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First-Generation Undergraduate Students and the Impacts of the
First Year of College: Some Additional Evidence*

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First Year of College: Some Additional Evidence

First-generation students are making significant gains towards access in higher education with enrollment numbers increasing over the past decade (Strayhorn, 2006). Yet the literature examining first-generation students has primarily focused on three distinct outcome measures: 1) college choice decisions and aspirations (e.g., Bui, 2002, 2005; Ceja, 2006; Gibbons & Shoffner, 2004), 2) academic achievement (e.g., Chen & Carroll, 2005; Dennis, Phinney, & Ivey-Chuateco, 2005; Ting, 2003), and 3) persistence and retention (e.g., Duggan, 2001; Harrell & Forney, 2003; Ishitani, 2006; Martin-Lohfink & Paulsen, 2005; Rendon, 1995; Somers, Woodhouse, & Cofer, 2004; Warburton & Carroll, 2001). While these studies have added to the overall literature examining first-generation students, a limited amount of research exists measuring the dimensions of intellectual and personal development of first-generation students versus all other students (Pascarella & Terenzini, 2005). Furthermore, existing research tends to overlook the cumulative impact of intergenerational educational benefits that may accrue to college students whose parents are college educated. Pascarella and Terenzini's (1991) review of the literature found evidence that the benefits of college do not just accrue to the individual, but are also passed down to that individual's own children.

This study aims to extend recent evidence (Pascarella, Pierson, Wolniak, & Terenzini, 2004) on the degree to which a first-generation student's college experience, specifically the cognitive and personal benefits he or she derives, is influenced by parental education. To this end, we analyzed longitudinal data from the first year of the Wabash National Study of Liberal Arts Education (WNSLAE). We were specifically concerned with estimating the net effects of parental education in three areas. First, we attempted to determine the effects of parental

education on the experiences of, or exposure to, empirically vetted good practices in undergraduate education. Second, we estimated the net impacts of parental education on a range of first-year outcomes frequently associated with a liberal arts education. Third, we estimated the extent to which the effects of vetted good practices in undergraduate education have a differential impact on first-year outcomes for students whose parents have various levels of education. In all cases we were specifically interested in differences between first-generation (neither parent has any college education) and students whose parents have varying degrees of postsecondary education. Additionally, our analyses also permitted us to examine the extent to which parental education may bestow educational benefits on one's children.

We find that, consistent with existing evidence, students with higher levels of parental postsecondary education experience greater exposure to vetted good practices in undergraduate education. Somewhat inconsistent with research based on data collected in the early 1990's, our analyses indicated that first-generation students demonstrate significantly smaller first-year gains on a range of outcomes associated with a theoretical model of effective liberal arts education. However, on some outcomes we also found a complex relationship between the effects of good practices and one's level of parental education. Specifically, the net impact of exposure to good practices differed in magnitude for students with different levels of parental postsecondary education.

Theoretical Perspectives

The theoretical perspectives for this paper draw from sociologists' theories on status attainment, cultural capital, and social capital and their impact in an educational context. Status attainment theory holds that the amount of education attained significantly mediates the effects of students' social origin characteristics on status attainment (Blau & Duncan, 1967). Social

origin characteristics, including parents' education, family income, and socioeconomic status, are largely measures of the financial and human capital that families have to invest in their children's education (Hauser & Kuo, 1997; Marjoribanks, 1998, 2002; Sewell & Shah, 1968). While family financial stability is a gateway towards investment in higher education, the culture encompassing an individual's lifestyle is just as valuable as monetary investments. Building off Bourdieu's (1977) definition of cultural capital, McDonough (1997) extends cultural capital into an educational context referring to the privileges and attitudes that middle and upper-class families transmit to their children as a mechanism for preserving their economic status. Within this educational context, parents transmit cultural capital by reinforcing the value and importance of a college education as a means towards maintaining socioeconomic status (McDonough). Students who possess high levels of cultural capital have the added advantage of being provided with additional resources within an educational and social setting. These resources provided students with an inherited advantage over students who possess low levels of cultural capital.

From an individualistic perspective, which often compliments cultural capital, sociologists view habitus as a mechanism by which an individual assesses their social environment in an effort to rationalize their decision-making. Habitus is defined as an internalized system of beliefs, experiences, and values acquired from the social environment, including the family, school, and work environment (Bourdieu, 1977; Paulsen, 2001). Similar to cultural capital, the habitus an individual possesses is directly proportional to the beliefs, experiences, and values provided by the social community. In other words, monetary benefits are not the only advantages available to individuals who possess high levels of cultural capital and habitus. As evident within cultural capital theory and embedded within the concept of habitus, the presence of significant others are also an instrumental construct of social capital theory

(Coleman, 1988). Social capital refers to the information, values, norms, standards, and expectations for education as communicated to individuals through the interpersonal relationships they share with others. Further, social capital encompasses the often powerful and influential positive benefits an individual receives from participation within a group (Portes, 1998; Tierney & Venegas, 2006). Individuals who possess high levels of social capital are well trained in interpersonal relationships and have an advantage in an environment, such as higher education, that emphasizes group collaboration and networking.

These theoretical perspectives suggest that students whose parents are highly educated have a significant advantage over first-generation students in the fundamental dimensions of cognitive and psychosocial development that accumulate during college. Compared to students with highly educated parents, first-generation students are already at a disadvantage in terms of their experiences, values, and resources before they even step foot on a college campus. This handicap may translate to a comparatively different college experiences for first-generation students, and perhaps negatively affect their levels of involvement on cognitive and psychosocial measures (Pascarella et al., 2004). However, the impacts of intergenerational benefits are often explained through indirect routes, including family income, career aspirations, and college type (Pascarella & Terenzini, 1991). Controlling for variables associated with intergenerational benefits must be accounted for when exploring the total and direct impacts of parental education.

Research on the Effects of Parental Education

Empirical evidence clearly highlights the disadvantage first-generation students maintain compared to non-first-generation students in various pre-college measures related to cultural and social capital. First-generation students are more likely to come from lower income families (Bui, 2002; Terenzini et al., 1996), spend less time socializing with various social agents in high

school (Terenzini et al.), have lower standardized test scores (Bui), are less likely to be prepared academically upon entering college (Horn, Nunez, & Bobbitt, 2000; Terenzini et al.), and have lower initial critical thinking abilities compared to their non-first-generation peers (Terenzini et al.). Sampling 11,112 first-year students from 28 institutions and controlling for background demographics, high school experiences, and prior academic achievement, Cruce, Kinzie, Williams, Morelon, & Yu (2005) found that students whose parents have no college experience feel less academically prepared compared to their peers.

The comparative differences between first-generation students and non-first-generation students continue upon enrollment in college. One area that is specifically impacted is students' engagement levels in various college experiences (Hahs-Vaughn, 2004; Pascarella et al., 2004; Pike & Kuh, 2005; Terenzini et al., 1996). Compared to their non-first-generation peers, first-generation students are less likely to live in an on-campus residency, participate in fewer extracurricular and volunteer activities, maintain lower levels of interactions with peers (Pascarella et al.), study fewer hours per week (Terenzini et al.), are frequently less involved in course learning activities and experiences (Lundberg, Schreiner, Hovaguimian, & Miller, 2007), and indicate having fewer resources to aid in the demands of academic rigor (Collier & Morgan, 2008). While first-generation students experience college differently than their non-first-generation peers, the magnitude, direction, and differences in college outcomes (e.g., reasoning/comprehension skills and critical thinking) are both small and inconsistent (Pascarella et al.). The experiences most beneficial for first-generation students are a heightened academic and classroom experiences (e.g., amount of hours studied, number of unassigned materials read), which is found to have a positive effect on student's cognitive development and critical thinking (Pascarella et al.), though recent research has found their level of involvement in these

experiences to be low (Lundberg et al., 2007). Additional evidence from a sample of nearly 2000 students from six urban universities who participated in the National Survey of Student Engagement (NSSE) found a positive relationship between first-generation students' engagement in effective educational practices and cognitive and affective growth (Filkins & Doyle, 2002).

