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Community Service and Critical Thinking:
An Exploratory Analysis of Collegiate Influences[1]

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Interest in encouraging undergraduates to become involved in community service has grown rapidly over the past several years. In addition to the formation of groups such as the Campus Compact, this interest can be seen in the curricula of numerous colleges which have instituted community services requirements for graduation. Interest in critical thinking has increased as well, with widespread agreement among educators that critical thinking should be an important, if not central, goal of education. Although critical thinking has long been valued by educators at all (Siegel, 1980), the importance placed upon the development of critical thinking has recently been especially strong in colleges and universities and other institutions serving adult learners (Brookfield, 1987; Paul, 1985). Despite the centrality of critical thinking skills, a great many views exist as to how to best define (Ennis, 1986; Sternberg, 1985a) and develop (Sternberg, 1985b) critical thinking.

This study's main goal is to examine the relationship between student experiences and the development of critical thinking ability among college students. In this paper, a wide variety of student experiences will be considered as potential predictors of critical thinking, with particular in the ways participation in community service activities affects critical thinking skills (and other educational outcomes). Data collected in connection with a large–scale study of undergraduate education currently being undertaken by the Higher Education Research Institute will be used to address these questions.

As noted above, various definitions of critical thinking have been offered. Meyers (1986, p. 3) has noted that a common theme among critical thinking definitions is that they "are usually made in terms of formal or informal logic, or, in more recent years, of general problem–solving skills." In this exploratory study, three measures of critical thinking ability will be used that are consistent with the definitions reviewed by Meyers. The first two measures are based upon student perceptions of their growth in the following areas since entering college[2]: a) ability to think critically, and b) analytical and problem–solving skills. Student scores on the analytical subtest of the Graduate Record Examination (GRE) will be used as the third measure of critical thinking ability.[3]

Community Service and Educational Outcomes

As noted above, this study's main goal is to examine the development of critical thinking ability among college students, with particular attention being given to participation in community service. Specifically, the study seeks to answer the following questions: Is community service related to critical thinking ability? What other educational outcomes are related to participating in volunteer work? (A recent paper by Astin, 1990, examines factors that contribute to student involvement in community service). What environmental factors contribute to critical thinking development?

To explore these questions I will use data collected as part of the Cooperative Institutional Research Program (CIRP) that is sponsored by the American Council on Education and the Higher Education Research Institute (HERI) at the University of California, Los Angeles. The CIRP freshman survey program annually collects a broad array of student background information using

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[2]Although these measures can be criticized as being based on student perceptions (and thus not measuring actual change or growth in these areas), recent analyses by Anaya (1991) show that student perceptions of their growth in cognitive areas are generally consistent with those measured by standardized tests such as the Graduate Record Examination.

[3]The GRE analytical subtest focuses on logical reasoning and problem solving ability thus making it a more appropriate measure of critical thinking ability than either the mathematical or verbal sections of the GRE (which are more subject specific).

the Student Information Form (SIF; see Astin, Panos, & Creager, 1966), and is designed to be used in longitudinal assessments of the impact of college on students.

The data for this study are drawn from the 1985 SIF administered to freshmen, the 1989 Follow–up Survey of 1985 Freshmen, and the 1989 Faculty Survey. In conjunction with studies of general education outcomes (sponsored by the Exxon Education Foundation—see Astin, 1988 and Hurtado, Astin, & Dey, 1991) and a large–scale evaluation of undergraduate science education (sponsored by the National Science Foundation), we mailed follow–up surveys to a large sample of freshmen attending institutions with distinctive curricula. For each student who was sent a follow–up survey, additional student information was solicited from several other sources. Admissions test scores (SAT or ACT) were provided directly by the Educational Testing Service and the American College Testing Program, respectively. Testing agencies also provided scores for the following graduate admissions tests: Graduate Record Exam (GRE), Law School Admission Test (LSAT), Medical College Admission Test (MCAT), and the Graduate Management Admission Test (GMAT). In addition, we collected information on the attitudes, values, and teaching techniques of undergraduate teaching faculty using the 1989 Faculty Survey (see Astin & Korn, 1991).

All told, we received responses from some 25,000 students (of these, some 5,100 had taken the GRE). These students attended a representative sample of 159 four–year colleges and universities in the United States. In the follow–up we asked students (in addition to their perceptions of growth in critical thinking areas) to indicate whether or not they had participated in volunteer work as undergraduates. By examining the responses of students to these items, we can examine whether or not community service is related to changes in critical thinking ability.

