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The Importance of Admissions Scores and Attendance to First-Year Performance

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Abstract. The goal of this study was to determine how ACT Aptitude Ratings (AAR, a pre-admission criterion) of first-year students are associated with various aspects of their first-year experiences. AAR scores were only weakly correlated with students' first-semester grade point averages (GPA), as well as their second-semester grades and attendance rates in a large, introductory biology course. The strongest correlates of students' academic success during their first year of college were their first-semester GPAs and their rates of class attendance. These results (a) indicate that instructors, advisors, and other learning assistance professionals should not rely heavily on AAR scores when making academic decisions regarding academic aspects of students' first-year experiences and (b) emphasize the importance of motivation-related behavior such as class attendance for the academic performances of first-year students. These findings are discussed relative to several recommendations to improve students' academic performances during their first year of college.

Colleges and universities spend much time and money trying to identify factors that predict students' academic performances. Researchers have examined a variety of factors related to academic performance (Tinto, 1975), including personality and

aptitude (Baird, 1984), stress and social class (Barney, Fredericks, & Fredericks, 1984), self-esteem and critical thinking (Bassarear, 1991), academic autonomy and motivation (Higbee & Thomas, 1999; Thomas & Higbee, 2000), and scores on standardized tests such as the SAT and ACT (Arbona & Novy, 1990; Moore, Jensen, Hsu, & Hatch, 2002; Young & Sowa, 1992). Although these studies have often been informative, most of them have not provided adequate answers to the question that is most often asked of instructors by first-year students, "What can I do to succeed at the university?"

Providing effective answers to this question is especially important for at-risk students, who usually lack some of the academic skills and experiences that are often associated with academic success in college. These at-risk students are becoming increasingly common at colleges and universities in the United States. For example, more than one third of students in many states who have earned academic scholarships have to take developmental courses when they start college (Schouten, 2003), and 35% of the students, who in 2000, entered two- and four-year public and private institutions in the United States took at least one year of remedial courses. By comparison, 28% of first-year students spent that much time in remedial courses in 1995 (Cavanagh, 2003; Remedial Education, 2003).

How can we identify the students most likely to succeed? Many colleges and universities base their admissions decisions on formulae that rely on students' scores on standardized tests (e.g., SAT, ACT), high school grade point average (GPA), and high school graduation rankings (Moore et al., 2002). Although some studies have reported a weak correlation between standardized-test scores and college grades (Montague, 1995; Nettles, Theony, & Grosman, 1986), others have concluded that such scores are not effective predictors of students' academic performances in college (Allen, 1986; Arbona & Novy, 1990; Nettles, 1984; Sedlacek & Adams-Gaston, 1989; Young & Sowa, 1992). As most instructors know, many students succeed in college despite the fact that they scored relatively poorly on admissions tests (Moore et al., 2002).

Given the contradictory evidence on standardized test scores, what factors are correlated with the academic performance of first-year students? To answer this question and better understand the relationship between pre-admission criteria and students' academic performance, I studied how students' ACT Aptitude Ratings are associated with their subsequent college GPAs. This study was supplemented by a simultaneous investigation of how students' ACT Aptitude Ratings and first-semester GPAs correlate with students' performance and attendance in an introductory biology course taken during the second semester. The biology course was selected because introductory science courses (a) are taken by most first-year students and (b) are high-risk courses for which many students are under-prepared. As a result, up to 50% of students earn a D, F, or W (withdrawal) (Congos, Langsam, & Schoeps, 1997).

Method

Participants

This study included 263 students enrolled in an introductory biology course (GC 1131, Principles of Biological Science) offered during the 2003 spring semester in the General College (GC) at the Twin Cities campus of the University of Minnesota. GC provides access to the university for students from diverse cultural, educational, and socio-economic backgrounds who do not meet all of the admissions requirements of the university's other colleges. GC prepares students to transfer to one of the university's degree-granting colleges. Many students in GC are considered to be "at risk" because they have lower grades, ACT scores, and high school graduation percentiles than most other students at the university. Courses in GC are content-rich, credit-bearing, transferable courses that count fully toward graduation from the university.

Students in this study had an average ACT composite score of 21, an average high school graduation percentile of 51, an average age of 20, and a gender composition of 47% female

and 53% male. These students' ethnic diversity was as follows: 58% Caucasian, 17% African American, 16% Asian American, 4% Chicano/Latina, 3% other, and 2% American Indian (University of Minnesota, 2003b).

