Institute of Higher Education
UNIVERSITY OF GEORGIA

IHE Research Projects Series

IHE Research in Progress Series 2019-018
Submitted to series: November 21, 2019

The Post-Collegiate Influence of Undergraduate Experiences: Intellectual, Civic, and Psychological Outcomes

Nicholas Bowman, *University of Iowa*

Gregory Wolniak
Institute of Higher Education, University of Georgia, gwolniak@uga.edu

Tricia Seifert, *Montana State University*

Kathleen Wise & Charles Blaich, *Wabash College*

The Post-Collegiate Influence of Undergraduate Experiences:

Intellectual, Civic, and Psychological Outcomes

Nicholas Bowman
University of Iowa

Gregory Wolniak
University of Georgia

Tricia Seifert
Montana State University

Kathleen Wise & Charles Blaich
Wabash College

ASHE 2019
Portland, OR

Abstract

Recent critiques of higher education from within and outside of the academy have questioned the benefits of an undergraduate education. Although research has extensively studied the short-term outcomes associated with college experiences, few studies have explored non-economic outcomes well after graduation. Therefore, the present study explores the link between college experiences and post-college outcomes using a large, multi-institutional dataset of over 20,000 bachelor's degree recipients. The results indicate that good teaching, academic challenge, and diversity experiences are positively—and often strongly—associated with alumni's perceptions of institutional and civic growth as well as their connection to their alma mater and overall satisfaction with college. Some consistent moderation of these relationships by gender, race, and years after graduation was also observed.

Keywords: Post-college outcomes, academic experiences, college alumni, non-binary gender

Higher education attainment has long been heralded as the key mechanism for social mobility (Blau & Duncan, 1967; McMahon, 2009), with credential attainment serving as an essential marker of human capital development (Becker, 1993). A substantial body of literature has investigated the essential proposition of human capital theory: the relationship between education and earnings (Gill & Leigh, 2003; Light & Strayer, 2004; Long, 2010; Ma, Pender, & Welch, 2016; Molitor & Leigh, 2005; Neumann et al., 2009; Park, 2011; Perna, 2003, 2005; Rumberger, 2010; Taniguchi, 2005; Wolniak et al., 2008). However, with increased student loan debt (Hemelt & Marcotte, 2016; Woo, 2014) and increasing accountability pressures, the value of a college education is being questioned with new fervor (Arum & Roksa, 2011, 2014; Selingo, 2013; Zorthian, 2017). Compound the public's questioning of higher education with expenditures in excess of $500 billion per year (NCES, 2017), and it is alarming how little is known about how experiences and environments encountered during higher education influence students after they graduate.

Concern over higher education's long-term effectiveness begs a key question: Which long-term outcomes should a college education promote? We contend that the fundamental long-term outcomes of higher education encompass the psychological/intellectual, civic, and career domains. These three domains are grounded in the works of leading scholars (see Clotfelter, 2017; Delbanco, 2012; Gutmann, 2014; McMahon, 2009), the American Academy of Arts & Sciences' Commission on Undergraduate Education (AAA&S, 2017), and those who have empirically synthesized the effects of college (Mayhew, Rockenbach, Bowman, Seifert & Wolniak, 2016; Pascarella & Terenzini, 1991, 2005).

As campuses are compelled to prioritize curricular and co-curricular programs (Dickeson, 2010), and yet act in institutionally isomorphic ways (McLendon, Hearn, & Deaton, 2006), it is

necessary to know which types of programmatic priorities hold the most promise for achieving desirable post-college outcomes, particularly from the perspectives of college graduates. The present study responds to this necessity by focusing on three types of experiences—student-faculty interactions, academic challenge, and diversity interactions—in relation to alumni intellectual, civic, and psychological outcomes after college. We sought to understand the extent to which students' specific experiences and encounters with institutional environments during college were associated with such outcomes after college. Moreover, we sought to uncover potential inequities in post-college outcomes, by examining whether particular experiences may have compensatory effects that benefit populations of alumni who have been historically underserved by higher education. Given the hostile campus climate that students from minoritized backgrounds often encounter (see Harper & Hurtado, 2007; Hurtado et al., 2012), some college experiences may be particularly influential for students who face micro and macro aggressions.

This examination extends and improves upon prior research in several ways. First, it explores a set of outcomes that has received very little attention, as most studies of post-college outcomes examine labor force participation and success, subjective well-being and life satisfaction, and health outcomes (see Hout, 2012; Mayhew et al., 2016; Pascarella & Terenzini, 2005). Second, the large dataset we analyzed allow us to explore a variety of moderators, including those that are almost never examined in research on college alumni (e.g., non-binary gender, Native Hawaiian/Pacific Islander students). Third, given the heterogeneity in the analytic sample, we can directly examine whether and how the link between experiences and outcomes differs as a function of the time since alumni received their undergraduate degree.

Ultimately, this study provides new empirical evidence from which to consider the practices that drive long-term outcomes of higher education by addressing the following research questions: **Q1)** To what extent do student-faculty interactions, academic challenge, and diversity interactions influence alumni intellectual, civic, and psychological outcomes after college? **Q2)** Does gender and racial/ethnic identity moderate these relationships? **Q3)** Do the relationships between experiences and outcomes differ as a function of the time since alumni received their undergraduate degree?

Conceptual and Theoretical Underpinnings

Grounding this investigation are theoretical and conceptual tenants related to intellectual, civic, and psychosocial attitudes regarding undergraduate education. To study alumni outcomes requires the synthesis of multiple perspectives that together view post-college outcomes through a lens comprised of human capital and socialization perspectives, as well as general models of college impact.

Human capital theory presents education alongside a host of other means of improving future earnings such as improving health, family dynamics, childcare, and on-the-job training that "influence future monetary and psychic income by increasing resources in people" (Becker, 1993, p. 11). In formalizing human capital theory, Becker explicitly assumed that schooling results in greater earnings and productivity because it provides "knowledge, skills, and a way of analyzing problems" (p. 19). While most prior studies have estimated the earnings premiums, wage differentials, or rates of return associated with higher education attainment, the present study examines alumni perceptions on their intellectual development in relation to aspects of the college experience. In so doing, we build on prior research by identifying factors associated with human capital development that have proven meaningful in the minds of college alumni, years

after leaving college and entering the workforce. Positive feelings towards one's undergraduate institution may also indirectly signal the quality of training and preparation received, though no prior study that we are aware has substantiated such a claim.