Given the differential effects of college experiences between first-generation and non-first-generation students in the literature, the following research questions serve as a guide for our analysis:

- 1) What are the effects of first-generation status on good practices and the following first-year outcomes: *Need for Cognition*, *Positive Attitude Toward Literacy*, *Collegiate Assessment of Academic Proficiency*, *Defining Issues Test-2*, *Miville-Guzman Universality-Diversity Scale*, *Ryff Scales of Psychological Well-Being*, and *Socially Responsible Leadership Scale*?
- 2) To what extent do differences in and exposure to good practices in undergraduate education mediate the effects of first-generation status on the *Need for Cognition*, *Positive Attitude Toward Literacy*, *Collegiate Assessment of Academic Proficiency*, *Defining Issues Test-2*, *Miville-Guzman Universality-Diversity Scale*, *Ryff Scales of Psychological Well-Being*, and the *Socially Responsible Leadership Scale*?
- 3) Are the effects of good practices on the first-year outcomes conditional; that is do the effects differ in magnitude for first-generation students versus non-first-generation students?

Research Methods

Institutional Sample. Funded by the Center of Inquiry in the Liberal Arts at Wabash College, the WNSLAE is a large, longitudinal investigation of the effects of liberal arts colleges

and liberal arts experiences on the cognitive and psychosocial outcomes theoretically associated with liberal arts education. The sample in our study consisted of incoming first-year students at 19 participating four-year and two-year colleges and universities located in 11 different states from the Northeast, Southeast, Midwest, and Pacific Coast regions of the United States. These institutions were selected from more than sixty colleges and universities responding to an invitation from WNSLAE. Additionally, these institutions were selected to represent the variety of differences in college and universities across the United States, including institutional type and control, size, location, and patterns of student residence. The selection technique overseen by WNSLAE produced a sample with a wide range of academic selectivity and variability in undergraduate enrollment, ranging from entering classes between 3,000 and 6,000 to public and private institutions with entering classes between 250 and 500. However, because the WNSLAE study was primarily concerned with the impacts of liberal arts colleges and liberal arts experiences, liberal arts colleges were purposefully over-represented. According to the 2007 Carnegie Classification of Institutions, three of the participating institutions were considered research universities, three were regional universities that do not grant doctoral degrees, two were two-year community colleges, and 11 were liberal arts colleges.

Student Sample. The individuals in the sample were first-year, full-time undergraduate students participating in the WNSLAE from each of the 19 institutions. The initial sample was selected in two distinct approaches. Student samples from each of the larger institutions were selected randomly from the incoming first-year class. The only exception to this sampling was at the largest participating institution; the sample was randomly selected from the incoming first-year class in the College of Arts and Sciences. Second, for a number of the smallest institutions in the study, including all liberal arts colleges, the entire incoming first-year class was sampled.

Students in the sample were invited to participate in the WNSLAE study and were informed that they would receive a monetary stipend for their participation in each data collection.

Furthermore, student participants were assured in writing that any information they provided would be kept in the strictest confidence and never become part of their institutional records.

Data Collection. The data collection was conducted in two parts: an initial collection measuring pre-college and demographic characteristics in the fall of 2006 and a follow-up assessment measuring college experiences and outcomes in the spring of 2007. ACT administered and conducted both the initial and follow-up data collections. The initial data collection comprised of 4,501 students and lasted between 90-100 minutes. Furthermore, each student was paid a stipend of \$50 each for his or her participation. In addition to measuring pre-college and demographic characteristics and participating in the WNSLAE pre-college survey, students also completed a series of instruments that measured dimensions of intellectual and personal development theoretically associated with a liberal arts education.

The follow-up administration consisted of two types of data collection and took about two hours to complete. Similar to the initial data collection, each participating student was paid an additional stipend of \$50. The first type of data obtained was based on two complementary questionnaire instruments that collected extensive information on students' experience of college: the NSSE student survey (Kuh, 2001) and the WNSLAE Student Experiences Survey. All students completed these two instruments prior to any other follow-up data. These instruments were specifically designed to capture student engagement in, or exposure to, empirically vetted good practices in undergraduate education. These good practices include such dimensions as: exposure to effective teaching, quality of non-classroom interactions with faculty, active learning, integrative experiences, influential interactions with other students, and high

expectations (Pascarella, Wolniak, Cruce, & Blaich, 2004; Pascarella, Cruce, Umbach, Wolniak, Kuh, Carini, Hayek, Gonyea, & Zhao, 2006). The second type of data collected consisted of posttest measures of the instruments measuring dimensions of intellectual and personal development that were first completed in the initial data collection.

Of the original sample of 4,501 students who participated in the initial data collection, 3,081 participated in the spring 2007 follow-up data collection, for a response rate of 68.5%. These 3,081 students represented 16.2% of the total population of incoming first-year students at the 19 participating institutions. To provide and account for an adjustment for potential response bias by sex, race, academic ability, and institution type in the sample of students, a weighting algorithm was created in an effort to make the overall sample more similar to the population from which it was drawn. Using data provided by each institution, follow-up participants were weighted up to each institution's first-year undergraduate population by sex (male or female), race (Caucasian, African American/Black, Hispanic/Latino, Asian/Pacific Islander, or other), and ACT (or SAT/COMPASS equivalent score) composite score.

Dependent variables. One of the primary strengths of the WNSLAE dataset is the assortment of pretest and posttest measures/outcomes, allowing us to measure total and direct effects of the collegiate experience. Given the unique attributes associated with the population of first-generation students, this study sought to examine seven outcome measures that theoretically account for both first-generation student experiences and explore outcome measures previously never conducted on the first-generation student population. Appendix A thoroughly outlines the operational definition for each variable, including reliability measures¹. The following is a highlight of each of the seven dependent variables. The first two dependent measures are scaled

¹ For a comprehensive breakdown of the operational definitions of the WNSLAE liberal arts outcomes and good practice scales, please visit <http://www.education.uiowa.edu/crue/publications/index.htm>

measurements that represent the inclination to inquire and desire for life-long learning. The first measure is an 18-item *Need for Cognition* scale, which refers to a student's desire to seek and engage in purposeful cognitive activities (Cacioppo, Petty, Feinstein, & Jarvis, 1996). The second measure is a six-item scale that assessed a student's *Positive Attitude toward Literacy*. This scale was comprised of variables that measured a student's enjoyment of reading, especially poetry and scientific and historical texts, and who enjoys expressing thoughts and ideas in writing activities (Bray, Pascarella, & Pierson, 2004). The third dependent measure is the *Collegiate Assessment of Academic Proficiency (CAAP)*. Developed by ACT, the *Collegiate Assessment of Academic Proficiency* is a 32-item instrument designed to measure a student's ability to think critically. Fourth, the *Defining Issues Test-2* measures moral development and character. The *Defining Issues Test-2* is a revised version of James Rest's original Defining Issues Test from 1979 and presents several dilemmas about social problems for the respondent to engage in high order moral reasoning.

