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ABSTRACT

This study, part of the National Study of Student Learning, sought to determine the extent to which college students' development of internal locus of attribution for academic success during the first year of college was influenced by institutional characteristics, students' academic experiences, and their social/non-academic experiences. The sample was 2,392 first-year students attending 23 diverse two- and four-year institutions located in 16 states throughout the county. Controlling for precollege internal attribution, academic ability, and other potentially confounding influences, a number of variables had significant positive effects on end-of-first-year internal attribution. These included: attending a two-year (versus four-year) college, level of exposure to postsecondary education, work responsibilities, the extent of course organization, instructional clarity, instructor support in the teaching received, and participation in intercollegiate athletics. Additional analysis indicated that many of the effects on internal attribution were conditional rather than general, differing in magnitude for different kinds of students. Four tables of data present the details of the study. (Contains 61 references.) (Author/JB)

INFLUENCES ON STUDENTS' INTERNAL LOCUS OF ATTRIBUTION FOR ACADEMIC SUCCESS IN THE FIRST YEAR OF COLLEGE*

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Abstract

This study sought to determine the extent to which students' development of internal locus of attribution for academic success during the first year of college was influenced by institutional characteristics, students' academic experiences, and their social/non-academic experiences. The sample was 2392 first-year students attending 23 diverse two- and four-year institutions located in 16 states throughout the country. Controlling for precollege internal attribution, academic ability, and other potentially confounding influences, a number of variables had significant, net, positive effects on end-of-first-year internal attribution. These included: attending a two-year (versus a four-year) college, level of exposure to postsecondary education, work responsibilities, the extent of course organization, instructional clarity, and instructor support in the teaching received, and participation in intercollegiate athletics. Additional analyses indicated that many of the effects on internal attribution were conditional rather than general, differing in magnitude for different kinds of students.

> Unique and innovative minds grow among those who can come to perceive differences between others and themselves, and who continue to hold the assumption that they are free agents, the makers of their own fate (Lefcourt, 1982, p. 2).

Independence of thought and action has long been considered not only an important element in conceptions of adulthood and psychosocial health (e.g., Chickering, 1969; Erikson, 1968; Heath, 1968, 1977, 1978; Kohlberg, 1972; Loevinger, 1976; Perry, 1970, 1981; Weiner, 1986), but also one of the major goals of liberal education in American colleges and universities (Heath, 1968; Chickering & Reisser, 1993; Gamson & Associates, 1984; Pascarella & Terenzini, 1991). The extent to which colleges and universities accomplish this goal has been the focus of considerable study (Bowen, 1977; Pascarella & Terenzini, 1991). One important line of inquiry has dealt with locus of control, a concept based in social learning theory and referring to the extent to which an individual is self-directed or believes that one determines one's own fate. People with a strong sense of internal control tend to believe that they are responsible for what happens to them, while more externally directed individuals tend to think that their destiny in a particular context is determined more by luck, fate, or other people (Lefcourt, 1982; Phares, 1976; Rotter, 1966, 1975; Weiner, 1986).

With a few exceptions (e.g., Watkins, 1987; Whiteley, 1982) the weight of evidence suggests that college attendance influences modest changes in the direction of a greater sense of internal locus of control over one's fate. Not only do students make statistically significant gains in the direction of internality during college (e.g., Behuniak & Gable, 1981; Knox, Lindsay, & Kolb, 1993; Linder, 1986; Olczak & Goldman, 1975; Priest, Prince, & Vitters, 1978; Schroeder & Lemay, 1973; Wolfle & Robertshaw, 1982), these gains appear to be greater in magnitude than those made by students with similar backgrounds whose formal schooling ended with secondary

school (Knox, Lindsay, and Kolb, 1993; Smart, Ethington, & McLaughlin, undated; Wolfle & Robertshaw, 1982). With the exception of colleges with a "cohesive peer environment" (e.g., full-time students living on-campus) there is little evidence to suggest that different kinds of postsecondary institutions (e.g., Carnegie Classification Type) have a differential influence on the modest gains that students make during college in the direction of increased internal locus of control.

Almost no inquiry has attempted to assess the influence of different collegiate academic and non-academic experiences on locus of control. What little research does exist is plagued by serious methodological problems. Behuniak and Gable (1981) and King (1973) found significant differences in increases in internality associated, respectively, with different academic majors and participation in an honors program (versus a regular curriculum). Since neither study controlled for initial levels of locus of control, however, it is difficult to determine if the effects noted are the result of exposure to different academic majors or curricular experiences (i.e., socialization), or if they are simply proxies for the fact that different majors or curricular experiences attract students with different levels of internality to begin with (i.e., recruitment). Similarly, evidence exists to suggest that students living in college residence halls make greater increases in internality than students who live off-campus and commute to college (Scott, 1975; Sullivan & Sullivan, 1980). Again, however, no controls could be made for precollege levels of internality, so it is difficult to determine if the differences noted are the result of differential recruitment or differential socialization.

The concept of locus of control has generated literally hundreds of studies (e.g., Pascarella & Terenzini, 1991; Perry, 1993). One important line of research in this body of inquiry has been

the role of locus of control in learning and cognitive growth. The weight of evidence in this research suggests that elementary, secondary, and college students who attribute academic success largely to their own effort (internals) do consistently better on a range of academic performance and achievement motivation measures than their counterparts who see little connection between their own efforts and academic success (externals) (e.g., Bar-Tal & Bar-Zohar, 1977; Lefcourt, 1982, 1984; Messer, 1972; Perry, 1991; Stipek & Weisz, 1981). There is some reason to believe that locus of control may play an important role in facilitating learning in new situations. In his extensive and informative review of the implications of perceived control for college students Perry (1991, pp. 3-4) points out that perceived control may play an even more important role in academic development at the college level than at elementary or secondary levels.

