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The Impact of College Student Socialization and
Socioeconomic Status on Cognitive Outcomes*

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Since Weidman (1989) put forth his Model of Undergraduate Socialization, much of the college impact research has focused on specific socialization processes, particularly student-faculty interactions and peer influences (Pascarella & Terenzini, 2005). Research suggests that frequent student-faculty and peer interactions are two primary influences on student learning and development (Astin, 1993; Furman & Gavin, 1989; Kuh & Hu, 2001; Newman & Newman, 1976; Pascarella & Terenzini, 1991, 2005; Tierney, Corwin, & Coylar, 2005; Whitt, Edison, Pascarella, Nora, & Terenzini, 1999; Cruce, Wolniak, Seifert, & Pascarella 2006). Student-faculty interactions, “that reinforce or extend intellectual ethos of the classroom...have positive implications for general cognitive development during college” (Pascarella & Terenzini, 2005, p. 189), while peer interactions provide encouragement and act as academic and personal support networks that positively influence students’ development (Tierney, Corwin, & Coylar)

Weidman (1989) argued that to fully understand college impact, researchers must focus on the socialization of students. He cited Brim’s (1966) definition of socialization: “the process by which persons acquire the knowledge, skills, and dispositions that make them more or less effective members of their society” (Weidman, p. 293). Weidman also contends that socioeconomic status (SES) is an important part of the socialization process for students. In fact, he placed such an emphasis on SES that he included it in two locations within his model: 1) the pre-college background characteristics that should be accounted for when conducting college impact research, and 2) as part of the on-going socialization that affects how students experience college. Yet, researchers focusing on student experiences and college outcomes have rarely included SES as a socializing influence (Walpole, 2007). Typically, when SES has been included

in research models, it is a control as opposed to being “investigated as a variable whose effects are important to understand” (Walpole, p. 8).

The goal of this analysis is to revisit Weidman’s (1989) Model of Undergraduate Socialization. In doing so, we plan to expand its application by analyzing the effects of SES on four cognitive outcomes, an expansion that Weidman himself suggested. Furthermore, we intend to fill a gap in the current literature by investigating the influence of SES along with other socializing influences. We begin with a review of the literature of undergraduate socialization, followed by a description of Weidman’s model, which provides our theoretical framework. Then we present a detailed description of our research and findings and conclude with a discussion of the implications for practice and research.

Review of the Literature

There is considerable evidence from three decades of college impact research that interactions with faculty positively influence college experiences and outcomes for many students. Students’ out of classroom contacts with faculty are associated with gains in academic and cognitive development (Terenzini, Pascarella, & Blimling, 1996) and personal and intellectual growth (Astin, 1993; Endo & Harpel, 1982; Pascarella & Terenzini, 2005). In Ku and Hu’s (2001) extensive analysis of student-faculty interactions in the 1990s, they found interactions substantially increased student’s satisfaction with their college experience, a replication of one of Endo & Harpel’s (1982) findings. Additionally, they found that the extent of student-faculty interactions does not significantly vary among institutional types, but is influenced by students’ academic preparation; those students with a stronger academic background reported higher levels of student-faculty interactions (Ku & Hu). Finally, in a study examining the extent and impact of student-faculty interactions across racial and ethnic groups,

faculty interaction was found to contribute to student learning and personal development for all racial and ethnic groups, but it contributed more for students of color than white students (Lundberg & Schreiner, 2004).

Likewise, interactions with peers are positively associated with a variety of developmental outcomes. The peer group has been described as “the single most important environmental influence on student development” (Astin, 1993, p. xxii). Whitt, Edison, Pascarella, Nora, and Terenzini (1999) concluded that peer involvement in- and out-of-the-classroom resulted in increased cognitive development. When asked to describe what had the greatest impact on their learning and personal development, college seniors frequently responded it was interactions with their peers (Kuh, 1995).

Good Practices in Undergraduate Education

A parallel line of inquiry explores the influences of undergraduate socialization interactions utilizing the “Good Practices” conceptual model created by Chickering & Gamson (1987, 1991, 1999). These good practices include factors such as student-faculty contact and cooperation among students (Chickering & Gamson, 1987, 1991). Researchers using the good practices as a conceptual framework have examined how often students experience the good practices and the influence of those practices on college outcomes (see, for example, Cruce, Wolniak, Seifert, & Pascarella, 2006; Kuh, Pace, & Vesper, 1997; Kuh & Vesper, 1997; Pascarella et al., 2006; Pascarella, Wolniak, Cruce, & Blaich, 2004; Seifert, Drummond, & Pascarella, 2006; Sturnick & Connors, 1995). Good practices in general, and cooperative learning with peers in particular, were positively associated with self-reported gains in college, such as general education, intellectual development, and personal/interpersonal development (Kuh, Pace & Vesper). Good practices such as faculty-interactions with students and peer

involvement have also been positively associated with cognitive development, plans to attend graduate school, and attitudes toward learning (Cruce, Wolniak, Seifert, & Pascarella).

Because the good practices have become common indicators of positive educational experiences, additional research has attempted to discern which groups of students are most likely to experience good practices. For example, Kuh & Vesper (1997) found that during the period between 1990 and 1994, student-faculty interactions increased at baccalaureate-granting institutions, but decreased at doctoral-granting institutions, while peer cooperation remained unchanged at both. Similarly, research has demonstrated that students at liberal arts colleges experience good practices at higher levels than students at other types of institutions (Pascarella, Wolniak, Cruce, & Blaich, 2004). Students at highly selective institutions experienced positive influential interactions with their peers compared to students at less selective institutions (Pascarella et al., 2006).

