Do High-Achieving Students Benefit From Honors College Participation? A Look at Student Engagement for First-Year Students and Seniors

Angie L. Miller1 and Amber D. Dumford2

Abstract
This study investigates findings from the National Survey of Student Engagement (NSSE), comparing various aspects of student engagement between honors college and general education students. Responses from 1,339 honors college students and 7,191 general education students across 15 different universities suggest a positive impact for honors college participation on reflective and integrative learning, use of learning strategies, collaborative learning, diverse discussions, student–faculty interaction, and quality of interactions for first-year students, even when controlling for student and institutional characteristics. For senior students, honors college participation was related to more frequent student–faculty interaction. Potential experiential and curricular reasons for these differences are discussed, along with implications for educators, researchers, parents, and students.

Keywords
honors college, student engagement, higher education, survey

A central tenet of gifted education is that gifted students require appropriate educational experiences to accommodate their learning needs. A variety of theoretical models and accompanying curricular and pedagogical practices exist for students in

1Indiana University, Bloomington, IN, USA
2University of South Florida, Tampa, FL, USA

Corresponding Author:
Angie L. Miller, Center for Postsecondary Research, Indiana University, 1900 E 10th St., Suite 419, Bloomington, IN 47406, USA.
Email: anglmill@indiana.edu
K–12 settings. However, there seems to be a disconnect between primary and secondary gifted education and that of higher education, even though one might assume that an expected track for gifted secondary students involves continuation of their education at a college or university. Honors colleges and programs are meant to provide an academically rigorous experience, often for high-ability students previously identified as gifted, but do the experiences of honors students align with models from the K–12 world? Furthermore, are these honors programs congruent with established best practices from the field of higher education? This study seeks to address this divide between K–12 and higher education research, exploring how participation in an honors college might have an influence on various aspects of student engagement in undergraduates.

**Review of the Literature**

**Environmental Impact**

Many models in gifted education that address origins, development, and functioning include an environmental component. One comprehensive model of giftedness that applies to multiple domains, incorporates structural specificity, and recognizes the importance of environment is Gagné’s (1999) Differentiated Model of Giftedness and Talent (DMGT). This model, and the corresponding updates of the “DMGT 2.0” (Gagné, 2009), and the Integrative Model of Talent Development (Gagné, 2018), makes a distinction between giftedness, considered to be aptitude domains; talents, considered to be fields in which these aptitudes are expressed; and developmental processes, considered to be a linking path between the abilities of giftedness and their manifestation as talents (Gagné, 2000, 2003) In addition, this model acknowledges how intrapersonal characteristics, environmental factors, and chance can also shape different aspects of the developmental process. For each of these categorized elements (giftedness, developmental processes, talent expression, intrapersonal attributes, environmental factors, and chance), there are further elaborative subfactors. The DMGT identifies environmental subfactors of milieu (including physical, cultural, social, and familial capital), specific individuals (including parents, other family members, peers, teachers, and mentors), and provisions (including enrichment from curriculum and pedagogy as well as administrative considerations of things like grouping and acceleration; Gagné, 2009).

The level of specificity in the DMGT is applicable to the honors college experience for several reasons. Undergraduate students participating in these programs are interacting not only with professors and classmates but also with other peers, and many still have close ties to their families. Furthermore, their experience is couched within the larger setting of higher education in general, and how they navigate this life stage is likely influenced by previous social and educational encounters. Specific curricular aspects of honors programs can also play a role, and these components may or may not be similar to what these students have previously experienced (such as self-contained classrooms or enrichment activities) during their K–12 schooling. As much of the
research involving models of gifted education has been conducted with younger elementary and secondary populations, it is also important to expand research on the effectiveness of these models across all ages.

**Honors Colleges and Programs**

It is critical to point out that for any consideration of high-achieving students within honors colleges or programs, there is a great deal of variance in the objectives and actual implementation of such programs. An “Honors College” at one school might differ in numerous ways from a program with the exact same title at another school, similar to what often occurs within K–12 settings. Admissions policies are generated within an overall context of institutional admissions criteria; sometimes honors students are admitted as first-years at the beginning of their time at the university, whereas others are given honors status only after taking a minimum number of credit hours or scoring above a grade point average (GPA) cutoff at the university (Schuman, 2006). Many students enrolling in honors colleges have been formally identified as academically gifted at one or more times during their prior education, but the services and programming they have received can fluctuate greatly from one student to the next (Rinn & Plucker, 2004). However, because most honors colleges have a minimum GPA (high school or college) requirement and/or standardized test criteria for admissions but do not require the types of IQ and other cognitive testing common to many K–12 programs, these students can technically be classified as high ability rather than gifted. This distinction is essential to remember when replicating research from younger, traditionally identified gifted K–12 populations with honors college students. Nevertheless, it is highly likely that they have been identified as gifted at some point in the past. For instance, a study of 393 honors college students at one university found that nearly all honors college students (92%) self-reported having participated in gifted programming during elementary, middle, and/or high school, although the types of programming to which they had been exposed varied widely (Miller & Speirs Neumeister, 2017).

Regardless of the possible variety of experiences, there are nevertheless some fundamental components of most honors colleges, including distinct and more academically rigorous versions of general education courses, often with smaller class sizes for enhanced student–faculty interaction, and these courses are often prerequisites to more demanding courses such as colloquia or seminars (Fischer, 1996; Freyman, 2005; Sederberg, 2005). Many of these classes are interdisciplinary, and students have the freedom to choose any major offered at the university; moreover, there is often a mandatory final thesis, capstone, or creative project that must be completed before graduation (Digby, 2005). A recent systematic review of honors curricula found that most programs have independent research elements, but there is more variation in requirements for other high-impact practices (HIPs) such as internships, service-learning, and study abroad (Cognard-Black & Savage, 2016). A number of universities also have separate honors residence halls or study rooms open exclusively to honors students (Noldon & Sedlacek, 1998; Rinn, 2004). Students may start on their honors program
path with great expectations for their college experience (Rinn, 2008), yet these expectations may or may not be fulfilled, depending on the particulars and execution of each program (Rinn & Plucker, 2004).

**Student Engagement**

Student engagement, defined as student involvement in educationally purposeful activities (Kuh, 2001), has been shown in many studies to be a strong predictor of students’ learning and personal development (Astin, 1993; Pace, 1980; Pascarella & Terenzini, 2005). Theories of engagement were developed with the assumption that this is a topic relevant for students of all ability levels, and the majority of empirical studies of the topic are done with a more general population that includes both honors and nonhonors students (Kuh, 2009). Therefore, it follows that a better understanding of how honors college participation affects engagement should inform the implementation of such programs. However, there are many aspects that play a part in student engagement, both inside and outside of the classroom (Kuh, 2001). Starting with those more traditionally focused on classroom experiences, many academic behaviors, including the use of learning strategies, quantitative reasoning, higher order learning, and reflective and integrative learning, can increase content knowledge as well as overall cognitive processing and are all linked to various aspects of achievement and success (Ormrod, 2011; Pascarella & Terenzini, 2005).

Perhaps the most critical of these academic behaviors to the student development process is higher order learning. Stemming from the well-known Bloom’s taxonomy (Krathwohl, 2002), higher order learning is comprised of a pattern in which students proactively integrate new knowledge and existing information, and then connect and extend this information to seek answers during the learning process (Lewis & Smith, 1993; Weiss, 2003). With higher order learning, students need to make decisions, generate new ideas or create new objects, make predictions, and solve problems. In a similar vein, utilizing a deep approach to learning refers to a process that goes beyond memorizing content and instead suggests a focus on the underlying meaning of information (Nelson Laird, Shoup, & Kuh, 2005), such as integrating new knowledge with existing knowledge or practical issues, and reflecting on one’s own views while considering views of others.