Before considering how community service is related to changes in critical thinking ability, it is important to understand how critical thinking changes during the undergraduate years without regard to participation in volunteer activities. This is summarized in Table 1, which shows that most students perceive growth in critical thinking areas. Nine out of 10 students report increased

critical thinking ability, with almost 4 out of 10 students reporting these abilities to be much stronger since entering college. Similarly, only about 10 percent of the students report having no growth (or actual declines) in critical thinking ability since entering college. This of course is not surprising: we would not expect students to become *less* able to think critically. This table, then, provides evidence that students do indeed feel an increased ability to think critically four years after entering college. (Please note, however, that these changes do not imply that college attendance caused these changes: these individuals may have reported increases in critical thinking ability *even if they did not attend college*. A more sophisticated set of analyses, discussed below, will be used to examine the question of college impact.)

Table 1
Change in Critical Thinking Areas (1985 freshmen followed up in 1989, in percentages)

Compared with with own ability as a college freshman	Critical Thinking Area	
	Ability to think critically	Analytical and Problem–solving skills
No change, or weaker	9	11
Stronger	52	56
Much stronger	40	34

Is community service participation related to changes in critical thinking ability? Table 2 shows the answer: while there is a relationship between community service and changes in critical thinking ability, this relationship is extremely small. For example, students who spend a large amount of time in community service are only 2 percent more likely to report much stronger analytical and problem–solving skills than those who do not volunteer at all (35 versus 33 percent). While the observed relationship is stronger for ability to think critically (44 versus 38 percent), it is nonetheless weak. This is true for student performance on the GRE analytical subtest as well: the

correlation between community service and GRE–analytical is very small (partial correlation = .02, controlling for SAT composite score). Taken together, these findings suggest that if community service does have an impact on critical thinking ability, this impact is small (if not negligible).

Table 2
Percentages of Students Reporting 'Much Stronger' Critical Thinking Abilities, by Amount of Time Spent Volunteering (1985 freshmen followed up in 1989)

Amount of Time Spent Volunteering	Much Stronger:	
	Ability to think critically	Analytical and Problem–solving skills
None	38	33
1 hour per week	39	34
More than 1 hour per week	44	35
All Students	*40*	*34*

If community service is not strongly related to critical thinking ability, what is it related to? The answer to this question is summarized in Table 3, which shows how involvement in volunteer work correlates with self–rated changes in a variety of areas. Of the 19 areas assessed in the 1989 follow–up, community service is most strongly related to growth in leadership abilities ($r = .14$), religious beliefs and convictions ($r = .13$), cultural awareness and appreciation ($r = .12$), and acceptance of people from different races/cultures ($r = .10$). Although the analyses summarized in Table 3 cannot tell us whether community service *caused* these changes (students with growing leadership abilities may, for example, seek out community service activities), volunteerism is strongly *related* to growth in leadership, religiosity, cultural appreciation and tolerance of others with different backgrounds. In addition, communication skills (public speaking ability, $r = .09$;

interpersonal skills, $r = .09$; writing skills, $r = .07$) are positively related to community service. Critical thinking skills are ranked 13 (ability to think critically) and 18 (analytical and problem-solving skills) out of the 19 areas considered. Note also that changes in cognitive and academic areas (e.g., knowledge of a particular field or discipline, general knowledge, confidence in academic abilities) have low ranks. This suggests that community service is more related to changes in student values and affective states than to critical thinking and cognitive development. Let's now consider how the college environment *is* related to the development of critical thinking.

Table 3
Correlation of Amount of Time Spent Volunteering with Change in Various Areas
(1985 freshmen followed up in 1989)

Change since entering college in:	Correlation (r)
Leadership abilities	.14
Religious beliefs and convictions	.13
Cultural awareness and appreciation	.12
Acceptance of people from different races/cultures	.10
Public speaking ability	.09
Interpersonal skills	.09
Writing skills	.07
Preparation for graduate or professional school	.07
Interest in pursuing a graduate/professional degree	.07
Foreign language skills	.07
Ability to work cooperatively	.07
Ability to work independently	.06
Ability to think critically	*.06*
Knowledge of a particular field or discipline	.04
General knowledge	.04
Job-related skills	.03
Confidence in your academic abilities	.03
Analytical and problem-solving skills	*.03*
Competitiveness	.00