Good practices have become such widely accepted indicators of positive socialization experiences that they have been incorporated into one of the most commonly used measures of student involvement in higher education, the National Survey of Student Engagement (NSSE) (Chickering & Gamson, 1999; Kuh, 2001). Yet for the most part, SES continues to be ignored, or merely controlled for, in this area of research (Walpole, 2007). We know of only one study that explicitly looked at both SES and elements of undergraduate student socialization. The researchers found that, controlling for a host of background characteristic, institutional type, and college experiences, students in the highest SES quartile experienced faculty interest in teaching and student development and positive interactions with peers (both in-and out-of-the-classroom) more than their peers in the lowest SES quartile (Goodman et al., 2006). Students in the second highest quartile also experienced more positive interactions with peers in-and-out-of-the-

classroom than individuals in the lowest quartile. Finally, students in the second lowest-quartile experienced faculty interest in teaching and student development and positive non-course related interactions with peers more than students in the lowest SES quartile (Goodman et al). These findings suggest that SES is related to other socializing influences, just as Weidman (1989) proposed. Therefore, a review of findings related to SES and college experiences and outcomes is warranted.

Socioeconomic Status and the Undergraduate Student Experience

In her extensive literature review on low SES college students, Walpole (2007) finds that most of the literature focuses on access to college, while differences in college experiences relative to SES are relatively unexplored. Walpole highlights three trends in the literature on low SES students: they are less involved in campus activities, they spend more time working for pay, and they choose different types of majors/have different educational goals (Walpole). She also finds little research related to SES and college outcome, though she cites evidence that low SES students are less likely to graduate college, less likely to attend graduate school, and earn lower income than higher SES students. In a study primarily examining low SES, first-generation students, Grayson (1997) found that these students report spending less time on cultural involvement and student activities than their peers. Further, low SES students receive lower grades, spend less time on student activities and studying, and work more when compared to high SES students (Walpole, 2003). Low income students (one indicator of low SES) work more than higher income students and are less likely to attend private institutions (Paulsen & St. John, 2002). Students from higher SES backgrounds were more likely to participate in students' senior year activities, including cooperative learning, tutoring others, and discussing course content

with other students (Appling, 2001). In turn, these activities, which lower SES students experienced less frequently, affected critical thinking and problem-solving abilities (Appling).

Clearly, low SES students experience college differently than their higher SES peers. The findings reviewed here lead us to believe that it is valuable to revisit Weidman's (1989) Model of Undergraduate Socialization that calls for including SES factors both to control for student backgrounds and account for ongoing socialization experiences. Walpole's (2007) suggestion that researchers move beyond using SES as a control and look at the differing effects on college experiences and outcomes lends credence to this argument.

Conceptual Model of Undergraduate Socialization

Weidman (1989) maintains that it is important to understand both the individual and the groups or memberships that influence the individual. From the individual's point of view, socialization entails learning the appropriate behaviors and attitudes of the group. This happens through interactions with others who exemplify the norms of the particular group. The individual learns whether his or her actions are appropriate for the group from the way the group members react positively or negatively. Once an individual is socialized into a group, that individual internalizes the norms of the group. For college students, this entails norms regarding how to behave in college, as well as "anticipatory socialization" or preparation for life after college.

Because students have already been socialized prior to coming to college, during college they must make sense of the norms they already know and those they are experiencing in college. The dissonance between the two will vary depending on the student's background and college experiences. Therefore Weidman's (1989) model, like research before him, places an emphasis on including student background characteristics that represent their abilities, goals, values, and SES. Some students adopt the norms of the groups they are in, which affects their

values and attitudes and college and career. Other times, students will hold firm to old beliefs, rejecting the norms of the socializing groups they encounter and remaining unchanged in their beliefs and values.

The Model of Undergraduate Socialization includes groups of variables representing three socializing influences that student experience during college. The first, which is common to most of the college impact research, is the collegiate experience itself. To capture the influence of college, Weidman (1989) suggests using variables reflecting academic characteristics (such as mission, selectivity, and major) and variables reflecting social characteristics. It is this latter set of variables that would reflect the socializing influences, both formal and informal, related to interactions with peers and faculty. Weidman's model goes further than most college impact models, in that he includes two additional socializing influences that are external to college: parents and non-college reference groups (e.g., employers and community organizations). He emphasizes that family SES, including such factors as parents' income, parents' education, and parents' occupational prestige, continues to influence students throughout college as part of the parental socialization.

Weidman's model was originally developed with affective outcomes in mind: career choices, aspirations, values, and life style preferences. While he believed that socialization was most likely to influence these kinds of attitudinal outcomes, he also suggests using the model to assess the influence of socialization on cognitive outcomes in future research.

Research Questions

Our goal is to expand the use of Weidman's (1989) Model of Undergraduate Socialization by applying it to cognitive outcomes. Our analyses will allow us to contribute to the college impact literature by analyzing the effects of SES variables on college outcomes.

Finally we want to discern how SES and other socializing factors work together to influence learning. The specific research questions guiding our analyses are:

1. To what extent do SES factors, both as a background characteristic and ongoing socialization, influence cognitive development?
2. To what extent do elements of student socialization, such as interaction with faculty and peers, influence cognitive development?
3. Do the effects of socialization (e.g., student-faculty interaction and peer influence) on college outcomes significantly vary by SES?

