0.764	-

* p < .05 ** p < .01 *** p < .001. p-value in column 4 based on robust standard errors.

Notes: The above data include information from respondents and non-respondents of the survey (N=599). Columns 1 and 2 represent the mean value for the respondents (n=277) and non-respondents (n=322), respectively, for baseline demographic characteristics. Each cell of Column 3 contains the result of a separate regression of each demographic covariate on whether they responded and an indicator for each randomization block. Column 3 is not the simple difference between Columns 1 and 2 due to the inclusion of block (i.e., strata) fixed effects in each regression. Column 5 represents average demographic characteristics from the National Postsecondary Student Aid Study: 2020 Undergraduate Students for full-time, first-time, community college students. GPA denotes grade point average; AGI denotes adjusted gross income. Robust standard errors are reported in parentheses. Missing GPA and AGI variables are coded to equal 1 if reported by the college or 0 if missing (i.e., binary variable).

Table 2. Summary Statistics of Sample

	Mean	Std. Dev.	n
Survey measures			
Hours studying and working for class	13.54	11.01	240
Hours spent on-campus	5.898	7.020	236
Weekly hours of paid work	12.99	14.82	236
Campus engagement scale	0.503	0.286	235
PHQ Anxious	0.382	0.487	228
PHQ Depressed	0.346	0.477	228
PSS High Stress	0.262	0.441	225
Food Insecure	0.408	0.493	223
Housing Insecure	0.596	0.492	223
Academic outcomes			
End of term enrollment status, Fall	0.993	0.085	277
Credits earned, Fall	8.181	4.939	277
End of term enrollment status, Spring	0.823	0.382	277
Credits earned, Spring	6.538	5.562	277
Cumulative credits earned, Spring	14.809	9.651	277

Notes. The full sample includes N=277 community college students from the participating colleges that responded to the College Student Experience Survey in Fall 2022. Variables reporting typical hours per week spent on campus, studying, and working are windorized at the 98th percentile. The indicators for anxiety and depression are derived from the the Patient Health Questionnaire (PHQ-4) and follow the thresholds developed by Kroenke et al. (2009). The indicator for stress is derived from the Perceived Stress Scale (PSS-4) questionnaire and follows the thresholds developed by Cohen et al. (1983). The food insecure indicator is derived from the U.S. Household Food Security Survey Module: Six-Item Short Form and follows thresholds developed by Blumberg et al. (1999). The housing insecure indicator is derived from a 6-item questionnaire and follows the threshold developed by The Hope Center for College, Community, and Justice (2021). For item-level questions and summary statistics see Appendix Table 1.

Table 3: Relationship Between Self-reported Measures of Well-being and Enrollment

	(1)	(2)	(3)	(4)
	End of term enrollment status spring year 1			
Housing insecurity	0.065	0.066	0.071	0.071
	(0.056)	(0.055)	(0.055)	(0.055)
Food insecurity	-0.027	-0.046	-0.022	-0.039
	(0.053)	(0.050)	(0.052)	(0.051)
Anxiety indicator from PHQ-4	-0.061	-0.108*	-0.084	-0.116*
	(0.063)	(0.065)	(0.066)	(0.066)
Depression indicator from PHQ-4	0.045	0.066	0.066	0.073
	(0.068)	(0.068)	(0.069)	(0.070)
High stress	-0.036	-0.034	-0.022	-0.026
	(0.079)	(0.076)	(0.077)	(0.075)
Hours studying and completing assignments per week		0.002		0.002
		(0.002)		(0.002)
Hours spent on campus per week		0.008***		0.008***
		(0.003)		(0.003)
Hours spent working for pay per week		-0.004**		-0.004**
		(0.002)		(0.002)
Campus engagement			0.142	0.072
			(0.092)	(0.094)
All Covariates	Yes	Yes	Yes	Yes
Academic Engagement	No	Yes	No	Yes
Campus Engagement	No	No	Yes	Yes
R^2	0.128	0.184	0.146	0.190
N	277.000	277.000	277.000	277.000

Notes: * p < .10 ** p < .05 *** p < .01. Clustered standard errors at the campus level. Each column contains the results of a separate regression of the predictor values on survey respondents' end of term enrollment status in spring of year 1. See table 1 for a list of the control covariates.