In addition, and closely tied to human capital theory, is the socialization that accompanies education attainment which enhances one's personal attributes, psychosocial resources, and values (Pallas, 2000). In fact, governments worldwide have justified investment in education as a key means to promoting desirable social outcomes. Among the most comprehensive studies to date on such outcomes is McMahon's (2009) *Higher Learning, Greater Good.* Often referred to as externalities, social outcomes comprise higher education's contribution to graduates' propensities towards involvement with civic and nonprofit organizations, donating to charitable organizations, and voting. With only a few exceptions (Astin, Sax, and Avalos, 1999; Myers, Myers, & Peters, 2018), researchers have not examined specific college experiences in relation to social outcomes following college.

Furthermore, and more generally, our study is informed by Astin's (1970a, 1970b, 1991) and Weidman, Twale, and Stein's (2001) models for assessing the effects of college on student outcomes. Astin's I-E-O framework highlights that the characteristics of a student before they enter postsecondary education (inputs) may influence students' subsequent decisions and experiences while in college (environments), which may in turn influence their qualities, characteristics and gains as they exit college (outputs). Particularly salient to the current study is evidence of the importance of student engagement, which centers on the importance of active learning, good teaching, high expectations from faculty, and exposure to respectful, inclusive and diverse environment for learning (Chickering & Gamson, 1987, 1991). Weidman and colleagues work on student socialization further suggests that academic and career development

are determined by knowledge and skill acquisition, as well as students' dispositions toward careers. While these models have been employed extensively in relation to college student outcomes (Mayhew, et al., 2016), they have rarely been examined in relation to alumni attitudes. Studies by Astin, et al. (1999) and Myers, et al. (2018) are important examples of research, grounded in college impact models, that explored college environments in relation to civic outcomes after college (e.g., civic engagement and volunteering).

Prior Literature

Unlike the abundant research base associating college experiences, particularly major field of study, with post-college earnings (Gill & Leigh, 2003; Light & Strayer, 2004; Long, 2010; Ma, Pender, & Welch, 2016; Molitor & Leigh, 2005; Neumann et al., 2009; Park, 2011; Perna, 2003, 2005; Rumberger, 2010; Taniguchi, 2005; Wolniak et al., 2008), fairly little research has examined the long-term effects of college experiences and environments on alumni perceptions of intellectual, civic, and psychological connections to their alma mater (see Mayhew et al., 2016). We detail this literature base in terms of experiences and environments with respect to these outcomes each in turn.

Long-term Effects on Intellectual Outcomes

Few studies have investigated the role of education in the perception of growth in intellectual outcomes. Ardelt (2010) and Ardelt, Pridgen, & Nutter-Pridgen (2018) examined the relationship between education, age, and perceptions of 3D wisdom (a combination of cognitive, reflective, and affective/compassionate wisdom). In a sample of 655 adults, Ardelt (2010) found older college-educated adults had higher scores on 3D wisdom than younger college-educated adults both of whom had higher scores than older adults without a college degree. Expanding their study sample to nearly 15,000 adults, Ardelt and colleagues found education attainment

positively associated with 3D wisdom and the disaggregated components of cognitive and reflective wisdom. Only an extremely small difference in compassionate wisdom by education level and age was found (Ardelt et al.)

The engineering disciplines have been particularly interested in following their alumni to better understand how particular experiences prepare alumni for industry. Building on Zydney and colleagues (2002) findings that alumni who engaged in undergraduate research "reported significantly greater enhancement of important cognitive and personal skills" (p. 156) than their uninvolved peers, Kinoshita, Young, and Knight (2014) examined alumni skill perceptions of engineering design (a key outcome associated with intellectual development within the discipline). They found three years post-graduation that alumni who participated in undergraduate research, completed an internship, and were either a woman or underrepresented minority engaging in an engineering club reported higher design scores. These high-impact practices (Kuh, 2008) are associated with one or more of the good practice dimensions (student-faculty interactions, academic challenge, and diversity interactions) examined in the present study, which also extends the analysis beyond a single professional major to a broader cross-section of undergraduate fields of study.

Long-Term Effects on Civic Outcomes

Major field of study has been the college experience most consistently investigated with respect to long-term civic outcomes. Drawing from the extant literature (Hillygus, 2005; Ishitani & McKitrick, 2013; Nie & Hillygus, 2001), it appears a curriculum that explicitly examines, discusses, and promotes civic skills and engagement (most commonly associated with social sciences and to a lesser extent education and humanities) manifest in alumni perceptions and behaviors that are more civically motivated. This is in contrast with those majors that have seen

the greatest increase in student enrollment (i.e., Business) or have been substantially promoted in recent years (Science, Technology, Engineering, and Mathematics specifically), which may suggest a future decline in civic engagement among college graduates.

Myers, Myers, and Peters (2019) conducted the most expansive examinations of college experiences and alumni civic engagement among a US-representative postsecondary sample. Informed also by the high-impact practice framework (Kuh, 2008), they found alumni who engaged in an internship, co-op or other field experience, research with a faculty member, or conducted a community-based course project as an undergraduate were more engaged civically than their peers. Although not an explicit examination of student-faculty interaction, academic challenge, and diversity interactions, the high-impact practices (Kuh, 2008) investigated provide insight into the curricular experiences that promote civic engagement and honor higher education's implicit social contract of contributing to the social fabric.