Academic Aptitude Rating

The University of Minnesota combines a student's ACT score and high school graduation percentile rank to create the student's Academic Aptitude Rating (AAR), which equals the student's high school graduation percentile plus two-times the student's ACT composite score. Some colleges at the University of Minnesota use AAR scores as requirements for admission. For example, the College of Liberal Arts requires AAR scores of at least 110 for regular admission, and the Institute of Technology guarantees admission to students having an AAR score of at least 135 (University of Minnesota, 2004a; University of Minnesota, 2004b). Although GC bases its admissions decisions on individual reviews of a variety of factors (e.g., family history, diversity), it also tracks students' AAR scores. For example, students who entered GC in the fall of 2003 had an average AAR of 93 (University of Minnesota, 2003a).

Institutional data were collected to determine each student's ACT Aptitude Rating and their grade point average (GPA) from their first semester at college (i.e., fall 2002). The data were compared to the students' average grades and attendance rates in the introductory biology class described above, which was taken by all of these students during their second semester of college (i.e., spring 2003). All students in this study were taught in a similar way (e.g., with the same syllabus, textbook, sequence of topics, pedagogical techniques) and in the same classroom. The study did not include students (a) who withdrew from the course, (b) who failed the course because of academic dishonesty, or (c) whose records did not include enough information to calculate an AAR score.

Class Attendance and Grades

The University of Minnesota (2002) has a concise, one-sentence policy regarding attendance, which establishes the expectation that students "attend all meetings of their courses." The course syllabus for GC 1131 added the following statement about the importance of attendance for academic success: "I expect you to prepare for and attend every class. This is important because class attendance is usually a strong indicator of course performance." On the first day of class, the instructor discussed and emphasized this part of the syllabus with students in the course. Attendance was recorded in every class. Class notes were not posted or distributed to students.

All exams in the course covered material presented both in class and in assigned readings from the required course textbook. Missing classes did not preclude any student from making an A; that is, students could have earned an A on each exam if they had read and understood the readings assigned in the textbook. No grades were curved, students were not allowed to retake any exams, and there were no extra-credit projects. Course grades were based entirely on students' abilities to demonstrate their mastery of the course's academic content and skills on four tests. No points were awarded for excellent attendance.

Limitations

The sample of students in this study may not have reflected the university population regarding study habits, rates of class attendance, and other variables. Although our models involved substantial multicolinearity, the strongest correlations were obvious.

Results

Students in this study had an average AAR of 93, an average GPA during their first semester of college of 2.7, an average attendance rate (percentage of classes attended) in the second-semester biology course of 70%, and an average score in the biology course of 74%.

Table 1 shows the relationship of students' AAR scores to their first-semester GPA, attendance rates, and grade in the second-semester introductory biology course. On average, students with AAR scores greater than 110 had significantly higher first-semester GPAs, rates of class attendance, and grades in the biology course than students having AAR scores below 110. However, there was no significant correlation of AAR scores below 110 with students' first-semester GPA, attendance rate in the introductory biology class, or course grade.

Table 1

Relationship of Academic Aptitude Rating (AAR) to First-Semester GPA, Attendance, and Course Grade in a Second-Semester Introductory Biology Course

AAR	Percentage of students	Average first-semester GPA	Average course attendance rate	Average course score
> 110	10	3.3	76	81
100-109	30	2.8	72	75
90-99	24	2.7	69	73
80-89	19	2.8	52	71
70-79	13	2.6	63	70
< 70	4	2.8	64	73

Note. AAR equals a student's high school graduation percentile plus two-times the student's ACT composite score.

Table 2 shows the relationship among students' first-semester GPA, AAR scores, attendance, and grade in the introductory biology class. There was no statistically significant relationship between GPA and AAR scores ($r = 0.16$, $p < .05$), but

the correlation of GPA with course scores was highly significant ($r = 0.68$, $p < .01$), as was the correlation between GPA and course attendance ($r = 0.50$, $p < .01$).

