RESEARCH REVISITED: COGNITIVE EFFECTS OF GREEK AFFILIATION IN COLLEGE: ADDITIONAL EVIDENCE[1,2]

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Previous research found broad based negative effects of fraternity/sorority affiliation on standardized measures of cognitive development after one year of college. Following the same sample, and employing essentially the same research design and analytic model, the present study found that the negative effects of fraternity/sorority affiliation were much less pronounced during the second or third years of college.

Social fraternities and sororities (commonly referred to as Greek organizations) are a very visible, if often controversial, aspect of undergraduate student life. Recently, they have become the focus of a growing body of research that has attempted to estimate their impact on various outcomes of college. (See Pascarella, Edison, Whitt, Nora, Hagedorn, & Terenzini [1996] for a review of this literature.) Greek affiliation has been linked with increased levels of satisfaction with college (Pennington, Zvonkovic, & Wilson, 1989; Pike & Askew, 1990), continued persistence in college and a higher probability of subsequent degree completion (Astin, 1975), and an increased ability to function in groups (Pike and Askew, 1990). Conversely, it has been linked with increased levels of alcohol consumption (Tampke, 1990; Wechsler, Kuh, & Davenport, 1996), higher levels of academic cheating behavior (Kirkvliet, 1994; McCabe & Bowers, 1996), and lower levels of principled moral reasoning (Sanders, 1990; Kilgannon, & Erwin, 1992).

A modest body of research has also addressed the impact of Greek affiliation on the academic or cognitive outcomes of college. Studies by Baird (1969), Kaludis and Zatkin (1966), Pike and Askew (1990), Prusok and Walsh (1964), and Willingham (1962) have examined the relationship between Greek affiliation and academic performance as reflected in grades; but the results of this research are inconclusive.

Note, too, as pointed out by Pascarella et al. (1996), that there are serious questions about the generalizability of grades as measures of cognitive growth during college. (See Pascarella & Terenzini [1991] for a review of the literature on the reliability, validity, and generalizability of grades.)

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There have been two longitudinal studies of the cognitive impacts of Greek affiliation that employ standardized measures. Both studies appeared in [the NASPA] journal. A well-designed, single institution study by Pike and Askew (1990) used the College Outcomes Measures Project (COMP) Objective Test developed by the American College Testing Program (Forrest & Steele, 1982). The COMP measures student competence along such dimensions as: intellectual and analytical skills, communication, reasoning, and problem solving. With statistical controls in effect for secondary school grades, entering ACT scores, and parents' education and income, students in Greek organizations had significantly lower COMP total scores than did their non-Greek counterparts.

Limitations of the Pike and Askew (1990) study (e.g., the single-institution sample, use of global cognitive growth score, the inability to 281 introduce controls for such factors as ethnicity, place of residence, full or part-time enrollment, or types of coursework taken), led to the second longitudinal investigation by Pascarella et al. (1996). Employing a sample from 18 4-year institutions, Pascarella et al. estimated the net impact of fraternity and sorority membership on standardized measures of reading comprehension, mathematics, and critical thinking after 1 year of college. In the presence of an extensive set of controls for such factors as precollege standardized ability, academic motivation, ethnicity, place of residence during college, full or part-time enrollment, and types of coursework taken, fraternity membership was found to have a significant negative effect on each of the three end-of-first-year cognitive measures, as well as on a composite score consisting of all three measures. The negative effect of sorority impact was not as pronounced. Compared to their counterparts who remained independent, women who joined sororities had significantly lower levels of end-of-first-year reading comprehension and composite achievement. Differences between Greek-affiliated and independent women on end-of-first-year mathematics and critical thinking were small and nonsignificant.

A major limitation of the Pascarella et al. (1996) study is that it only traces the cognitive impacts of Greek-affiliation through the first year of college. Thus, it is impossible to determine from their results if the potentially negative cognitive impacts of fraternity or sorority membership are limited to the first year of college, or if they extend into subsequent years. If fraternities or sororities tend to create a peer culture, whose norms enhance the nonacademic or nonintellectual, one might expect nontrivial negative cognitive consequences that persist beyond the first year. Conversely, the findings of the Pascarella et al. study may simply reflect the fact that joining a fraternity or sorority in the first year of college requires so much time and emotional commitment from students that it seriously dilutes the impact of their academic experience.