Long-term Effects on Psychological Outcomes Toward Undergraduate Institution

The research on psychological outcomes o alumni undergraduate institution operationalized these primarily in terms of institutional satisfaction manifest as alumni charitable giving to and volunteering at their alma mater. We found no studies that examined the extent to which student-faculty interactions, academic challenge, and diversity interactions during the undergraduate years promoted these outcomes. Rather, the extant literature examined involvement with college activities, particularly fraternity and sorority affiliation and other forms of peer-to-peer involvement. In the main, college involvement was positively associated with philanthropic donations and volunteering (Hummel, 2010; Morgan, 2014; Porter, Hartman, & Johnson, 2011; Sun, Hoffman, & Grady, 2007, Weerts & Ronca, 2008). Yet fraternity and sorority affiliation was nuanced with Merkel (2013) finding that alumni often viewed their

connection to the fraternity/sorority chapter to be the more salient relationship than that to their mater. However, irrespective of whether alumni were active or inactive with respect to their donation and volunteerism, they tended to report positive academic and social college experiences (Weerts & Ronca, 2007).

In summary, a paucity of research has investigated the long-term effects of college experiences and environments on alumni intellectual, civic, and psychological outcomes. With higher education expenditures in the U.S. exceeding $500 billion per year (NCES, 2017), it is alarming how little research has charted the relationship between college experiences and students' lives after they graduate with their undergraduate degree. Furthermore, the erosion of national confidence in the value of a postsecondary degree, seen in arguments and commentary that today's college students may simply not be learning enough (Arum & Roksa, 2011; Delbanco, 2012; Zorthian, 2017), will likely persist unimpeded without empirical evidence of higher education's influence on students beyond the college years. It is from this vantage point we assert the significance of the present study.

Method

Data Source and Participants

This study examined data from the Higher Education Data Sharing (HEDS) Alumni Survey, which was administered at 69 private and public institutions that are members of the HEDS Consortium. The analytic sample included respondents from surveys that were administered in 2015-2018. The surveys were primarily targeted toward alumni who were approximately one year, five years, or 10 years after graduation, but some institutions chose to send this survey to students from a variety of years. Overall, the 28,718 alumni who completed to this survey ranged from 1-66 years post-graduation. Within this sample, 38% of participants

were men, 0.5% identified outside of the traditional gender binary, 65% were White/Caucasian, 5% were Hispanic/Latinx, 3% were Asian American/Asian, 2% were African American/Black, 2% were not U.S. citizen or permanent resident (and therefore were not coded for U.S. race, per IPEDS), 2% were multiracial, and 20% were unknown race/ethnicity. Moreover, 42% had graduated within five years of completing the survey, and 20% had graduated more than 10 years before completing the survey.

Measures

Dependent variables. The study involved four outcome measures capturing alumni: perceptions of growth on intellectual outcomes; perceptions of growth in civic outcomes; feelings of connection to their undergraduate institution; and satisfaction with their undergraduate institution. Specifically, respondents reported the extent to which they perceived their undergraduate experiences as contributing to their growth on intellectual outcomes (e.g., "Examination of ideas, evidence and assumptions before accepting or formulating a conclusion") using a four-point scale (1 = very little, to 4 = very much). This 10-item index had strong internal reliability ($\alpha = 0.87$). A four-item index with the same response options was employed to examine perceived growth within civic outcomes (e.g., "Promoting the quality of life in a community, through both political and nonpolitical processes"; $\alpha = 0.83$). Single-item psychological measures also indicated how connected alumni feel with their undergraduate institution (1 = no connection, to 4 = very strong connection) and how satisfied they are with their institution (1 = very dissatisfied, to 5 = very satisfied).

Importantly, the two outcomes that measured students' perception of the undergraduate experiences' contribution to their growth do not provide accurate or direct measures of growth, especially since the constructs in this study were assessed well after college for some

participants. Instead, and consistent with empirical evidence and theory about the interpretation and validity of self-reported gains (e.g., Herzog & Bowman, 2011; Porter, 2013), we view the measures as only representing alumni's perceptions of growth, which we contend are important indicators of feelings towards the quality of learning resulting from one's postsecondary education (Bowman, 2014).

Independent variables. The primary independent variables consisted of three types of college experiences that are well-established as significant predictors of a variety of undergraduate student outcomes (see Mayhew et al., 2016; Pascarella & Terenzini, 2005). First, good teaching and high-quality faculty interactions were measured by nine items about interactions with instructors that occurred within and outside of the classroom (e.g., "Most faculty with whom I had contact at this institution were interested in helping students grow in more than just academic areas"; 1 = strongly disagree, to 5 = strongly agree, $\alpha = 0.91$). Second, academically challenging assignments and discussions with high faculty expectations was measured through a 14-item index (e.g., "Argued for or against a particular point of view and defended my argument"; 1 = never, to 5 = very often, $\alpha = 0.89$). Third, interpersonal and co-curricular interactions with diversity was measured through six items which included both engaging across difference and/or discussing issues of difference (e.g., "Had serious discussions with students whose political, social, or religious opinions were different from your own"; 1 = never, to 5 = very often, $\alpha = 0.86$).

Covariates. Additional variables included in the models were the number of years after graduation; race/ethnicity (African American/Black, American Indian/Alaskan Native, Asian American/Asian, Native Hawaiian/Pacific Islander, Hispanic/Latinx, multiracial, not a U.S. citizen or permanent resident, and unknown race/ethnicity, with White/Caucasian as the referent

group); gender (woman and non-binary, with man as the referent group); undergraduate major (biological sciences, business, communications, education, engineering, fine arts, health sciences, humanities, physical sciences, and other, with social science as the referent group); and the institution's profile in terms of its proportion of undergraduates as defined by the Carnegie Classification of Institutions (2017) (very high undergraduate enrollment, high undergraduate enrollment, and majority undergraduate enrollment, with "exclusively undergraduate" as the referent group). All dependent variables and continuous independent variables were subsequently standardized with a mean of zero and a standard deviation of one to facilitate interpretation of effect sizes.

Analyses

Ordinal least squares multiple regression analyses were used to predict each of the four dependent variables, with cluster-robust standard errors used to account for the nesting of students within institutions. The initial analyses included college experiences, gender, race/ethnicity, undergraduate major, years after graduation, and institutional undergraduate profile as predictors. Additional analyses incorporated interactions between the three college experience scales and gender, race/ethnicity, and years after graduate. The interactions for each of the three constructs (gender, race/ethnicity, years after graduation) were explored in separate models to avoid problems with multicollinearity.