Table 4: Relationship between self-reported measures of well-being and credit accumulation

	(1)	(2)	(3)	(4)
	Cumulative credits earned through spring year 1			
Housing insecurity	0.065	-0.311	-0.179	-0.275
	(1.437)	(1.364)	(1.440)	(1.367)
Food insecurity	-0.101	-0.172	0.066	0.039
	(1.420)	(1.337)	(1.431)	(1.342)
Anxiety indicator from PHQ-4	-0.316	-1.178	-0.616	-1.286
	(1.513)	(1.423)	(1.539)	(1.431)
Depression indicator from PHQ-4	-2.862*	-2.815*	-2.705	-2.918*
	(1.612)	(1.552)	(1.652)	(1.591)
High stress	-0.445	-0.163	-0.406	-0.247
	(1.637)	(1.560)	(1.636)	(1.550)
Hours studying and completing assignments per week		0.182***		0.184***
		(0.056)		(0.055)
Hours spent on campus per week		0.171**		0.184**
		(0.085)		(0.088)
Hours spent working for pay per week		-0.011		-0.021
		(0.037)		(0.038)
Campus engagement			-0.216	-1.749
			(2.194)	(2.120)
All Covariates	Yes	Yes	Yes	Yes
Academic Engagement	No	Yes	No	Yes
Campus Engagement	No	No	Yes	Yes
R^2	0.241	0.301	0.247	0.308
N	277.000	277.000	277.000	277.000

Notes: * p < .10 ** p < .05 *** p < .01. Clustered standard errors at the campus level. Each column contains the results of a serparate regression of the predictor values on survey respondents' credit accumulation at the end of spring, year 1. See table 1 for a list of the control covariates.

Appendix Table 1. Item level survey summary statistics

	Mean	Std. Dev.	Missing Responses (%)	Responded Don't Know (%)	n
Academic Engagement					
Hours Studying and Working for Class	13.54	11.01	0.13	0.08	250
Hours Spent On-campus	5.898	7.020	0.15	0.05	245
Faculty Office Hours	0.461	0.500	0.13	0.03	224
New Student Orientation	0.644	0.480	0.14	0.06	234
Campus Events	0.352	0.479	0.13	0.04	233
Career Assessment and Counseling	0.426	0.496	0.14	0.03	231
Career Exploration Programs or Activities	0.328	0.470	0.13	0.03	239
Advising on Course Selection and Planning	0.797	0.403	0.14	0.03	241
Advising on Academic Problems	0.576	0.495	0.14	0.00	240
Academic Support or Tutoring	0.398	0.491	0.14	0.00	240
Work					
Worked for Pay this Semester	1.308	0.820	0.13	0.00	250
Weekly Hours of Work	13.734	16.916	0.15	0.08	246
Chose Class Times Based on Work Schedule	0.623	0.486	0.03	0.15	130
Financial Aid Experience					
Received Financial Aid from these Sources:					
Federal Grants (e.g., Pell or SEOG)	0.911	0.286	0.15	0.20	213
Federal Loans	0.234	0.425	0.18	0.19	192
Federal Work Study	0.121	0.327	0.17	0.31	182
Cost of Living Pilot Grant	0.304	0.461	0.17	0.26	184
Need Based Tuition Waiver	0.311	0.464	0.19	0.28	148
Cash Grant	0.194	0.396	0.18	0.06	160
Other federal/state/local government grants or	0.519	0.501	0.17	0.04	158
Use of Financial Aid					
Stay enrolled in my college	0.951	0.217	0.16	0.05	223
Reduce stress and/or anxiety	0.847	0.361	0.16	0.04	229
Afford educational materials for my classes	0.897	0.304	0.16	0.09	224
Pay for a laptop/computer	0.467	0.500	0.17	0.06	225
Pay down a student loan or avoid taking more debt	0.510	0.501	0.17	0.06	210
Afford transportation	0.559	0.498	0.17	0.08	220
Pay bills or support family members to pay bills	0.452	0.499	0.17	0.08	221
Pay for healthcare expenses	0.209	0.407	0.18	0.10	211
Afford housing	0.279	0.450	0.17	0.29	215
Afford childcare	0.106	0.308	0.18	0.38	208
Public Aid					
Receive Food-based Public Assistance	0.541	0.499	0.16	0.00	218
Receive Housing-based Public Assistance	0.300	0.459	0.18	0.00	210
Mental Health					
Unable to Control Important Things in Life	2.071	1.117	0.17	0.00	238
Felt Confident to Handle Personal Problems	2.314	0.960	0.17	0.00	239
Felt Things were Going My Way	2.059	0.882	0.18	0.00	239
Difficulties Felt Insurmountable	2.174	1.133	0.18	0.00	236
Little interest or pleasure in doing things	1.134	0.989	0.17	0.00	238
Feeling down, depressed, or hopeless	1.000	0.974	0.18	0.00	239
Feeling nervous, anxious or on edge	1.277	1.001	0.18	0.09	238
Not being able to stop or control worrying	1.155	1.030	0.18	0.08	238
Food and Housing Security					
Lacked Money to Buy Food	0.519	0.642	0.19	0.12	212
Could Not Eat Balanced Meals	0.514	0.700	0.19	0.21	210
Skipped Meals Due to Insufficient Money	0.310	0.464	0.02	0.09	200
Cut Size of Meals/Skipped Meals	1.082	0.672	0.19	0.08	49
Ate Less Due to Poor Financial Situation	0.308	0.463	0.19	0.16	208
Felt Hungry but Did Not Eat Due to Poor Financial Situation	0.296	0.457	0.19	0.00	213
Failed to Pay Rent/Mortgage Due to Poor Financial Situation	0.426	0.496	0.19	0.00	190
Moved Two Times or More	0.090	0.287	0.19	0.00	233
Moved in with Others Due to Poor Financial Situation	0.124	0.330	0.19	0.19	234
Experienced Homelessness	0.085	0.280	0.19	0.00	235
Could Not Pay Utilities Due to Poor Financial Situation	0.279	0.450	0.19	0.11	172
Safety in Current Location	2.957	0.891	0.19	0.09	235
Background					
Identify as First-Generation Low Income	0.718	0.451	0.19	277	202
Highest Level of Education Achieved by Parents	1.952	1.460	0.00	0.00	208
Scales					
Anxiety and Depression Scale	2.118	1.771	.	.	228
Food Security Scale: Raw	2.395	1.906	.	.	228
Food Security Scale: Edited	1.713	2.113	.	.	223
Perceived Stress Scale	7.844	2.903	.	.	225