Table 2

Relationship of First-Semester GPA to Academic Aptitude Rating (AAR) Score, Attendance, and Course Grade in a Second-Semester Introductory Biology Course

GPA	Percentage of students	Average AAR	Average course attendance rate*	Average course score*
3.50-4.00	18	95	84	85
3.00-3.49	33	95	77	77
2.50-2.99	24	93	68	72
2.00-2.49	10	90	64	69
1.00-1.99	8	93	58	65
0-0.99	7	93	36	49

Note. Percentage of students reflects those who achieved first-semester GPA in each category.

*$p < .01$

Table 3 shows the relationship among students' scores in a second-semester introductory biology course, their first-semester GPA, attendance in the second-semester biology course, and AAR scores. The correlation of students' grades with AAR scores was not significant, but the correlation of students' course scores with their GPAs was significant ($r = 0.68$, $p < .01$), as was the correlation between their course grade and rates of class attendance in the second-semester biology course ($r = 0.50$, $p < .01$).

Table 3

Relationship of Second-Semester Course Grade in an Introductory Biology Course to First-Semester GPA, Attendance, and Academic Aptitude Rating (AAR) Score

Course Grade	Percentage of students	Average first-semester GPA*	Average course attendance rate*	Average AAR
A (89-100%)	9	3.6	92	98
B (79-88%)	26	3.2	79	96
C (69-78%)	28	2.8	70	93
D (59-68%)	18	2.4	61	92
F (<59%)	19	1.2	29	90

Note. Percentage of students reflects those who achieved course grade in each category.

*$p < .01$

Table 4 shows how students' rates of class attendance are related to their first-semester GPA, AAR scores, and grade in a second-semester introductory biology course. The correlation of students' class-attendance rate with their biology course scores was statistically significant ($r = 0.63$, $p < .01$), as was the correlation between students' class-attendance rate and their GPAs ($r = 0.50$, $p < .01$), but the correlation of class attendance rate with AAR scores was not significant ($r = 0.09$, $p < .05$).

Table 4

Relationship of Attendance Rate in an Introductory Biology Course to First-Semester GPA, Academic Aptitude Rating (AAR) Score, and Second-Semester Course Grade in an Introductory Biology Course

Course Attendance Rate	Percentage of students	Average first-semester GPA*	Average AAR	Average course score*
91-100	17	3.2	95	82
81-90	18	3.1	95	80
71-80	16	3.2	92	80
61-70	19	2.9	93	74
51-60	15	2.6	92	72
41-50	4	2.2	96	66
31-40	4	2.5	89	64
21-30	4	1.9	93	62
11-20	2	1.8	91	57
0-10	1	1.6	95	42

Note. Percentage of students reflects those students' course attendance rates.

*$p < .01$

Discussion

AAR Scores Correlate Weakly With Students' Academic Success.

The correlation of AAR scores with students' academic performances in their first semester of college (i.e., as measured by their first-semester GPA) was weak. Indeed, students' AAR scores accounted for only 2% of the variation in their first-semester GPA. Although AAR scores above 110 were associated with the highest GPAs in this study (i.e., 3.3), 90% of students in this study

had AAR scores below 110, and these students' scores were only weakly correlated with their first-semester GPAs. For example, students having AAR scores ranging from 80 to 89, from 100 to 109, and below 70 had average GPAs (2.8) that exceeded those of students having AAR scores ranging from 70 to 79 and 90 to 99. Moreover, the average AAR scores of students with GPAs below 2.00 (i.e., 93) exceeded those of students with GPAs between 2.00 and 2.49, and equaled those of students having GPAs between 2.50 and 2.99.

AAR scores are also weakly correlated with students' grades and attendance rates in individual courses taken during students' first year of college, as measured here in the introductory biology course. That is, variability in AAR scores accounted for only 1 to 2% of the variation in grades and attendance rates in the introductory biology course. Although AAR scores greater than 110 were associated with the highest attendance rates and grades (i.e., 76% and 81%, respectively), there was no similar association for other average ranges of AAR. For example, students having AAR scores below 79 attended class more often, on average, than did students having AAR scores between 80 and 89, and students having AAR scores below 70 earned higher average grades than did students having AAR scores between 70 and 79. These data for students' academic performances in a second-semester course are consistent with AAR scores being only weakly correlated with the academic performances of first-year students.

Class Attendance and First-Semester GPA Are Strongly Correlated With Students' Subsequent Academic Success.