Results

The results of the primary analyses are presented in Table 1. With only one exception, all of the key practices (i.e., independent variables) examined here have positive and highly significant relationships with the four outcomes. Among these three practices, experiencing challenge is most strongly related to intellectual outcomes (B = .53), diversity interactions are

most strongly related to civic outcomes (B = .40), and good teaching is most strongly related to connection with the institution and college satisfaction (B = .36 and .45, respectively). The only non-significant relationship is that diversity interactions are unrelated to college satisfaction when accounting for the other variables in the model.

[Insert Table 1]

Although the direct influence of demographics was not the main focus of the study, some of these relationships are noteworthy. Alumni who identify with non-binary genders reported lower institutional growth, connection to the institution, and college satisfaction than men, whereas women are higher than men on all four outcomes. Alumni from minoritized or unknown racial identities were often less satisfied with and less connected to their institution than were White alumni, whereas Black, Latinx, and international alumni reported greater intellectual growth than did White alumni. Undergraduate major often predicted these outcomes. When compared with social science graduates, engineering graduates are considerably higher on perceived intellectual growth, connection to their institution, and college satisfaction, whereas they are substantially lower on perceived civic growth. These same patterns are observed among physical science graduates as well, albeit with smaller relationships. Humanities and fine arts graduates were less satisfied with college and perceived lower civic gains than did social science graduates, but these groups do not differ significantly in connection with their institution or perceived intellectual gains. These relationships may reflect different opportunities and experiences in the labor market tied to their undergraduate field of study.

Table 2 displays the results of interaction terms for gender. Good teaching practices were more positively related to intellectual outcomes, institutional connection, and college satisfaction among alumni who identify outside of the traditional gender binary than among men (Bs > .25,

*p*s < .05). In addition, relative to men, women exhibited a weaker relationship between academic challenge and perceived civic growth as well as a stronger relationship between diversity experiences and civic outcomes. These group differences in the coefficients for women versus men were relatively modest in size (|*B*s| = .04, *p*s < .05). No other interactions with gender were significant.

[Insert Table 2]

Key interactions between the three college experiences and race/ethnicity are displayed in Table 3. The relationships between diversity experiences and most dependent variables—intellectual and civic outcomes as well as college satisfaction—were less positive among Black alumni than White alumni (*B*s < .08, *p*s < .05). Moreover, two interactions are significant and positive for Native Hawaiian/Pacific Islander students: those for challenge predicting civic outcomes (*B* = .22, *p* < .01) and for diversity experiences predicting institutional connection (*B* = .60, *p* < .001). Native Hawaiian/Pacific Islander and Black/African American students are the only two racial/ethnic groups for whom multiple interactions were significant; virtually none of the interactions for other racial/ethnic groups are significant, which is why these are not presented within Table 3.

[Insert Table 3]

Finally, Table 4 displays interactions between years after graduation and key college experiences. The link between good teaching and psychological outcomes (college satisfaction and institutional connection) is significantly weaker among alumni who graduated a longer time ago, but these moderation patterns are not large in magnitude (*B*s ≈ -.04, *p*s < .001). The only other significant interaction is also modest in size: The link between diversity interactions and perceived civic growth is somewhat larger for alumni who graduated earlier (*B* = .03, *p* < .05).

[Insert Table41]

Discussion

With this study we sought to understand the extent to which aspects of the undergraduate experience and encounters with the college environment might promote outcomes following college related to alumni attitudes towards their intellectual, civic growth, and feelings of connectedness and satisfaction towards the undergraduate institution. We additionally sought to uncover potential inequities in post-college outcomes by examining whether particular experiences may distinctly advantage (or disadvantage) populations of alumni who have been historically underserved by higher education, and the extent to which the influence of experiences during college change as more time passes since alumni received their undergraduate degree. Drawing on data from the HEDS Alumni Survey, representing 69 private and public institutions from across the United States, and an analytic sample comprised of roughly 20,000 survey respondents from 2015-2018, we examined relationships between important dimensions of the college experiences and post-college outcomes among alumni who ranged from one to 10 or more years after graduation. Our results point to three main findings that address the research questions.

First, from the perspective of alumni, and controlling for a host of demographic and institutional factors, engaging with good teaching, exposure to high expectations and challenge, and interactions with diversity during college contribute positively to development, or growth, across intellectual and civic dimensions, and promote a sense of connection to the undergraduate institution. For decades, higher education researchers have pointed to active learning, good teaching, high expectations from faculty, and exposure to respectful, inclusive and diverse environment as highly impactful for students' learning and development across a range of

outcomes (Chickering & Gamson, 1987; Mayhew, et al., 2016; Pascarella & Terenzini, 1991, 2005). Our results suggest that the value of such experiences extend well beyond the college years and remain influential as individuals' transition into the labor market and cultivate their professional and civic lives.

In an era of frequent and often harsh critiques that higher education is failing to adequately prepare students, it stands to reason that if the college experience was not delivering the skills and dispositions needed to succeed in life after college, alumni attitudes would not reflect favorably on their undergraduate institution, or its contribution to personal growth. Our findings suggest otherwise. Given the large number of institutions and alumni contained in the data analyzed, the evidence we have uncovered may point to a general phenomenon in higher education, at least among the institutions that are members of the HEDS Consortium.

What's more, our findings highlight the lasting influence of specific practices and institutional conditions. The importance of good teaching, challenge, and diverse exposure during college are strongly promoted as "high impact" practices through organizations such as the AAC&U and widely implemented on campuses across the country. Our findings provide some validation to the notion that such practices may, in fact, by highly impactful well-beyond the college years. However, our findings also show considerable variation across college majors, particularly in terms of cultivating civic mindedness, such as concern for community and engaging with political processes. For example, alumni who majored in health-related fields reported the highest levels of civic growth, while engineering and physical science majors reported the lowest levels of civic growth. The latter finding with respect to STEM majors is consistent with previous literature (Ishitani & McKitrick, 2013; Hillygus, 2005; Nie & Hillygus,

2001) and provides evidence from a more expansive set of alumni that civic engagement may wane as enrollment in these majors increase.