> Almost immediately upon entering college, a student assumes more responsibility for his/her education than previously: in choosing courses, in completing assignments, and in seeking remedial assistance. During class, greater independent effort is expected in note-taking, in comprehending the lecture material, and in mastering the content of the course. Furthermore, an increased emphasis is placed on competition and on success as instrumental factors in career-attainment.

Perry (1991) also points out that a series of experimental students (e.g., Perry & Dickens, 1984, 1988; Magnusso & Perry, 1989) indicate that locus of control for academic success may also play an important role in explaining why some students gain more from effective instruction than others. In these experiments students with low internal control were unable to benefit from instructor expressiveness (one of the elements of effective lecturing), performing no better than if

they had received less effective instruction. Perry (1991, p. 29) concludes that loss of control may interfere with effective instruction because "it impairs information-processing activities normally primed by effective (expressive) instruction."

Thus, substantial evidence exists to suggest the importance of locus of attribution for academic success in the academic development of college students. However, the research is virtually silent with respect to the kinds of collegiate academic and non-academic experiences that influence locus of attribution for academic success. This investigation sought to address this problem in the literature by means of a multi-institution, longitudinal study of the influence of the first year of postsecondary education on the development of internal locus of attribution for academic success. Specifically, the study had two purposes. First, it sought to determine the influence of four sets of variables on internal locus of attribution. These were: student precollege characteristics, the characteristics of the institution attended, students' academic experiences, and students' social/non-academic experiences. Second, the study sought to determine if the influences on locus of attribution for academic success of these four sets of variables differed in magnitude according to student precollege characteristics (i.e., gender, ethnicity, and age) or institutional context (i.e., two-year versus four-year colleges).

METHOD

Conceptual Framework

As suggested by Astin (1993), Chickering (1969), and Chickering & Reisser (1993), at least four sources of influence need to be taken into account if one is to derive a valid estimate of the impact of college. These are: 1) the initial or pre-enrollment characteristics of students, 2)

the organizational or environmental emphases of the institution attended, 3) students' academic experiences, and 4) students' social or non-academic experiences. Chickering (1969) has also stressed that, in assessing the impact of students' academic and non-academic experiences, it is important to capture not only students' actual involvements (e.g., time spent studying, courses taken, hours worked per week), but also the extent and nature of students classroom and out-of-class interactions with major agents of socialization on campus (e.g., faculty and peers). This conceptual framework guided our selection of variables and data analyses in the study.

Institutional Sample

The sample was selected from incoming first-year students at eighteen 4-year and five 2-year colleges and universities located in 16 different states throughout the country. Institutions were selected from the National Center on Education Statistics Integrated Postsecondary Education Data System (IPEDS) 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, 2-year colleges, historically Black colleges), size, location, commuter versus residential character, and the ethnic distribution of the undergraduate student body. In aggregate, the student population of those 23 schools approximated the national population of undergraduates by ethnicity and gender.

Student Sample and Instruments

An initial data collection was conducted in the Fall of 1992. Each of the 23 participating institutions was given a target sample size relative in magnitude to the respective sizes of the entering class at each institution. The overall target sample was 5,000 students randomly selected

from among entering first-year students at each institution. The overall obtained sample size (i.e., those students actually participating) for the Fall, 1992 data collection was 3,840, a participation rate of 76.8 percent.

The initial data collection lasted approximately three hours. Students were advised that they were participating in a national, longitudinal study of student learning and would be paid a $25 stipend for their participation. They were also advised that the information they provided would be kept confidential, would never become part of their institutional records, and that all that was expected of them was a good-faith effort on the test modules (see below) and candid responses to all questionnaire items.

A precollege survey form gathered information on student demographic characteristics and background, as well as aspirations, expectations of college, and a series of items assessing students orientation toward learning--one of which was their locus of attribution for academic success. Participants also completed Form 88A of the Collegiate Assessment of Academic Proficiency (CAAP). The CAAP was developed by the American College Testing Program (ACT) specifically to assess selected general skills typically acquired by students during the first two years of college (ACT, 1989). The total CAAP consists of five, 40-minute, multiple-choice test modules, three of which, reading comprehension, mathematics and critical thinking, were administered at the Fall, 1992 data collection.

A follow-up testing of the sample took place in the Spring of 1993. This data collection required about three and one-half hours and included Form 88B of the CAAP, Pace's (1984, 1987, 1990) College Student Experiences Questionnaire (CSEQ) to measure students' first-year experiences in college, and a specially designed survey form assessing aspects of students' first-

year experiences not covered by the CSEQ. Students were paid a second stipend of $35 for their participation in the follow-up data collection.

Of the original sample of 3,840 students who participated in the Fall, 1992 data collection, 2,685 participated in the Spring, 1993 data collection, for a follow-up response rate of 69.92%. Given the high response rates at both testings it is not particularly surprising that the sample was reasonably representative of the population from which it was drawn. However, to adjust for potential response bias by gender, ethnicity, and institution, a sample weighting algorithm was developed. Specifically, within each of the individual institutions participants in the follow-up data collection were weighted up to the institutions' first-year population by gender (male or female) and ethnicity (White, Black, Hispanic, other). Thus, for example, if an institution had 100 Black men in its first-year class and 25 Black men in the sample, each Black male in the sample was given a sample weight of 4.00. An analogous weight was computed for participants falling within each gender x ethnicity cell within each institution. The effect of applying sample weights in this manner was to adjust not only for response bias by gender and ethnicity, but also for response bias by institution. Given the sampling plan that led to the selection of the 23 institutions in the study and the weighting of individual respondents within each institution, the weighted aggregate sample of 2,685 students is reasonably representative of the national population of first-year students in two- and four-year institutions with respect to gender and ethnicity.