As St. Clair (1999) has noted, there have been relatively few quantitative studies of how class attendance relates to students' academic performance. Although it seems intuitive to many instructors that high rates of class attendance would correlate positively with high grades, several studies have concluded otherwise (Berenson, Carter, & Norwood, 1992; Borland & Howsen, 1998; Devadoss & Foltz, 1996; Feldman, Carney, & Schloman, 1998;

Hammen & Kelland, 1994; Thompson & Plummer, 1979). Some studies have argued against compulsory attendance (Petress, 1996; St. Clair), and others have even concluded that mandatory attendance policies may impede learning (Hyde & Flournoy, 1986). There are several possible explanations for these differing conclusions. For example, some studies involved small populations of first-year students, others involved only upper-division students, and in others, instructors distributed their class notes, thereby reducing the importance of attending class. Regardless, the differing outcomes led St. Clair to conclude that "research has not consistently revealed a positive relationship between attendance and achievement" (p. 172).

Unlike most other studies, this study included a relatively large sample of students ($N = 263$) enrolled in an introductory science course in which lecture notes were not posted or distributed to students, thereby presumably increasing the importance of class attendance for earning high grades. In this study, students' rates of class attendance were strongly correlated with their academic success, as measured both by their first-semester overall GPA and their grades in the second-semester biology course. These correlations were statistically significant and consistent. For example,

1. Poor first-semester GPAs were associated with low attendance rates and grades in the second-semester biology course. As noted above, there was not a similar relationship between students' GPAs and their AAR scores. Although this study examined academic behaviors (i.e., class attendance) and academic performance (i.e., course grade) in a second-semester course, such behaviors and performances are usually similar throughout the first year of college (Moore, in press; Moore, 2004).
2. Decreases in students' rates of class attendance corresponded to decreases in students' GPAs and course grades, but not with consistent patterns in their AAR scores. Students who came to class most often earned higher first-semester GPAs and course grades in the

introductory biology course than students who missed many classes. Although this correlation was not perfect, it was strong and statistically significant.

3. Poor grades in the second-semester biology course were associated with poor first-semester GPAs and attendance rates in the course.

Taken together, these results indicate that students' first-semester GPAs and rates of class attendance in a second-semester course are strongly correlated with students' academic performance in that course. This finding underscores the importance of students getting off to a good start in college, because their first-semester GPAs are strongly correlated with their subsequent academic performances. One of the best ways for students to get a good start, and thereby increase their chances of earning high grades, involves a simple choice; namely, whether they will attend class regularly. For example,

1. Students who come to class most often are more likely to earn higher first-semester GPAs than are students who miss classes (Moore, 2003). AAR scores are not strongly correlated with most students' rates of class attendance, and consequently are usually not strongly associated with students' academic success.
2. Students who earn the highest first-semester GPAs are most likely to continue to earn adequate grades in their second semester of college. An important reason for this success is that these students attend class regularly (Martin, 1989; Wyatt, 1992). Students not motivated or engaged enough to attend class regularly will likely fail despite instructors' best efforts because they will not be present to benefit from instructors' advice, knowledge, or teaching strategies that would likely help them succeed. As Thomas and Higbee (2000) have noted, "The best ... teacher, no matter how intellectually satisfying, no matter how clear in providing explanations and examples, may not be able to reach the high-risk freshman who has no real interest in learning ... and will

certainly not be successful with the student who fails to show up for class" (p. 231).

The finding reported here that students' first-semester GPAs and attendance rates in a second-semester course are highly correlated with students' grades in the introductory biology course is consistent with previous studies of the importance of class attendance for students' academic success (Moore, 2003; Moore et al., 2003). For example, Wiley (1992) reported that students' rates of class attendance and, to a lesser extent, their previous GPA, accounted for 62% of the variation in students' grades in introductory business courses, and Street (1975) concluded that 52% of the variability in students' grades can be explained by their rates of class attendance. Launius (1997) reported a correlation coefficient for attendance and grades of 0.46, and Devadoss and Foltz (1996) concluded that students' grades were strongly influenced by students' previous GPAs and rates of class attendance.