It is in the first year that students face tasks of adjustment to the academic demands of postsecondary education, cultivate effective study habits and time management. Involvement in fraternities (and to a lesser extent, in sororities) during this period may seriously detract from time required to become successfully integrated into academic life (Pascarella et al., 1996). If the latter view is the more correct, then we might expect Greek affiliation to exert less of an influence on cognitive growth as students progress beyond the first year of college. The major purpose of the present study was to estimate the cognitive impacts of Greek affiliation beyond the first year of college. The study had three specific purposes. First, it sought to assess the unique (or net) effects of Greek affiliation on objective, standardized measures of writing skills and science reasoning at the end of the second year of college, and on objective, standardized

measures of reading comprehension and critical thinking at the end of the third year of college. Second, it sought to assess the impact of Greek affiliation on student self-reported gains at the end of the second and third years of college in understanding the arts and humanities, understanding science, and in writing and thinking skills. Finally, it attempted to determine if the cognitive impacts of Greek affiliation differed for students in different institutional contexts and/or students with different characteristics.

Method

Samples

Institutional Sample. The institutional sample in this study was 18 4-year colleges and universities located in 15 states. Institutions were chosen from the National Center on Education Statistics Integrated Postsecondary Education Data System data to represent differences in colleges and universities nationwide on a variety of characteristics, including institutional type and control (e.g., private and public research universities, private liberal arts colleges, public and private comprehensive universities, historically black colleges), size, location, patterns of student residence, and the ethnic distribution of the undergraduate student body. Our sampling technique produced a sample of institutions with a wide range of selectivity. For example, we included some of the most selective institutions in the country and some that were essentially open admission.

Student Sample. The individuals in the overall student sample were students participating in the first, second, and third follow-ups of the National Study of Student Learning (NSSL), a large, longitudinal investigation of the factors that influence learning and cognitive development in college. The initial sample was selected at random from the incoming first-year class at each of the 18 colleges and universities in the institutional sample; each was given a target sample size relative to the size of its first-year class. The students received a cash stipend for their participation in each data collection, and they were told that any information they provided would be kept confidential and would never become part of their institutional records.

Data Collection

Initial Data Collection. The initial data collection was conducted in the fall of 1992 with 3,331 students from the 18 institutions participating. Data collected included an NSSL precollege survey of student demographic characteristics and background, students' aspirations and expectations of college, and students' orientations toward learning. Participants also completed Form 88A of the Collegiate Assessment of Academic Proficiency (CAAP). The CAAP was developed by the American College Testing Program (ACT) to assess general intellectual skills typically acquired by students during the first 2 years of college (ACT, 1989, 1991). The CAAP consists of 40-minute, multiple-choice test modules, three of which—critical thinking, mathematics, and reading comprehension—were administered in the initial data collection.

The critical thinking test is a 32-item instrument that measures a student's ability to clarify, analyze, evaluate, and extend arguments. A passage typically contains a series of sub-arguments that support a more general conclusion. Each passage contains one or more arguments and involves a variety of formats, including case studies, debates, dialogues, overlapping positions, statistical arguments, experimental results, or editorials. Each passage is accompanied by a set of multiple-choice items. The KR-20 reliability coefficients for the critical thinking test ranged

from .81 to .82 (ACT, 1990). In pilot testing of various instruments for use in the NSSL on a sample of 30 college students, the critical thinking test of the CAAP was found to correlated .75 with the total score on the Watson-Glaser Critical Thinking Appraisal (Pascarella, Bohr, Nora, & Terenzini, 1995). The mathematics test consists of 35 items designed to measure a student's ability to solve mathematical problems typical of many postsecondary curricula. The emphasis is on quantitative reasoning rather than formula memorization. The content areas tested include pre-, elementary, intermediate, and advanced algebra; coordinate geometry; trigonometry; and introductory calculus. The KR-20 reliability coefficients for the mathematics test ranged between .79 and .81. The CAAP reading comprehension test comprised 36 items that assess reading comprehension as a product of skill in inferring, reasoning, and generalizing.