Variables

The dependent variable in the study was a four-item, Likert-type scale (5 = strongly agree to 1 = strongly disagree) entitled: Internal Locus of Attribution for Academic Success (hereafter

also referred to in a shorter form as internal attribution). The four items constituting the scale (scored in reverse), their correlation with the total scale score, and the scale reliabilities are shown in Table 1. The first numbers are the item correlations with the total score for the precollege measure of internal attribution (assessed during the Fall, 1992 data collection), while the second numbers are the item correlations with the actual dependent measure of internal attribution (assessed during the Spring, 1993, end-of-first-year data collection).

The internal attribution scale was originally developed through factor analysis in a longitudinal pilot study at a research university and a two-year college conducted prior to the present investigation (Pascarella, et al., 1994). In developing items for the scale we were guided by other longer and more detailed instruments measuring locus of attribution for academic success, such as the Intellectual Achievement Responsibility Scale (Crandall, Katkovsky, & Crandall, 1965). The shortened scale used in this study had internal consistency (alpha) reliabilities of .62 for the precollege measure and .64 for the end-of-first-year follow-up, dependent measure. Though not outstanding, reliabilities of this magnitude are adequate for the kinds of correlational analyses conducted in this investigation (e.g., Thorndike & Hagen, 1977), and are generally consistent with reliabilities reported for other measures of locus of control (Stipek & Weisz, 1981).

Place Table 1 About Here

Following the conceptual framework for the study, four sets of independent variables were selected from the NSSL data set. The first set consisted of students' precollege characteristics.

These included: precollege internal locus of attribution for academic success, academic ability, gender, ethnicity, age, and precollege academic motivation. The second set captured several institutional characteristics or environmental emphases of the institution attended. These included an estimate of the average precollege internal attribution of each institution's first-year class, students' perception of the level of non-discrimination in the institution's racial and gender environments, level of environmental emphasis on being critical, evaluative, and analytical, and whether or not the college attended was a two-year or four-year institution.

The third set of independent variables tapped students' first-year academic experiences. these included credit hours taken, hours spent studying, number of courses taken in the first year of college in five areas: social sciences, mathematics, arts and humanities, natural science and engineering, and technical/preprofessional, a measure of course learning, a measure of experiences with faculty, honors college participation, first-year grades, number of essay exams in courses, self-reported gains in writing and thinking analytically, and six factorially derived scales measuring student perceptions of the kinds of teaching or instruction received in their coursework as a whole. The introduction to the items composing the six teaching or instruction scales was as follows:

> We would like to get your opinion on the overall nature of the teaching you received during the past year. We want to know, in general, how your teachers taught and what you did in class. Please circle the number on the scale below that indicates how often you have experienced the following in your coursework as a whole.
>
> The possible responses were: "never", "occasionally", "often", or "very often".

The fourth set of variables attempted to capture the different dimensions of students' first-year social/non-academic experiences. These included: place of residence, fraternity/sorority membership, participation in a racial or cultural awareness workshop, hours worked per week, participation in campus clubs and organizations, a measure of interaction with student peers, and participation in intercollegiate athletics. Operational definitions of all individual variables are given in Table 2.

Place Table 2 About Here

Analytic Procedures

The data analysis was conducted in two stages. Stage one employed ordinary least-squares regression to estimate the net or unique effect of each independent variable on end-of-first-year (Spring, 1993) internal locus of attribution for academic success, while statistically controlling for the effects of all other independent variables. In the second stage of the analyses we tested for the presence of conditional effects based on gender, ethnicity, age, and institutional type (2-year versus 4-year) (Pedhazur, 1982). A series of cross-product (or interaction) terms was computed between gender, ethnicity, age, and institutional type on the one hand and each of the other independent variables in the prediction model on the other. These were then added to the regression model employed in the first stage of the analyses (i.e., the main- or general-effects model). The addition of the sets of cross-product terms was done separately for gender, ethnicity, age, and institutional type. A statistically significant increase in explained variance (R^2) attributable to the entry of the set of cross-product terms (over and above the main- or general-

effects model) indicates that the net effects of different influences on internal attribution differ in magnitude by student gender, ethnicity, age, or institutional type.

Of the 2,685 students participating in the Spring, 1993 follow-up testing, complete data for the different analyses conducted in the study were available for 2,392 students. Based on the weighted sample, these 2,392 participants represented a population of 31,456 first-year students at the 18 four-year and 5 two-year colleges and universities. The weighted sample (n = 31,456), adjusted to the actual sample size (n = 2,392) to obtain correct standard errors, was used in all analyses. Because of the large (unweighted) sample size, the critical alpha level was set at .01.

RESULTS

Table 3 summarizes the results of the regression of end-of-first-year internal locus of attribution for academic success on the four sets of independent (predictor) variables. The "zero-order correlation" is the simple correlation of each predictor variable with end-of-first-year internal attribution, the "beta" is the standardized partial regression coefficient, and the "b" is the unstandardized or metric partial regression coefficient. The results of this first stage in the analyses will be presented within the four categories of predictor variables.

