

Academic performance of transfer versus “native” students in a wildlife Bachelor of Science program

Stephen S. Ditchkoff, David N. Laband, and Kent Hanby

Abstract We analyzed empirical factors that predicted academic performance of wildlife sciences majors at Auburn University who graduated during the period 1995–2000 in the required courses in the wildlife sciences curriculum (not the university core curriculum or supporting courses). Controlling for a variety of factors, we found no evidence that academic performance of native students (i.e., those entering the program as freshmen) in the required wildlife sciences curriculum exceeded that of transfer students. Rather, we found that high-school grade-point average (GPA) and Academic College Testing (ACT) or Scholastic Achievement Test (SAT) scores were the most important predictors of future academic performance. Among transfer students, transfer GPA was a strong, positive predictor of subsequent academic performance in the required wildlife sciences curriculum. We suspect that transfer students in a wildlife sciences program are able to meet challenges associated with entering a new university setting because of small class sizes and personal relationships that often develop with faculty. Our results suggested a bifurcated strategy when recruiting students: recruitment efforts aimed at native students should focus on ACT or SAT scores and high-school GPA, while transfer students should be targeted on the basis of transfer GPA, regardless of whether they have taken the ACT or SAT.

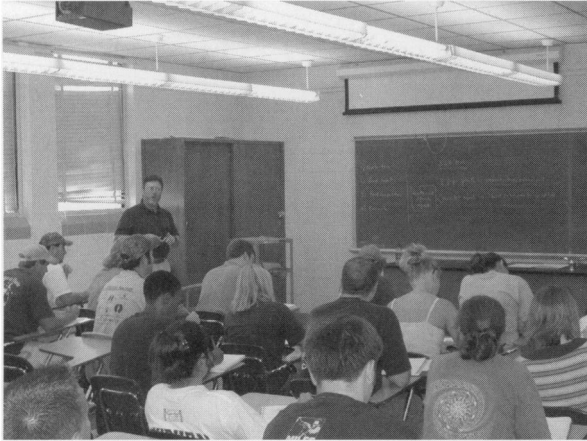
Key words academics, Bachelor of Science, grade-point average, transfer student, undergraduate, university, wildlife sciences curriculum

Transfer students are an important component of the student body in most 4-year academic colleges and universities across the United States. Estimates suggest that approximately 20% of students will transfer from 2-year community or technical colleges to 4-year institutions (Grubb 1991). However, this number may be even greater for natural resource programs: at Auburn University, normally >50% of students enrolled in wildlife or forestry degree programs were transfer students (D. N. Laband, Auburn University, unpublished data). A concern of administrators at many 4-year colleges and universities is that transfer students have been reported to have lower grade-point averages (GPAs) and retention rates relative to their “native” coun-

terparts (Hills 1965, Townsend 1995), particularly during the first or second semester after transferring. This dip in academic performance has been coined “transfer shock” (Hills 1965) and has received considerable attention among sociologists and academic counselors. Many factors can contribute to transfer shock, or perceived differences in academic performance between transfer and native students, but some factors considered most important have been institutional differences in academic rigor, size and location, and competition among students (Eggleston and Laanan 2001).

In addition to the challenges listed above, transfer students must also cope with a variety of other academic, social, and climatic issues during their

Authors' address: School of Forestry and Wildlife Sciences, Auburn University, AL 36849, USA; e-mail for Ditchkoff: ditchss@auburn.edu.



Students in wildlife programs may benefit from small-size classes in which faculty-student interaction is common.

acclimation to their new college or university. Eggleston and Laanan (2001) suggested that transfer students must cope with negative attitudes toward transfer students by university faculty and administrators, admissions and registration complications, advising problems, and general confusion in areas relating to housing, career planning, student activities involvement, and financial aid. Also, transfer students must cope with both academic (e.g., classroom performance, faculty-student interaction, advising and planning, career focus) and social concerns (e.g., self-confidence, campus adjustment, time management, finances) as well (Eggleston and Laanan 2001). These challenges undoubtedly create an environment that mitigates learning and likely result in the poor retention rates sometimes reported for transfer students (Hills 1965, Laanan 2001).