The test consists of four prose passages, of about 900 words each, which are designed to be representative of the level and kinds of writing students commonly encounter in college curricula. The passages were drawn from topics in fiction, the humanities, the social sciences, and the natural sciences. The KR-20, internal consistency reliabilities for the reading comprehension test ranged between .84 and .86.

First Follow-Up Data Collection. The first follow-up data collection was conducted in the spring of 1993. This data collection included Form 88B of the CAAP reading comprehension, mathematics, and critical thinking modules; the College Student Experiences Questionnaire (CSEQ) (Pace, 1984); and a follow-up instrument developed for the NSSL. The CSEQ and the NSSL follow-up instrument were used to measure a wide range of students' curricular and out-of-class experiences in the first year of college.

The CSEQ also asks respondents to report the gains they think they have made during college across a wide range of dimensions. Of the original sample of 3,331 students involved in the fall 1992 data collection, 2,416 students participated in the first follow-up (72.53%).

Data from the first NSSL follow-up formed the basis for the Pascarella et al. (1996) study of the cognitive impacts of Greek affiliation.

Second Follow-Up Data Collection. The second follow-up of the NSSL sample was conducted in the spring of 1994. Similar to the first follow-up, extensive measures of students' second-year experiences were taken from their responses on the CSEQ and the NSSL follow-up survey. Students also completed Form 88A of the CAAP science reasoning and writing skills modules.

The CAAP science-reasoning test is a 45-item, 40-minute test designed to measure students' skills in scientific reasoning. The contents of the test are drawn from biology, chemistry, physics, and the physical sciences.

The test emphasizes scientific reasoning skills rather than recall of scientific content or a high level of skill in mathematics or reading. The reliability estimates for the science reasoning test ranged between .76 and .87 (ACT, 1991). The writing skills test is a 72-item, 40-minute test measuring students' understanding of the conventions of standard written English in usage, mechanics, and rhetorical skills.

The test consists of six prose passages, each of which is accompanied by a set of 12 multiple-choice test items. A range of passage types is used to provide a variety of rhetorical situations. The writing skills test has reliability estimates ranging between .93 and .95 (ACT, 1991).

The three self-report measures were the gains in understanding the arts and humanities scales (e.g., "broadening your acquaintance and enjoyment of literature"), the gains in understanding science scale (e.g., "understanding the nature of science and experimentation"), and the gains in writing and thinking skills scale (e.g., "ability to think analytically and logically") taken from the end-of-second-year responses on the CSEQ. Each scale was derived through factor analysis and has been used in previous analyses of the NSSL sample (e.g., Whitt, Edison, Pascarella, Nora, and Terenzini, 1999a and 1999b).

The alpha (internal consistency) reliabilities for the three self-report gain scales were: .76 for understanding the arts and humanities, .83 for understanding science, and .77 for writing and thinking skills.

Of the 2,416 students who participated in the first follow-up (spring 1993), 1,613 participated in the second follow-up (spring 1994) for a response rate of 66.8%. To provide at least some adjustment for potential bias by sex, race/ethnicity, and institution in the sample of students persisting in the study, a weighting algorithm was developed. Within each of the 18 institutions, participants in the second follow-up data collection were weighted up to the institution's end-of-second-year population by sex (male or female) and race/ethnicity (White, African American, Hispanic, other). Thus, for example if an institution had 100 African American men in its second-year class and 25 African American men in the sample, each African American man in the sample at that institution was given a weight of 4.00. An analogous weight was computed for participants in each sex and race/ethnicity cell in each institution. Applying sample weights in this manner allowed us to adjust not only for sample bias by sex and race/ethnicity, but also for sample bias (i.e., differential rates of sample persistence in the study) by institution.

Third Follow-Up Data Collection. The third follow-up of the NSSL sample took place in the spring of 1995. Measures of students' third-year experiences were taken from their responses on the CSEQ and the NSSL Follow-Up Survey.

Participants also completed Form 88B of the CAAP reading comprehension and critical thinking modules. Of the 1,613 4-year college students who participated in the spring 1994 data collection, 1,054 participated in spring 1995, for a third-year response rate of 65.3%. A third weighting algorithm, analogous to the one employed in the second follow-up, was developed to adjust for potential end-of-third-year sample bias by sex, race/ethnicity, and institution.