Other, more specific, academic skills and behaviors are also important for engagement. Learning strategies are explicit patterns or combinations of learning activities that learners use to gain knowledge (Clayton, Blumberg, & Auld, 2010; Vermetten, Lodewijks, & Vermunt, 1999; Vermunt, 1996), part of what is often termed self-regulated learning (Pintrich, 2004). There are a variety of methods that students can use when studying and learning. These learning strategies can range from taking notes when reading and in class, to summarizing and organizing new information, to creating an environment that is conducive to studying (Ormrod, 2011) and the use of these strategies can vary by discipline (Dumford, Cogswell, & Miller, 2016). Another specialized construct, quantitative literacy/quantitative reasoning (QL/QR), includes the ability to use numerical, statistical, and graphical information in everyday life as well
as in the workplace (Steen, 1997, 2001; Wilkins, 2000, 2010). Quantitative literacy surpasses the ability to simply perform mathematical computations and extends to a deeper understanding of quantitative data. Quantitative reasoning, or the activities and skills performed and developed to become a quantitatively literate person, is more readily apparent in some academic disciplines over others. This skill is crucial for a variety of engaged and effective situations in higher education, such as reaching conclusions about or analyzing issues with numbers, graphs, or statistics within one’s major field (Rocconi, Lambert, McCormick, & Sarraf, 2013).

Interactions with peers through collaborative learning and discussions with diverse others are also valuable elements of student engagement (Cabrera et al., 2002). Collaborative learning is a process in which two or more students participate together in a specific intellectual activity, and the teacher serves as a facilitator rather than a knowledge source. Students work together for an enhanced understanding of course material, to solve problems, to complete group projects, or for a variety of other more challenging learning activities (Goodsell, 1992; Smith, Sheppard, Johnson, & Johnson, 2005). Since the late 1980s, collaborative learning has been a well-accepted pedagogy in higher education (Astin, 1993; Cabrera et al., 2002; Cockrell, Caplow, & Donaldson, 2000; Tinto, 1997). Furthermore, social interactions can be important both in and out of the classroom. Research suggests that experiencing diversity in college impacts students’ personal development (Astin, 1993), and interacting with diverse peers is related to positive academic outcomes. These diverse interactions can have an impact on cognitive development, reducing racial bias, civic engagement, and prosocial behaviors such as volunteering and leadership (Bowman, 2010, 2011, 2013; Denson, 2009; Denson & Chang, 2009; Gurin, Dey, Hurtado, & Gurin, 2002; Loes, Pascarella, & Umbach, 2012; Nelson Laird, 2005).

Certainly, experiences with faculty play a pivotal role in student engagement. It is widely accepted that student–faculty interactions generally have a positive influence on the cognitive growth and development of college students, as well as their satisfaction (Kuh & Hu, 2001; Pascarella & Terenzini, 2005). Frequent interactions between students and faculty are also beneficial to retention (Lau, 2003). A plethora of seminal work in the field of higher education demonstrates that student–faculty interaction is positively related to students’ learning (Astin, 1993; Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999; Kuh, Pace, & Vesper, 1997; Pike, 1991; Quaye & Harper, 2015; Volkwein & Carbone, 1994). In addition to positive interactions with students, faculty who teach their courses with clarity, organization, and provide prompt and formative feedback also have a beneficial influence on the learning and development of their students (Pascarella & Terenzini, 2005), and students’ perceptions of various effective teaching practices are positively associated with critical thinking, psychological well-being, leadership, openness to diversity, and academic motivation (Blaich & Wise, 2011). Teaching clarity is an important characteristic of effective teaching (Ginsberg, 2007; Hativa, Barak, & Simhi, 2001). Teaching methods where there is transparency in instructional approach and goal setting provide students with a better understanding of expectations and course content (BrekaLorenz, Ribera, Kinzie, & Cole, 2012). Teaching clarity has a positive relationship with various educational outcomes such as student achievement and satisfaction (Chesebro & McCroskey, 2001; Hativa, 1998).
In addition, there are several elements of the surrounding environment that contribute to student engagement, such as the quality of interactions with students, faculty, and other types of staff, as well as an overall perception of a supportive environment (Baird, 2005). Interactions may impact a variety of student outcomes including academic achievement, social development, and critical thinking (Umbauch & Wawrzynski, 2005; Whitt, Edison, Pascarella, Nora, & Terenzini, 1999). Both formal and informal relationships are necessary to enhance the student experience. However, student characteristics, interests, and attributes influence the frequency and quality of interactions with faculty, staff, and peers (Cole, 2007; Kim & Sax, 2009). A supportive campus environment extends to cognitive, social, and physical domains for students (Flowers & Pascarella, 2003; Pascarella & Terenzini, 2005). Positive interactions within these domains stimulate engagement and further participation within the environment (Kuh & Hall, 1993; Webber, Krylow, & Zhang, 2013). Research demonstrates connections between supportive environments and many advantageous aspects of higher education, including retention, satisfaction, engagement, and involvement of students (Kuh, 1993; Kuh & Hall, 1993; Quaye & Harper, 2015).

**Student Engagement in Honors Colleges**

There is limited empirical research looking at patterns for student engagement specifically within honors colleges or programs, and the majority of this research has looked at single institutions only and can often have low numbers that constrain statistical power and generalizability (Buckner, Shores, Sloane, Dantzler, & Shields, 2016). Slavin, Coladarci, and Pratt (2008) found that honors participation was related to 1-year retention but not 4-year graduation rates at one institution. Shushok (2006) found that honors college students were not only more likely to be retained but also had higher GPAs, perceived gains, and more frequent interactions with faculty and discussions of sociocultural issues with peers. Shushok (2006) also determined through follow-up focus groups that as upperclassmen students are generally less involved in the honors college. Similarly, Kampfe, Chasek, and Falconer (2016) found differences in reasons for continuing in honors programming between lower and upper division students, and that upper division students (i.e., juniors and seniors) were less involved in the honors community. One qualitative study cited connectedness, a sense of community, and increased opportunities as benefits of honors college participation (Young, Story, Tarver, Weinauer, & Keeler, 2016). The most rigorous study of honors colleges, using longitudinal information from 18 different institutions, found that when comparing the beginning and the end of the first year, honors students self-reported better in-class experiences and also performed better on critical thinking and mathematics assessments, even after controlling for several other factors (Seifert, Pascarella, Colangelo, & Assouline, 2007). However, this study focused only on the benefits of honors programming in the first year of college, with data that were collected during the 1990s and may not hold up given more recent expansions and curricular changes within honors colleges.

Other research has incorporated student engagement and honors colleges through focusing specifically on certain educational experiences or HIPs. Programs such as
learning communities, service learning, undergraduate research with faculty, internships, senior capstone projects or culminating experiences, and study abroad were recognized as HIPs due to their positive connection with key educational outcomes as well as the mutual qualities that influence their effectiveness (Kuh, 2008). Some studies have considered honors college participation, the honors culminating senior experience, and the honors thesis as “enhancement experiences” and found that they are related to academic engagement and graduate degree aspirations (Brint, Cantwell, & Hanneman, 2008). Honors learning community participation, where students live in specific residence halls and partake in designated, thematic programming, has been linked to positive outcomes such as first-semester GPA, retention, and increased diverse interactions (Stassen, 2003). Honors college living–learning communities can also involve more frequent use of critical thinking skills, faculty interactions outside of class, learning new perspectives, discussions of academic and sociocultural issues with peers outside of class, and a more supportive residence environment (Inkelas & Weisman, 2003). It may be that student engagement is higher among honors college students because of these increased HIP opportunities.