Notes. The full sample includes N=277 community college students who responded to the College Experience Survey in Fall 2022.

Appendix Table 2. Summary Statistics of Survey Respondents Administrative Data

	Mean	Std. Dev.	Min	Max	n
Academic					
End of Term Enrollment Status Fall Yr 1	0.993	0.085	0	1	277
Credits Attempted Fall Yr 1	12.01	2.41	0	21	277
Credits Earned Fall Yr 1	8.181	4.939	0	20	277
GPA Fall Yr 1	2.485	1.371	0	4	265
Cumulative GPA Fall Yr 1	2.471	1.372	0	4	267
ESL course indicator Fall Yr 1	0.094	0.292	0	1	277
Developmental course indicator Fall Yr 1	0.412	0.493	0	1	277
STEM course indicator Fall Yr 1	0.671	0.471	0	1	277
Online 100% course indicator Fall Yr 1	0.776	0.418	0	1	277
In Person course indicator Fall Yr 1	0.646	0.479	0	1	277
Hybrid 80% Online course indicator Fall Yr 1	0.090	0.287	0	1	277
End of Term Enrollment Status Spring Yr 1	0.823	0.382	0	1	277
Credits attempted Spring Yr 1	10.00	4.80	0	21	277
Credits Earned Spring Yr 1	6.538	5.562	0	21	277
Cumulative credits earned through spring year 1	14.809	9.651	0	37	277
GPA Spring Yr 1	2.388	1.418	0	4	226
Cumulative GPA Spring Yr 1	2.516	1.230	0	4	238
ESL course indicator Spring Yr 1	0.041	0.198	0	1	245
Developmental course indicator Spring Yr 1	0.249	0.433	0	1	245
STEM course indicator Spring Yr 1	0.599	0.491	0	1	277
Online 100% Spring Yr 1	0.563	0.497	0	1	245
In-person course indicator Spring Yr 1	0.731	0.445	0	1	245
Hybrid 80% Online Spring Yr 1	0.082	0.274	0	1	245
Financial Aid					
Cost of Living award paid end fall Y1	1670.45	1734.55	0	3500.00	275
Federal other award paid end fall Y1	307.70	153.56	0	600.00	275
Institutional award paid end spring Y1	143.15	355.42	0	2548.00	275
Loan award paid end spring Y1	44.09	341.54	0	3167.00	275
Pell award paid end fall Y1	3099.81	561.70	0	3448.00	275
State award paid end fall Y1	458.05	512.89	0	3000.00	275
Tuition waiver paid end fall Y1	136.20	128.40	0	706.00	275
Cost of Living award paid end spring Y1	1590.95	1690.69	0	3500.00	228
Federal other award paid end spring Y1	156.97	331.10	0	2650.00	228
Institutional award paid end spring Y1	158.55	483.40	0	4320.00	228
Loan award paid end spring Y1	56.41	393.09	0	3167.00	228
Pell award paid end spring Y1	2745.79	868.70	0	3448.00	228
State award paid end spring Y1	371.99	466.45	0	1403.00	228
Tuition waiver paid end spring Y1	112.18	184.99	0	2167.00	228

Notes. The full sample includes N=277 community college students who responded to the College Experience Survey in Fall 2022.