Second, the effects of exposure to good teaching, challenge, and diversity is somewhat moderated by students' demographic identities. Notably, students with non-binary gender identities distinctly benefit from good teaching in terms of intellectual growth, feeling connected to their institution, and satisfaction with college. Given the challenges that non-binary students face, they appear to especially benefit when instructors engage in a manner that conveys an interest in their learning and growth. In addition, interactions with diversity during college appears uniquely beneficial for women in terms of their sense of civic growth tied to their college experience.

Equally notable were differences in the effects of college experiences across racial/ethnic identities. In particular, among Black-identified alumni, having interactions with diversity during college was negatively associated with intellectual and civic growth, as well as satisfaction with college. These differential relationships are likely attributable to the quality and nature of this diversity engagement, as Black students are especially likely to experience a hostile campus climate (e.g., Harper & Hurtado, 2007). That is, Black students' interactions may not have met all or most of the ideal conditions of intergroup contact (see Allport, 1954; Pettigrew, 1998), so they did not yield the positive effects that often accrue from cross-racial interaction (Chang, 2011; Pettigrew & Tropp, 2006). Alternatively, diverse college interactions among Native Hawaiian/Pacific Islanders was strongly and positively associated with feeling connected to their undergraduate institution. The explanation for this pattern is not clear, as this group has received relatively little attention in the college impact literature.

Together, these findings point to the opportunities and challenges colleges face in serving a wide range of students from myriad social and cultural backgrounds. The complexities uncovered in the present study have been found in other research as well. Although examining outcomes directly associated with the engineering industry, Kinoshita, Young, and Knight (2014) found alumni participation in engineering specific clubs for women and underrepresented minorities positively associated with higher levels of teamwork, engineering design, communication, and leadership skills while more general club participation was limited to positive associations with teamwork and communication. At the very least, it is important to note that the kinds of college experiences widely heralded as impactful for student growth and development do not serve all students equally in the years following college.

The third and final main finding points to the evolving perceptions of alumni as time passes beyond their time as undergraduate students. Given the nature of the data we analyzed, which contained alumni who graduated from college from one to many years (even decades) after college, we had the unique opportunity to explore how, or if, attitudes towards college change over time. One might anticipate that attitudes towards the college experience weaken as more time passes beyond college, particularly in terms of feeling connected to one's undergraduate institution. In fact, while exposure to good teaching had strong positive associations with feeling connected to the undergraduate institution and satisfaction towards college, our findings illustrate that these positive relationships decline as time passes. However, in terms of civic growth, the importance of interactions with diversity during college appears to strengthen as more years pass. Thus, the long-term influence of good teaching and interactions with diversity are partly a function of the time since alumni received their undergraduate degree. It may be the synthesis of these good practices in undergraduate education that undergird

findings from a German sample that cognitive wisdom tends to remain at higher levels longer for those with more education (Ardelt, Pridgen, & Nutter-Pridgen, 2018).

Conclusion and Implications

This paper identified sizable relationships between several college experiences and post-college outcomes. For the most part, the strength of these relationships is similar for recent graduates and for alumni who attended college decades earlier, thereby illustrating the lasting nature of the potential effects. These findings are useful given that the overwhelming majority of college impact studies only examine fairly short-term outcomes. Researchers and practitioners often assume (consciously or unconsciously) that any impact of student experiences persists beyond a semester, a year, or even a couple of years, rather than constituting ephemeral growth that disappears by the end of the sophomore year. The present study provides direct evidence of long-term outcomes for three broad types of postsecondary experiences: good teaching, academic challenge, and diversity interactions.

The current findings also illustrate the need to attend to student subgroups that are frequently overlooked in higher education research. As a result of a lack of sample size and/or attention to relevant issues, students who identify outside of binary constructions of gender and students from Pacific Islander backgrounds are often not examined separately in quantitative research. Instead, Pacific Islander students may be combined with Asian students or with students from several identities within an "other" racial category; students outside of the "traditional" gender binary are often categorized based on their biological sex or lumped into a referent group with women or men. Whenever possible, this practice should be avoided to risk overlooking important variation in college experiences and outcomes. That said, the size of these groups was reasonably modest even within this very large sample of alumni, so the findings

observed here should be treated with caution and would certainly benefit from further exploration and replication.

From a practical perspective, this study suggests the importance of continuing to promote the student experiences on which we have focused. Given the increasing emphasis on institutional revenue that may accrue from students' continued enrollment and graduation, some colleges and universities may be tempted to lower standards or more generally avoid facilitating experiences that may be challenging, difficult, or uncomfortable for students, since these may be viewed as increasing the likelihood of attrition. Although academic challenge is framed as a separate construct here, some good teaching practices and many diversity interactions often reflect some level of challenge, so this logic may be relevant to those experiences as well. However, this study argues for the opposite perspective: alumni will perceive greater long-term outcomes and have greater long-term connection and satisfaction with their alma mater when they have experienced these forms of challenge during their undergraduate years. The experiences examined here are also clearly associated with favorable short-term outcomes, including retention for a variety of good teaching practices (see Mayhew et al., 2016). Practitioners should continue to differentiate between forms of challenge and discomfort that may ultimately lead to learning and growth versus those that are simply barriers that should be avoided, such as a hostile campus climate or a lack of relevant academic and/or social supports. Fortunately, the goals of fostering both short-term and long-term outcomes as well as both retention and growth appear to be more aligned than some might perceive.

References

Morgan, R. A. (2013). Factors that lead millennial alumni to donate to their alma mater. (Doctoral dissertation). Retrieved from: http://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1842&context=dissertations

Ardelt, M. (2010). Are older adults wiser than college students? A comparison of two age cohorts. *Journal of Adult Development, 17*, 193-207.

Ardelt, M., Pridgen, S., & K. L., Nutter-Pridgen (2018). The relation between age and three-dimensional wisdom: Variations by wisdom dimensions and education. *The Journals of Gerontology: Series B, 73*, 1339-1349.

Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.

American Academy of Arts and Sciences (AAA&S). (2017). *The Future of Undergraduate Education, The Future of America*. Cambridge MA: Commission on the Future of Undergraduate Education. https://www.amacad.org/multimedia/pdfs/publications/researchpapersmonographs/CFUE_Final-Report/BRIEF_Future-of-Undergraduate-Education.pdf.