Methods

Sample and Data Collection

Our analysis draws from a sample of students from 19 institutions that participated in the Wabash National Study of Liberal Arts Education (WNSLAE), a longitudinal study investigating the effects of the liberal arts experiences on a range of outcomes associated with a college education. The colleges and universities participating in the study represent a variety of characteristics including institutional type and control, selectivity, size, location, and patterns of student residence. Liberal arts colleges are purposefully over-represented because the primary focus of the WNSLAE study is liberal arts colleges and experiences. Our analytic sample includes 11 liberal arts colleges, three research universities, three regional universities, and two community colleges.

The students within the sample were first-year, full-time undergraduates. Students invited to participate included the entire first-year population at the smaller institutions. Students were randomly selected from the incoming class in the College of Arts and Sciences at the largest institution and selected randomly from the incoming first-year class at the other large

institutions. Students were offered a small monetary stipend for their participation in each data collection.

The data collection was conducted in two waves. The initial data collection took place in early Fall 2006 with 4,501 students participating. Using the WNSLAE pre-college survey, student demographic information, family background characteristics, high school experiences, and various pre-college measures on cognitive and psychosocial outcomes were collected. The follow-up data collection (n = 3,081) was conducted in Spring 2007. Two complementary survey instruments were administered to measure a myriad of student college experiences, student engagement, and exposure to good practices: the NSSE student survey and the WNSLAE Student Experiences Survey.

Additionally, posttest measures on the outcomes were collected. While all students completed most of the instruments chosen to measure college outcomes, there were two exceptions due to concerns regarding the length of time required to complete the instruments. The *CAAP Critical Thinking Test* and the *Defining Issues Test-2* were each administered to approximately half of the participants who were selected randomly. Of the 3,081 students participating in both data collections, 1,485 had useable responses on the *CAAP Critical Thinking Test* and 1,584 had useable responses on the *Defining Issues Test-2*.

We weighted the follow-up participant data up to each of 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 score (or COMPASS/SAT equivalent). This weighting cannot adjust for non-response bias, but it does make the sample more similar to the population from which it was drawn.

After eliminating students with missing data, 2,422 students (79% of original completers) remained in our analyses for the *Need for Cognition* and *Positive Attitude Toward Literacy* outcomes. Because two instruments were administered to smaller samples, 1,227 students (83% of original completers) remained in the analytic sample for *CAAP Critical Thinking* and 1,264 students (80% of original completers) for the *Defining Issues Test-2*.

*Dependent Variables*¹

The WNSLAE dataset includes nearly 20 measures of outcomes associated with attending college. For this study, we chose four measures that representing cognitive development: *Need for Cognition*, *Positive Attitude Toward Literacy*, *CAAP Critical Thinking*, and *Defining Issues Test-2*. Each instrument was administered at the beginning of the first-year and at the completion of the first-year, which provided pre-test and post-test scores for all outcomes.

Need for Cognition is an 18-item scale ($\alpha = 0.897$) that investigates an individual's desire to engage in cognitive activities (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Those who score high on the *Need for Cognition* scale “tend to seek, acquire, think about, reflect back on information to make sense of stimuli, relationships, and events in their world” (p. 198). Individuals with low need for cognition are more likely to rely on others to make sense of their world. When administered to college students, the *Need for Cognition* has been positively associated with the high levels of verbal ability, generating complex attributions for human behavior, desire to maximize information gained over maintaining one's perceived reality (Cacioppo, et al.), and college grades (Elias & Loomis, 2002).

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

Positive Attitude Toward Literacy is a six-item scale ($\alpha = 0.708$) that examines the extent to which a student finds pleasure in literacy activities, such as reading literature and poetry, expressing ideas through writing, and reading scientific or historical material (Bray, Pascarella, & Pierson, 2004). Among college students, the *Positive Attitude Toward Literacy* scale has correlated positively with library use, reading unassigned books, and reading comprehension (Bray, Pascarella, & Pierson).

The *CAAP Critical Thinking* measure ($\alpha = 0.81 - 0.82$), developed by the American College Testing Program (ACT, 1991), is a module from the Collegiate Assessment of Academic Proficiency. The measure represents effective reasoning and problem-solving and has been validated with the Watson-Glaser Critical Thinking Appraisal, another assessment of critical thinking (Pascarella, Bohr, Nora, & Terenzini, 1995).

The *Defining Issues Test-2* ($\alpha = 0.77 - 0.81$) is a revised version of the original Defining Issues Test from 1979, that measures moral judgment or reasoning (Rest, Narvaez, Thoma, & Bebeau, 1999). We used the N2 test score, which represents the degree to which an individual uses higher order moral reasoning in resolving moral issues and reflects the extent to which one rejects ideas because they are simplistic or biased (Bebeau & Thoma, 2003). An extensive body of evidence supports the validity of the Defining Issues Test in predicting principled ethical behavior in a number of areas, including resistance to cheating, helping behavior, and community involvement (see Pascarella & Terenzini, 1991, 2005).