Of course, the correlations reported here are not perfect, and class attendance does not guarantee learning. Students who come to class only to socialize, read the newspaper, or sleep will not benefit from being in class. Similarly, although students' GPAs and attendance rates are strongly correlated with their academic success (Devadoss & Foltz, 1996; Launius, 1997; Moore, 2003; Moore et al., 2003; Street, 1975), correlation is not necessarily synonymous with cause. Causality might go either way; high rates of class attendance might help students earn better grades, or students' desires to make higher grades might underlie their high rates of class attendance, or both. Moreover, other variables may be responsible for the correlations reported here, and good grades and high rates of class attendance are probably a proxy for other factors such as motivation, perseverance, educational background, emotional maturity, and diligence. Regardless, there is no mistaking the importance of regular class attendance, and the motivation and educational involvement that it represents, for students' academic success (Moore et al.). The importance of class attendance was described this way by Thompson (2002): "If

a student ever complains about a grade or how tough the course is, one of the first things I look at is class attendance. That usually says it all" (p. B5). Thomas and Higbee (2000) were more succinct when they concluded that "nothing replaces being present in class" (p. 229).

Helping Students Succeed

Data reported here support several recommendations for instructors, advisors, and administrators to improve students' first-year experience. Summer orientation programs, Supplemental Instruction programs, and first-year seminars should consistently and repeatedly emphasize the importance of class attendance and academic engagement for students' academic success. These emphases should go beyond truisms such as "It's important to go to class." Students have heard this often, but large percentages of them have not been convinced of its validity and, as a result, choose to skip classes anyway (Friedman, Rodriguez, & McComb, 2001; Romer, 1993). Instead, faculty and administrators should emphasize the empirical correlation of high grades and class attendance and use data to show students how different rates of class attendance are correlated with different probabilities of earning various grades (e.g., in the introductory biology course, students who attended fewer than 80% of classes had no chance of earning an A, and those who attended 100% of classes had more than a 90% chance of making at least a C; Moore, 2003). Attending class regularly increases the probability of earning a passing grade (Brocato, 1989; Hollister, 1993; Jones, 1984; Lamdin, 1996; Launius, 1997; Moore, 2003; Romer, 1993; Snell, Mekies, & Tesar, 1995; White, 1992; Wiley, 1992), especially for ethnic minority students (Gatherer & Manning, 1998).

Faculty and staff may also want to remind students that their future incomes and lifestyles depend largely on whether they graduate from college (U.S. Census Bureau, 2003). Graduation from college, in turn, requires that students pass their classes, and whether they pass their classes depends largely on whether they attend class and engage themselves in their

education. Students' differing efforts usually produce different rewards. Attending class helps students pass courses, graduate from college, and increase their future earning potential.

Instructors and advisors should monitor students' progress by monitoring their class attendance rates. Although self-reported data (e.g., answers to questions such as "Did you study?" and "Did you read the assignments?") are often unreliable (Caron, Whitbourne, & Halgin, 1992; Sappington, Kinsey, & Munsayac, 2002), class attendance is easily, accurately, and objectively measured. Class attendance is usually a strong predictor of students' academic success (Moore et al., 2003). With this in mind, faculty should monitor students' attendance and use quantitative data about class attendance and course grades to counsel them to avoid missing class. Moreover, faculty should intervene before absenteeism becomes an established pattern. Students who insist on skipping class may need counseling to explore their roles as learners (Thomas & Higbee, 2000). This counseling will be most effective if it occurs before students are expelled from college because of failing grades that result from their absenteeism.

Students also need a realistic picture of what it will take for them to pass their courses and graduate from college. For example, many traditional students enter college with cultural backgrounds, educational experiences, and academic skills that can ameliorate the effects of occasional absenteeism. As Launius (1997) has noted, these students "may learn through experience which courses they need to attend regularly in order to get a good grade and which they do not" (p. 91). In contrast, many "average" students often lack one or more of these experiences or skills, thereby making it more difficult for them to overcome the problems caused by absenteeism. Thus, their motivation, educational engagement, and work-ethic are all the more important (St. Clair, 1999). This conclusion is valid for a variety of courses, including introductory biology, physics, and anatomy and physiology (Moore et al., 2003). In this regard, there is much merit in Woody Allen's claim that "Eighty percent of success is showing up."

Instructors, advisors, and learning assistance professionals play critical roles in helping under-prepared students have a successful first-year experience and become college graduates. However, students must also understand what they must do to succeed. Students will be more successful if we provide explicit, research-based recommendations about what behaviors they will need to excel.

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