Place Table 3 About Here

Precollege Variables

In the presence of controls for all other predictors in the equation, two of the six precollege variables had statistically significant effects on end-of-first-year internal attribution. Not surprisingly, the parallel precollege measure of internal attribution had, by far, the strongest

influence of any variable in the prediction model. With a beta of .440, its net impact was four times as strong as the next most influential variable. Net of other influences, women also had higher levels of internal attribution than men. End-of-first-year internal attribution was not significant influenced by a student's precollege academic ability or motivation, or by his or her ethnicity or age.

Environmental Emphasis of the Institution Attended

Of the five institutional environment measures only one had a significant net influence on end-of-first-year internal locus of attribution for academic success. In the presence of controls for all other variables in the prediction model, attending a four-year (versus a two-year college) negatively influenced internal attribution. Put another way, students who attended two-year colleges made greater first-year net movement toward internal locus of attribution for academic success than their counterparts at four-year colleges and universities. Interestingly, the average precollege internal attribution of the first year students at the institution attended had no significant net effect at all on individual student internal attribution at the end of the first year of college. Thus, there appeared to be no appreciable contextual effect derived from attending an institution where one's student peers tended to have high or low levels of internal attribution.

Student Academic Experiences

Five student academic experiences had significant net effects on end-of-first-year internal locus of attribution for academic success. Extent of student exposure to postsecondary education, operationalized as total credit hours taken during the first year of college, had a small but positive significant effect on internal attribution. The remaining four significant effects were all measures of the kinds of teaching students reported as receiving in their overall academic

program during the first year of college. Three scales measuring students' perceptions of teacher organization and preparation, teacher instructional skill and clarity, and teacher support each had a positive net effect on internal attribution. A fourth scale, which assessed students perceptions of the use of technology in the overall teaching they received in the first year of college, had a significant negative effect on end-of-first-year internal attribution.

Student Social/Non-Academic Experiences

Three of seven measures of students' social/non-academic experiences had significant net effects on end-of-first-year internal attribution. Controlling for the influence of all other variables in the prediction equation, hours worked per week and competing in intercollegiate athletics both had positive net influences on internal attribution. Conversely, the student acquaintances scale, a measure of students' interactions with peers of different racial, cultural, religious, national origin, and economic backgrounds, had a negative influence on internal attribution. It is worth noting, however, that in all three cases the zero-order correlation between each independent variable (i.e., work, student acquaintances, and athletic participation) was not statistically significant. It was only in the presence of the other independent variables in the model that the regression coefficients for these variables become statistically significant. This was not the case for any of the other precollege, institutional, or academic experience variables that had significant net effects on internal attribution. For all those variables the zero-order correlation with end-of-first-year internal attribution was also statistically significant.

Conditional Effects

The second stage in the analyses sought to determine if the net effects estimated in the first stage of the analyses differed in magnitude by student gender, age, or ethnicity, or by institutional

context (two- versus four-year). The addition of the sets of cross-product terms to the main-effects prediction equation (i.e., shown in Table 3) was associated with four statistically significant ($p < .01$) increases in explained variance (R^2) ranging from 1.8% to 3.6%. This finding suggested that the net effects on internal locus of attribution for academic success did, in fact, differ in magnitude by student gender, age, and ethnicity, as well as by attendance at a two-year versus a four-year college.

To identify those individual predictor variables for which there were significant conditional effects, end-of-first-year internal attribution was regressed on all predictor variables separately for two-year and four-year college students, for White versus non-White students, for men versus women, and for students 19 or younger versus students 20 or older. T-tests for differences in metric regression coefficients across different samples (Cohen & Cohen, 1975) were then conducted to determine those individual predictor variables that differed in the magnitude of their influence on internal attribution by institutional type (two- versus four-year) or by student ethnicity, gender, or age. Table 4 presents the significant conditional effects uncovered and provides the metric (unstandardized) regression coefficients for the comparison samples.

Place Table 4 About Here

As Part A of Table 4 shows, there were five significant conditional effects involving first-year attendance at a two-year versus a four-year college. Specifically, honors college participation, joining a fraternity or sorority, hours worked per week, and teacher instructional skill and clarity had significantly stronger positive, net effects on end-of-first-year internal attribution for students attending two-year (versus four-year) colleges. Conversely, the number of

essay exams in first-year courses had a negative effect on internal attribution for the two-year college students but a positive influence for their four-year college counterparts.

Part B of Table 4 shows the four significant conditional effects involving ethnicity. With other influences controlled statistically, non-White women showed a greater advantage in internal attribution relative to non-White men than the comparative advantage of White women relative to their male counterparts. Similarly, the positive net effects of credit hours taken and work were not the same for all students. Rather, these two variables had stronger positive impacts on internal attribution for non-White students than for their White counterparts. Conversely, attending an institution with an environmental emphasis on being critical, evaluative, and analytical positively influenced internal attribution for White students, but had a negative influence on the development of internal attribution for non-White students.

Finally, Parts C and D of Table 4 show the conditional effects based on gender and age, respectively. As the Table indicates, the course learning scale had a stronger positive influence on end-of-first-year internal attribution for men than for women. Similarly, participation in an honors program had a stronger positive impact on internal attribution for first-year students age 19 or younger than it did on their counterparts who were age 20 or older. Conversely, Greek affiliation had a modest negative influence on internal attribution for students 19 or younger, but a substantial positive impact for students 20 or older.