Independent Variables

Controls. In order to account for differences among students' backgrounds and college experiences, we introduced several groups of controls into our models. Our first set of control variables accounts for differences in student background characteristics and includes sex, race,

English as a native language, ACT composite score, highest intended academic degree, and academic motivation. Additionally, pretest measures of educational outcomes serve as controls in our models. As a result, we can more confidently attribute outcome scores to the college experience because we will have accounted for the students' starting scores (Astin & Lee, 2003; Pascarella, 2006). The second set of control variables represents college experiences. It includes student's place of residence, working on- and off-campus, Greek affiliation, and member of a sponsored athletic team. Finally, we also control for institutional type (e.g., community colleges, regional universities, and research universities) with liberal arts colleges serving as our reference group.

Variables of Interest. The independent variables we are most interested in for these analyses include socialization factors, similar to those specified in Weidman's (1989) model of undergraduate socialization. We have chosen several variables related to SES, which Weidman suggested are important family socialization factors. Within the category of SES, we included a series of variables related to parental education: Mother has some college, Mother has a Bachelor's degree or higher, Father has some college, and Father has a Bachelor's degree or higher. The reference categories are Mother has no college education and Father has no college education. We also included a total income variable that represents the family income if the student is still a dependent or student income if he or she is independent. Given the sensitivity of income and the often unreliability of this self-reported variable, we also used Student has Federal Grant as a proxy for income. This is an institution-reported variable and students who receive the grants are at or below poverty level. Finally, we controlled for family size and included variables that measure the number of siblings in the family and the number of dependents the student reports.

Because the roles of faculty and peer influence are also integral to Weidman's (1989) conceptual model, we included several scales measuring vetted good practices in undergraduate education that also reflect the influence of socialization. See Table 1 for individual items included within each of these scales and the alpha reliability of each.

Insert Table 1 here

Three scales representing the influence of faculty include, 1) *Quality of non-classroom interactions with faculty*, which reflects personal relationships with faculty as well as faculty influence on personal and intellectual development, 2) *Faculty interest in teaching and student development*, which reflects the student's perception that faculty are genuinely interested in students and teaching, and 3) *Frequency of interactions with faculty*, which reflects the frequency that students talk to faculty concerning grades, assignments, career, etc. or worked with them on non-course related activities. A fourth scale, *Frequency of interaction with student affairs staff*, was included to extend Weidman's (1989) model to include another group of individuals we believe may have an important socializing role for students. This scale represents how often students work with or talks to student affairs staff.

We also included three additional scales representing the socializing influence of peers. *Degree of positive peer interactions* represents the extent to which students agree that they have engaged in satisfying relationships with other students and that those relationships have a positive impact on them. *Cooperative learning* is a measure of the extent to which students learn from each other by working together both in- and out-of-class. Finally, *Co-curricular involvement* is a measure of the number of hours per week that the student spends participating in co-curricular activities, presumably working with other students.

Limitations

The WNSLAE study's primary focus is to study the effects of undergraduate liberal arts experiences on liberal arts colleges. Because of this focus, the WNSLAE dataset has three primary limitations that should be noted. First, the dataset is overpopulated with liberal arts colleges, possibly overestimating the effects of the liberal arts experience across the cognitive outcomes. To account for this possibility, we control for institutional type in our models. Second, the overpopulation of liberal arts colleges directly implies in overpopulation of students who are more likely exposed to the liberal arts experience. Lastly, liberal arts colleges typically have higher enrollment standards and admit students with higher levels of academic achievement. Therefore, our analytic sample may be overpopulated with high-achieving students, who theoretically may come from high SES families.

Analyses

Data Analyses. We began our analyses by reviewing the potential biases of missing data and the effects of multicollinearity. We analyzed cases that were dropped because of missing data and found no bias on race and sex for those individuals. Therefore, we used listwise deletion in our regressions.

We also looked for correlations among our SES variables and surprisingly, found none above 0.27, suggesting we do not have a multicollinearity problem with our regression models. The variance inflation factor was 1.73, indicating the multicollinearity of the independent variables to be acceptable (Myers, 1990; Stevens, 2002). It should be noted that we did attempt a more parsimonious model by creating an SES scale based on the results of principle component analysis. The resulting variable included mother and father's education and parental income and had an alpha reliability of 0.63. However, when included in our regression models, the SES variable was never significant. We returned to our original model with multiple education and

income-related variables, believing these variables influence different outcomes in distinct ways and that those effects were being “washed out” by combining them into one variable. This is supported by Paulsen and St. John’s (2002) suggestion that the interactions of education, income, and social status are too complex to combine into a composite variable.

Ordinary Least Squares Regressions. We conducted a series of ordinary least squares regressions on the four dependent variables, introducing variables into the models in three separate blocks (see Table 2). The first block includes the socioeconomic variables that can impact a student’s family socialization: level of parental education, total income, student has federal grant, number of siblings, and number of dependents. In the second block, we add controls for background characteristics (sex, race, English is native language, ACT composite score, highest intended academic degree, and academic motivation) and a pretest measure for the outcome. The third block introduces college level controls including student’s place of residence, working on- and off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type. In addition, the third block incorporated seven good practice scales that relate to student socialization in- and out-of-the-classroom: *Quality of non-classroom interactions with faculty*, *Faculty interest in teaching and student development*, *Frequency of interactions with faculty*, *Degree of positive peer interactions*, *Cooperative learning*, *Co-curricular involvement*, and *Frequency of interaction with student affairs staff*. For interpretative purposes, all continuous variables were standardized in each model.