Insert Appendix A here

The fifth measure is the *Miville-Guzman Universality-Diversity Scale*. This 15-item scale measures a student's intercultural effectiveness dimension and universal-diverse orientation. Next, the *Ryff Scales of Psychological Well-Being* is a 54-item theoretically-grounded instrument specifically focuses on measuring six dimensions of psychological well-being: positive evaluations of oneself, personal sense of continued growth and development, belief in a purposeful and meaningful life, positive relations with others, capacity to effectively manage one's life and surrounding world, and autonomy. The final dependent measure was the *Socially Responsible Leadership Scale*. This measure was assessed with the 68-item, revised version II of the Socially Responsible Leadership Scale. The *Socially Responsible Leadership Scale* measures

the eight dimensions of Astin's Social Change Model of leadership development (Astin, Astin, Boatsman, Bonous-Hammarth, Chambers, Goldberg, et al., 1996). Developed specifically to measure college student leadership in college students, Astin's model describes leadership as a collaborative group process aimed towards promoting positive social change (Tyree, 1998). The instrument has eight scales corresponding to the eight dimensions of leadership (Astin et al.; Dugan, 2006): Consciousness of Self, Congruence, Commitment, Collaboration, Common Purpose, Controversy with Civility, Citizenship, and Change.

Independent Variables. The variable of interest in this study was parental education. Prior research has examined parental education as a dichotomous measure: parents who have no college education versus parents who have some college education or college degree(s). By categorizing parental education as such, the researcher assumes that students with parents who have minimal levels of college experience will have similar estimates to those whose parents both have bachelor's degrees or higher. Pascarella et al. (2004) categorized parental education into three types: first-generation students, moderate parental college education, and high parental college education. Taking Pascarella et al.'s reasoning one step further, this analysis controls for a larger portion of variance in parental education and categorized parent's education as follows: one or both have some college education but no Bachelor's degree, at least one parent has a Bachelor's degree, both parents have a Bachelor's degree, and at least one parent has a Master's degree or higher. The omitted category was neither parent has any college education (defined as first-generation students for this study).

The methodology for this study nearly replicates the analytic model utilized by Pascarella et al. (2004). Similarly, this study has adopted the conceptual framework used by the researchers to accurately estimate the impact of college. This framework includes taking into account and

controlling for: 1) student background characteristics and pre-college experiences, 2) institutional type, 3) student's academic experiences, and 4) student's non-academic experiences. The control measures for student background characteristics included gender, race/ethnicity, number of siblings, English as a native language, and parental income. The pre-college characteristics included ACT (or SAT/COMPASS equivalent) composite score, work for pay during high school, volunteered during high school, read for pleasure outside of class, visited a library for research purposes, academic motivation, openness to diversity/challenge, and pretest measures of each outcome variables. Institutional type was controlled for by the inclusion of dummy variables for community colleges, liberal arts colleges, and research universities, with regional colleges and universities being the omitted category.

An important purpose of this analysis was to measure first-generation students' academic and nonacademic college experiences that are theoretically considered to add to students' growth on the dependent measures listed above. Using evidence from the body of literature examining good practices linked to personal and intellectual growth in undergraduate education, the WNSLAE team purposefully included items that measured these practices and conducted a factor analysis to create good practice scales. From these good practice scales, another factor analysis was conducted to create six all-encompassing measures of good practices from the WNSLAE study, four of which were incorporated into our analytical model: Academic Challenge and High Expectations (31-item scale), Diversity Experiences (9-item scale), Influential Interactions with Peers (9-item scale), and Good Teaching/High Quality Interactions with Faculty (23-item scale). While these four scales measured an array of college experiences, five variables not included in these scales but which expose students to good practices are: place

of residence, number of liberal arts courses taken, working on- and off-campus, Greek affiliation, and member of a sponsored athletic team.

Limitations

The WNSLAE study's primary purpose is to study the effects of undergraduate liberal arts experiences on liberal arts colleges. This dataset has three limitations that researchers should note while interpreting our findings. First, the dataset is overpopulated with liberal arts colleges, possibly overestimating the effects of the liberal arts experience. However, given that our analyses control for various institution types, our analytic sample is rather robust with regards to institutional type. Second, though the WNSLAE is a longitudinal study, our analyses are limited to first-year experiences and outcomes. Lastly, the overpopulation of liberal arts colleges may also have an indirect effect on the amount of first-generation students in our analytic sample. Liberal arts colleges tend to have higher enrollment standards in terms of academic achievement. Theoretically, first-generation students would be at an academic disadvantage with regards to enrollment into a liberal arts college. Table 1 illustrates the disproportion of first-generation students compared to each of the other levels of parental education.

Insert Table 1 here

Analyses

Given the potential for respondent bias based on missing cases, we ran initial missing data analyses across sex, gender, and parental education and found no significant patterns of biases. Therefore, we utilized listwise deletion across our entire analytic sample. Further, we examined our variables set for potential multicollinearity effects and found no high correlations that warranted further investigation.

Ordinary Least Squares Regressions. We conducted a series of ordinary least squares (OLS) regressions, with continuous variables being standardized, to measure the estimates for each model. Similar to the Pascarella et al. (2004) analysis on the differential and conditional effects of college experiences on first-generation student outcomes, the OLS regressions were carried out using a three-model process: 1) the total effects model regressed each outcome on a battery of pre-college and background characteristics (e.g., sex, race/ethnicity, ACT composite score), 2) the direct effects model, which regressed each outcome on the control variables from the total effects model in addition to a number of college experience variables, including the good practice scales, and 3) the conditional effects model, which regressed each outcome on the variables in the direct effects model and the cross-product conditional effects of level of parental education x each good practice; do the estimated effects of good practices on each outcome differ in magnitude for first-generation students versus non-first-generation students?

Conditional Effects. After running our direct effects model, we tested for conditional effects related to level of parental education and the good practice scales. Significant conditional effects would indicate that the effects of the good practice scales differed between first-generation status and higher levels of parental education on the cognitive and psychosocial outcomes. To test for conditional effects, we created four groups of cross-product terms multiplying each good practice scale by the four levels of parental education (i.e. parents have some college education, one parent has a Bachelor's degree, both parent's have a Bachelor's degree or higher, and one parent has a Master's degree or higher). Because we were primarily interested if the conditional effects were independent of the general effects, we added all the cross-product terms into the direct effects model. Since our models include a battery of control variables and pre-college outcome measures, multiple significant conditional effects indicates

that independence exists between the good practice scales. A significant change in R^2 value between the models suggests that the conditional effects add significantly to the model and that the effects of the good practices are conditional based on parental education level. The conditional effects models across the various outcomes are summarized in Table 3.

While the conditional effects help describe the change in slope for the good practices between each level of parental education, we were interested in estimating the magnitude of the significant conditional effects for each subsample of students. If the conditional effects were significant, we decomposed the sample into subsamples by all levels of parental education (including first-generation students as its own unique subsample) and re-ran the direct effects model. Table 4 summarizes the individual significant conditional effects for first-generation students and other parental groups.

Results

Good Practices

Table 2 summarizes the total and direct effects of level of parental education on each of the four good practice scales. Note that the parental education variables are dummy variables. The omitted category for each parental education variables is first-generation students. In other words, a significant positive effect implies a disadvantage for first-generation students. With one exception, being a first-generation student lowers one's exposure to the four vetted good practice measures of undergraduate education. Students, irrespective of parental education, report experiencing good teaching and interactions with faculty at similar levels. In the total effects models, first-generation students were disadvantaged in terms of their experiences with academic challenge, diversity, and interactions with peers. However, when we took into account students' college experiences, this disadvantage for first-generation students continued only for academic

challenge and interactions with peers. The disadvantages experienced by first-generation students in diversity experiences, compared to students whose parents have a bachelor's degree, are reduced to non-significance when college experience variables (e.g., place of residency, number of liberal arts courses taken, working on- or off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type) are added into the model. As seen in Table 2, being a first-generation student places you at a significant disadvantage in academic challenge and interactions with peers when controlling for pre-college and background characteristics (e.g., sex, race/ethnicity, ACT composite score, academic motivation, etc.). Being a first-generation student continues to be a significant disadvantage in academic challenge and interactions with peers when college experiences are accounted for. The significant effect sizes across parental education levels in the direct effects model ranged from small to moderate ($b = 0.14 - 0.21, p < 0.05$).