Research Design

The study design was a pretest-posttest quasi-experimental design in which statistical controls were made for salient precollege (fall 1992) and other variables. For consistency with the Pascarella et al. (1996) investigation, the primary comparison groups (independent variable) for the study were men and women who reported that they had joined a social fraternity or sorority during the first year of the study and their counterparts who indicated that they had not affiliated

with a Greek organization during the 3 years of the study. Students who indicated joining a Greek organization in the second or third year of the study were excluded, although they are incorporated in a supplementary analysis.

Dependent variables for the second year of the study were end-of-second-year scores on the CAAP writing skills and science reasoning tests; and end-of-second-year self-reported gains on the understanding arts and humanities, the understanding science, and the writing and thinking skills scales from the CSEQ. For the third year of the study, the dependent variables were end-of-third-year scores on the CAAP reading comprehension and critical thinking tests, and end-of third-year self-reported gains on the same three CSEQ scales employed in the second year of the study.

Evidence about the factors that independently influence learning and cognitive growth during college (e.g., Astin, 1977, 1993; Kuh, 1993; Pascarella & Terenzini, 1991) informed the selection of control variables:

1. Individual precollege (fall 1992) CAAP reading comprehension and critical thinking scores in the prediction of end-of third-year reading comprehension and critical thinking; individual level scores on a composite of precollege reading comprehension, mathematics, and critical thinking in the prediction of all other dependent variables. (Though not a strictly parallel precollege measure of writing skills or science reasoning, the precollege ability composite nevertheless correlated quite highly with those two dependent variables—.75 and .77 respectively.)
2. Precollege (fall 1992) academic motivation as measured by an eight-item, Likert-type scale (5 = strongly agree to 1 = strongly disagree) developed for the NSSL and based on research on academic motivation (e.g., Ball, 1977). Examples of items included: "I am willing to work hard in a course to learn the material, even if it won't lead to a higher grade," "When I do well on a test it is usually because I was well prepared, not because the test was easy," "In high school I frequently did more reading in a class than was required simply because it interested me," and "In high school I frequently talked to my teachers outside of class about ideas presented during class." Internal consistency reliability of the scale was .65.
3. Ethnicity (i.e., Caucasian, person of color).
4. Socioeconomic status (average of parents' education and income).
5. Age.
6. Cumulative number of credit hours taken through the second or third years of college (taken from the second or third NSSL follow-up questionnaire).
7. Average number of hours spent studying per week during the second or third years of college (taken from the second or third NSSL follow-up questionnaire).
8. Participation in intercollegiate athletics during the second or third year of college (taken from the second or third NSSL follow-up questionnaire).
9. On- or off-campus residence during the second or third year of college (taken from the second or third NSSL follow-up questionnaire).
10-14. Number of courses taken through the second or third year of college in (a) natural sciences and engineering (e.g., biology, chemistry, engineering, geology, physics); (b) arts and humanities (e.g., art history, composition, English literature, foreign languages, philosophy, classics); (c) social sciences (e.g., economics, psychology, history, sociology,

political science, social work); (d) mathematics (e.g., algebra, calculus, statistics, computer science, geometry, matrix algebra); and (e) technical/preprofessional (e.g., business, education, physical education, nursing, physical therapy, drafting). Respondents were to indicate, from 61 different courses across the five areas, how many of the courses they had taken during the second or third year of college. This information was taken from the second or third NSSL follow-up questionnaire.

Because the existing body of evidence suggests that institutional context can play a role in shaping the impact of college in indirect, if not direct, ways, we also included one institutional-level variable in the analytic model:

15. The average level of academic preparation of each institution's first-year class, estimated by the average precollege (fall 1992) composite score on the CAAP reading comprehension, mathematics, and critical thinking tests for the sample of first-year students at each of the eighteen institutions. Each student in the sample was assigned the mean score of his or her institution on the composite measure, and the institutional mean estimate was employed in the analyses of all individual-level dependent variables in both years of the study. Inclusion of this variable in the analytic model served as a control for the potential confounding effect of differential levels of Greek affiliation at colleges with different levels of student body selectivity.