SUMMARY AND DISCUSSION

The findings of this study point to a variety of independent sources of influence on students' development of internal locus of attribution for academic success during the first year of

college. These influences span much of the range of students' college experience, including the kind of institution they attend, their level of exposure to postsecondary education, the kinds of teaching they receive, how much they work, their involvements and interactions with peers, and their involvement in athletics. Such a finding is quite consistent with Pascarella and Terenzini's (1991, p. 610) conclusion that most of college's impact on students is the "cummulative result of a set of interrelated experiences sustained over an extended period of time" rather than the result of any single experience.

A second generalization from the findings concerns the impact of attending a two- versus a four-year institution during the first year of college. A major critique of the two-year college posits that, although it may largely guarantee equality of opportunity for access to higher education, it may not provide an educational experience equal in impact to that of four-year institutions (e.g., Astin, 1977; Brint & Karabel, 1989; Karabel, 1986; Zwerling, 1976). In the present study, however, students attending two-year institutions actually made greater net movement toward internal attribution during the first year of college than their counterparts in four-year institutions. Such a finding is consistent with a recent and growing body of inquiry suggesting that when student background characteristics are taken into account the intellectual, attitudinal, and socioeconomic impacts of two-year colleges may be at least equivalent to those of four-year institutions (Bohr, et al., 1994; Pascarella, et al., 1994; Pascarella, Bohr, Nora, & Terenzini, 1995; Whitaker & Pascarella, 1994). Furthermore, the fact that the net advantage of two-year colleges held in the presence of a large number of other predictor variables suggests that the effect is not merely a proxy for such potentially confounding influences as differences among

two- and four-year college students in precollege internal attribution, degree of exposure to postsecondary education, work responsibilities or grading practices.

A third notable finding of the study was that end-of-first-year internal attribution was positively influenced by extent of exposure to postsecondary education (operationally defined as total number of credit hours taken). This effect persisted even in the presence of controls for student precollege traits (including internal attribution), the characteristics of the institution attended, and students' academic and social/non-academic experiences during college. Such a finding tends to support a generalization from previous research; namely, that exposure to postsecondary education has a modest, but positive, net effect on the development of internal attribution (e.g., Knox, Lindsey, & Kolb, 1993; Wolfle & Robertshaw, 1982). Existing research, however, documented postsecondary education's effect on internal attribution over an extended period of time (between 7 and 13 years.) The findings of our study suggest that the effects on internal attribution of differential exposure to postsecondary education may be discernible after only one year of college.

A fourth, and perhaps from a policy standpoint the most significant, finding concerns the role of teacher behaviors in the development of internal locus of attribution for academic success. Controlling for the influence of a wide range of potential confounding influences, three teacher behaviors had positive net impacts on end-of-first-year internal attribution. Students who reported that the overall teaching they received was characterized by high levels of teacher organization and preparation, teacher instructional skill and clarity, and teacher support demonstrated greater movement toward internal attribution for academic success during the first year of college than other students. Such a finding is significant in that it suggests that the

development of internal locus of attribution for academic success may be facilitated by teaching practices or behaviors that are effective in promoting student classroom success. Each of the three teacher behavior scales shown in this study to positively influence internal attribution has also been shown to have substantial positive links with student learning (Cohen, 1981; Feldman, 1989; Marsh, 1984). Equally important, perhaps, is the fact that major elements of these effective teaching behaviors or practices (e.g., "presentation of material is well organized," "instructors effectively review and summarize the material," "course goals and requirements are clearly explained") can themselves be learned by college faculty (Pascarella & Terenzini, 1991; Weimer, 1990). Thus, a major conclusion from our findings is that effective teaching practices, that are themselves learnable, may not only positively influence student learning, they may also facilitate increased student internal locus of attribution for academic success.

A fifth major conclusion from the findings is that internal locus of attribution for academic success may also be positively influenced by students' social or non-academic experiences. Specifically, in the presence of controls for all other independent variables, work responsibilities and participation in intercollegiate athletics during the first year of college had modest positive impacts on the development of internal attribution. The specific causal linkages between such involvements and internal attribution for academic success are not totally clear. However, one possible, if tentative, explanation is that such activities as work and athletics reward the individual for the efficient use of time and for the accomplishment of specific goals. In so doing one may acquire a stronger sense of being personally in control of one's life, and this, in turn, may have coincident implications for one's sense of academic destiny.

It is worth pointing out, however, that the positive effects on internal attribution of work and athletic participation became statistically significant only in the presence of all other independent variables. This suggests at least the possibility that these specific effects are the result of statistical artifacts associated with colinearity (Pedhazur, 1982). Consequently, we have less faith in their substantive interpretation than we do in the other effects estimated.

In the second stage of the analyses we sought to determine if the effects on internal locus of attribution were general (i.e., similar in magnitude for all students) or conditional (i.e., differing in magnitude for different kinds of students). Our analyses rejected the null hypothesis for general effects and suggest that the variables influencing internal attribution did in fact differ in magnitude by student ethnicity, gender, and age, and by whether or not the student attended a two- versus a four-year college.

Most notably, a number of variables that had significant impacts on locus of attribution in the general-effects regression model (stage one of the data analyses, based on the entire sample) were found to differ dramatically in the magnitude of their impacts for different subsamples of students. For example, work during college had stronger, positive net effects on internal attribution for non-White students and students attending two-year colleges than for their counterparts who were White, or who attended four-year colleges. Similarly, while degree of exposure to postsecondary education (i.e., credit hours taken) had a significant, positive, impact on locus attribution in the general-effects model, the magnitude of the impact was dramatically larger for non-White than White students. Specifically, exposure to postsecondary education was over 11 times more important to the development of internal attribution for non-White students than it was for their White counterparts. Finally, teacher instructional skill and clarity had a

positive impact on internal attribution for two-year college students that was nearly 8 times as large as the corresponding impact for students attending four-year colleges.