Arum, R., & Roksa, J. (2011). *Academically adrift: Limited learning on college campuses*. Chicago, IL: University of Chicago Press.

Arum, R., & Roksa, J. (2014*). Aspiring adults adrift: Tentative transitions of college graduate*s. Chicago, IL: University of Chicago Press.

Astin, A. W. (1970a). The methodology of research on college impact, part one. *Sociology of Education, 43*, 223-254.

Astin, A. W. (1970b). The methodology of research on college impact, part two. *Sociology of Education, 43*, 437-450.

Astin, A. W. (1991). *Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education*. Westport, CT: American Council on Education/Macmillan.

Astin, A. W., Sax, L. J., & Avalos, J. (1999). Long-term effects of volunteerism during the undergraduate years. *The Review of Higher Education, 22*(2), 187-202.

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd edition).. Chicago, IL: University of Chicago Press.

Blau, P. M., & Duncan, O. D. (1967). *The American occupational structu*re. New York: Wiley.

Carnegie Classification of Institutions (2017). Enrollment profile classification description. Retrieved from: http://carnegieclassifications.iu.edu/classification_descriptions/enrollment_profile.php

Chang, M. J. (2011). *Quality matters: Achieving benefits associated with racial diversity*. Columbus, OH: Kirwin Institute for the Study of Race and Ethnicity, The Ohio State University.

Chickering, A., & Gamson, Z. (1987). Seven principles for good practice in undergraduate education. AAHE Bulletin, 39(7), 3-7.

Clotfelter, C. T. (2017). *Unequal colleges in the age of disparity*. Cambridge, MA: Harvard University Press.

Delbanco, A. (2012). *College: What it was, is, and should be*. Princeton, NJ: Princeton University Press.

Dickeson, R. C. (2010). *Prioritizing academic programs and services: Reallocating resources to achieve strategic balance*. San Francisco, CA: Jossey-Bass.

Gill, A. M., & Leigh, D. E. (2003). Do the returns to community college differ between academic and vocational programs? *Journal of Human Resources, 38*(1), 134–155.

Gutmann, A. (2014). The fundamental worth of higher education. *Proceedings of the American Philosophical Society, 158*(2), 136-143.

Harper, S. R., & Hurtado, S. (2007). Nine themes in campus racial climates and implications for institutional transformation. In S. R. Harper & L. D. Patton (Eds.), *New Directions for Student Services, 120*, 7-24. San Francisco, CA: Jossey-Bass.

Hemelt, S. W. & Marcotte, D. (2016). The changing landscape of tuition and enrollment in American public higher education. *The Russell Sage Foundation Journal of the Social Sciences, 2*(1), 42-68.

Hillygus, D. S. (2005). The missing link: Exploring the relationship between higher education and political engagement. *Political Behavior, 27*, 25-47.

Hummel, R. (2010). *Factors influencing alumni connection and commitment.* (Doctoral dissertation). Retrieved from Opus: https://hdl.handle.net/10133/2480

Hurtado, S., Alvarez, C. L., Guillermo-Wann, C., Cuellar, M., & Arellano, L. (2012). A model for diverse learning environments. In J. C. Smart & M. B. Paulsen (Eds.), *Higher Education: Handbook of Theory and Research* (Vol. 27, pp. 41-122). New York, NY: Springer.

Ishitani, T. T., & McKitrick, S. A. (2013). The effects of academic programs and institutional characteristics on postgraduate civic engagement behavior. *Journal of College Student Development, 54*, 379-396.

Kinoshita, T., Young, G., & Knight, D. B. (2014). *Learning after learning: Perceptions of engineering alumni on skill development*. IEEE Frontiers in Education Conference (FIE) Proceedings, p.1-7. 10.1109/FIE.2014.7044122

Kuh, G. D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter*. Washington DC: Association of American Colleges and Universities.

Light, A., & Strayer, W. (2004). Who receives the college wage premium? Assessing the labor market returns to degrees and college transfer patterns. *Journal of Human Resources, 39*(3), 746–773.

Long, M. C. (2010). Changes in the returns to education and college quality. *Economics of Education Review, 29*(3), 338-347.

Ma, J., Pender, M., & Welch, M. (2016). *Education pays 2016: The benefits of higher education for individuals and society.* New York: College Board.

Mayhew, M. J., Rockenbach, A. N., Bowman, N. A., Seifert, T. A., & Wolniak, G. C., with Pascarella, E. T., & Terenzini, P. T. (2016). *How college affects students: 21st century evidence that higher education works* (Vol. 3). San Francisco, CA: Wiley.

McLendon, M. K., Hearn, J. C., & Deaton, R. (2006). Called to account: Analyzing the origins and spread of state performance-accountability policies for higher education. *Educational Evaluation and Policy Analysis, 28*(1), 1-24.

Merkel, R. E. (2013). The influence of sorority and fraternity involvement on future giving. In N. D. Drezner (Ed.), *Expanding the donor base in higher education* (pp. 152-170). New York, NY: Routledge.

McMahon, W. W. (2009). *Higher learning, greater good: The private and social benefits of higher education*. Baltimore, MD: Johns Hopkins University Press.

Molitor, C. J., & Leigh, D. E. (2005). In-school work experience and the returns to two-year and four-year colleges. *Economics of Education Review, 24*(4), 459–468.

Myers, C. B., Myers, S. M., & Peters, M. (2018). The longitudinal connections between undergraduate high impact curriculum practices and civic engagement in adulthood. *Research in Higher Education, 60*, 83-110.

National Center for Education Statistics (NCES). (2017). *The Condition of Education 2017, Postsecondary Institution Expenses*. NCES 2017-144. Retrieved from https://nces.ed.gov/fastfacts/display.asp?id=75.

Neumann, G., Olitsky, N., & Robbins, S. B. (2009). Job congruence, academic achievement, and earnings. *Labour Economics, 16*(5), 503–509.