Development of Critical Thinking

What aspects of the college environment foster (or inhibit) the development of critical thinking? To explore the answer to this question I conducted a series of multivariate analyses which had two main stages. In the first main stage, the influence of the characteristics of entering freshmen on critical thinking were statistically controlled. This is a necessary first step in trying to understand environmental influences since students are not randomly attracted and admitted to colleges. Rather, different types of colleges attract different kinds of students (whose critical thinking skills may develop in different ways). If we do not first control for these student characteristics, we run the risk that they may inadvertently influence our results and lead us to making incorrect conclusions about college's impact on critical thinking (see Astin, 1991). The second main stage of these analyses involves looking for environmental characteristics that influence critical thinking skills *after the biasing influences of entry characteristics have been controlled.* Thus, we can obtain a relatively unbiased view of environmental influences on critical thinking.

Table 4 summarizes the results of the first stage of the analysis, which examines significant relationships between entry characteristics and critical thinking. In essence, this table shows us the kinds of students that are likely to have relatively strong (and weak) increases in critical thinking during the undergraduate years.[4] Students with high intellectual self–esteem, who attend college to become more cultured and improve study skills all have relatively strong gains in critical thinking ability (remember from Table 1 that most students report gains in critical thinking ability; students with these characteristics are more likely than the average student to report strong gains). Similarly, the ratings—on a 5–point scale ranging from 'Highest 10%' to 'Lowest 10%' compared to the average person their age—that students give themselves in artistic ability, drive to achieve,

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[4]Tables 4 and 5 show only those variables that are significantly related to at least two out of the three critical thinking measures. In addition to simplifying the presentation, this procedure serves to validate the results of the separate analyses (each of which addresses a slightly different dimension of critical thinking ability), thereby increasing our confidence that the results shown are not simply due to chance.

Table 4
Student Entry Characteristics that are Significantly Related to Critical Thinking (1985 freshmen followed up in 1989)

Entry Characteristics that are Related to:	
Relatively Strong Increases in Critical Thinking	Relatively Weak Increases in Critical Thinking
Intellectual self–esteem	Life goal: Raise a family
Reason for attending college: To become a more cultured person	Anticipated major: Education
Reason for attending college: To improve study skills	
Self-rating: Artistic ability	
Self-rating: Drive to achieve	
Self-rating: Mathematical ability	
Verbal aptitude (SAT verbal score)	
College attended was student's top choice	
In high school: Asked teacher for advice after class	

NOTE: Based on multiple regression analyses of three critical thinking measures: self–rated change in ability to think critically, self-rated change in analytical and problem solving skills, and performance on the GRE analytical subtest. Only those variables that are significant predictors of two of the three critical thinking measures are shown. Variables shown in bold type were significant predictors of all three critical thinking measures.

and mathematical ability are related to strong increases in critical thinking (note that drive to achieve was positively related to all three critical thinking measures). These suggest that students with positive views of themselves tend to grow more in critical thinking than other students. The final student characteristics associated with larger than average gains in critical thinking are verbal aptitude (as measured by the Scholastic Aptitude Test), attending a college that was the student's top choice, and interacting with high school teachers outside of class. Taken together, these suggest that in addition to a positive view of one's abilities, the ability to successfully negotiate the educational system is related to strong growth in critical thinking.

In contrast, students who place greater value on family life and who anticipate majoring in education tend to have smaller gains in critical thinking ability. It may be that these students simply seek to maximize other educational outcomes —such as developing interpersonal skills— and in doing so are less successful at developing critical thinking. In any case, it should be remembered that most students gain in critical thinking over the undergraduate years; family– oriented students and those interested in education simply *gain less* on average than do other students.

The final table (Table 5) provides a summary of those features of the college environment that had positive or negative influences on increases in critical thinking, net of the effect of entry characteristics. Of the many characteristics considered in the analysis, several have strong and consistent effects on the critical thinking measures.

Student involvement, for example, has several interesting relationships with critical thinking ability. Discussing political/social or racial/ethnic issues is positively related to gains in critical thinking. It may be that in thinking about and discussing these issues, students develop the ability to critically analyze the arguments and statements of others. The amount of time that students spend studying also seems to be positively related to gains in critical thinking, as does taking many courses emphasizing science and scientific inquiry. This suggest that 'time on task' works for critical thinking as it does for other cognitive outcomes.