Interaction Effects. After running our initial regressions, we tested for interaction effects related to the SES and socialization variables. We wanted to see if the effects of the college socialization factors on our outcomes were the same for all students or if they differed according to levels of SES. We created seven groups of cross-product terms multiplying each socialization

variable by mother has some college experience, mother has a Bachelor's degree or higher, father has some college experience, father has a Bachelor's degree or higher, and total income. Since the main effects of SES were only significant for two outcomes, we only tested for interaction effects for those outcomes. Substituting one group at a time, we added the cross-product terms into the full regression college model for *Positive Attitude Toward Literacy* and *CAAP Critical Thinking*. A significant change in R^2 in the models suggested that interaction effects were present. Significant coefficients for the cross-product variables isolate where the effects of socialization are conditional based on parental education level and total income. It is important to note for interpretative purposes that the socialization variables are standardized continuous variables, levels of parental education are dichotomous variables (the omitted category is first-generation status) and total income is a standardized continuous variable. See Tables 3 and 4 for a summary of the significant interaction effects.

Design Effect. Because we employ a two-stage cluster sample design, it is quite possible that our standard errors are misestimated as a result of the design effect. Given the importance of examining a number of interaction effects, the analyses could not account for the design effect when running our analyses. To try to account for the possible misestimation of our standard error (often biased downward), we use a more stringent and conservative significant level of $p < 0.01$ (see Thomas and Heck, 2001).

Results

General Effects

Table 2 summarizes the standardized effects of various SES measures and the socialization influences, related to peer, faculty, and staff interactions, on the four cognitive outcomes. We found that although parents' education level and total income tend to have

significant effects on the outcomes, most of those effects disappear when we control for other background characteristics and college experience. Contrary to prior research, recipients of a federal grants (often used as a proxy for income) and family size (e.g., number of siblings and number of dependents) were mostly non-significant across cognitive outcomes. Interactions with peers, faculty, and staff did not consistently influence any of the outcomes, and where they were significant, the effect sizes were very small.

Insert Table 2 here

SES Model. The first set of models regress each outcome on the block of SES factors. While the significant effects of SES were distinct in that no one variable consistently influence the outcomes, the SES factors as a group influenced all of the outcomes. Across all four outcomes, students whose mother or father attained any amount of college education scored from 0.16 to 0.54 standard deviations higher than first-generation students. In other words, first-generation college students are at a disadvantage across cognitive outcomes. The SES variables measuring total income suggest that high income students score higher on the *CAAP Critical Thinking*. However, total income was found to have a significantly negative effect on *Positive Attitude Toward Literacy*, indicating that low-income students tend to gain more from literacy and writing activities than higher-income students. Family size had one isolated and minimal effect. For a one standard deviation increase in number of dependents, measures on the *Need for Cognition* increase by 0.05 standard deviations from the mean. Overall, these significant results highlight the importance of accounting for SES factors as Weidman (1989) suggested.

Pre-College Model. For the Pre-college model, we regress the outcomes on the block of SES factors while controlling for other student background and pre-college characteristics, including sex, race, English as a native language, ACT composite score, highest intended

academic degree, and academic motivation. We also included a pretest measure of the outcome for that model. It is important to note that while many of the significant effects disappeared from the SES model to the Pre-college model, two of the four outcome measures (*Positive Attitude Toward Literacy* and *CAAP Critical Thinking*) were still significantly impacted by two SES factors (level of parental education and total income). The disappearance of many of the significant effects can be attributed to the inclusion of the pretest measures for each outcome. Because the pretest accounts for a significant proportion of the variance measured on each outcome, we would expect to see a decrease in significant effects and effect sizes on all of the other variables. Therefore, persistent significant effects across any of the socioeconomic factors, after controlling for background and pre-college characteristics and the pretest, indicate the importance of SES influences. Furthermore, it is also important to take into account multiple background and pre-college characteristics because they may moderate the effects of SES, as this model demonstrates.

College Model. The final set of models regress the outcomes on variables from the Pre-college model while adding the socialization scales and other college experience variables. The magnitude of the effect sizes of the SES measures slightly decrease from the Pre-college model to the College model. While no measures of SES were found to be significant net of demographics, pre-college characteristics, and college experiences on *Need for Cognition* and *Defining Issues Test-2*, father's education and total income continued to be significant for *Positive Attitude Toward Literacy* and *CAAP Critical Thinking*. Compared with first-generation college students, students whose fathers had any level of college experience scored significantly higher on the *CAAP Critical Thinking* (0.13 – 0.22 standard deviations). Interestingly, the influence of total income is quite different from that of parental education, even though the two

are typically correlated. For every standard deviation increase in total income, a student's *Positive Attitude Toward Literacy* score decreased by 0.05 standard deviations.

Interaction Effects

We added a series of interaction terms to our College models to assess the interaction effects of SES and socialization. However within the college models, levels of parental education and total income were not-significant for *Need for Cognition* and *Defining Issues Test-2*. Because significance was not prevalent in the college models, we did not test the interaction effects of socialization with levels of SES for *Need for Cognition* and *Defining Issues Test-2*. The interaction effects did yield a statistically significant increase in R^2 ($p < 0.01$) for *Positive Attitude Toward Literacy* and *CAAP Critical Thinking*. This suggests that for each outcome, the effects of socialization added substantially to the predictive ability of our models. The significance of cross-products between mother and father's education and socialization and total income and socialization provides information about interaction effects for first-generation students (the omitted category). Tables 3 and 4 highlight the significant interaction effects of parental education and income with peer, faculty, and staff interactions.