Insert Table 2 here

General Effects

Table 3 summarizes the standardized total and direct effects of level of parental education on seven cognitive and psychosocial college outcomes measured after the first-year of college. Across all four of the seven outcome measures, first-generation students are significantly at a disadvantage in cognitive and psychosocial outcomes compared to students whose parents have higher levels of education. Level of parental education had no significant effect on three cognitive outcomes (*Need for Cognition*, *CAAP Critical Thinking*, and *Defining Issues Test-2*). However, first-generation students are disadvantaged in their development on the *Positive Attitude Toward Literacy* outcome compared to students whose parents have some college education, students who had at least one parent with a Bachelor's degree, and students who have

one parent with a Master's degree or higher. This indicates that while being a first-generation student has a modestly negative effect across *Positive Attitude Toward Literacy*, level of parental education has a modest to no effect on overall cognitive development.

Insert Table 3 here

Conversely, a student's parental education level is a key predictor of success across all measures of psychosocial development in this analysis. First-generation students continue to be at a disadvantage compared to non-first-generation students across the *MGUDS Total Diversity Scale*, *Ryff Scale of Well-Being (Total)*, and the *Socially Responsible Leadership Scale*. After controlling for pre-college and background characteristics, being a first-generation student had a significantly moderate, negative total effect on the *MGUDS Total Diversity Scale*, and *Ryff Scale of Well-Being (Total)*. After accounting for college experiences and the good practices in the direct effects model, these negative effects continued to be prevalent for first-generation students. The most consistent finding across all parental education levels was the *Socially Responsible Leadership Scale*. With one exception (i.e. only one level of parental education was significant on the leadership scale measuring *Change*), the magnitude of the significant effect sizes of being a non-first-generation student ranged from small to moderately large across the remaining seven leadership scales ($b = 0.12 - 0.38$). In other words, being a first-generation student had a significantly negative effect on leadership development compared to all other students. The negative effects of being a first-generation student remained even when accounting for college experiences and the good practices. Unlike the results measuring cognitive development, being a first-generation student clearly has a statistically significant negative effect across all psychosocial measures.

As the results indicate, the magnitude of the effects decreased slightly from the significant total and direct effects across all the college outcomes. This is explained by the effects of the good practice scales of academic challenge, diversity experiences, interactions with peers, and good teaching/high quality interactions with faculty. The direct effect takes into account these good practices as well as various other college experience measures (see the footnote in Table 3). As illustrated in Table 2, the effect of being a first-generation student is lessened when good practices are added to the model. This in part is attributed to the fact that first-generation students report experiencing the good practices at lower levels than their peers whose parents have some college education. It is important to note that the parental education levels that continue to be significant are doing so after controlling for pretest outcome measures and accounting for college experience measures, thus indicating the significant effects that the good practices have on cognitive and psychosocial outcomes.

Conditional Effects

To determine the presence of conditional effects, cross-product terms were created between the dummy variables for level of parental education and each of the four good practice scales. The estimation of the presence for conditional effects yielded a statistically significant increase in R^2 ($p < 0.05$) for each outcome measure. This permitted the examination of conditional effects in estimating the magnitude of good practices for each subsample of students.

Insert Table 4 here

We uncovered a substantial number of conditional effects modeling the good practice scales and level of parental education. This suggests that many of the good practice scales had effects across the cognitive and psychosocial outcomes that differed in magnitude for first-generation students compared to students whose parents had higher levels of educational

attainment. Note that in the good practice (see Table 2) and the general effects models (see Table 3), being a first-generation student lowers ones exposure to vetted good practices and is disadvantageous across four of the seven outcomes. Of the conditional effects, nearly half of those that were significant were between first-generation students and students whose parents have some college education. This implies that even students whose parents experience low levels of a college education have a significantly differing college experience compared to first-generation students.

Except for two isolated exceptions, the individual significant conditional effects in Table 4 highlight a rather consistent phenomenon with regards to first-generation students' involvement in each of the good practices; first-generation students who participated in experiences that were academically challenging and interacted frequently with peers benefited at higher levels across cognitive and psychosocial outcomes compared to their non-first-generation peers. However, being a first-generation student and participating in higher levels of good teaching interactions with faculty was actually inhibitive across nearly all cognitive and psychosocial outcomes compared to non-first-generation students. Lastly, first-generation students who report participating in diversity experiences benefited at higher levels on the *CAAP Critical Thinking*, yet participation in diversity experiences hindered their development on *Need for Cognition*.

Discussion and Implications

Pascarella et al.'s (2004) investigation of first-generation students across various cognitive and critical thinking outcomes after the second- and third-year of college yielded effects that were both isolated and inconsistent. This analysis contributes additional evidence of the effects of the level of parental education on seven college outcomes after the first-year of

study and the results are nearly consistent across all outcomes: First-generation students are measuring at a significantly lower level across cognitive and psychosocial outcomes compared to non-first-generation students. Further, whereas Pascarella et al. mainly found significant net differences between first-generation students and students whose parents both have a Bachelor's degrees or higher, this analysis found significant differences across all parental education levels. Moreover, first-generation students experience lower exposure to vetted good practice measures of undergraduate education. However, after examining the conditional effects of these good practices across levels of parental education, first-generation students who participate in high levels of academic challenge and peer interactions benefit greatly across nearly all cognitive and psychosocial outcomes.

While the effects of students whose parents had higher levels of educational attainment yielded varying significant results, students whose parents have some college and students with at least one parent having a Master's degree or above had the highest degree of significant results across all outcomes. This indicates that students whose parents have low levels of college attainment have similar cognitive and psychosocial development during the first-year of college compared to students whose parents have the highest level of education attainment. Even more interesting is that the standardized effect sizes for students whose parents have some college were the largest. In other words, if a student's parents have some college but no college degree, they were more likely to measure higher across all significant cognitive and psychosocial outcomes compared to all other students. This appears to somewhat contradict cultural capital research that theorizes that parents who are highly educated transmit fundamental intergenerational benefits to their children.

Examining all four measures of cognitive development, only *Positive Attitude Toward Literacy* yielded significant effects across parental education types. It is important to note that each of the four cognitive outcomes measures a distinct dimension of cognitive development. The inconsistency of significance across these measures actually sheds light on the distinct aspects of each cognitive outcome that affect first-generation students. At the end of the first-year of college, first-generation students report lower levels of enjoyment of literacy activities and writing compared to non-first-generation students. This finding supports aspects of cultural capital theory that college-educated parents transmit positive reinforcement mechanisms to their children about the importance of engaging in educationally meaningful activities such as reading and writing.