Wildlife science programs, like other majors at 4-year academic institutions, are comprised of both native and transfer students and must meet the needs of both groups if they are to be successful. However, little or no data are available regarding academic performance of transfer students in wildlife science programs. To address this issue, we collected data on academic performance of transfer and native students in the wildlife sciences degree program at Auburn University, Auburn, Alabama. We hypothesized that academic performance of native students would be better than that of transfer students because of the additional challenges that transfer students must face. This is the first analysis of students' academic performance in a wildlife sciences curriculum of which we are aware. Previous work on wildlife sciences educa-

tion has tended to focus on curricular content (e.g., the symposium on Biometrics in Undergraduate Education as reported in the Winter 2001 issue of the *Wildlife Society Bulletin*), cooperative versus individualistic learning (Fazzari and Moen 1996, Moen et al. 2000), and integrative learning (Moen et al. 1996).

Methods

We examined data on academic performance of 113 students who graduated from Auburn University with a Bachelor of Science degree in Wildlife Sciences during the 6-year period from 1995-2000. During this period there were no changes in the required curriculum taken by undergraduate wildlife sciences majors. Data on more recent graduates was not usable, because Auburn University converted from a quarter-based to a semester-based academic calendar, at which time the required wildlife sciences curriculum was changed. All data were provided by the Office of Institutional Research at Auburn University, Alabama.

We did not examine overall academic performance of students during their tenure at Auburn University, but rather confined our attention to students' academic performance in the set of wildlife sciences courses that all students seeking the Bachelor of Science degree in Wildlife Sciences were required to complete. We did this to ensure that we were measuring performance in wildlife science courses, not general electives courses. During the time period under consideration, all



Field laboratories commonly associated with courses in wildlife programs allow students to interact with faculty in small-group settings, develop interpersonal relationships with faculty, and possibly overcome factors that may hinder academic performance.

undergraduate students majoring in wildlife sciences were required to take 19 core courses, in addition to a variety of electives not included in the analysis. We gathered data on student academic performance from the following courses: Animal Physiology, Evolution and Systematics, Fish and Wildlife Law Enforcement, Forest Policy, Genetics, Herpetology, Invertebrate Zoology, Mammalogy, Ornithology, Plant Ecology, Principles of Ecology, Principles of Wildlife Management, Silviculture, Systematic Botany, Wildland Recreation Philosophy and Policy, Wildlife Biology, Wildlife Conservation, Wildlife Habitat Analysis, and Wildlife Philosophy and Policy.

We used analysis of covariance (ANCOVA) to examine effects of categorical and continuous variables on academic performance, as measured by grade-point average (GPA) of transfer and native students in 19 core courses (Model 1). Gender, state residency (resident vs. nonresident), and transfer status (transfer vs. native) were main effects in the model, and Academic College Testing (ACT) or Scholastic Achievement Test (SAT) score, high-school GPA, and age at graduation were covariates. Alabama students were not required to take the ACT or SAT to gain admittance to a community college; therefore, this analysis included only those transfer students who had taken the ACT or SAT. However, if transfer students who did not take the ACT or SAT differed in other fundamental respects from transfer students who did take the ACT or SAT, the absence of the former group from the sample could bias statistical results. That is, the estimated effect of the transfer students who took the ACT or SAT would not reflect the effect on academic performance of all transfer students. To account for this, we parsed our sample to include only transfer students and investigated whether there was a difference in academic performance in the required wildlife sciences curriculum between transfer students who took the ACT or SAT and transfer students who took neither test. We included in Model 2 data on students' GPA at their 2-year institution and number of credit hours transferred to Auburn University and analyzed these data with ANCOVA. Main effects included ACT or SAT score (0 or 1 depending on whether the ACT or SAT was taken), gender, and state residency, and covariates were age, number of hours transferred from the students' previous institution, and GPA from the students' previous institution.

Finally, we examined the importance of ACT or SAT scores, and high-school GPA, relative to other

variables in an ANCOVA, as predictors of academic performance of transfer students in the required wildlife sciences curriculum. This analysis (Model 3) included only transfer students who had reported their ACT score and high-school GPA. Gender and residency were main effects, and ACT or SAT, high-school GPA, age, transfer GPA, and transfer hours were included as covariates. If we found significant main effects in Models 1, 2 or 3, we then ran an analysis of variance (ANOVA) without the covariates because ANCOVA examines how main effects influence a dependent variable relative to covariates, and ANOVA would allow us to examine main effects in the absence of covariates. Multiple comparisons were conducted when main effects or interactions were significant ($P < 0.05$) using Fisher's least-square differences procedure. We used a Bonferroni correction for all multiple comparisons to keep the experiment-wise error rate at a statistical significance level of $\alpha = 0.05$.