The Current Study

After reviewing the literature, there is an apparent need for studies that explore student engagement specifically among high-ability populations in higher education. Much of the study of gifted individuals focuses on K–12 populations, but it is important to extend findings into adult populations as one does not “grow out” of giftedness (Streznewski, 1999) and the development of academic talent continues into one’s adult years (Subotnik, Olszewski-Kubilius, & Worrell, 2011). Many theoretical models of gifted education also should apply to undergraduate students, but little research has looked at the environmental impact of educational experiences for young adults in honors colleges. Conversely, much of the research on the multiple facets of student engagement within higher education looks at effective practices across a wide range of ability levels, rather than honors colleges specifically. Honors colleges are resource-heavy educational programs, in terms of administrative and faculty load, so it is imperative to provide evidence of their effectiveness. This study extends research on the importance of specialized programming and curriculum for gifted individuals to those at the college level. Therefore, the following research questions will be addressed:

**Research Question 1:** Compared with general education students, are students who participate in honors colleges or programs higher on a variety of aspects of engagement, even after controlling for demographic and institutional characteristics known to influence the college experience? It is hypothesized that honors students will be more engaged in the areas of higher order thinking, reflective and integrative learning, collaborative learning, student–faculty interaction, quality of interactions, and supportive environment due to small class sizes, academic rigor of honors courses, and honors-specific programming.
Research Question 2: Are these patterns similar for first-year students and seniors, or do they vary? Given the concentration of honors courses in a student’s early college career to fulfill university-wide course requirements, as opposed to a concentration of major-required courses during the senior year, there may be more engagement for first-year honors students who are generally more involved and spend more time in honors-related activities. Much of the previous research has focused on how honors programming can impact the first-year experience, but it is important to understand the experience for upperclassmen as well.

Method

Data and Sample

Our study used data from the 2015 administration of the National Survey of Student Engagement (NSSE). NSSE annually collects information from first-year and senior students about the nature and quality of the programs and activities in which they are engaged while at their higher education institutions. NSSE asks students about their experiences, time spent on certain activities, and perceptions of institutional support. Since its inception, NSSE has always focused on first-year and senior students, as they are at two key points in their undergraduate educational journeys, with first-year students laying the foundation and seniors having the most exposure to college (NSSE, 2000). Data show that the experiences of these groups are different (NSSE, 2009) and given patterns of retention, transfer, persistence, and enrollment, it is best to keep these groups distinct when considering engagement (NSSE, 2011). Due to these differences, NSSE has a stringent requirement to keep these groups separate for reporting and analysis.

In 2015, more than 300,000 first-year and senior respondents from 541 four-year colleges and universities were surveyed. The NSSE respondents and participating institutions are representative of all U.S. bachelor’s degree-seeking students and institutions, with a few exceptions (female, White, and full-time students are slightly over-represented; NSSE, 2015). The reasons that institutions participate vary and include national and regional accreditation, departmental/program reviews, curricular reform (general education), and institutional improvement efforts (e.g., retention rates, HIPs, first-year experience programming).

In addition to the main survey instrument, NSSE adds experimental questions for research and development purposes. In 2015, several item sets were tested at random subsets of participating institutions, and this study uses responses to an item set including additional demographics questions that was appended to the core survey instrument. Data from 1,339 honors college students and 7,191 general education students across 15 different universities offering honors colleges or programs were available. The participating institutions varied across type and size. There were eight private and seven public institutions. In terms of enrollment size, there were four schools with under 2,500 students, two schools in the 2,500 to 4,999 range, three in the 5,000 to 9,999 range, and five with more than 10,000 students. First-year students made up 46% of the respondents, while the remaining 54% were seniors. The sample was 40%
males and 60% females, with 88% reporting full-time enrollment status. There were 47% of respondents reporting first-generation status (neither parent holds a bachelor’s degree), and 80% were traditionally aged (below 25 years old). In terms of racial/ethnic diversity, the sample was 55% White, 12% Black/African American, 13% Hispanic or Latino, and 7% Asian/Asian American, and the remaining respondents falling into other or multiple racial categories. For more details on the characteristics of the sample, see Table 1.

**Table 1. Sample Descriptive Statistics.**

| Valid % |
|---------|
| First-generation | 47 |
| Traditionally aged (below 25 years old) | 80 |
| Female | 60 |
| Race/ethnicity |
| American Indian | <1 |
| Asian, Asian American | 7 |
| Black, African American | 12 |
| Latino, Hispanic | 13 |
| Native Hawaiian/Other Pacific Islander | <1 |
| Prefer not to respond | 4 |
| Unknown/Other race or ethnicity | 2 |
| Multiracial | 7 |
| White | 55 |
| Full-time enrollment | 88 |
| Transfer student | 30 |
| College grades |
| Mostly As | 45 |
| Mostly Bs | 46 |
| Mostly Cs or lower | 9 |
| Discipline |
| Arts and humanities | 8 |
| Biological sciences | 9 |
| Physical sciences, math, and computer science | 6 |
| Social sciences | 9 |
| Business | 19 |
| Communications, media, and public relations | 4 |
| Education | 6 |
| Engineering | 11 |
| Health professions | 16 |
| Social service professions | 5 |
| Other majors | 5 |
| Undecided | 1 |
| Participating in honors college | 16 |
Data Collection Procedures

Students were recruited through an email requesting their participation. All first-year and senior students at the institutions received this email, which contained a link to the online survey instrument. The surveys were completed online during untimed sessions. NSSE is administered annually during the spring semester, and depending on the institution’s calendar, it can range from February to May. Students receive a maximum of five contact emails. The average institutional response rate was 29%.

Measures

Students were identified as honors college or general education students using a self-reported item. This honors college identifying item was included in an experimental item set with several additional demographic items, and the set was appended to the core survey. The item asked “Are you currently in an honors program or honors college at your institution?” with response options of “No,” “Yes,” or “Not applicable, to my knowledge my institution does not have an honors program or college.” Those who responded “Yes” were recoded to create a dichotomous “Honors participant” flag (16% of first-year respondents and 15% of seniors). Originally, the item set was administered to 18 different institutions, but those with high percentages of “not applicable” were researched to verify the existence of honors programs, and three schools were dropped from the sample when no evidence of such a program was found. This dichotomous honors college identifier was the independent variable of interest in the study.

The dependent variables were 10 scales, which NSSE terms “Engagement Indicators,” that were used to measure the engagement levels of students. These scales included higher order learning (four items; Cronbach’s $\alpha = .85$ first-year, .86 senior), reflective and integrative learning (seven items; Cronbach’s $\alpha = .87$ first-year, .88 senior), quantitative reasoning (three items; Cronbach’s $\alpha = .85$ first-year, .87 senior), learning strategies (three items; Cronbach’s $\alpha = .77$ first-year, .78 senior), collaborative learning (four items; Cronbach’s $\alpha = .81$ first-year, .80 senior), discussions with diverse others (four items; Cronbach’s $\alpha = .89$ first-year, .90 senior), student–faculty interactions (four items; Cronbach’s $\alpha = .83$ first-year, .85 senior), effective teaching practices (four items; Cronbach’s $\alpha = .85$ first-year, .87 senior), quality of interactions (five items; Cronbach’s $\alpha = .84$ first-year, .81 senior), and supportive environment (eight items; Cronbach’s $\alpha = .89$ first-year, .89 senior). These scales show acceptable levels of internal consistency (McMillan & Schumacher, 2001), and previous research suggests sufficient evidence for construct validity with exploratory and confirmatory factor analyses (Miller, Sarraf, Dumford, & Rocconi, 2016). Each scale was scored on a 60-point scale by converting the response sets to 60-point intervals and then averaging the rescaled items. Consequently, a score of zero would mean a student responded at the bottom of the response set for every item in the scale, while a score of 60 would mean that a student responded at the top of the response set for every item in the scale. Thus, higher scores on the scales mean higher
levels of that particular aspect of engagement. (For a more detailed discussion of the scale construction process and the individual items in each scale, please refer to the NSSE website at http://nsse.indiana.edu/html/analysis_resources.cfm.)

The survey instrument also collected demographic information from respondents, including gender, transfer status, enrollment status, parents’ education, age, major, race/ethnicity, and grades. The survey instrument data are then combined with institution-provided data, such as student scores for SAT/ACT, institution control, and size. This demographic and institutional information served as control variables for all of the models. As a variety of research in the field of higher education points to important differences in the educational experiences of students based on these characteristics (see Pascarella & Terenzini, 2005, for a review), it is important to include them in the models. For additional descriptions of these variables, see Table 2.