Parental Education x Socialization. A number of significant interaction effects were prevalent in our analyses. This indicates that first-generation students, compared to students whose parents have various levels of college education, are experiencing the socialization in different ways. In some cases, first-generation students experience an advantage as far as the socialization affecting their college outcomes. In other cases, they experience a disadvantage. Significant interaction effects were moderate in effect size, ranging from -0.13 to 0.11 standard deviations.

Insert Tables 3 and 4 here

First-generation college students do not receive the same benefits from socialization with faculty (frequency of interactions with faculty) or peers (cooperative learning) on *Positive Attitude Toward Literacy*. For a standard deviation increase in frequency of interactions with faculty, students whose mother has a Bachelor's degree or higher or whose father has some college experience score 0.09 and 0.08 standard deviations higher on *Positive Attitude Toward Literacy*, respectively. Further, for a standard deviation increase in participation in cooperative learning and frequency of interactions with student affairs staff, students whose mother has a Bachelor's degree or higher score 0.11 standard deviations higher on *Positive Attitude Toward Literacy*. In other words, even though first-generation students are exposed to faculty, student, and staff interactions, they are still at a disadvantage compared to non-first-generation students. This trend was reversed on isolated interactions on the outcome measuring *CAAP Critical Thinking*. For a standard deviation increase in faculty interest in teaching and student development, students whose mother has some college experience but not a Bachelor's degree or score 0.10 lower on the *CAAP Critical Thinking*.

Income x Socialization. The interactions between the total income and socialization, both continuous measures, tell a surprising story. The interaction effects for total income and socialization produce negative effects for each of the cognitive outcomes. In other words, participation in the socializations was modified by income. The significant interaction effects for the cross-product of income x socialization indicate a continuing negative adjustment to the slope found in the college model. This signifies that the socializations have a compensatory effect for lower income students on *Positive Attitude Toward Literacy* and *CAAP Critical Thinking*. For a standard deviation increase in the socialization and income, the *b*-coefficient for significant outcomes decreased by *x* standard deviations. Moreover, the negative interactions

were not isolated to one particular socialization agent. Socialization with faculty and peers was equally negative for high total income students across the *Positive Attitude Toward Literacy* as well as the *CAAP Critical Thinking*.

Discussion and Implications

Results from this longitudinal study on the effects of socialization factors on first-year students' cognitive outcomes at nineteen participating two-year four-year and colleges and universities demonstrates that Weidman's (1989) theory of socialization can be extended to cognitive outcomes. Further, this analysis supports the proposition that SES is an important variable that must be taken into account as a variable of interest in college impact research (Walpole, 2007; Weidman). SES clearly has a direct effect on a number of college outcomes.

Our models highlight the importance of taking into account multiple background characteristics because they may moderate the effects of SES. However, even after taking into account the socialization scales and other college socialization variables (e.g., Greek affiliation, working on- and off-campus), the significant effects of SES remained. Therefore, it appears that it is not enough for colleges and universities to simply provide avenues for positive socialization with peers, faculty, and staff. Institutions need to change the collegiate environment to alleviate the ongoing socialization of students from lower SES families that negatively affects many college outcomes. A recent study exploring the effects of vetted good practices on various levels of parental education found that being a first-generation student lowers one's exposure to good practices (Padgett & Johnson, 2008), thus suggesting that first-generation students are at a significant disadvantage with regards to their exposure to meaningful socializations.

The interaction effects highlight the distinction that being a first-generation student places you at a disadvantage when participating in the socializations across *Positive Attitude*

Toward Literacy, and at an advantage across the *CAAP Critical Thinking*. In particular, students whose mother's have a Bachelor's degree or higher and who are exposed to frequent interactions with faculty, cooperative learning, and frequent interactions with student affairs staff score higher across *Positive Attitude Toward Literacy* compared to first-generation students. This indicates that students whose mothers have some postsecondary education are able to make more of their socialization experiences in order to achieve at higher levels on *Positive Attitude Toward Literacy*. Yet, first-generation students who perceived that faculty were interested in teaching and student development benefited at higher levels across *CAAP Critical Thinking* compared to students whose mother has some college experience. In other words, while faculty, peer, and staff interactions were a hindrance for first-generation students on the *Positive Attitude Toward Literacy*, faculty interactions was a benefit for first-generation students on *CAAP Critical Thinking*.

A surprising yet consistent finding across the cognitive outcomes was the negative interaction effect for high income students and their exposure to the socializations. High income students who experience peer, faculty, and staff socialization score lower across cognitive measures, thus indicating that the socialization mechanisms have an additive effect for lower income students on *Positive Attitude Toward Literacy* and *CAAP Critical Thinking*. When controlling for level of parental education, low income students who are exposed to frequent interaction with faculty, cooperative learning, and frequent interactions with student affairs staff are benefitting on the *Positive Attitude Toward Literacy*. Similarly, when controlling for level of parental education, low income students who are exposed to quality non-classroom interaction with faculty and positive peer interactions are benefitting on the *CAAP Critical Thinking*. Some caution is warranted when applying these results across populations. The average total income of

the WNSLAE student sample is much higher than the traditional income levels of college students. Thus, students with low levels of income may be overestimating the effects of socialization across the cognitive outcomes. This limitation, coupled with our findings, indicates the need for future research to explore in more depth the effects of income and socialization on cognitive measures.