Several other significant conditional effects further illustrate how the estimation of general effects (i.e., those based on the entire sample) can mask variations in effects for sample subgroups. In the regression analysis based on the entire sample, Greek affiliation, honors program participation, and an environmental emphasis on being critical, evaluative, and analytical all failed to have a significant general effect on internal attribution. However, when the sample was disaggregated a different picture emerged. The effect of a critical, evaluative, and analytical environment was positive for White students, but negative for their non-White peers. Similarly Greek affiliation had a modest negative effect on internal attribution for students 19 or younger, but a strong positive impact for students 20 or older. Greek membership also had a positive impact on internal attribution for two-year college students that was over 10 times as large as its effect for White students. Finally, participation in an honors program had substantial positive effects on the development of internal attribution for two-year college students and students who were 19 or younger, but basically small and trivial influences for their counterparts who attended four-year colleges, or who were 20 or older.

It is important to point out that conditional effects in non-experimental research on college impacts do not always replicate well (Pascarella & Terenzini, 1991). Consequently, it is probably prudent to regard the conditional effects uncovered in this study as preliminary and suggestive rather than confirmatory or conclusive. They await replication, but they also underscore the importance of investigating the presence of conditional effects in studies of the factors that influence the outcomes of college. Failure to do so could, as the findings of this study suggest,

mask the presence of significant differences in the pattern of influences for different kinds of students.

LIMITATIONS

This investigation has several limitations that should be kept in mind when interpreting the findings. First, although the overall sample is multiinstitutional and consists of a broad range of two- and four-year institutions from around the country, the fact that the analyses were limited to a sample of five two-year and eighteen four-year colleges means that we cannot necessarily generalize the results to all two- and four-year institutions in the United States. Similarly, although attempts were made in the initial sampling design and subsequent sample weighting to make the sample as representative as possible at each institution, the time commitment and work required of each student participant undoubtedly led to some self-selection. We cannot be sure that those who were willing to participate in the study responded in the same way as those who were invited but declined to participate. Third, our measure of internal locus of attribution for academic success was specially developed for this study, and it is certainly not the only way in which the concept of internal attribution can be operationally defined. Alternative conceptualizations or operational definitions of the dependent measure might have produced findings different from those yielded by this investigation. Finally, this study is limited by the fact that we were only able to trace the development of internal locus of attribution for academic success over the first year of college. We cannot be sure that the results we report would hold for subsequent years in college.

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TABLE 1

ALPHA RELIABILITIES AND ITEM-TOTAL SCORE CORRELATIONS FOR INTERNAL LOCUS OF ATTRIBUTION FOR ACADEMIC SUCCESS SCALE

Scale/Item	Item-Total Score Correlations[a]	Alpha Reliability[a]
INTERNAL LOCUS OF ATTRIBUTION FOR ACADEMIC SUCCESS (All items coded in reverse)		.62/.64
The grade I get in a course depends on how hard the instructor grades, not on how carefully I study.	.43/.44	
Good luck is more important for college academic success than hard work.	.42/.44	
Getting a good grade in a college course depends more on being "naturally smart" than on how hard I work.	.40/.40	
When I have trouble learning the material in a course it is because the professor isn't doing a very good job.	.31/.34	

[a]First number is for the precollege measure, second number is for the end-of-first-year follow-up.

TABLE 2

VARIABLE DEFINITIONS

Category/Variable

PRECOLLEGE VARIABLES

Precollege Internal Locus of Attribution for Academic Success: A four-item scale measuring students' precollege level of internal attribution for academic success, alpha reliability = .62 (all items coded in reverse and shown in Table 1).

Precollege Ability: A composite of the reading comprehension, mathematics, and critical thinking modules of the Collegiate Assessment of Academic Proficiency (CAAP), developed by the American College Testing Program, alpha reliability = .83,

Female: 1 = female, 0 = male,

Non-White: 1 = non-White, 0 = White,

Age: A continuous variable calculated by subtracting year of birth from 1992.

Precollege Academic Motivation: An eight-item, Likert-type scale (5 = "strongly agree" to 1 = "strongly disagree") with an internal consistency reliability of .65. The scale items were based on existing research on academic motivation (e.g., Ball, 1977). Examples of constituent items are: "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."

ENVIRONMENTAL EMPHASIS OF THE INSTITUTION ATTENDED

Average Precollege Internal Locus of Attribution for Academic Success of Each Institution's First Year Class: Estimated by the average level of precollege internal locus of attribution at each of the 23 institutions in the sample. Each individual student was given the mean of his or her institution.

(Table 2 continued)

Category/Variable

Non-Discriminatory Racial Environment: A seven-item Likert-type scale (5 = "strongly agree" to 1 = "strongly disagree") with an alpha reliability of .76. Examples of constituent items are: "Instructors treat all students the same regardless of race," "Few if any of the students at this college are prejudiced against minority students," and "Overall, course content at this institution reflects the experiences of minorities (e.g., a literature course would include minority authors)."

Non-Discriminatory Gender Environment: A seven-item Likert-type scale (5 = "strongly agree" to 1 = "strongly disagree") with an alpha reliability of .73. Examples of constituent items are: "Instructors treat all students the same whether the student is male or female," "Few if any of the students at this college are prejudiced against women," and "One seldom hears negative words about women while attending classes."