### Table 2. Description of Independent Variables.

| Variable                                      | Description                                                                 |
|------------------------------------------------|-----------------------------------------------------------------------------|
| Student characteristics & experiences (Level 1) |                                                                             |
| First-generation statusa                       | 0 = at least one parent earned a bachelor’s degree; 1 = neither parent earned a bachelor’s degree |
| Race or ethnicitya                             | American Indian; Asian, Asian American; Black, African American; Latino, Hispanic; Native Hawaiian or Other Pacific Islander; Prefer not to respond; Unknown/Other race or ethnicity; Multiracial; Whiteb |
| Transfer statusa                               | 0 = started at current institution; 1 = transfer student                    |
| Sexa                                           | 0 = female; 1 = male                                                        |
| Age                                            | Continuous variable for age                                                 |
| Enrollment statusa                             | 0 = part-time; 1 = full-time                                                |
| SAT/ACT score                                  | Continuous variable for combined ACT and SAT scores (ACT converted to SAT)  |
| Percentage of courses taken online             | Continuous variable for the percentage of courses taken online              |
| Earned college gradesa                         | Mostly Asb; Mostly Bs; Mostly Cs                                            |
| Disciplinea                                     | biological sciences, agriculture, and natural resources; physical sciences, mathematics, and computer science; social sciences; business; communications, media, and public relations; education; engineering; health professions; social service professions; other majors; undecided; arts and humanitiesb |
| Honors program or honors college participationa| 0 = no; 1 = yes                                                            |
| Institution characteristics (Level 2)          |                                                                             |
| Enrollment size                                | Continuous variable for the total number of undergraduate enrollment        |
| Controla                                       | 0 = public; 1 = private                                                     |

*aCoded as a dichotomous variable (0 = not in group; 1 = in group).

bReference group.
Data Analysis

Twenty hierarchical linear models (HLMs) were run predicting each of the 10 engagement indicators (higher order learning, reflective and integrative learning, quantitative reasoning, learning strategies, collaborative learning, discussions with diverse others, student–faculty interaction, effective teaching practices, quality of interactions, and supportive environment) at the two student class levels (first-year and senior). HLM was chosen for three reasons: (a) the data consisted of students nested within institutions, (b) engagement indicators have been shown to vary by institution, and (c) the dependent measures were continuous (Raudenbush & Bryk, 2002; Thomas & Heck, 2001). Because not all institutions use the same types of honors requirements and programming (Cognard-Black & Savage, 2016), it was important to use HLM to account for the students nested within the same institutions and thus do have the same honors requirements and programming (Raudenbush & Bryk, 2002).

As previous research (Pascarella & Terenzini, 2005) suggests that there are differences in student engagement and educational experiences for students based on a variety of student and institutional characteristics, several control variables were also included in the analyses. Each full model included controls for student characteristics and experiences at Level 1 (gender, race/ethnicity, first-generation status, transfer status, age, enrollment status, ACT/SAT score, percentage of online courses, college grades, and major field) and controls for institutional characteristics at Level 2 (size and public/private). In each model, the key independent variable was the dichotomous flag for honors program/college participation.

All independent variables at Levels 1 and 2 were grand mean centered before entering the analyses. In addition, all coefficients for the independent variables at Levels 1 and 2 of the final models were estimated as random effects, because the researchers had rich data, inferences about the underlying population were the goal of the research, and random effects estimators of regression coefficients allow for statistically efficient estimates (Clarke, Crawford, Steele, & Vignoles, 2010; Raudenbush & Bryk, 2002; Snijders & Bosker, 2012). Dependent variables were standardized before being entered into the regression analyses, so that the coefficients could be interpreted as effect sizes. All independent continuous variables were also standardized (age, ACT/SAT score, percentage of courses online, and institutional size), while categorical variables were dummy coded prior to entry in the model (for variable list, see Table 2). No sum of squares correction was done because “multilevel models already address the multiple comparison problem and also yield more efficient estimates, especially in settings with low group-variation, which is where multiple comparisons are a particular concern” (Gelman, Hill, & Yajima, 2012, p. 211). Missing data were removed through listwise deletion, and there were no outliers present in the data.

In addition to the full models, 20 “null” models (HLMs containing none of the independent variables) for each of the 10 dependent variables at both the first-year and senior levels (a total of 20 null models) were estimated. This was done in order to calculate both the model fit and the percentage of within and between variance explained by each of the full models. When evaluating the chi-square for the models, the differences in deviance
between the null and full models were all at least twice as big as the number of parameters estimated for each of the 20 models, which suggested that the full models showed the best model fit (Snijders & Bosker, 2011). The percentage of within and between variance explained for the first-year models (ranging from 2.5% to 6.1% at Level 1 and 1.3% to 83% at Level 2) can be found in Table 3 and for the senior models (ranging from 3.2% to 20% at Level 1 and 14.6% to 94.5% at Level 2) in Table 4.

### Results

In terms of the research questions, the HLM analyses resulted in statistically significant and nontrivial differences when considering several of the engagement indicators. For first-year students, the results from the HLMs suggest that, even after controlling for the effects of student characteristics and experiences and institutional characteristics, participation in an honors college or program positively influences six of the 10 engagement indicators. In particular, honors participation had a statistically significant positive effect...
Table 4. Senior HLM Results for the Effect\(^a\) of Honors College Participation (the Independent Variable Interest) on Each of the Engagement Indicator Scales (the Dependent Variables) and the Model Explained Variance at Levels 1 and 2.

| DV: Engagement indicator                  | Coeff. | Sig. | Variance explained\(^b\): Level 1 (%) | Variance explained\(^b\): Level 2 (%) |
|------------------------------------------|--------|------|---------------------------------------|--------------------------------------|
| Higher order learning                    | -.033  |      | 6.6                                   | 31.4                                 |
| Reflective & integrative learning       | .023   |      | 9.0                                   | 82.6                                 |
| Quantitative reasoning                   | .042   |      | 11.0                                  | 49.8                                 |
| Learning strategies                      | -.014  |      | 3.2                                   | 28.1                                 |
| Collaborative learning                   | -.022  |      | 20.0                                  | 72.4                                 |
| Discussions with diverse others          | .028   | ***  | 11.8                                  | 14.6                                 |
| Student–faculty interaction              | .161   | ***  | 6.5                                   | 77.8                                 |
| Effective teaching practices             | -.049  |      | 10.7                                  | 94.5                                 |
| Quality of interactions                  | .018   |      | 12.7                                  | 88.9                                 |
| Supportive environment                   | -.002  |      | 11.0                                  | 63.1                                 |

Note. HLM = hierarchical linear model; DV = dependent variable.

\(^a\)Controlling for student characteristics & experiences (gender, race, first-generation status, transfer status, age, enrollment status, ACT/SAT score, percentage of courses taken online, college grades, and disciplinary area) at Level 1 and institutional characteristics (enrollment size and control) at Level 2. All continuous dependent variables (engagement indicators) and controls (age, ACT/SAT score, percentage of courses taken online, and institutional size) were standardized before running models.

\(^b\)Percentage of variance explained at each level calculated by subtracting the conditional error variance (sigma square for Level 1 and tau for Level 2 of the full model) from the unconditional error variance (sigma square for Level 1 and tau for Level 2 of the unrestricted or null model) and then dividing by the unconditional error variance.

\(\ast\)\(p < .05\). \(\ast\ast\)\(p < .01\). \(\ast\ast\ast\)\(p < .001\).

on reflective and integrative learning (\(\beta = .193; p \leq .001\)), learning strategies (\(\beta = .147; p \leq .01\)), collaborative learning (\(\beta = .158; p \leq .001\)), discussions with diverse others (\(\beta = .102; p \leq .05\)), student–faculty interaction (\(\beta = .266; p \leq .001\)), and quality of interactions (\(\beta = .091; p \leq .05\)). These findings suggest that first-year honors college students more frequently engaged in activities that promote reflective and integrative learning, learning strategies, and collaborative learning; had more frequent discussions with diverse others and faculty interactions; and rated higher quality of interactions, as compared with their nonhonors first-year counterparts. The first-year models explained 2.5% to 6.1% of the variance in the engagement indicators at Level 1 and 1.3% to 83.0% at Level 2. For more details on the first-year models, see Table 3.