Various levels of parental education yielded significant results across all three psychosocial measures (*MGUDS Total Diversity Scale*, *Ryff Scale of Well-Being*, and *Socially Responsible Leadership Scale*). This highlights the importance of how parental education significantly affects a student's personal and interpersonal development. Individuals who maintain a high level of cultural and social capital are more likely to participate in positive interpersonal relationships. Positive relationships with parents reinforce social capital theory and imply that higher levels of parental education create supportive social networks that theoretically aid in the psychosocial development of their children. Across the *MGUDS Total Diversity Scale*, *Ryff Scale of Well-Being*, and *Socially Responsible Leadership Scale*, nearly every parental education type was significantly positive, indicating again that first-generation students measure lower across psychosocial measures compared to their non-first-generation peers. Specifically, the *Socially Responsible Leadership Scale* yielded significant, moderate effects across the four parental education types for nearly every scale. Quality leadership incorporates and emphasizes

the need for high levels of interpersonal collaborations, thus indicating the need to participate in high levels of social capital.

The conditional effects clearly illustrate that the magnitude of the effect of the good practices on the outcomes for first-generation students compared to their non-first-generation peers is dependent upon exposure to each good practice. First-generation students benefit at higher levels of cognitive and psychosocial development when exposed to academically challenging experiences and interacting with peers. First-generation students' participation in positive peer interactions indicates the importance of emphasizing the utilization of collaborative learning environments and integrating co-curricular activities for incoming first-generation students. It is important that first-generation students are instructed to seek out academically challenging experiences and to interact frequently with peers because of the underlying value these experiences have on cognitive and psychosocial development.

While first-generation students appear to be benefiting from frequent interactions with peers, their interactions with faculty have a conditional negative effect on nearly every outcome. This finding indicates that their interactions with faculty negatively affected their measures on cognitive and psychosocial outcomes, except on the *Positive Attitude Toward Literacy* and the *Citizenship* scale on the *Socially Responsible Leadership Scale*. Regardless, this finding clearly illustrates that first-generation students have not been conditioned to the positive benefits of interacting with instructors. These interactions would help build a foundation early on in a first-generation students' collegiate career to further aid in their cognitive and psychosocial development. Social capital theory posits that first-generation students may be at a disadvantage because their information and expectations for interpersonal relationship with faculty are not contingent with their actual experiences. Furthermore, this finding may be describing the effects

that first-generation students' background characteristics have on their previous exposure to faculty interactions.

The final good practice measure on diversity experiences was found to have both minimal and inconsistent conditional effects. For example, first-generation students who participated in diversity experiences measured lower on the *Need for Cognition* compared students whose parents have a Master's or higher, yet measured higher on another cognitive measure, *CAAP Critical Thinking*. Clearly, participation in each of the four good practices has varying effects between first-generation students and their non-first-generation peers.

Conclusion

This analysis extends upon recent evidence (e.g., Pascarella et al., 2004) that first-generation students are at a significant disadvantage compared to their non-first-generation peers across a number of college experiences and outcomes. Our findings suggest that being a first-generation student not only lowers one's exposure to a number of vetted good practices but places them at a significant disadvantage in cognitive and psychosocial outcomes compared to students whose parents have higher levels of postsecondary education. Furthermore, we tested the conditional effects of good practices on the first-year outcomes and found that many of the good practices differed between first-generation students and their non-first-generation peers. These differences were both negative and positive and were dependent upon the exposure to a specific good practice. In other words, the effects of good practices were not universally a benefit for first-generation students. This implies that some vetted good practices, specifically good teaching interactions with faculty, can actually hinder cognitive and psychosocial development for first-generation students.

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Table 1

Descriptive Statistics on Level of Parental Education using the Wabash National Study of Liberal Arts Education

	n	Male	White	English is Native Language	Mean Parental Income
First-Generation Students	235	29%	57%	82%	\$49,170
Parents have some College	454	29%	80%	96%	\$61,999
One Parent has Bachelor's	438	34%	80%	95%	\$77,614
Both Parents have Bachelor's or above	415	35%	88%	96%	\$108,994
One Parent has Master's or above	1,050	38%	84%	94%	\$125,662

Table 2

Standardized Total and Direct Effects of Level of Parental Education (versus First-Generation Students) on the Good Practice Scales using the Wabash National Study of Liberal Arts Education (n = 2,592)

Variables ^a	<i>GP Academic Challenge</i>		<i>GP Diversity Experiences</i>		<i>GP Interactions with Peers</i>		<i>GP Good Teaching Interactions w/ Faculty</i>	
	Total ^b	Direct ^c	Total ^b	Direct ^c	Total ^b	Direct ^c	Total ^b	Direct ^c
Parent's have some College ^d	0.07	0.07	-0.08	-0.06	0.17*	0.09	-0.02	-0.05
One Parent has Bachelor's ^d	0.25**	0.21**	0.11	0.05	0.29**	0.16*	-0.04	-0.04
Both Parents have Bachelor's or higher ^d	0.19**	0.13	0.22**	0.14	0.28**	0.15*	0.02	0.03
One Parent has Master's or higher ^d	0.19**	0.15*	0.07	-0.01	0.26**	0.14*	0.05	0.07
R ²	0.21	0.23	0.22	0.27	0.10	0.19	0.10	0.16

* p < 0.05, ** p < 0.01

^a Only parental education is included in this table.

^b Controlling for sex, race, number of siblings, English as a second language, parental income, ACT composite score, work for pay during high school, volunteered during high school, read for pleasure outside of class, visited a library for research purposes, highest intended academic degree, academic motivation, and openness to diversity.

^c Controlling for student background and precollege variables listed in ^b and the following college experiences: place of residence, number of liberal arts courses taken, working on- and off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type.

^d Omitted category is first-generation students; identified as students whose parents have no college education.

Table 3

Standardized Total and Direct Effects of Level of Parental Education (versus First-Generation Students) and Good Practices on Seven Outcome Measures using the Wabash National Study of Liberal Arts Education

Variables ^a	Cognitive Development												Psychosocial Development					
	Need for Cognition			Positive Attitude Toward Literacy			CAAP Critical Thinking			Defining Issues Test-2			MGUDS Total Diversity Scale			Ryff Scale of Well-Being (Total)		
	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.
Parents have some College ^d	-0.02	-0.01	0.01	0.10	0.13**	0.18**	-0.03	0.05	0.08	0.05	0.02	0.01	0.16**	0.17**	0.08	0.26**	0.23**	0.16**
One Parent has Bachelor's ^d	0.04	0.04	0.06	0.09	0.11*	0.15**	0.12	0.12	0.11	0.08	0.01	0.00	0.08	0.08	0.02	0.14**	0.11*	0.07
Both Parents have Bachelor's or higher ^d	0.03	0.03	0.04	0.06	0.08	0.10	0.09	0.10	0.07	0.06	-0.01	-0.04	0.09	0.07	0.01	0.20**	0.16**	0.12*
One Parent has Master's or higher ^d	0.03	0.03	0.05	0.09	0.12*	0.15**	0.02	0.00	-0.02	0.14	0.07	0.07	0.11*	0.12*	0.06	0.14**	0.10*	0.06
Precollege Outcome Measure	0.64**	0.61**	0.61**	0.63**	0.61**	0.61**	0.55**	0.54**	0.56**	0.57**	0.58**	0.58**	0.56**	0.52**	0.52**	0.68**	0.59**	0.59**
GP Academic Challenge		0.13**	0.21**		0.10**	0.10		-0.01	0.12*		0.07**	0.08		0.06**	0.10		0.10**	0.18**
GP Diversity Experiences		0.05**	-0.08		0.05**	0.00		0.02	0.08		0.00	-0.08		0.17**	0.18**		-0.01	-0.03
GP Interactions with Peers		-0.04*	0.01		0.01	-0.05		0.02	-0.02		0.02	0.15**		-0.02	0.08		0.20**	0.30**
GP Good Teaching Interactions w/ Faculty		0.04*	-0.13**		0.07**	0.12**		0.03	0.05		0.03	-0.06		0.11**	0.07		0.12**	-0.02
GP Academic Challenge																		
Parents have some College			-0.03			0.03			-0.05			-0.03			-0.03			-0.01
One Parent has Bachelor's			-0.02			0.00			-0.03			0.06			-0.01			-0.03
Both Parents have Bachelor's or higher			-0.05			-0.01			-0.08**			-0.05			-0.04			-0.07*
One Parent has Master's or higher			-0.08*			-0.02			-0.11**			0.01			-0.01			-0.08*
GP Diversity Experiences																		
Parents have some College						0.01						0.02			-0.04			0.00
One Parent has Bachelor's						0.01						0.06			-0.02			0.02
Both Parents have Bachelor's or higher						0.04						0.06			-0.04			-0.01
One Parent has Master's or higher						0.05						0.02			0.05			0.05
GP Interactions with Peers																		
Parents have some College			-0.04*			0.03						0.03			-0.07*			-0.08**
One Parent has Bachelor's			0.00			0.02						0.02			-0.08*			-0.03
Both Parents have Bachelor's or higher			-0.02			0.03						0.01			-0.01			-0.04*
One Parent has Master's or higher			-0.04			0.04						0.02			-0.11**			-0.05
GP Good Teaching Interactions w/ Faculty																		
Parents have some College			0.05*			-0.03						-0.05			0.07*			0.05*
One Parent has Bachelor's			0.09**			0.00						-0.02			-0.01			0.07**
Both Parents have Bachelor's or higher			0.10**			-0.07**						-0.01			0.04			0.12**
One Parent has Master's or higher			0.13**			-0.02						0.04			0.08*			0.08**
R ²	0.57	0.60	0.61	0.59	0.62	0.62	0.74	0.75	0.77	0.56	0.57	0.59	0.50	0.56	0.57	0.53	0.60	0.61
N			2,592			2,592			1,288			1,358			2,592			2,592