Environmental Emphasis on Being Critical, Evaluative, and Analytical: Single-item CSEQ rating on a seven-point scale where 1 = weak emphasis and 7 = strong emphasis.

Attended a Four-Year (versus a Two-Year) College: 1 = four-year college, 0 = two-year college.

STUDENT ACADEMIC EXPERIENCES

Total Credit Hours Completed: Number of hours completed during current academic year.

Hours Per Week Spent Studying: Single-item, 6-point self-report of hours per week spend studying where 1 = none and 6 = more than 20 hours.

Social Sciences Courses Taken: Number of college courses taken in the first year in anthropology, audiology/speech pathology, child and family studies, communications, economics, geography, history, political science, psychology, or social work.

(Table 2 continued)

Category/Variable

Mathematics Courses Taken: Number of college courses taken in the first year in pre-algebra, algebra, calculus, statistics, computer science, geometry, matrix algebra, accounting, or business math.

Technical/Preprofessional Courses Taken: Number of college courses taken in the first year in drawing, drafting, architectural design, criminology, education, agriculture, business, physical therapy, pharmacy, physical education, nursing, or computer programming.

Arts and Humanities Courses Taken: Number of college courses taken in the first year in art history, art appreciation, studio art, dance, theater, music appreciation, music performance, composition or writing, English literature, foreign language, humanities, philosophy, linguistics, classics, or religious studies.

Natural Sciences & Engineering Courses Taken: Number of college courses taken in the first year in astronomy, botany, biology, chemistry, physics, geology, zoology, microbiology, and engineering.

CSEQ Course Learning Scale: A 10-item CSEQ scale reflecting students' experiences in courses (e.g., "Took detailed notes in class," "Participated in class discussions," "Tried to explain the material to another student or friend," "Did additional readings on topics that were introduced and discussed in class"). Scored on a 4-point scale, where 1 = never and 4 = often. Alpha = .84.

CSEQ Experiences with Faculty Scale: A 10-item CSEQ scale reflecting students' experiences with faculty (e.g., "Talked with a faculty member," "Discussed ideas for a term paper or other class project with a faculty member," "Worked with a faculty member on a research project," "Discussed personal problems or concerns with a faculty member."). Scored on a 4-point scale, where 1 = never and 4 = often. Alpha = .89.

Member of an Honors College or Honors Program: 1 = yes, 0 = no.

Cumulative First-Year Grades: A single CSEQ item that asked students to report their grades during the first year of college, where 5 = A and 1 = C, C- or lower.

(Table 2 continued)

Category/Variable

Essay exams in Courses: A single CSEQ item that asked students to indicate the number of essay exams taken in courses during the first year of college, where 1 = none to 5 = more than 20.

Perceived Teacher Organization and Preparation: A five-item scale that asked students to indicate the level of teacher organization and preparation in their first-year coursework as a whole; internal consistency reliability = .87. Examples of constituent items are: "Presentation of material is well organized," "Instructors are well prepared for class," and "Course goals and requirements are clearly explained." Coded: 1 = never, to 4 = very often.

Perceived Teacher Instructional Skill and Clarity: A five-item scale that asked students to indicate the level of teacher skill and clarity in their first-year coursework as a whole; internal consistency reliability = .86. Examples of constituent items are: "Instructors give clear explanations," "Instructors effectively review and summarize the material," and "Instructors answer my questions in a way that helps me understand the material." Coded: 1 = never, to 4 = very often.

Perceived Teacher Support: A four-item scale that asked students to indicate the level of teacher or instructional support in their first-year coursework as a whole; internal consistency reliability = .69. Examples of constituent items are: "Instructors given assignments that help in learning the course material," and "Instructors are available for consultation outside of class." Coded: 1 = never, to 4 = very often.

Perceived Teacher Use of Questioning Techniques: A six item scale that asked students to indicate the extent to which teachers used effective questioning techniques in their first-year instruction as a whole; internal consistency reliability = 84. Examples of constituent items are: "Instructors' questions in class ask me to show how a particular course concept could be applied to an actual problem or situation," "Instructors' ask challenging questions in class," "Instructors' questions in class ask me to argue for or against a particular point of view." Coded: 1 = never, to 4 = very often.

(Table 2 continued)

Category/Variable

Perceived Teacher Feedback: A four-item scale that asked students to indicate the extent to which teachers provided feedback on their progress in their first-year coursework as a whole; internal consistency reliability = .67. Examples of constituent items are: "Instructors keep me informed of my level of performance," and "Instructors check to see if I have learned well before going on to new material." Coded: 1 = never, to 4 = very often.

Perceived Use of Educational Technology: A four-item scale that asked students to indicate the extent to which computers and instructional technology were used in their first-year instruction as a whole; internal consistency reliability = .55. Examples of constituent items are: "Instructors used electronic technologies (e.g., computers, video, audio, film, CD-ROM) to present course content" and "Courses require me to learn how to use computers or word processors." Coded: 1 = never, to 4 = very often.

Gains in Writing and Thinking Analytically: A four-item scale taken from the CSEQ that asked students to estimate their gains during the first year in the ability to write and think analytically; internal consistency reliability = .77. Examples of constituent items are: "Writing clearly and effectively" and "Ability to think analytically and logically." Coded: 1 = very little, to 4 = very much.

STUDENT SOCIAL/NON-ACADEMIC EXPERIENCES

On-Campus Residence: 1 = lived on-campus, 0 = lived off-campus.

Joined a Fraternity or Sorority: 1 = yes, 0 = no.

Participated in a Racial or Cultural Awareness Workshop: 1 = yes, 0 = no.