Nie, N., & Hillygus, D. S., (2001). Education and democratic citizenship. In D. Ravitch & J. P. Viteritti (Eds.), *Making good citizens: Education and civil society* (pp. 30-57). New Haven, CT: Yale University.

Park, S. (2011). Returning to school for higher returns. *Economics of Education Review, 30*(6), 1215– 1228.

Pascarella, E. T., & Terenzini, P. T. (1991). *How college affects students*. San Francisco, CA: Jossey-Bass.

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research (Vol. 2)*. San Francisco, CA: Jossey-Bass.

Perna, L. W. (2003). The private benefits of higher education: An examination of the earnings premium. *Research in Higher Education, 44*(4), 451–472.

Perna, L. W. (2005). The benefits of higher education: Sex, racial/ethnic, and socioeconomic group differences. *Review of Higher Education, 29*(1), 23–52.

Pettigrew, T. F. (1998). Intergroup contact theory. *Annual review of psychology*, *49*(1), 65-85.

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of personality and social psychology*, *90*(5), 751.

Porter, T., Hartman, K., & Johnson, J. S. (2011). Books and balls: Anticedents and outcomes of college identification. *Research in Higher Education, 13*, 1-14.

Rumberger, R. W. (2010). Education and the reproduction of economic inequality in the United States: An empirical investigation. *Economics of Education Review, 29*(2), 246–254.

Selingo, J. (2013). *College (unbound): The future of higher education and what it means for students*. Las Vegas, NV: Amazon Publishing.

Sun, X., Hoffman, S. C., & Grady, M. L. (2007). A multivariate causal model of alumni giving: Implications for alumni fundraisers. *International Journal of Educational Advancement, 7*, 307-332.

Taniguchi, H. (2005). The influence of age at degree completion on college wage premiums. *Research in Higher Education, 46*(8), 861-881.

Weerts, D. J., & Ronca, J. M. (2007). Profiles of supportive alumni: Donors, volunteers, and those who "do it all." *International Journal of Educational Advancement, 7*, 20-34.

Weerts, D. J., & Ronca, J. M. (2008). Characteristics of alumni donors who volunteer at their alma mater. *Research in Higher Education, 49*, 274-292.

Weidman, J. C., Twale, D. J., & Stein, E. L. (2001).. *Socialization of graduate and professional students in higher education: A perilous passage?* (ASHE-ERIC Higher Education Report: Vol. 28). San Francisco, CA: Jossey-Bass.

Wolniak, G. C., Seifert, T. A., Reed, E. J., & Pascarella, E. T. (2008). College majors and social mobility. *Research in Social Stratification and Mobility, 26*, 123-139.

Woo, J. (2014). *Degrees of debt student borrowing and loan repayment of bachelor's degree recipients 1 year after graduating: 1994, 2001, and 2009*. Washington, DC: National Center for Education Statistics.

Zorthian, J. (2017, September 7). Americans are divided on whether college degrees are worth it. *Fortune*. Retrieved from http://fortune.com/2017/09/07/americans-college-worth-it/

Zydney, A. L., Bennett, J. S., Shahid, A., & Bauer, K. W. (2002). Impact of undergraduate research experience on engineering. *Journal of Engineering Education, 91*, 151-157.

Table 1. Results of multiple regression analyses predicting post-college outcomes.

Key Independent Variable	Intellectual Growth	Civic Growth	Connection to the Institution	College Satisfaction
Good teaching and high-quality faculty interactions	.211***	.169***	.360***	.448***
	(.010)	(.011)	(.012)	(.012)
Challenging assignments with high faculty expectations	.534***	.261***	.140***	.206***
	(.010)	(.015)	(.012)	(.010)
Interactions with diversity	.068***	.396***	.069***	-.019
	(.007)	(.014)	(.009)	(.010)
Women	.048***	.095***	.029*	.076***
	(.013)	(.012)	(.014)	(.016)
Non-binary gender	-.206**	-.005	-.320**	-.330***
	(.075)	(.068)	(.107)	(.087)
American Indian/Alaskan Native	.095	-.062	-.104	-.186*
	(.088)	(.083)	(.125)	(.082)
Asian American/Asian	-.024	-.056	-.109**	-.177***
	(.022)	(.044)	(.040)	(.038)
African American/Black	.171***	.099	-.079	.028
	(.049)	(.060)	(.056)	(.051)
Native Hawaiian/Pacific Islander	-.342*	.099	-.260	-.176
	(.138)	(.073)	(.168)	(.186)
Hispanic/Latinx	.076***	.031	-.070*	-.110**
	(.022)	(.031)	(.027)	(.035)
Not a U.S. citizen or permanent resident	.063*	.115**	-.086	-.147***
	(.030)	(.037)	(.050)	(.038)
Multiracial	.031	-.009	-.084*	-.051
	(.038)	(.041)	(.040)	(.040)
Unknown race/ethnicity	-.042	-.085*	-.115**	-.111*
	(.026)	(.036)	(.034)	(.044)
Very high undergraduate enrollment	-.053*	.049	-.109**	-.056
	(.024)	(.054)	(.038)	(.046)
High undergraduate enrollment	-.038	.007	-.001	.025
	(.020)	(.078)	(.039)	(.037)
Majority undergraduate enrollment	-.037	-.026	-.072	-.053
	(.029)	(.054)	(.089)	(.046)
Years after graduation	-.006	-.020	.026	.097***
	(.008)	(.013)	(.015)	(.013)
Biological sciences major	.082***	-.061**	.033	-.002
	(.020)	(.021)	(.022)	(.022)
Business major	.076**	.021	.012	.072*
	(.026)	(.033)	(.029)	(.032)
Communications major	.044	.005	.055	.006
	(.029)	(.038)	(.041)	(.032)
Education major	-.014	.082*	-.033	.058*
	(.021)	(.034)	(.032)	(.028)

Engineering major	.337***	-.334***	.289***	.254***
	(.026)	(.064)	(.033)	(.064)
Fine arts major	-.032	-.137***	.016	-.130***
	(.023)	(.025)	(.026)	(.020)
Health sciences major	.154***	.155***	-.056	.043
	(.032)	(.037)	(.033)	(.047)
Humanities major	.002	-.056***	.019	-.036*
	(.017)	(.014)	(.022)	(.017)
Physical sciences major	.114***	-.232***	.079*	.044*
	(.019)	(.054)	(.038)	(.021)
Other major	.014	.046	.084*	.009
	(.028)	(.027)	(.038)	(.026)
R^2	.493	.475	.244	.341

Note. Standard errors are in parentheses. Dependent and continuous independent variables were standardized with a mean of zero and a standard deviation of one to facilitate effect size interpretation. Cluster-robust standard errors were used to account for the nesting of students within institutions. Referent groups for dummy-coded variables were men, White/Caucasian, entirely undergraduate enrollment, and social science major. *$p < .05$ **$p < .01$ ***$p < .001$

Table 2. Results of regression analyses exploring gender moderation of the link between college experiences and post-college outcomes.