In the case of senior students, only one model showed a positive effect. Participation in honors colleges or programs had a statistically significant positive effect on student faculty interaction (\(\beta = .161; p \leq .001\)). This finding indicates that honors college seniors reported more frequent interaction with faculty, compared with nonhonors seniors. The senior models explained 3.2% to 20.0% of the variance in the engagement indicators at Level 1 and 14.6% to 94.5% at Level 2. For the remaining details on the senior models, see Table 4. While the magnitude of the effects of honors participation
on all of the engagement indicators (with the exception of the effect on student–faculty interaction for first-year students) would be considered small by Cohen’s standards (Cohen, 1988), some of the differences could be argued as bordering on medium when considering new standards that were created using very large sample sizes within education (Rocconi & Gonyea, 2015).

Discussion

Even after controlling for a variety of student characteristics (gender, race/ethnicity, first-generation status, transfer status, age, enrollment status, ACT/SAT score, percentage of online courses, college grades, and major field), as well as specifically accounting for the nested institution-level factors in the model (enrollment size and public/private), the results still show that participation in an honors college is a positive predictor of several aspects of student engagement. For first-year students, honors participation was related to higher reflective and integrative learning, use of learning strategies, collaborative learning, diverse discussions, student–faculty interaction, and quality of interactions. The strongest impact was on student–faculty interaction, with reflective and integrative learning as the next strongest. Conversely, the weakest (but still statistically significant) impact was on quality of interactions. Honors college involvement had less of an impact for seniors, with student–faculty interaction as the only positive significant relationship. These findings can be interpreted as partial empirical support for Gagné’s (2009) DMGT with college populations, as there does seem to be relationships between numerous aspects of the honors college environment and the impact of other individuals (teachers, peers) and situations (curricular, social). For the indicators where no differences were apparent between honors and nonhonors students, this also harkens back to previous literature suggesting that there is little evidence of the needs and expectations of gifted college students being met effectively (Rinn & Plucker, 2004).

There are several potential reasons for these patterns of results. First-year students are often focused on taking core curricular requirements and have not yet taken many (if any at all) of their upper level major courses. For first-year students who are participating in honors colleges, there are often special sections of required core courses reserved for them. These classes are usually smaller, taught by qualified faculty, and frequently have an interdisciplinary or thematic component, which sets them apart from the “regular” versions of these courses taken by the general education students. Largely based on what gifted education terms an “enrichment” model (Coleman & Cross, 2005), these courses are designed to be more engaging than other traditional introductory classes, especially those at large universities that may consist of several hundred students in a vast lecture hall. The increased student–faculty interaction for seniors might also be due to the curricular requirement for an honors thesis or capstone experience at many institutions, as these types of projects are usually done under the guidance of a faculty advisor. First-year students in honors colleges may also benefit from an “acceleration” standpoint (Coleman & Cross, 2005), if they have received college credits from high school dual-enrollment or Advanced Placement (AP) programs, because they would be able to take more upper level nonhonors courses as well.
The differences between first-years and seniors in the patterns of results, with more apparent benefits for first-year students, may be due to a combination of a greater availability of lower division honors courses, which first-year students are more likely to be taking, and the fact that seniors may be more focused on (nonhonors) major requirements. Furthermore, most upper level classes tend to be smaller, regardless of whether or not they are designated as honors versions of the course. Thus, both general education and honors students are exposed to beneficially engaging elements that are easier to implement in smaller classes, such as reflective discussions and working in small groups with other students under the guidance of the instructor. First-year honors students might also benefit from specially developed residence life programming that is available due to living in an honors-designated residence hall (Inkelas & Weisman, 2003; Stassen, 2003). They are more likely to have advisors and staff with increased knowledge of their needs and might also feel a sense of community among peers with similar academic ability. However, fewer seniors tend to live on campus, so the benefits of these special residence halls may be less apparent for seniors.

Other research has suggested that as upperclassmen, students are less involved in the honors community (Kampfe et al., 2016; Shushok, 2006), which might also explain the lack of significant findings for seniors. Nevertheless, we should explore this interpretation a bit further, and extend this idea to the attrition of honors colleges in general. Is there selective mortality among these programs, in that fewer seniors are officially enrolled as honors students? Goodstein and Szarek (2013) found at one institution that only 41% to 50% of students who started in the honors college actually completed all of the requirements for the program, suggesting this is quite problematic as “students who are not fully involved in the curriculum or programming of honors programs cannot obtain all the academic, intellectual, social, or cultural benefits available” (p. 89). Small groups of upperclassmen remaining in honors colleges has been challenging for other investigations that attempt to make comparisons across class levels or generalize to all points in the college experience (Rinn, 2005, 2007). However, looking at our data suggests this is less likely to be the case for our respondents. In the current study, there is only a 1% drop in the percentage of students reporting that they are currently part of an honors college or program, with 16% of first-year students and 15% of seniors selecting this category.

So is honors college participation worth it for high-ability students? The answer to this question might actually be dependent upon the student’s goals and expectations for the college experience. If the student desires strictly an acceleration model and only wants to earn college credits and reach graduation as quickly as possible, then honors colleges may not be the best route for this. However, if the student has been exposed to and is pleased with a more enrichment-based model, many features of honors colleges may be attractive. Previous exposure to and preferences for ability grouping is also a factor in weighing honors college participation. Honors colleges, especially those with designated residence halls, share many features of the K–12 self-contained classroom (Coleman & Cross, 2005). Thus, students familiar with this grouping format (and who thrived with it in the past) may be more satisfied with the experience, especially if they value the “community of learners” aspect.
Prospective high-ability college students, as well as their parents and guidance counselors, should take time to research the specific aspects of honors programs when they are applying to colleges. Rather than simply verifying whether or not a university has an honors college available, interested parties should gather details on the curriculum and format of honors courses, living options, and additional graduation requirements. They should also keep in mind, per the findings from this study, that they may experience greater benefits from honors college participation initially during their first year, but by the time they are seniors the advantages may be less pronounced. Conversely, they should not rule out institutions simply because they do not have an honors program. If the student is seeking small class sizes, increased faculty interaction, and exposure to peers of similar ability levels, they might get similar experiences from a smaller, more selective private school.

To increase the impact on student engagement for honors college seniors, faculty could be encouraged to include more Type III research and inquiry projects on topics of interest (Renzulli, 1986), as research suggests these can have many positive outcomes, even at the undergraduate level (Syer, Chichekian, Shore, & Aulls, 2013). Faculty could also address some of the motivational and developmental needs of high-ability students at this level through self-exploratory projects such as autobiographical writing assignments, predicting how historical trends will impact their future lives, or the use reflective learning portfolios (Clark, 2008). Institutions should reward faculty for continuing to address overall engagement, even though teaching specific major field content is often the focus of upper division courses. Course release time for planning new and innovative honors courses, or for working with honors students on research, is important for the continuation of effective honors college experiences. The strengths and weaknesses revealed in this study can help to inform curricular and programming enhancements for honors colleges and should also be considered by parents, counselors, and graduating gifted high school students in the process of choosing a college.

Limitations and Future Directions

Although there are several strengths of this study, some limitations should also be noted. One limitation involves the use of self-reported measures. Although this type of research has the advantage of increased sample size and ease of online data collection, responses to the measures may not always be completely objective. However, most studies looking at self-reports of students in higher education suggest that self-reports and actual abilities are positively related (Anaya, 1999; Hayek, Carini, O’Day, & Kuh, 2002; Pike, 1995) and social desirability bias does not play a major role in their responses for surveys of basic cognitive and academic behaviors (Miller, 2012). The lower response rate could be a potential source of bias in the sample, although previous research suggests that studies with lower response rates can still maintain adequate response representativeness (Fosnacht, Sarraf, Howe, & Peck, 2017; Lambert & Miller, 2014). Furthermore, although there is a wide range of students attending multiple institutions in the sample, it is not representative of all students enrolled in all
4-year colleges and universities in the United States. Institutions participate in NSSE for a variety of reasons, generally for institutional improvement, which could influence the overall context of the college experience.