* p < 0.05, ** p < 0.01

^a Only parental education and good practice scales are included in this table.

^b Controlling for sex, race, number of siblings, English as a second language, parental income, ACT composite score, work for pay during high school, volunteered during high school, read for pleasure outside of class, visited a library for research purposes, highest intended academic degree, academic motivation, and openness to diversity.

^c Controlling for student background and precollege variables listed in ^b and the following college experiences: place of residence, number of liberal arts courses taken, working on- and off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type.

^d Omitted category is first-generation students; identified as students whose parents have no college education.

Table 3 cont.

Standardized Total and Direct Effects of Level of Parental Education (versus First-Generation Students) and Good Practices on Seven Outcome Measures using the Wabash National Study of Liberal Arts Education

Variables ^a	Psychosocial Development																							
	Socially Responsible Leadership Scale																							
	Consciousness of Self			Congruence			Commitment			Collaboration			Common Purpose			Controversy With Civility			Citizenship			Change		
	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.	Total ^b	Direct ^c	Cond.
Parents have some College ^d	0.38**	0.32**	0.27**	0.32**	0.28**	0.27**	0.32**	0.27**	0.28**	0.28**	0.24**	0.19**	0.33**	0.29**	0.23**	0.29**	0.26**	0.23**	0.21**	0.20**	0.19**	0.18**	0.17**	0.19**
One Parent has Bachelor's ^d	0.17**	0.13*	0.13*	0.18**	0.14*	0.16*	0.18**	0.14*	0.16*	0.16**	0.11	0.08	0.16*	0.12	0.11	0.10	0.10	0.06	0.19**	0.13*	0.13*	0.09	0.06	0.08
Both Parents have Bachelor's or higher ^d	0.23**	0.20**	0.19**	0.27**	0.24**	0.25**	0.23**	0.20**	0.21**	0.16*	0.12	0.08	0.17**	0.14*	0.10	0.13*	0.12*	0.10	0.23**	0.16**	0.15*	0.14*	0.10	0.13*
One Parent has Master's or higher ^d	0.22**	0.18**	0.18**	0.22**	0.20**	0.21**	0.23**	0.19**	0.20**	0.21**	0.17**	0.15**	0.21**	0.18**	0.16**	0.18**	0.18**	0.16**	0.22**	0.16**	0.17**	0.03	0.01	0.03
Precollege Outcome Measure	0.60**	0.55**	0.56**	0.51**	0.46**	0.46**	0.47**	0.42**	0.42**	0.49**	0.41**	0.41**	0.54**	0.47**	0.46**	0.45**	0.43**	0.43**	0.54**	0.50**	0.50**	0.56**	0.52**	0.51**
GP Academic Challenge		0.12**	0.17**		0.14**	0.14*		0.11**	0.22**		0.16**	0.24**		0.13**	0.33**		0.10**	0.13*		0.13**	0.14*		0.12**	0.13*
GP Diversity Experiences		-0.01	0.00		0.01	0.02		-0.01	-0.01		0.02	0.11		0.00	-0.01		0.08**	0.04		0.08**	0.04		0.09**	0.02
GP Interactions with Peers		0.09**	0.10*		0.03	0.00		0.04*	0.02		0.14**	0.14**		0.08**	0.07		0.03	0.16**		0.06**	0.06		0.11**	0.13**
GP Good Teaching Interactions w/ Faculty		0.08**	0.01		0.11**	0.12*		0.17**	0.06		0.07**	0.02		0.11**	0.00		0.13**	-0.06		0.03*	0.10*		0.02	-0.07
GP Academic Challenge																								
Parents have some College			0.02			0.06			0.02			0.06*			-0.04			0.03			0.05			0.06
One Parent has Bachelor's			-0.06			0.00			-0.07*			-0.04			-0.05			0.01			0.00			0.01
Both Parents have Bachelor's or higher			-0.05			-0.04			-0.07*			-0.12**			-0.12**			-0.03			-0.07*			-0.03
One Parent has Master's or higher			-0.05			-0.04			-0.12**			-0.11*			-0.19**			-0.08			0.00			-0.07
GP Diversity Experiences																								
Parents have some College			-0.07**			-0.02			0.00			-0.08**			-0.01			-0.01			0.04			0.05
One Parent has Bachelor's			0.04			0.00			0.04			-0.02			-0.01			-0.04			0.00			0.03
Both Parents have Bachelor's or higher			0.02			-0.03			-0.06			-0.04			-0.01			-0.01			0.00			0.02
One Parent has Master's or higher			0.02			0.03			0.02			-0.04			0.03			0.07			0.03			0.06
GP Interactions with Peers																								
Parents have some College			-0.05*			-0.01			-0.01			-0.04			-0.05			-0.08**			-0.02			-0.04
One Parent has Bachelor's			0.04			0.03			0.01			0.03			0.02			-0.05			0.02			0.01
Both Parents have Bachelor's or higher			0.03			0.01			0.00			0.02			0.02			-0.04			0.02			-0.02
One Parent has Master's or higher			-0.01			0.03			0.03			0.00			0.03			-0.10**			-0.01			0.00
GP Good Teaching Interactions w/ Faculty																								
Parents have some College			0.05*			-0.05			0.01			-0.02			0.02			0.11**			-0.10**			0.00
One Parent has Bachelor's			0.01			0.00			0.05*			0.00			0.08**			0.05			-0.01			0.03
Both Parents have Bachelor's or higher			0.05			0.04			0.10**			0.09**			0.06*			0.12**			0.02			0.11**
One Parent has Master's or higher			0.05			0.01			0.11**			0.07*			0.10**			0.14**			-0.01			0.10**
R ²	0.42	0.48	0.50	0.36	0.41	0.41	0.33	0.40	0.41	0.35	0.43	0.45	0.36	0.42	0.43	0.36	0.43	0.44	0.44	0.49	0.50	0.42	0.48	0.49
N			2,592			2,592			2,592			2,592			2,592			2,592			2,592			2,592

* p < 0.05, ** p < 0.01

^a Only parental education and good practice scales are included in this table.