Data Analysis

The data analyses were carried out in three stages. In the first stage, we estimated the total cognitive effects of Greek affiliation, employing reduced-form equations (Alwin & Hauser, 1975). Each dependent variable was regressed on a dummy variable representing Greek affiliation (coded 1) or independent (coded 0), plus all other variables considered causally prior or concurrent (i.e., individual precollege ability, precollege academic motivation, age, ethnicity, socioeconomic status, and the average composite ability of the first-year students at each institution). In the second stage of the analyses we estimated the direct cognitive effects of Greek affiliation by regressing each dependent variable on the total effects model specified above plus each of the college experience variables (i.e., cumulative credit hours taken, on-campus residence, hours spent studying, participation in athletics, and the cumulative number of courses taken in arts and humanities, social sciences, mathematics, natural sciences and engineering, and technical/preprofessional areas).

In the third stage of the analyses we tested for the presence of conditional effects (Pedhazur, 1982), that is, the possibility that the magnitude of the impact of Greek affiliation was different for students with different characteristics, or in different institutional contexts. A series of cross-product terms was computed between the Greek/independent variable and each of the other fifteen variables in the direct effects model. These were then added to the direct effects regression model employed in the second stage of the analyses. A statistically significant increase in explained variance (R2) attributable to the set of cross products indicates that the net effects of Greek affiliation are conditional; that is, they differ in magnitude for students at different levels on other variables in the prediction model. The nature of statistically significant individual conditional effects can then be examined.

All analyses reported in the next section are weighted sample estimates, adjusted to the actual sample size to obtain correct standard errors. Separate analyses were conducted for men and women.

Results

Year 2

Table 1 summarizes the estimated total (column "T") and direct (column "D") causal effects of Greek affiliation on end-of-second-year cognitive outcomes for men (Part A) and women (Part B). As the table indicates, in the presence of statistical controls for the confounding variables, being a member of a fraternity tended to have negative total and direct effects on all five cognitive outcomes for men. The magnitude of the impacts, however, were quite small; and the null hypotheses that they were due to chance could not be rejected (i.e., they were all nonsignificant). For women sorority membership had very small and nonsignificant negative effects on writing skills and science reasoning, and a small nonsignificant, positive effect on self-reported gains in understanding the arts and humanities. However, sorority membership had a modest, but statistically significant, positive total effect on self-reported gains in understanding science and significant, positive total and direct effects on self-reported gains in writing and thinking skills.

Tests for the presence of conditional effects in the second year of the study yielded little new information. For all dependent variables (five for men and five for women) the addition of the sets of cross products between Greek affiliation and all other predictors was associated with small and statistically nonsignificant increases in explained variance. Thus, we found little evidence to suggest that the net, second-year impacts of Greek affiliation summarized in Table 1 differed in magnitude for different kinds of students.

Year 3

Table 2 summarizes the estimated total and direct causal effects of Greek affiliation on end-of-third-year cognitive outcomes for men (Part A) and women (Part B). As the table indicates, in the presence of Table 1 being a member of a fraternity tended to have negative total and direct effects on all five cognitive measures. Two of these—CAAP reading comprehension and CSEQ self-reported gains in understanding the arts and humanities—reached statistical significance. Thus, compared to their counterparts who remained independent during the 3 years of the study, men who joined fraternities in their first year of college tended to have significantly lower third-year reading comprehension scores and reported significantly lower growth after 3 years of college in understanding the arts and humanities.

For women the effects of Greek affiliation on end-of-third-year cognitive outcomes tended to be mixed. Being a member of a sorority had negative, but small and nonsignificant, total and direct effects on third-year objective measures of reading comprehension and critical thinking. Conversely, sorority membership tended to influence positively the three CSEQ self-reported gains, one of which reached statistical significance. Compared to their counterparts who remained independent for the 3 years of the study, women who joined a sorority in the first year of college tended to report significantly greater growth in understanding science after 3 years of college.