These mixed effects have different implications for colleges and universities. First, since first-generation college students are not receiving the same benefits of peer, faculty, and staff socialization on cognitive outcomes as students whose parents have some college education, colleges and universities need to reconsider how they are meeting the needs of first-generation students. It cannot be assumed that engaging them in good practices with their peers and faculty is enough. Second, since low income students do benefit more from peer, faculty, and staff socialization than their higher income peers, colleges and universities need to find ways to encourage low-income students to engage in good practices with these socializing agents.

As our findings suggest, socialization in college can provide students from low SES families with either an additive boost towards, or a disadvantage on, cognitive development. Rather than assume that encouraging students to engage with socializing agents is an appropriate solution for all students, colleges and universities must be attentive to the socialization effects of SES as well. By examining the differences that exist between level of parental education and total income, as our research has done, institutions can create targeted educational practices for different populations of students. While this is time and labor intensive, institutions should be dedicated to providing a positive educational experience to its underserved students.

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Table 1

Socialization Scales Using the Wabash National Study of Liberal Arts Education

Socialization Scale	Constituent Labels of Items in Scaled Variable	Cronbach Alpha
<i>Quality of Non-Classroom Interactions with Faculty</i>	The extent R agrees that non-classroom interactions with faculty have had a positive influence on personal growth, values, and attitudes	0.854
	The extent R agrees that non-classroom interactions with faculty have had a positive influence on intellectual growth and interest in ideas	
	The extent R agrees that non-classroom interactions with faculty have had a positive influence on career goals and aspirations	
	The extent R agrees that since coming to this institution, R has developed a close, personal relationship with at least one faculty member	
	The extent R agrees that R is satisfied with the opportunities to meet and interact informally with faculty members	
<i>Faculty Interest in Teaching and Student Development</i>	Most faculty with whom R had contact are genuinely interested in students	0.850
	Most faculty with whom R had contact are interested in helping students grow in more than just academic areas	
	Most faculty with whom R had contact are outstanding teachers	
	Most faculty with whom R had contact are genuinely interested in teaching	
	Most faculty with whom R had contact are willing to spend time outside of class to discuss issues of interest and importance to students	
<i>Frequency of Interactions with Faculty</i>	During current school year, how often has R discussed grades or assignments with an instructor	0.702
	During current school year, how often has R talked about career plans with a faculty member or advisor	
	During current school year, how often has R discussed ideas from readings or classes with faculty members outside of class	
	During current school year, how often has R worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)	
<i>Degree of Positive Peer Interactions</i>	R has developed close personal relationships with other students	0.871
	The student friendships R has developed at this institution have been personally satisfying	
	Interpersonal relationships with other students have had a positive influence on Rs personal growth, attitudes, and values	
	Interpersonal relationships with other students have had a positive influence on Rs intellectual growth and interest in ideas	
	Rs quality of relationships with other students	
	It has been difficult for R to meet and make friends with other students (reverse-coded)	
	Few of the students R knows would be willing to listen to and help R with a personal problem (reverse-coded)	
Most students at this institution have values and attitudes different from R (reverse-coded)		
<i>Cooperative Learning</i>	In Rs classes, students taught each other in addition to faculty teaching	0.697
	Faculty encouraged R to participate in study groups outside of class	
	R participated in one or more study group(s) outside of class	
	During current school year, how often has R worked with other students on projects outside of class	
<i>Co-curricular Involvement</i>	Number of hours per week R spends participating in co-curricular activities	
<i>Frequency of Interactions with Student Affairs Staff</i>	How often R discussed a personal problem or concern with student affairs professionals	0.844
	How often R worked on out-of-class activities (e.g., committees, orientation, student life activities) with student affairs professionals	
	How often R talked about career plans with student affairs professionals	
	How often R discussed ideas from readings or classes with student affairs professionals	
	How often R discussed grades or assignments with student affairs professionals	

Table 2

Standardized Effects of Socioeconomic Status and Socialization on Four Cognitive Outcomes using the Wabash National Study of Liberal Arts Education

Variables ^a	<i>Need for Cognition</i>			<i>Positive Attitude Toward Literacy</i>			<i>CAAP Critical Thinking</i>			<i>Defining Issues Test-2</i>		
	SES ^b	Pre-college ^c	College ^d	SES ^b	Pre-college ^c	College ^d	SES ^b	Pre-college ^c	College ^d	SES ^b	Pre-college ^c	College ^d
Mother has some College Education ^e	0.10	-0.02	0.01	-0.02	0.01	0.03	-0.06	-0.09	-0.03	-0.21	-0.02	0.00
Mother has Bachelor's Degree or higher ^e	0.22**	0.01	0.04	0.15	0.07	0.08	0.33**	-0.09	-0.05	0.01	-0.01	0.00
Father has some College Education ^e	-0.08	0.02	0.01	0.10	0.10	0.09	0.54**	0.30**	0.22**	0.14	-0.02	-0.07
Father has Bachelor's Degree or higher ^e	0.16*	0.05	0.04	0.21**	0.02	0.00	0.48**	0.21**	0.13*	0.41**	0.00	-0.03
Total Income	-0.01	-0.02	-0.01	-0.11**	-0.05**	-0.05*	0.11**	-0.02	-0.03	-0.01	-0.02	-0.05
Student has Federal Grant	-0.03	-0.02	-0.05	-0.04	-0.03	-0.07	-0.16	0.06	-0.03	-0.08	-0.04	-0.05
Number of Siblings	-0.01	-0.01	-0.01	0.00	0.01	0.01	-0.04	-0.01	-0.01	-0.03	0.00	0.02
Number of Dependents	0.05*	0.01	0.01	0.02	0.01	0.01	-0.05	0.00	0.01	-0.02	0.04	0.04
Precollege Outcome Measure		0.66**	0.64**		0.71**	0.69**		0.57**	0.57**		0.57**	0.58**
Quality Non-classroom Interactions w/ Faculty			0.04			0.08**			0.07**			0.06
Faculty Interest in Teaching & Student Development			0.01			0.01			-0.01			-0.04
Frequency of Interactions w/ Faculty			0.04			0.02			-0.07*			0.05
Degree of Positive Peer Interactions			-0.02			0.01			0.01			0.01
Cooperative Learning			0.05**			0.02			0.03			0.03
Co-Curricular Involvement			0.04			0.01			0.01			0.00
Frequency of Interactions w/ Student Affairs Staff			0.00			0.04			-0.02			-0.06*
R ²	0.03	0.57	0.59	0.02	0.59	0.61	0.15	0.74	0.76	0.05	0.57	0.59
N			2,442			2,442			1,227			1,264