Further research on this topic is needed. There were relatively low standardized coefficients and percentages of explained variance, which suggest that there are many other factors not included in the analyses influencing the variables of interest. Even though the models controlled for many variables, there may also be differences between honors and nonhonors students on preexisting characteristics such as incoming GPA, personality traits, and achievement motivation. In addition, given the research design, this study was unable to test for causal relationships between honors college participation and engagement. The results can only confirm whether or not they are associated. It might be beneficial to engage in a qualitative methodology to look more in depth at the academic experiences of honors college students, to infer greater detail on their understanding of engagement, as well as the advantages and disadvantages of the overall honors college experience. Case studies with particularly high-performing institutions might also be relevant for consideration. Future research could include other related psychosocial constructs, such as personality traits, perfectionism, and achievement goal orientation that have been more readily studied in K–12 gifted populations, and explore their relationship to engagement within higher education. As honors college samples are considered high ability rather than gifted, due to the admission requirements of the honors college, it is important to continue replication of previous research in this older population. Given these caveats, the results should be interpreted with caution.

Yet even in light of the potential limitations, this study has several important implications. This work begins the complex integration of theories and knowledge within gifted education with research-based best practices in the field of higher education. All students, regardless of ability level, can certainly reap the benefits of engagement (Kuh, 2009), but confirming that at least some types of engagement are happening in honors colleges is important as well. This perspective speaks not only to the potential advantages of honors college participation, which can in turn support resource allocation for such programs, but can also be expanded to address other related issues. In addition to the indicators of student engagement that were the focus of this study, participation in HIPs such as study abroad, research with faculty, service learning, learning communities, internships and field experiences, and senior culminating experiences might also function differently among high-ability students. More research might concentrate on how these specific practices relate to the honors college experience. As student–faculty interaction was an important finding from this study, future researchers might examine the pedagogical practices of faculty who teach honors courses as well. How do these instructors encourage engagement? What are their perceptions of honors courses and students? It may also be of interest to link student engagement within honors college students to postcollegiate outcomes such as career plans and job attainment. Continuing to gather evidence on the experiences of honors college students and the effectiveness of these programs can inform the fields of both gifted education and higher education, which will ultimately allow educators to better serve high-ability students at the college level.
Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Angie L. Miller https://orcid.org/0000-0002-5828-235X

References

Anaya, G. (1999). College impact on student learning: Comparing the use of self-reported gains, standardized test scores, and college grades. Research in Higher Education, 40, 499–526.

Astin, A. W. (1993). What matters in college? Four critical years revisited. San Francisco, CA: Jossey-Bass.

Baird, L. (2005). College environments and climates: Assessments and their theoretical assumptions. In Higher education: Handbook of theory and research (Vol. 10, pp. 507–537). Bodmin, Cornwall, Great Britain: Springer.

Blaich, C., & Wise, K. (2011). From gathering to using assessment results: Lessons from the Wabash National Study. (NILOA Occasional Paper No. 8). Urbana, IL: University of Illinois and Indiana University, National Institute of Learning Outcomes Assessment. Retrieved from http://www.learningoutcomeassessment.org/documents/Wabash_000.pdf

Bowman, N. A. (2010). College diversity experiences and cognitive development: A meta-analysis. Review of Educational Research, 80, 4–33.

Bowman, N. A. (2011). Promoting participation in a diverse democracy: A meta-analysis of college diversity experiences and civic engagement. Review of Educational Research, 81, 29–68.

Bowman, N. A. (2013). How much diversity is enough? The curvilinear relationship between college diversity interactions and first-year student outcomes. Research in Higher Education, 54, 874–894.

BrckaLorenz, A., Ribera, T., Kinzie, J., & Cole, E. (2012). Examining effective faculty practice: Teaching clarity and student engagement. To Improve the Academy, 31, 1–18.

Brint, S., Cantwell, A. M., & Hanneman, R. A. (2008). The two cultures of undergraduate academic engagement. Research in Higher Education, 49, 383–402. doi:10.1007/s11162-008-9090-y

Buckner, E., Shores, M., Sloane, M., Dantzler, D., & Shields, C. (2016). Honors and non-honors student engagement: A model of student, curricular, and institutional characteristics. Journal of the National Collegiate Honors Council–Online Archive, Paper 508. Retrieved from https://digitalcommons.unl.edu/nchcjournal/508/

Cabrera, A. F., Crissman, J. L., Bernal, E. M., Nora, A., Terenzini, P. T., & Pascarella, E. T. (2002). Collaborative learning: Its impact on college students' development and diversity. Journal of College Student Development, 43, 20–34.

Cabrera, A. F., Nora, A., Terenzini, P. T., Pascarella, E. T., & Hagedorn, L. S. (1999). Campus racial climate and the adjustment of students to college: A comparison between white students and African-American students. Journal of Higher Education, 70, 134–160.
Chesebro, J. L., & McCroskey, J. C. (2001). The relationship of teacher clarity and immediacy with student state receiver apprehension, affect and cognitive learning. *Communication Education, 50*, 59–68.

Clark, L. (2008). Motivational issues in the education of academically talented college students. In L. Clark & J. Zubizarreta (Eds.), *Inspiring exemplary teaching and learning: Perspectives on teaching academically talented college students* (pp. 65–106). Lincoln, NE: National Collegiate Honors Council.

Clarke, P., Crawford, C., Steele, F., & Vignoles, A. (2010). *The choice between fixed and random effects models: Some considerations for educational research* (Discussion Paper Series No.5287). Bonn, Germany: Institute for the Study of Labor.

Clayton, K., Blumberg, F., & Auld, D. P. (2010). The relationship between motivation, learning strategies and choice of environment whether traditional or including an online component. *British Journal of Educational Technology, 41*, 349–364. doi:10.1111/j.1467-8535.2009.00993.x

Cockrell, K. S., Caplow, J. A., & Donaldson, J. F. (2000). A context for learning: Collaborative groups in the problem-based learning environment. *Review of Higher Education, 23*, 347–364. doi:10.1553/rhe.2000.0008

Cognard-Black, A. J., & Savage, H. (2016). Variability and similarity in honors curricula across institution size and type. *Journal of the National Collegiate Honors Council–Online Archive*, Paper 521. Retrieved from https://digitalcommons.unl.edu/nchjournal/521/

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Cole, D. (2007). Do interracial interactions matter? An examination of student-faculty contact and intellectual self-concept. *The Journal of Higher Education, 78*, 249–281.

Coleman, L. J., & Cross, T. L. (2005). *Being gifted in school*. Waco, TX: Prufrock Press.

Denson, N. (2009). Do curricular and cocurricular diversity activities influence racial bias? A meta-analysis. *Review of Educational Research, 79*, 805–838.

Denson, N., & Chang, M. J. (2009). Racial diversity matters: The impact of diversity-related student engagement and institutional context. *American Educational Research Journal, 46*, 322–353.

Digby, J. (2005). *Peterson’s honors programs: The official guide of the National Collegiate Honors Council* (4th ed.). Princeton, NJ: Peterson’s.

Dumford, A. D., Cogswell, C. A., & Miller, A. L. (2016). The who, what, and where of learning strategies. *Journal of Effective Teaching, 16*(1), 72–88.

Fischer, D. (1996, September 16). The new honors programs. *U.S. News & World Report, 121*, 108–110.

Flowers, L. A., & Pascarella, E. T. (2003). Cognitive effects of college: Differences between African American and Caucasian students. *Research in Higher Education, 44*, 21–49.

Fosnacht, K., Sarraf, S., Howe, E., & Peck, L. (2017). How important are high response rates for college surveys? *The Review of Higher Education, 40*, 245–265.

Freyman, J. (2005). What is an honors student? *Journal of the National Collegiate Honors Council–Online Archive*, Paper 154. Retrieved from https://digitalcommons.unl.edu/nchjournal/154/

Gagné, F. (1999). Is there light at the end of the tunnel? *Journal for the Education of the Gifted, 22*, 194–234.