^b Controlling for sex, race, number of siblings, English as a second language, parental income, ACT composite score, work for pay during high school, volunteered during high school, read for pleasure outside of class, visited a library for research purposes, highest intended academic degree, academic motivation, and openness to diversity.

^c Controlling for student background and precollege variables listed in ^b and the following college experiences: place of residence, number of liberal arts courses taken, working on- and off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type.

^d Omitted category is first-generation students; identified as students whose parents have no college education.

Table 4

Significant Standardized Conditional Effects of Level of Parental Education (versus First-Generation Students) and Good Practices on Seven Outcome Measures using the Wabash National Study of Liberal Arts Education

Good Practices	Cognitive Development			Psychosocial Development		
	<i>Need for Cognition</i>	<i>Positive Attitude Toward Literacy</i>	<i>CAAP Critical Thinking</i>	<i>Defining Issues Test- 2</i>	<i>MGUDS Total Diversity Scale</i>	<i>Ryff Scale of Well- Being (Total)</i>
GP Academic Challenge						
First-Generation Students	0.21		0.00			0.06
Parents have some College						
One Parent has Bachelor's						
Both Parents have Bachelor's or higher			-0.07			0.07
One Parent has Master's or higher	0.10		-0.05			0.06
GP Diversity Experiences						
First-Generation Students	-0.05		0.13			
Parents have some College	0.16					
One Parent has Bachelor's	0.07					
Both Parents have Bachelor's or higher						
One Parent has Master's or higher	0.05		-0.09			
GP Interactions with Peers						
First-Generation Students	0.03			0.17	0.11	0.30
Parents have some College				-0.02	0.00	0.11
One Parent has Bachelor's	0.03			0.01		
Both Parents have Bachelor's or higher					-0.01	0.20
One Parent has Master's or higher				-0.04	-0.03	
GP Good Teaching Interactions w/ Faculty						
First-Generation Students	-0.14	0.13		-0.10	0.08	-0.01
Parents have some College	0.00			0.15	0.13	0.10
One Parent has Bachelor's	0.10					0.15
Both Parents have Bachelor's or higher	0.19	0.03			0.15	0.31
One Parent has Master's or higher	0.08			0.05		0.09

If the conditional effects were significant from the direct effects model (see Table 3), we decomposed the sample into subsamples by all levels of parental education (including first-generation students as its own unique subsample) and re-ran the direct effects model. The significant conditional effects for the each student subsample is reported above.

The F-statistic was significant at $p < 0.05$ for each of the seven outcomes, indicating the interactions did add significantly to the model. Further, the p-value indicating significance level is not included, given the prior significance of the F-statistic in the conditional effects model (see Table 3).

Table 4 cont.

Significant Standardized Conditional Effects of Level of Parental Education (versus First-Generation Students) and Good Practices on Seven Outcome Measures using the Wabash National Study of Liberal Arts Education

Good Practices	Psychosocial Development						
	<i>Socially Responsible Leadership Scale</i>						
	<i>Consciousness of Self</i>	<i>Commitment</i>	<i>Collaboration</i>	<i>Common Purpose</i>	<i>Controversy With Civility</i>	<i>Citizenship</i>	<i>Change</i>
GP Academic Challenge							
First-Generation Students		0.09	0.16	0.28		0.13	
Parents have some College			0.36				
One Parent has Bachelor's		0.08					
Both Parents have Bachelor's or higher		0.05	-0.05	-0.01		-0.02	
One Parent has Master's or higher		0.03	0.09	0.04			
GP Diversity Experiences							
First-Generation Students	-0.02		0.01				
Parents have some College	-0.07		0.00				
One Parent has Bachelor's							
Both Parents have Bachelor's or higher							
One Parent has Master's or higher							
GP Interactions with Peers							
First-Generation Students	0.13				0.16		
Parents have some College	0.02				0.02		
One Parent has Bachelor's							
Both Parents have Bachelor's or higher							
One Parent has Master's or higher					0.02		
GP Good Teaching Interactions w/ Faculty							
First-Generation Students	0.01	0.06	0.04	0.03	-0.04	0.12	-0.07
Parents have some College	0.05				0.18	-0.07	
One Parent has Bachelor's		0.19		0.19			
Both Parents have Bachelor's or higher		0.31	0.29	0.14	0.21		0.19
One Parent has Master's or higher		0.23	0.14	0.16	0.19		0.08

If the conditional effects were significant from the direct effects model (see Table 3), we decomposed the sample into subsamples by all levels of parental education (including first-generation students as its own unique subsample) and re-ran the direct effects model. The significant conditional effects for the each student subsample is reported above.

The F-statistic was significant at $p < 0.05$ for each of the seven outcomes, indicating the interactions did add significantly to the model. Further, the p-value indicating significance level is not included, given the prior significance of the F-statistic in the conditional effects model (see Table 3).

The F-statistic was significant for the *Congruence* scale, but no interactions between first-generation and any of the parental education comparison groups were significant.

Appendix A
Operational Definitions for Each Variable

Variable/Description

Dependent Variables

Need for Cognition : Student's end of the first-year mean score on the Need for Cognition scale. The primary scale measuring a student's inclination to inquire and lifelong learning, this 18-item scale examines the degree to which a student enjoys engaging in effortful cognitive activities. A high score for cognition denotes a greater need to seek, engage, enjoy, and reflect back on cognitive activities. In contrast, those with low need scores are more likely to rely on others, cognitive heuristics, or social comparison processes to make sense or evaluate their world. The internal consistency reliability for this scale is $\alpha = 0.897$.

Positive Attitude Toward Literacy Scale : Student's end of the first-year mean score on the Positive Attitude Toward Literacy scale. The second of two scales measuring a student's inclination to inquire and lifelong learning, this 6-item scale assesses a student's enjoyment of literacy activities such as reading poetry, literature, scientific and historical material, and expressing ideas in writing. The internal consistency reliability for this scale is $\alpha = 0.71$.

Collegiate Assessment of Academic Proficiency : Student's end of the first-year critical thinking scaled score on the Collegiate Assessment of Academic Proficiency. Developed by the American College Testing Program, the Collegiate Assessment of Academic Proficiency is a 32-item instrument designed to measure a student's ability to clarify, analyze, evaluate, and extend arguments. The internal consistency reliabilities for the Collegiate Assessment of Academic Proficiency critical thinking test range between $\alpha = 0.81$ and $\alpha = 0.82$ (ACT, 1991).

Defining Issues Test 2 : Student's end of the first-year N2-score on the Defining Issues Test 2. Measuring moral development and character, the Defining Issues Test 2 is a revised version of James Rest's original DIT from 1979. The Defining Issues Test 2 presents several dilemmas about social problems and after each, a series of 12 items representing different issues that might be raised by the problem are presented. Each item is scored using the N2-score, which reflects the extent to which one exhibits high order moral reasoning and the extent to which one rejects ideas because they are simplistic or biased. The internal consistency reliability for the N2-score range from $\alpha = 0.77$ to $\alpha = 0.81$ (Rest, et al., 1999; University of Minnesota, n.d.).