Appendix Table 3: Relationship between self-reported measures of well-being and enrollment

	(1)	(2)	(3)	(4)
	End of Term Enrollment Status Spring Yr 1			
Housing insecurity	0.103*	0.105*	0.103*	0.105*
	(0.060)	(0.059)	(0.059)	(0.059)
Food insecurity	-0.059	-0.063	-0.059	-0.063
	(0.054)	(0.052)	(0.053)	(0.052)
Anxiety indicator from PHQ-4	-0.079	-0.097	-0.081	-0.098
	(0.069)	(0.070)	(0.070)	(0.071)
Depression indicator from PHQ-4	0.081	0.076	0.090	0.082
	(0.070)	(0.070)	(0.072)	(0.073)
High stress	-0.009	-0.007	-0.001	-0.002
	(0.079)	(0.077)	(0.078)	(0.076)
Hours studying and completing assignments per week		0.005**		0.004**
		(0.002)		(0.002)
Hours spent on campus per week		0.006**		0.006**
		(0.003)		(0.003)
Hours spent working for pay per week		-0.002		-0.001
		(0.002)		(0.002)
Campus engagement			0.108	0.062
			(0.094)	(0.097)
All Covariates	Yes	Yes	Yes	Yes
Academic Engagement	No	Yes	No	Yes
Campus Engagement	No	No	Yes	Yes
R^2	0.134	0.178	0.141	0.180
N	206.000	206.000	206.000	206.000

Notes: * p < .10 ** p < .05 *** p < .01. Clustered standard errors at the campus level. Each column contains the results of a serparate regression of the predictor values on survey respondents' end of term enrollment status in spring of year 1. The appendix sample omits any respondent who did not complete the entire survey. See Table 1 for a list of the control covariates.

Appendix Table 4: Relationship between self-reported measures of well-being and student behaviors

	(1)	(2)	(3)	(4)
Dependent variable:	Campus engagement	Hours studying	Hours on-campus	Hours working
Independent variable				
Housing insecurity	-0.0231	0.0376	0.0964	0.163
	(0.0485)	(0.166)	(0.170)	(0.173)
Food insecurity	0.0300	0.0435	0.0733	-0.183
	(0.0472)	(0.160)	(0.166)	(0.175)
Anxiety indicator from PHQ-4	0.0600	0.0636	0.441**	-0.133
	(0.0508)	(0.167)	(0.199)	(0.203)
Depression indicator from PHQ-4	-0.0932*	0.179	-0.0794	0.0482
	(0.0531)	(0.203)	(0.216)	(0.226)
High stress	-0.0814	-0.340	0.173	0.0839
	(0.0589)	(0.213)	(0.202)	(0.225)
All Covariates	Yes	Yes	Yes	Yes
R^2	0.112	0.035	0.037	0.021
N	235	231	231	231

Notes: * p < .10 ** p < .05 *** p < .01. Clustered standard errors at the campus level. Each column contains the results of a serparate ordered probit regression model of the predictor values on survey respondents' campus and student engagement. See Table 1 for the complete list of the control covariates. Columns 2-4 contain pseudo R^2

Appendix Table 5: Relationship between self-reported measures of well-being and credit accumulation

	(1)	(2)	(3)	(4)
	Cumulative credits earned through spring year 1			
Housing insecurity	0.268	0.242	0.263	0.230
	(1.547)	(1.438)	(1.551)	(1.434)
Food insecurity	-0.076	-0.141	-0.076	-0.150
	(1.558)	(1.433)	(1.562)	(1.431)
Anxiety indicator from PHQ-4	-0.612	-1.225	-0.586	-1.202
	(1.621)	(1.503)	(1.628)	(1.505)
Depression indicator from PHQ-4	-2.398	-2.719	-2.487	-2.969*
	(1.748)	(1.698)	(1.800)	(1.759)
High stress	0.457	0.740	0.383	0.517
	(1.714)	(1.575)	(1.729)	(1.590)
Hours studying and completing assignments per week		0.240***		0.244***
		(0.054)		(0.055)
Hours spent on campus per week		0.211**		0.231**
		(0.101)		(0.108)
Hours spent working for pay per week		-0.000		-0.004
		(0.043)		(0.042)
Campus engagement			-1.032	-2.884
			(2.442)	(2.354)
All Covariates	Yes	Yes	Yes	Yes
Academic Engagement	No	Yes	No	Yes
Campus Engagement	No	No	Yes	Yes
R^2	0.234	0.332	0.235	0.338
N	206.000	206.000	206.000	206.000

Notes: * p < .10 ** p < .05 *** p < .01. Clustered standard errors at the campus level. Each column contains the results of a serparate regression of the predictor values on survey respondents' credit acumulation at the end of spring, year 1. See table 1 for a list of the control covariates.