Table 1
Estimated Total (T)[a] and Direct (D)[b] Effects of Greek Affiliation on End-of-Second-Year Cognitive Outcomes

	Writing Skills		Science Reasoning		Gains in Understanding the Arts and Humanities		Gains in Understanding Science		Gains in Writing and Thinking Skills	
Group	T	D	T	D	T	D	T	D	T	D
PART A: MEN										
Regression Coefficient for Fraternity Membership[c]	-2.522 (-.045)	-2.119 (-.038)	-.509 (-.015)	-.690 (-.020)	-.162 (-.060)	-.145 (-.059)	-.112 (-.036)	-.166 (-.054)	-.072 (-.029)	-.072 (-.028)
R^2 for Total Model	.650**	.667**	.648**	.688**	.102*	.262**	.153**	.352**	.105*	.192**
PART B: WOMEN										
Regression Coefficient for Sorority Membership[c]	-1.617 (-.030)	-1.476 (-.028)	-.192 (-.006)	-.247 (-.008)	.069 (.027)	.085 (.033)	.163* (.054)	.091 (.030)	.264** (.109)	.221** (.091)
R^2 for Total Model	.643**	.655**	.590**	.621**	.090**	.185**	.105**	.281**	.054*	.133**

[a]Controlling for individual precollege composite ability; the average composite ability of the first-year students at each institution; precollege academic motivation; age; ethnicity; and socioeconomic status.

[b]Controlling for all variables in superscript "a", plus cumulative credit hours taken; on-campus residence; participation in athletics; hours spent studying; and the cumulative number of courses taken in five areas: arts and humanities, social sciences, mathematics, natural sciences and engineering, and technical/preprofessional areas.

[c]Top number is the unstandardized (metric) regression coefficient; number in parentheses is the standardized regression coefficient.

* $p < .05$
** $p < .01$

Table 2
Estimated Total (T)[a] and Direct (D)[b] Effects of Greek Affiliation on End-of-Third-Year Cognitive Outcomes

	Reading Comprehension		Critical Thinking		Gains in Understanding the Arts and Humanities		Gains in Understanding Science		Gains in Writing and Thinking Skills	
Group	T	D	T	D	T	D	T	D	T	D
PART A: MEN										
Regression Coefficient for Fraternity Membership[c]	-1.679* (-.071)	-1.709* (-.072)	-.802 (-.041)	-.740 (-.041)	-.250** (-.115)	-.203* (-.093)	-.046 (-.017)	-.034 (-.013)	.004 (-.002)	-.022 (-.010)
R^2 for Total Model	.534**	.573**	.620**	.654**	.073*	.276**	.182**	.469**	.086*	.235**
PART B: WOMEN										
Regression Coefficient for Sorority Membership[c]	-1.042 (-.042)	-.799 (-.032)	-.928 (-.046)	-.844 (-.042)	.043 (.018)	.046 (.019)	.231* (.073)	.193* (.061)	.096 (.041)	.107 (.046)
R^2 for Total Model	.651**	.668**	.651**	.664**	.085**	.260**	.203**	.394**	.097**	.186**

[a]Controlling for individual precollege reading comprehension, critical thinking, or composite ability (in the prediction of the gains scores); the average composite ability of the first-year students at each institution; precollege academic motivation; age; ethnicity; and socioeconomic status.

[b]Controlling for all variables in superscript "a", plus cumulative credit hours taken; on-campus residence; participation in athletics; hours spent studying; and the cumulative number of courses taken in five areas: arts and humanities, social sciences, mathematics, natural sciences and engineering, and technical/preprofessional areas.

[c]Top number is the unstandardized (metric) regression coefficient; number in parentheses is the standardized regression coefficient.

* $p < .05$
** $p < .01$

Tests for the presence of conditional effects in the third year of the study were quite consistent with those conducted in the second year. For all dependent measures, the addition of the sets of cross products between Greek affiliation and all other predictors was associated with small and statistically nonsignificant increases in explained variance. Thus, we found little evidence to suggest that the net third-year impacts of Greek affiliation summarized in Table 2 differed in magnitude for different kinds of students.