Table 5
College Environmental Characteristics that are Significantly Related to Critical Thinking,
After Controlling for the Effects of Student Entry Characteristics (1985 freshmen followed up in 1989)

College Characteristics that are Related to:

Relatively Strong Increases in Critical Thinking	Relatively Weak Increases in Critical Thinking
Discussed political/social issues in the past year	Institutional size
Hours per week spent studying or doing homework	Felt like leaving college in the past year
Interaction with faculty	Felt depressed in the past year
Had class paper critiqued by an instructor in the past year	
Number of courses taken that emphasized science/scientific inquiry	
Received vocational/career counseling in the past year	
Discussed racial/ethnic issues in the past year	
Gave a presentation in class in the past year	

NOTE: Based on multiple regression analyses of three critical thinking measures: self-rated change in ability to think critically, self-rated change in analytical and problem solving skills, and performance on the GRE analytical subtest. Only those variables that are significant predictors of two of the three critical thinking measures are shown. Variables shown in bold type were significant predictors of all three critical thinking measures.

Student–faculty interaction seems to be an important positive influence on critical thinking (it was a positive predictor of all three critical thinking measures). Vocational and career counseling is also positively related to gains, perhaps because thinking about and questioning the future is a form of critical thinking. In addition to the positive benefits of faculty and staff interacting with students, the way faculty structure in–class experiences seems to be positively related to critical thinking gains for undergraduates. For example, critiquing the papers of undergraduates and requiring in–class presentations seems to increase gains. The activities may serve to encourage students to engage the course–related materials in a different fashion than is required by other pedagogical techniques.

Three environmental characteristics were associated with smaller than average gains in critical thinking. Institutional size has the strongest such effect, perhaps because it may mitigate against the possibility of faculty engaging students in the ways noted above that promote critical thinking. Feeling depressed and wanting to leave college is also negatively related to strong gains in critical thinking. It may be that students who are depressed tend to avoid engaging faculty and are likewise less involved intellectually than others, thus resulting in smaller growth in critical thinking. This, coupled with the finding that intellectual self–esteem is related to strong gains in critical thinking (see Table 4), suggests an interesting avenue for future research: Is there a connection between critical thinking and the affective states of students (such as self–esteem)?

Conclusions

Although the intent of this study was exploratory, the results discussed above point to some interesting conclusions:

- **Community service is not strongly related to increases in critical thinking ability**

  These exploratory analyses show that participation in community service activities is only slightly related to critical thinking development. Although different forms of student involvement appear to facilitate critical thinking ability, volunteer activities do not.

- **Community service is related to changes in student values and affective development**

  These exploratory analyses show that community service participation is positively associated with increases in leadership, religiosity, cultural appreciation and tolerance of others with different backgrounds. In addition, communication and interpersonal skills are positively related to volunteer activities. Changes in cognitive areas (including critical thinking) are only weakly related to community service.

- **Critical thinking development is strongest among students with high levels of intellectual self–esteem**

  These analyses showed that certain student characteristics are related to changes in critical thinking ability four years after entering college. Specifically, students with high intellectual self–esteem, positive views of their drive to achieve, mathematical and artistic abilities, and those who can successfully negotiate the educational system all have larger than average gains in critical thinking. In contrast, family–oriented students and those interested in majoring in education have smaller than average gains.

- **Net of the effect of background characteristics, critical thinking development can be influenced by a variety of environmental characteristics and student experiences**

    After removing the student–based influences, these analyses suggest that student involvements can influence critical thinking. Discussing political/social and racial ethnic issues, spending a lot of time studying, and taking courses emphasizing scientific inquiry are positively associated with stronger than average gains in critical thinking. Student–faculty interaction, having a class paper critiqued by an instructor, and giving a class paper are also positive influences. Attending a large institution, being depressed, and wanting to leave school are all predictors of smaller than average gains in critical thinking ability.

Future research, of course, should be directed at these and related topics. For example, while this study has shown that community service is not directly related to changes in critical thinking ability, community service may help to enable its development. If community service activities can be structured in such a way as to promote intellectual self–esteem and positive views of their abilities, students may be encouraged to become involved and engaged in those experiences that seem to promote critical thinking. Perhaps in this way, by empowering students to become more fully engaged in their studies, service activities can indirectly influence learning outcomes.

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