Key Independent Variable	Intellectual Growth	Civic Growth	Connection to the Institution	College Satisfaction
Good teaching and high-quality faculty interactions	.204*** (.014)	.174*** (.012)	.365*** (.019)	.457*** (.020)
Challenging assignments with high faculty expectations	.546*** (.015)	.282*** (.018)	.161*** (.018)	.225*** (.017)
Interactions with diversity	.066*** (.011)	.375*** (.017)	.070*** (.013)	-.007 (.013)
Women	.048*** (.014)	.094*** (.012)	.029 (.014)	.075*** (.017)
Non-binary gender	-.158* (.067)	.027 (.068)	-.263* (.101)	-.263** (.092)
Women x good teaching	.004 (.013)	-.010 (.013)	-.008 (.021)	-.017 (.020)
Non-binary x good teaching	.331* (.157)	.123 (.087)	.254* (.105)	.365*** (.104)
Women x academic challenge	-.017 (.015)	-.037* (.014)	-.034 (.019)	-.029 (.020)
Non-binary x academic challenge	-.070 (.117)	-.013 (.087)	-.055 (.103)	-.034 (.106)
Women x diversity interactions	.007 (.013)	.037** (.014)	-.006 (.017)	-.024 (.014)
Non-binary x diversity interactions	-.012 (.113)	-.024 (.071)	-.111 (.091)	-.087 (.113)
R^2	.492	.474	.243	.340

Note. Standard errors are in parentheses. Dependent and continuous independent variables were standardized with a mean of zero and a standard deviation of one to facilitate effect size interpretation. Cluster-robust standard errors were used to account for the nesting of students within institutions. Analyses controlled for race/ethnicity, years since graduation, undergraduate major, and institutional enrollment profile. *$p < .05$ **$p < .01$ ***$p < .001$

Table 3. Selected results of regression analyses exploring racial/ethnic moderation of the link between college experiences and post-college outcomes.

Key Independent Variable	Intellectual Growth	Civic Growth	Connection to the Institution	College Satisfaction
Good teaching and high-quality faculty interactions	.216*** (.011)	.170*** (.012)	.362*** (.013)	.440*** (.014)
Challenging assignments with high faculty expectations	.534*** (.011)	.258*** (.015)	.134*** (.013)	.196*** (.011)
Interactions with diversity	.069*** (.008)	.401*** (.012)	.073*** (.011)	-.014 (.010)
African American/Black	.178*** (.040)	.116** (.038)	-.069 (.060)	.056 (.049)
Native Hawaiian/Pacific Islander	-.389** (.141)	.065 (.081)	-.277 (.170)	-.226 (.168)
Black x good teaching	-.019 (.046)	.024 (.032)	.023 (.062)	.091 (.046)
NH/PI x good teaching	-.224 (.143)	-.050 (.077)	-.282 (.246)	-.282 (.201)
Black x academic challenge	-.029 (.041)	.008 (.061)	-.022 (.059)	-.018 (.040)
NH/PI x academic challenge	.203 (.220)	.219** (.075)	-.095 (.138)	.034 (.182)
Black x diversity interactions	-.081** (.030)	-.129** (.042)	-.035 (.043)	-.088* (.039)
NH/PI x diversity interactions	-.077 (.191)	-.095 (.127)	.602*** (.178)	.188 (.198)
R^2	.494	.476	.245	.343

Note. Standard errors are in parentheses. White/Caucasian was the reference group; several other racial/ethnic groups and the interactions between these and good practices were also included in the models (not shown here). Dependent and continuous independent variables were standardized with a mean of zero and a standard deviation of one to facilitate effect size interpretation. Cluster-robust standard errors were used to account for the nesting of students within institutions. Analyses also controlled for gender, years since graduation, undergraduate major, and institutional enrollment profile.
*$p < .05$ **$p < .01$ ***$p < .001$

Table 4. Selected results of regression analyses exploring moderation by years after graduation of the link between college experiences and post-college outcomes.

Key Independent Variable	Intellectual Growth	Civic Growth	Connection to the Institution	College Satisfaction
Good teaching and high-quality faculty interactions	.210*** (.010)	.169*** (.011)	.364*** (.011)	.451*** (.012)
Challenging assignments with high faculty expectations	.534*** (.011)	.260*** (.015)	.140*** (.011)	.209*** (.010)
Interactions with diversity	.070*** (.008)	.398*** (.014)	.065*** (.009)	-.023* (.009)
Years after graduation	-.007 (.008)	-.022 (.012)	.026 (.013)	.100*** (.012)
Years after graduation x good teaching	-.013 (.006)	-.000 (.008)	-.042*** (.011)	-.046*** (.006)
Years after graduation x academic challenge	.010 (.006)	-.015 (.011)	.011 (.011)	-.011 (.006)
Years after graduation x diversity interactions	.007 (.009)	.027* (.012)	-.006 (.009)	.012 (.006)
R^2	.492	.474	.245	.341

Note. Standard errors are in parentheses. Dependent and continuous independent variables were standardized with a mean of zero and a standard deviation of one to facilitate effect size interpretation. Cluster-robust standard errors were used to account for the nesting of students within institutions. Analyses also controlled for gender, race/ethnicity, undergraduate major, and institutional enrollment profile. *$p < .05$ **$p < .01$ ***$p < .001$