Hours Worked Per Week: Combination of average number of hours of on- and off-campus work per week during the school year, coded 1 = none, to 9 = more than 35.

(Table 2 continued)

Category/Variable

CSEQ Clubs and Organizations Scale: A 10-item (CSEQ scale reflecting students' involvement in campus clubs and organizations [e.g., "Attended a program or event put on by a student group," "Worked in some student organization or special project (publications, student government, social event, etc.)," "Worked on a committee," "Met with a faculty advisor or administrator to discuss the activities of a student organization"], where 1 = never to 4 = very often. Alpha = .92.

CSEQ Student Acquaintances Scale: A 10-item CSEQ scale measuring the nature of students' interactions with peers (e.g., "Made friends with students whose interests were very different from yours," "Made friends with students whose race was different from yours," "Had serious discussions with students whose philosophy of life or personal values were very different from yours," "Had serious discussions with students from a country different from ours"), where 1 = never to 4 = very often. Alpha = .90.

Competed in Intercollegiate Athletics: 1 = yes, 0 = no.

DEPENDENT VARIABLE

End-of-First-Year Internal Locus of Attribution for Academic Success: A four-item scale measuring students' end-of-first-year level of internal attribution for academic success, alpha reliability = .64 (all items coded in reverse and shown in Table 1).

TABLE 3

REGRESSION ANALYSIS SUMMARY FOR THE PREDICTION OF END-OF-FIRST-YEAR INTERNAL LOCUS OF ATTRIBUTION FOR ACADEMIC SUCCESS

Predictor	Zero-Order Correlation	Beta	b
PRECOLLEGE VARIABLES			
Precollege internal locus of attribution for academic success	.505	.440	.453*
Precollege academic ability	.009	-.016	-.017
Female	.188	.080	.425*
Non-White	.032	.044	.244
Age	.127	.004	.002
Precollege academic motivation	.068	-.007	-.035
ENVIRONMENTAL EMPHASIS OF THE INSTITUTION ATTENDED			
Average precollege internal locus of attribution for academic success of each institution's first year class	084	-.030	-.201
Non-discriminatory gender environment	.035	-.025	-.011
Non-discriminatory racial environment	.013	-.049	-.032
Environmental emphasis on being critical, evaluative, and analytical	.087	.032	.069

(Table 3 continued)

Predictor	Zero-Order Correlation	Beta	b
Attended a four-year (versus a two-year college)	-.121	-.080	-.457*
STUDENT ACADEMIC EXPERIENCES			
Total credit hours taken	.071	.055	.085*
Hours per week spent studying	.089	-.010	-.020
Social science courses taken	-.053	-.038	-.053
Mathematics courses taken	-.075	-.033	-.071
Arts and humanities courses taken	-.040	-.035	-.042
Natural sciences and engineering courses taken	-.053	-.017	-.032
Technical/preprofessional courses taken	-.038	-.013	-.024
Course learning scale	.146	.031	.015
Experiences with faculty scale	.050	-.006	-.003
Honors college or honors program participation	.055	.022	.183
Cumulative first-year grades	.149	.048	.104
Essay exams in courses	.033	.009	.023
Perceived teacher organization and preparation	.263	.111	.564*

(Table 3 continued)

Predictor	Zero-Order Correlation	Beta	b
Perceived teacher instructional skill and clarity	.252	.078	.362*
Perceived teacher support	.262	.086	.423*
Perceived teacher use of questioning techniques	.094	-.039	-.181
Perceived teacher feedback	.115	-.049	-.233
Perceived use of technology	.112	-.073	-.334*
Gains in writing and thinking analytically	.121	.025	.106
STUDENT SOCIAL/NON-ACADEMIC EXPERIENCES			
On-campus residence	-.032	-.004	-.022
Joined a fraternity or sorority	.043	.024	.247
Participated in a racial or cultural awareness workshop	.002	.030	.196
Hours worked per week	.027	.061	.055*
Clubs and organizations scale	.026	.021	.008
Student acquaintances scale	-.002	-.061	-.024*
Competed in intercollegiate athletics	.009	.064	.486*
R^2	.348*		

*$p < .01$

TABLE 4

METRIC REGRESSION COEFFICIENTS FOR SIGNIFICANT CONDITIONAL EFFECTS

PART A: Conditional Effects Based on Attendance at a Two-Year Versus a Four-Year College

Predictor Variable	Two-Year	Four-Year
Honors college or honors program participation	1.604[a]	.074[a]
Essay exams in courses	- .203[b]	.099[b]
Perceived teacher instructional skill and clarity	1.042[c]	.134[c]
Hours worked per week	.142[d]	.026[d]
Joined a fraternity or sorority	2.654[e]	.236[e]

PART B: Conditional Effects Based on Ethnicity

Predictor Variables	White	Non-White
Female	.200[f]	.687[b]
Environmental emphasis on being critical, evaluative, and analytical	.186[g]	-.114[g]
Total credit hours taken	.017[h]	.197[h]
Hours worked per week	-.007[i]	.121[i]

(Table 4 continued)

PART C: Conditional Effects Based on Age

Predictor Variable	Men	Women
Course learning scale	.069[j]	.001[j]

PART D: Conditional Effects Based on Age

Predictor Variable	19 or Younger	20 or Older
Honors college or honors program participation	.363[k]	.098[k]
Joined a fraternity or sorority	-.086[l]	.578[l]

Note: Regression coefficients with the same superscript are significantly different in magnitude at $p < .01$ with the influence of all other predictors in the model control statistically.