Gagné, F. (2000). Understanding the complex choreography of talent development through DMGT-based analysis. In K. A. Heller, F. J. Mönks, R. J. Sternberg, & R. F. Subotnik (Eds.), *International handbook of giftedness and talent* (2nd ed., pp. 67–79). Amsterdam, The Netherlands: Elsevier Science.
Gagné, F. (2003). Transforming gifts into talents: The DMGT as a developmental theory. In N. Colangelo & G. A. Davis (Eds.), Handbook of gifted education (3rd ed., pp. 60–74). Boston, MA: Pearson Education.

Gagné, F. (2009). Building gifts into talents: Detailed overview of the DMGT 2.0. In B. MacFarlane & T. Stambaugh (Eds.), Leading change in gifted education: The festschrift of Dr. Joyce VanTassel-Baska (pp. 61–80). Waco, TX: Prufrock Press.

Gagné, F. (2018). The DMGT/IMTD: Building talented outputs out of gifted inputs. In C. M. Callahan & H. L. Hertberg-Davis (Eds.), Fundamentals of gifted education: Considering multiple perspectives (2nd ed., pp. 55–70). New York, NY: Routledge.

Gelman, A., Hill, J., & Yajima, M. (2012). Why we (usually) don’t have to worry about multiple comparisons. Journal of Research on Educational Effectiveness, 5, 189–211. doi:10.1080/19345747.2011.618213

Ginsberg, S. M. (2007). Teacher transparency: What students can see from faculty communication. Journal of Cognitive Affective Learning, 4(1), 13–24.

Goodsell, A. S. (1992). Collaborative learning: A sourcebook for higher education. University Park, PA: National Center on Postsecondary Teaching, Learning, and Assessment.

Goodstein, L., & Szarek, P. (2013). They come, but do they finish? Program completion for honors students at a major public university, 1998–2010. Journal of the National Collegiate Honors Council–Online Archive, Paper 398. Retrieved from https://digitalcommons.unl.edu/nchcjournal/398/

Gurin, P., Dey, E. L., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. Harvard Educational Review, 72, 330–367.

Hativa, N. (1998). Lack of clarity in university teaching: A case study. Higher Education, 36, 353–381.

Hativa, N., Barak, R., & Simhi, E. (2001). Exemplary university teachers: Knowledge and beliefs regarding effective teaching dimensions and strategies. The Journal of Higher Education, 72, 699–729.

Hayek, J. C., Carini, R. M., O’Day, P. T., & Kuh, G. D. (2002). Triumph or tragedy: Comparing student engagement levels of members of Greek-letter organizations and other students. Journal of College Student Development, 43, 643–663.

Inkelas, K. K., & Weisman, J. L. (2003). Different by design: An examination of student outcomes among participants in three types of living-learning programs. Journal of College Student Development, 44, 335–368. doi:10.1353/csd.2003.0027

Kampfe, J. A., Chasek, C. L., & Falconer, J. (2016). An examination of student engagement and retention in an honors program. Journal of the National Collegiate Honors Council–Online Archive, Paper 515. Retrieved from https://digitalcommons.unl.edu/nchcjournal/515/

Kim, Y. K., & Sax, L. J. (2009). Student-faculty interaction in research universities: Differences by student gender, race, social class, and first-generation status. Research in Higher Education, 50, 437–459.

Krathwohl, D. R. (2002). A revision of Bloom’s taxonomy: An overview. Theory into Practice, 41, 212–218. doi:10.1207/s15430421tip4104_2

Kuh, G. D. (1993). In their own words: What students learn outside the classroom. American Educational Research Journal, 30, 277–304.

Kuh, G. D. (2001). The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties. Bloomington: Center for Postsecondary Research, Indiana University.

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.
Kuh, G. D. (2009). The National Survey of Student Engagement: Conceptual and empirical foundations. *New Directions for Institutional Research, 2009*(141), 5–20. doi:10.1002/ir.283

Kuh, G. D., & Hall, J. E. (1993). Cultural perspectives in student affairs work. In G. D. Kuh (Ed.), *Cultural perspectives in student affairs work* (pp. 1–20). Washington, DC: American College Personnel Association.

Kuh, G. D., & Hu, S. (2001). The effects of student-faculty interaction in the 1990s. *Review of Higher Education, 24*, 309–332.

Kuh, G. D., Pace, C., & Vesper, N. (1997). The development of process indicators to estimate student gains associated with good practices in undergraduate education. *Research in Higher Education, 38*, 435–454.

Lambert, A. D., & Miller, A. L. (2014). Lower response rates on alumni surveys might not mean lower response representativeness. *Educational Research Quarterly, 37*(3), 38–51.

Lau, L. K. (2003). Institutional factors affecting student retention. *Education, 124*, 126–136.

Lewis, A., & Smith, D. (1993). Defining higher order thinking. *Theory into Practice, 32*, 131–137. doi:10.1080/00405849309543588

Loes, C., Pascarella, E., & Umbach, P. (2012). Effects of diversity experiences on critical thinking skills: Who benefits? *The Journal of Higher Education, 83*, 1–25.

McMillan, J. H., & Schumacher, S. (2001). *Research in education: A conceptual introduction*. New York, NY: Longman.

Miller, A. L. (2012). Investigating social desirability bias in student self-report surveys. *Educational Research Quarterly, 36*(1), 30–47.

Miller, A. L., Sarraf, S. A., Dumford, A. D., & Rocconi, L. M. (2016). *Construct validity of NSSE Engagement Indicators* (NSSE Psychometric Portfolio Report). Bloomington: Indiana University, Center for Postsecondary Research, School of Education. Retrieved from http://nsse.indiana.edu/pdf/psychometric_portfolio/Validity_ConstructValidity_FactorAnalysis_2013.pdf

Miller, A. L., & Speirs Neumeister, K. L. (2017). The influence of personality, parenting styles, and perfectionism on performance goal orientation in high ability students. *Journal of Advanced Academics, 28*, 313–344. doi:10.1177/1932202X17730567

National Survey of Student Engagement. (2000). *The NSSE 2000 report: National benchmarks of effective educational practice*. Bloomington: Indiana University, Center for Postsecondary Research. Retrieved from http://nsse.indiana.edu/pdf/NSSE%202000%20National%20Report.pdf

National Survey of Student Engagement. (2009). *Validity: 2009 Known groups validation* (NSSE Psychometric Portfolio Report). Bloomington: Indiana University, Center for Postsecondary. Retrieved from http://nsse.indiana.edu/pdf/psychometric_portfolio/Validity_GroupMembership.pdf

National Survey of Student Engagement. (2011). *NSSE multi-year data analysis guide*. Bloomington: Indiana University, Center for Postsecondary Research. Retrieved from http://nsse.indiana.edu/2011_Institutional_Report/pdf/NSSE%20MYDAG.pdf

National Survey of Student Engagement. (2015). *NSSE 2015 overview*. Bloomington: Indiana University, Center for Postsecondary Research. Retrieved from http://nsse.indiana.edu/2015_Institutional_Report/pdf/NSSE%202015%20Overview.pdf

Nelson Laird, T. F. (2005). College students’ experiences with diversity and their effects on academic self-confidence, social agency, and disposition toward critical thinking. *Research in Higher Education, 46*, 365–387.

Nelson Laird, T. F., Shoup, R., & Kuh, G. D. (2005, May). *Measuring deep approaches to learning using the National Survey of Student Engagement*. Paper presented at the Annual Meeting of the Association for Institutional Research, Chicago, IL.
Nolden, D., & Sedlacek, W. E. (1998). Gender differences in attitudes, skills, and behaviors among academically talented university freshmen. *Roeper Review, 21*, 106–1069.

Ormrod, J. E. (2011). *Human learning* (6th ed.). Upper Saddle River, NJ: Pearson.

Pace, C. R. (1980). Measuring the quality of student effort. *Current Issues in Higher Education, 2*, 10–16.

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

Pike, G. R. (1991). The effects of background, coursework, and involvement on students’ grades and satisfaction. *Research in Higher Education, 32*, 16–30.

Pike, G. R. (1995). The relationship between self-reports of college experiences and achievement test scores. *Research in Higher Education, 36*, 1–22.