Miville-Guzman Universality-Diversity Scale : Student's end of the first-year total mean score on the short form of the Miville-Guzman Universality-Diversity Scale. This 15-item scale measures a student's intercultural effectiveness dimension and universal-diverse orientation. The instrument is a total scale score comprised of three subscale scores: Diversity of Contact, Relativistic Appreciation and Comfort with Differences. A high score denotes a greater mean value on these three subscales. The internal consistency reliability for this scale is $\alpha = 0.851$.

Ryff Scales of Psychological Well-Being: Student's end of the first-year total mean score on the Ryff Scales of Psychological Well-Being. This 54-item theoretically-grounded instrument specifically focuses on measuring six dimensions of psychological well-being: positive evaluations of oneself, personal sense of continued growth and development, belief in a purposeful and meaningful life, positive relations with others, capacity to effectively manage one's life and surrounding world, and autonomy. The Ryff Scales of Psychological Well-Being tend to have positive associations with measures of happiness and satisfaction and negative associations with depression. The internal consistency reliabilities for each of the six scales ranged from $\alpha = 0.793$ to $\alpha = 0.864$.

Socially Responsible Leadership Scale : Student's end of the first-year score on each of the eight dimensions of the Socially Responsible Leadership Scale. Derived from the 68-item, revised version II of the Socially Responsible Leadership Scale. The Socially Responsible Leadership Scale measures the eight dimensions of Astin's Social Change Model of leadership development (Astin, A., Astin, H., Boatsman, Bonous-Hammarth, Chambers, Goldberg, et al., 1996). Developed specifically to measure college student leadership in college students, Astin's model describes leadership as a collaborative group process aimed towards promoting positive social change (Tyree, 1998). The instrument has eight scales corresponding to the eight dimensions of leadership (Astin, et al., 1996; Dugan, 2006): The eight scales are: Consciousness of Self (being aware of the values, emotions, attitudes, and beliefs that motivate one to take action); Congruence (thinking, feeling, and behaving with consistency, genuineness, authenticity, and honesty toward others); Commitment (intensity and duration in relation to a person, idea, or activity—the energy and passion that propels one to act); Collaboration (working with others in a common effort); Common Purpose (working with others within a shared set of aims and values); Controversy with Civility (recognizing two fundamental realities of any group effort, that (a) differences of viewpoint are inevitable and valuable, and (b) such differences must be aired openly and with respect and courtesy); Citizenship (believing in a process whereby a person or group is responsibly connected to the environment and the community); and Change (adapting to continuously evolving environments and situations, while maintaining the primary functions of the group). The internal consistency reliabilities for the eight subscales of the SRLS in the present study ranged from $\alpha = 0.77$ to $\alpha = 0.88$.

Measures of Good Practices/Liberal Arts Experiences

Academic Challenge and High Expectations : Student's beginning and end of the first-year score on the good practice scale measuring academic challenge and high expectations (pretest and posttest). This 31-item scale that combined items from four subscales: Academic challenge and effort, frequency of higher-order exams and assignments, challenging classes and high faculty expectations, and integrating ideas, information, and experiences. The internal consistency reliability for this scale is $\alpha = 0.879$.

Diversity Experiences : Student's beginning and end of the first-year score on the good practice scale measuring diversity experiences (pretest and posttest). This 9-item scale combined items from two subscales: Diversity experiences and meaningful discussions with diverse peers. The internal consistency reliability for this scale is $\alpha = 0.80$.

Influential Interactions with Peers : Student's beginning and end of the first-year score on the good practice scale measuring influential interactions with peers (pretest and posttest). This 9-item scale that combined items from two subscales: Positive peer interactions and co-curricular involvement. The internal consistency reliability for this scale is $\alpha = 0.852$.

Good Teaching/High Quality Interactions with Faculty : Student's beginning and end of the first-year score on the good practice scale measuring good teaching and high quality interaction with faculty (pretest and posttest). This 23-item scale that combined items from four subscales: Faculty interest in teaching and student development, prompt feedback, quality and impact of nonclassroom interactions with faculty, and overall exposure to clear and organized instruction. The internal consistency reliability for the 23-item scale is $\alpha = 0.92$.

Independent Variable of Interest

Parent's Education : Student's father and mother's educational attainment based on a 9-item response: Did not finish high school, High school graduate/GED, Attended college but no degree, Vocational/technical certificate or diploma, Associate or other two-year degree, bachelors or other four-year degree, Masters, Law, and Doctorate. Father and mother's educational attainment was recoded into a 4-item response set: 1 = At least one parent participated in some college but did not receive a Bachelor's or other four-year degree, 2 = At least one parent received a Bachelor's degree, 3 = Both parent's received a Bachelor's degree, and 4 = At least one parent received a Master's degree or Higher. Student's whose parent's received a high school diploma/GED were the omitted category and labeled as first-generation status.

Pre-college Control Variables

Gender : 1 = Male, 0 = Female

Race/Ethnicity : 1 = White, 0 = Other

Number of Siblings : Based upon the beginning of the first-year, how many brothers and sisters does the student have? '1' No siblings, 1 sibling, 2 siblings, 3 siblings, or 4 or more siblings.

English is Native Language : English is student's native language, 1 = yes, 0 = no.

Parent's Income : What is your best estimate of your parents' total annual income? 1 = Less than \$14,999, 2 = \$15,000 - \$24,999, 3 = \$25,000 - \$34,999, 4 = \$35,000 - \$49,999, 5 = \$50,000 - \$74,999, 6 = \$75,000 - \$99,999, 7 = \$100,000 - \$199,999, 8 = \$200,000 - \$299,999, and 9 = \$300,000 or more. Midpoints were created to make the variable continuous.

ACT Composite Score : Student's common metric of precollege academic ability with imputations.

Worked for Pay during High School : Within the last year, did the student work for pay in high school? 1 = Yes, 0 = Rarely/Never.

Volunteered during High School : Within the last year, did the student volunteer in high school? 1 = Yes, 0 = Rarely/Never.

Read for Pleasure in High School : Within the last year, did the read for pleasure in high school? 1 = Yes, 0 = Rarely/Never.

Use of Library in High School : Within the last year, did the student use the library for research or homework in high school? 1 = Yes, 0 = Rarely/Never.

Educational Aspirations/Goals : Students highest intended academic degree upon beginning the first-year: 1 = Vocational/technical certificate or diploma, 2 = Associate degree, 3 = Bachelors degree, 4 = Masters degree, 5 = Law, and 6 = Doctorate.

Academic Motivation : Student's mean-based scale of precollege academic motivation using a Likert-like scale.

Openness to Diversity/Challenge : Student's mean-based scale of precollege openness to diversity/challenge using a Likert-like scale.

College Control Variables

Institutional Type : The institutional type of each college and university from which the students were sampled, dummy coded into the following categories: 1) Community college, 2) Liberal Arts college, and 3) Research university. Regional college was the omitted category.

Live On-Campus : Does the student live on-campus? 1 = Live on-campus, 0 = Live off-campus.

Hours Work On-Campus : The number of hours per week the student works for pay on-campus (using the midpoints of a categorical variable): 1 = 0, 2 = 2.5, 3 = 8, 4 = 13, 5 = 18, 6 = 23, 7 = 28, and 8 = 45+

Hours Work Off-Campus : The number of hours per week the student works for pay off-campus (using the midpoints of a categorical variable): 1 = 0, 2 = 2.5, 3 = 8, 4 = 13, 5 = 18, 6 = 23, 7 = 28, and 8 = 45+

Greek Membership : Is the student a member of a social fraternity or sorority? 1 = Yes, 2 = No.

Student Athlete : Is the student a member of an institutionally sponsored athletic team? 1 = Yes, 0 = No.

Liberal Arts Courses : The number of courses a student a student participated in during the first-year, based on a continuous scale.