Magnitude of Effects

Because it can be strongly influenced by such factors as sample size and the ratio of explained to unexplained variance, statistical significance can be misleading as an indication of the importance of an effect. Consequently, to help determine if the cognitive effects of Greek affiliation were less pronounced in the second and third years of the study than they were in the first, we computed a series of effect sizes and compared them with those reported for the first year estimates of Pascarella et al. (1996). We employed the same effect size metric as Pascarella et al., which was the statistically adjusted mean difference between Greek-affiliated and independent groups (i.e., the unstandardized or metric regression coefficient for the direct effect of Greek affiliation in Tables 1 and 2) divided by the standard deviation of the independent group (Glass, 1977; Light & Pillemer, 1982). The resultant number is the fraction of a standard deviation which one group is advantaged (or disadvantaged) relative to the other. Pascarella et al. (1996) only analyzed data for the objective CAAP scores in their study of the first-year effects of Greek affiliation. They report average disadvantages across the end-of-first-year reading comprehension, mathematics, and critical thinking tests of .20 of a standard deviation for Greek-affiliated men, and .13 of a standard deviation for Greek-affiliated women. In the present study the average disadvantage across the end-of-second and third-year objective CAAP scores (i.e., writing skills, science reasoning, reading comprehension, and critical thinking) was .135 of a standard deviation for Greek-affiliated men and .092 of a standard deviation for Greek-affiliated women. In both cases, this represents a reduction in the size of the average CAAP score disadvantage from that reported in the first year of the study of about a third. Thus, not only did we find fewer statistically significant CAAP score disadvantages accruing to Greek-affiliated students in the second and third years of college (the only disadvantage reaching statistical significance was on reading comprehension for fraternity men), but also the absolute magnitude of the cognitive deficits were about a third smaller in the second and third years of college than they were in the first.

As shown in Tables 1 and 2, the net effects of Greek-affiliation on CSEQ measures of students' self-reported cognitive growth during the second and third years of college differed dramatically for men and women. For men, fraternity membership had a negative impact, while for women sorority membership had a positive impact. Across both years, the average disadvantage in self-reported cognitive growth accruing to Greek-affiliated men was .144 of a standard deviation. For women the corresponding advantage in growth accruing to sorority members was .177 of a standard deviation.

Supplementary Analyses

The main analyses in this study compared students who joined a fraternity or sorority during the first year of college with those who remained independent throughout the 3 years of the study. It was the case, however, that a small number of students joined fraternities or sororities in the

second and even the third year of college. To estimate how that might influence the overall impact of Greek affiliation on cognitive outcomes, we conducted an additional set of analyses that changed the independent variable to incorporate those who joined Greek organizations in the second and third year of the study. For the second and third year of the study, the comparison groups were men and women who joined Greek organizations either during the first or second year of college, versus those who remained independent through the second year of college. Similarly, in the third year of the study the comparison groups were students who joined Greek organizations during the first, second, or third years of college; versus their counterparts who remained independent through the third year of college. With these changes in the independent variable, we sought to derive the same estimates of Greek affiliation as those summarized in Tables 1 and 2.

The results of these analyses (available in detail from the first author) generally reduced the previous cognitive impacts of Greek affiliation in both magnitude and statistical significance. For example, the significant negative impacts of fraternity membership on third-year reading comprehension summarized in Table 2 were reduced in magnitude by about 70% and became nonsignificant. Similarly, the significant positive effects of sorority membership on growth in understanding science in both the second and third years of the study (see Tables 1 and 2) were reduced in magnitude by about 65% and became nonsignificant. Such evidence suggests that after the first year of college joining a fraternity or sorority may have only a trivial positive or negative impact on one's cognitive development during college.

Conclusions

The findings of this study need to be considered along with those from earlier analysis of the NSSL data (Pascarella et al., 1996), which found rather broad-based negative effects of Greek affiliation on standardized measures of cognitive development during the first year of college.

Following the same sample further through their college careers, and using essentially the same research design and analytic model, the present study found that the negative effects of fraternity or sorority membership were much less pronounced during the second or third years of college. On objective, standardized measures of cognitive skills, the effects of Greek affiliation continued to be negative for both men and women; but they were substantially smaller in magnitude and only one could be considered non-chance—a negative effect for fraternity membership on end-of-third-year reading comprehension.