* p < 0.01, ** p < 0.001

^a Only variables of interest have been included in this table.^b No other variables were included in this model.^c Controlling for the following student background variables: sex, race, English as a native language, ACT composite score, highest intended academic degree, and academic motivation.^d Controlling for the variables listed in c and the following college experience: place of residence, working on- and off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type.^e Omitted category is first-generation students; identified as students whose parents have no college education.

Table 3

Significant Standardized Interaction Effects of Parental Education and Socialization and Total Income and Socialization on Positive Attitude Toward Literacy using the Wabash National Study of Liberal Arts Education

	<i>Frequency of Interactions w/ Faculty</i>	<i>Degree of Positive Peer Interactions</i>	<i>Cooperative Learning</i>	<i>Frequency of Interactions w/ Student Affairs Staff</i>
Mother has Some College Education ^a	0.03	0.04	0.05	0.04
Mother has Bachelor's Degree or higher ^a	0.08	0.09	0.11*	0.10
Father has Some College Education ^a	0.10	0.12*	0.08	0.08
Father has Bachelor's Degree or higher ^a	0.02	0.02	-0.02	-0.01
Total Income ^b	-0.05*	-0.05*	-0.05**	-0.05**
Socialization Variable	-0.07	-0.02	0.04	0.04
Socialization x Mother has Some College Experience	0.01	-0.02	0.00	0.04
Socialization x Mother has Bachelor's or higher	0.09*	0.04	0.11**	0.11**
Socialization x Father has Some College Experience	0.08**	0.04	0.00	0.01
Socialization x Father has Bachelor's or higher	0.05	0.02	-0.07	-0.05
Socialization x Total Income	-0.08*	-0.04	-0.06*	-0.08*
R ²	0.61	0.61	0.61	0.61
N	2,442	2,442	2,442	2,442

* p < 0.01, ** p < 0.001

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

^b Total income is a continuous variable.

Controlling for sex, race, English as a native language, ACT composite score, highest intended academic degree, academic motivation, precollege outcome measure, place of residence, working on- and off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type.

Table 4

Significant Standardized Interaction Effects of Parental Education and Socialization and Total Income and Socialization on CAAP Critical Thinking using the Wabash National Study of Liberal Arts Education

	<i>Quality Non-classroom Interactions w/ Faculty</i>	<i>Faculty Interest in Teaching & Student Development</i>	<i>Frequency of Interactions w/ Faculty</i>	<i>Degree of Positive Peer Interactions</i>	<i>Cooperative Learning</i>	<i>Frequency of Interactions w/ Student Affairs Staff</i>
Mother has Some College Education ^a	-0.03	-0.04	-0.03	-0.01	0.00	-0.02
Mother has Bachelor's Degree or higher ^a	-0.05	-0.05	-0.05	-0.04	-0.03	-0.05
Father has Some College Education ^a	0.23**	0.23**	0.20**	0.22**	0.18**	0.24**
Father has Bachelor's Degree or higher ^a	0.13*	0.14*	0.10	0.13*	0.08	0.13*
Total Income ^b	-0.03	-0.04	-0.04	-0.03	-0.04	-0.04
Socialization Variable	0.19**	0.08	0.11	0.10	0.16**	0.04
Socialization x Mother has Some College Experience	-0.02	-0.10**	-0.02	0.00	0.01	0.03
Socialization x Mother has Bachelor's or higher	-0.06	-0.09	-0.07	0.02	-0.08	-0.06
Socialization x Father has Some College Experience	0.00	0.02	-0.06	0.02	-0.03	0.02
Socialization x Father has Bachelor's or higher	0.01	0.05	-0.08	-0.02	-0.06	-0.05
Socialization x Total Income	-0.09**	-0.02	-0.02	-0.13**	-0.03	0.00
R ²	0.76	0.76	0.76	0.76	0.76	0.76
N	1,227	1,227	1,227	1,227	1,227	1,227

* p < 0.01, ** p < 0.001

^a Omitted category is first-generation students; identified as students whose parents have no college education.^b Total income is a continuous variable.

Controlling for sex, race, English as a native language, ACT composite score, highest intended academic degree, academic motivation, precollege outcome measure, place of residence, working on- and off-campus, Greek affiliation, member of a sponsored athletic team, and institutional type.