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16*, 385–407. doi:10.1007/s10648-004-0006-x

Quaye, S. J., & Harper, S. R. (2015). *Student engagement in higher education: Theoretical perspectives and practical approaches for diverse populations* (2nd ed.). New York, NY: Routledge.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Newbury Park, CA: Sage.

Renzulli, J. S. (1986). The three-ring conception of giftedness: A developmental model for creative productivity. In R. J. Sternberg & J. Davidson (Eds.), *Conceptions of giftedness* (pp. 51–92). Cambridge, UK: Cambridge University Press.

Rinn, A. N. (2004). Academic and social effects of living in honors residence halls. *Journal of the National Collegiate Honors Council–Online Archive, Paper 173*. Retrieved from https://digitalcommons.unl.edu/nchcjournal/173/

Rinn, A. N. (2005). Trends among honors college students: An analysis by year in school. *The Journal of Secondary Gifted Education, 16*, 157–167. doi:10.4219/jsge-2005-479

Rinn, A. N. (2007). Effects of programmatic selectivity on the academic achievement, academic self-concepts, and aspirations of gifted college students. *Gifted Child Quarterly, 51*, 232–245. doi:10.1177/0016986207302718

Rinn, A. N. (2008). Pre-college experiences and characteristics of gifted students. In L. Clark & J. Zubizarreta (Eds.), *Inspiring exemplary teaching and learning: Perspectives on teaching academically talented college students* (pp. 9–17). Lincoln, NE: National Collegiate Honors Council.

Rinn, A. N., & Plucker, J. A. (2004). We recruit them, but then what? The educational and psychological experiences of academically talented undergraduates. *Gifted Child Quarterly, 48*, 54–67.

Rocconi, L. M., & Gonyea, R. M. (2015, May). *Contextualizing student engagement effect sizes: An empirical analysis*. Paper session presented at the Association for Institutional Research Conference, Denver, CO.

Rocconi, L. M., Lambert, A. D., McCormick, A. C., & Sarraf, S. A. (2013). Making college count: An examination of quantitative reasoning activities in higher education. *Numeracy, 6*(2), 1–20. doi:10.5038/1936-4660.6.2.10

Schuman, S. (2006). *Beginning in honors: A handbook* (Monograph Series, Paper 7). National Collegiate Honors Council. Lincoln, Nebraska: Digital Commons at University of Nebraska-Lincoln. Retrieved from http://digitalcommons.unl.edu/nchcmono/7

Sederberg, P. (2005). Characteristics of the contemporary honors college: A descriptive analysis of a survey of NCHC member colleges. *Journal of the National Collegiate Honors Council–Online Archive, Paper 180*. Retrieved from https://digitalcommons.unl.edu/nchcjournal/180/
Seifert, T. A., Pascarella, E. T., Colangelo, N., & Assouline, S. G. (2007). The effects of honors program participation on experiences of good practices and learning outcomes. *Journal of College Student Development, 48*, 57–74. doi:10.1353/csd.2007.0007

Shushok, F. (2006). Student outcomes and honors programs: A longitudinal study of 172 honors students 2000–2004. *Journal of the National Collegiate Honors Council–Online Archive*, Paper 15. Retrieved from https://digitalcommons.unl.edu/nchcjournal/15/

Slavin, C., Coladisci, T., & Pratt, P. A. (2008). Is student participation in an honors program related to retention and graduation rates? *Journal of the National Collegiate Honors Council–Online Archive*, Paper 66. Retrieved from https://digitalcommons.unl.edu/nchc-journal/66/

Smith, K. A., Sheppard, S. D., Johnson, D. W., & Johnson, R. T. (2005). Pedagogies of engagement: Classroom-based practices. *Journal of Engineering Education, 94*, 87–101. doi:10.1002/j.2168-9830.2005.tb00831.x

Snijders, T., & Bosker, R. J. (2011). *Multilevel analysis: An introduction to basic & advanced multilevel modeling* (2nd ed.). London, England: SAGE.

Stassen, M. L. A. (2003). Student outcomes: The impact of varying living-learning community models. *Research in Higher Education, 44*, 581–613. doi:10.1023/A:1025495309569

Steen, L. A. (1997). *Why numbers count: Quantitative literacy for tomorrow’s America*. New York, NY: College Entrance Examination Board.

Steen, L. A. (2001). *Mathematics and democracy: The case for quantitative literacy*. Princeton, NJ: Woodrow Wilson National Fellowship Foundation.

Streznewski, M. K. (1999). *Gifted grownups: The mixed blessings of extraordinary potential*. New York, NY: John Wiley.

Subotnik, R. F., Olszewski-Kubilius, P., & Worrell, F. C. (2011). Rethinking giftedness and gifted education: A proposed direction forward based on psychological science. *Psychological Science in the Public Interest, 12*, 3–54. doi:10.1177/1529100611418056

Syer, C. A., Chichekian, T., Shore, B., & Aulls, M. A. (2013). Learning “to do” and learning “about” inquiry at the same time: Different outcomes in valuing the importance of various intellectual tasks in planning, enacting, and evaluating an inquiry curriculum. *Instructional Science, 41*, 521–537. doi:10.1007/s11251-012-9242-5

Thomas, S. L., & Heck, R. H. (2001). Analysis of large-scale secondary data in higher education research: Potential perils associated with complex sampling designs. *Research in Higher Education, 42*, 517–540.

Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *The Journal of Higher Education, 68*, 599–623. doi:10.1080/00221546.1997.11779003

Umbach, P. D., & Wawrzynski, M. R. (2005). Faculty do matter: The role of college faculty in student learning and engagement. *Research in Higher Education, 46*, 153–184.

Vermetten, Y. J., Lodewijks, H. G., & Vermunt, J. D. (1999). Consistency and variability of learning strategies in different university courses. *Higher Education, 37*, 1–21.

Vermunt, J. D. (1996). Metacognitive, cognitive and affective aspects of learning styles and strategies: A phenomenographic analysis. *Higher Education, 31*, 25–50.

Volkwein, J., & Carbone, D. (1994). The impact of departmental research and teaching climates on undergraduate growth and satisfaction. *Journal of Higher Education, 65*, 147–167.

Webber, K. L., Krylow, R. B., & Zhang, Q. (2013). Does involvement really matter? Indicators of college student success and satisfaction. *Journal of College Student Development, 54*, 591–611. doi:10.1353/csd.2013.0090
Weiss, R. E. (2003). Designing problems to promote higher-order thinking. *New Directions for Teaching & Learning, 2003*(95), 25–31. doi:10.1002/tl.109

Whitt, E. J., Edison, M., Pascarella, E. T., Nora, A., & Terenzini, P. T. (1999). Interactions with peers and objective and self-reported cognitive outcomes across 3 years of college. *Journal of College Student Development, 40*, 61–78.

Wilkins, J. L. M. (2000). Preparing for the 21st century: The status of quantitative literacy in the United States. *School Science and Mathematics, 100*, 406–418. doi:10.1111/j.1949-8594.2000.tb17329.x

Wilkins, J. L. M. (2010). Modeling quantitative literacy. *Educational and Psychological Measurement, 70*, 267–290. doi:10.1177/0013164409344506

Young, J. H., Story, L., Tarver, S., Weinauer, E., & Keeler, J. (2016). The honors college experience reconsidered: Exploring the student perspective. *Journal of the National Collegiate Honors Council–Online Archive*, Paper 524. Retrieved from https://digitalcommons.unl.edu/nchejournal/524/

**Author Biographies**

**Angie L. Miller** is an associate research scientist in the Center for Postsecondary Research at Indiana University. She does research and data analysis for the National Survey of Student Engagement (NSSE) and the Strategic National Arts Alumni Project (SNAAP). Her research interests include creativity assessment, the utilization of creativity in educational settings, and factors impacting gifted student engagement and achievement.

**Amber D. Dumford** is an associate professor at the University of South Florida. She teaches in the department of College Student Affairs and coordinates the graduate program. Her research interests include gender issues in higher education, arts education, engineering education, creativity, and quantitative reasoning.