To understand further the effects of Greek affiliation, the present study also included self-reported measures of students' cognitive growth. For men, fraternity membership continued to exert small negative effects in the second and third years of college, but only one was statistically significant. Greek-affiliated men reported significantly smaller gains in understanding the arts and humanities after 3 years of college than did men who remained independent. For women the impacts of sorority membership on self-reported gains were just the opposite. In both the second and third years of college, sorority membership exerted small positive effects on all self-reported gains measures. Several of these reached statistical significance. During both the second and third years of college, Greek-affiliated women reported significantly greater gains in understanding science than their counterparts who remained

independent. Similarly, compared to women who remained independent, Greek-affiliated women reported significantly greater gains in writing and thinking skills after 2 years of college. Taken together the findings of this investigation, along with those of Pascarella et al. (1996), tend to support the hypothesis that any major negative learning consequences of Greek affiliation occur primarily when students pledge a fraternity or sorority in the first year of college.

It may simply be that the pledging process itself interferes with a student's ability to adjust to the rather rigorous intellectual demands of the first year of college. After the initial year of college, however, any negative consequences of fraternity or sorority membership may tend to diminish, if not totally disappear. (To be sure, we found some isolated evidence of small, but persistent cognitive disadvantages for men after the first year of college; but we also found some evidence to suggest that sorority membership may have modest beneficial consequences for women during the second and third years of college.)

Consistent with the above conclusion are the findings of our supplementary analyses. When we included in the sample men and women who joined fraternities or sororities after the first year of college, the negative effects of Greek affiliation in the second and third years of college diminished even further.

Another hypothesis we tested in this study was whether the cognitive effects of Greek affiliation were general (i.e., the same magnitude for all students) or conditional (i.e., differing in magnitude for students with different characteristics). The Pascarella et al. (1996) study found that the effects of fraternity membership on first-year cognitive outcomes differed significantly in magnitude by ethnicity. There were pronounced negative effects for White men but slightly positive effects for men of color. This conditional effect did not persist into the second or third years of college. Indeed, we found little evidence for the presence of any conditional effects of fraternity or sorority membership in the present study. Thus, we conclude that the cognitive effects of Greek affiliation in the second and third years of college appear to be similar in magnitude for men or women with different background characteristics (e.g., ability, socioeconomic status, academic motivation, ethnicity), with different college experiences (e.g., study time, full- or part-time enrollment, course-taking patterns, athletic participation), and in different institutional contexts (e.g., the average academic ability of the student body).

Policy Implications

Evidence presented in this paper, along with previous analyses of the NSSL data, suggest that any broad-based negative cognitive effects of Greek affiliation occur largely during the first year of college. Thereafter these effects diminish substantially. Thus, the major implication of this research would be to consider institutional policies that delay the pledging of fraternities and sororities until after the first year of college. Once students make successful adjustment to the academic demands of postsecondary education, it would appear that Greek affiliated activities have only very small impacts on their intellectual growth.

Limitations

The NSSL data have several limitations that should be kept in mind when interpreting the results. First, although the overall sample is multi-institutional and consists of a broad range of 4-year institutions from 15 states, the fact that the analyses were limited to 18 4-year colleges means

that one cannot necessarily generalize the results to all 4-year institutions. Similarly, although we attempted in the initial sampling design and subsequent sample weighting to make the sample as representative as possible at each institution, the time commitments and work required of each student participant led to some self-selection.

The responses of the students who were willing to participate in the study might have differed from those of the students who were invited, but declined, to participate.

Several additional analyses reported elsewhere (e.g., Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1998) have looked at differences in the characteristics of those students who participated in all 3 years of the NSSL and those who dropped out of the study. The dropouts consist of two groups: (1) those who dropped out of the institution during the study and (2) those who persisted at the institution but dropped out of the study. Initial participants who dropped out of their institutions had somewhat lower levels of precollege academic preparation (as measured by the CAAP), socioeconomic background, and academic motivation than their counterparts who persisted in the study. Yet, students who remained in the study, and those who dropped out of the study but persisted at the institution, did not differ significantly (e.g., with regard to precollege academic preparation, age, race or ethnicity, or socioeconomic background).

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