Results

Our ANCOVA model (Model 1) to examine relative importance of select independent variables in predicting academic performance of transfer and native students ($n = 113$) was significant ($F_{9,103} = 5.54$; $P < 0.001$). Both ACT (or ACT-equivalent SAT) score ($F_{1,103} = 9.04$; $P = 0.003$) and high school GPA ($F_{1,103} = 19.29$; $P < 0.001$) were positive predictors of student performance in the required wildlife sciences curriculum. No other variables were associated ($P > 0.05$) with academic performance (Table 1). The ANOVA for Model 1 was not significant ($F_{6,130} = 0.50$; $P = 0.807$).

The ANCOVA model (Model 2) used to examine differences in academic performance of transfer students ($n = 81$) who took the ACT or SAT and those who did not was significant ($F_{9,71} = 3.85$; $P < 0.001$). Transfer GPA was a positive predictor ($F_{1,71} = 18.64$; $P < 0.001$) of transfer student performance (Table 2). Although we detected a gender*residency interaction ($F_{1,71} = 6.02$; $P = 0.017$), Fisher's least-square differences procedure did not indicate any differences ($P > 0.05$) among groups. The ANOVA for Model 2 was not significant ($F_{6,74} = 2.19$; $P = 0.053$).

The ANCOVA model (Model 3) used to examine relative importance of select independent variables in predicting academic performance of transfer students ($n = 57$) that reported their ACT or SAT score on their application was significant ($F_{1,48} = 5.92$; $P <$

Table 1. Results of ANCOVA (Model 1) that examined academic performance, as measured by grade point average (GPA), of undergraduate wildlife students ($n = 113$) at Auburn University, Alabama from 1995-2000.

Source	df	$\beta \pm 1$ SE	F	P
Model	9		5.54	<0.001
Main effects				
Gender	1	0.200 \pm 0.119	2.96	0.089
Residency (AL or out-of-state)	1	0.029 \pm 0.246	0.30	0.585
Transfer status (native or transfer)	1	-0.014 \pm 0.144	0.01	0.928
Interactions				
Gender \times Residency	1	0.010 \pm 0.217	0.00	0.963
Gender \times Transfer status	1	-0.059 \pm 0.191	0.09	0.760
Residency \times Transfer status	1	0.065 \pm 0.257	0.06	0.801
Covariates				
ACT/SAT score	1	0.041 \pm 0.014	9.04	0.003
High school GPA	1	0.405 \pm 0.092	19.29	<0.001
Age at graduation	1	0.038 \pm 0.025	2.29	0.133
Error	103			
Total	112			

0.001). Transfer GPA ($F_{1,48}=8.02$; $P=0.007$), high-school GPA ($F_{1,48}=4.44$; $P=0.040$), and ACT or SAT score ($F_{1,48}=4.11$; $P<0.048$) were positive predictors of performance of these students (Table 3). Once again we detected a gender*residency interaction ($F_{1,71}=9.86$; $P=0.003$), but Fisher's least-square differences procedure did not indicate any differences ($P>0.05$) among groups. The ANOVA for Model 3 was significant ($F_{3,53}=3.31$; $P=0.027$), and there was a gender*residency interaction ($F_{3,53}=7.40$; $P=0.009$). However, Fisher's least-square

Table 2. Results of ANCOVA (Model 2) that examined academic performance, as measured by grade point average (GPA), of transfer wildlife students ($n = 81$) at Auburn University, Alabama from 1995-2000.

Source	df	$\beta \pm 1$ SE	F	P
Model	9		3.85	<0.001
Main effects				
Gender	1	0.272 \pm 0.124	0.56	0.458
Residency (AL or out-of-state)	1	0.605 \pm 0.292	1.42	0.238
ACT/SAT (was a score reported)	1	-0.175 \pm 0.182	0.77	0.382
Interactions				
Gender \times Residency	1	-0.841 \pm 0.343	6.02	0.017
Gender \times ACT/SAT	1	-0.028 \pm 0.238	0.01	0.907
Residency \times ACT/SAT	1	0.282 \pm 0.324	0.01	0.931
Covariates				
Age at graduation	1	0.011 \pm 0.025	0.21	0.648
Transfer GPA	1	0.446 \pm 0.103	18.64	<0.001
Number of transfer credits	1	0.001 \pm 0.002	0.07	0.787
Error	71			
Total	80			

differences procedure did not indicate any differences ($P>0.05$) among groups.

Discussion

Our data suggested, contrary to our original hypothesis, that native students did not outperform transfer students with regard to GPA in 19 core wildlife courses. This finding was consistent with data collected for the wildlife program at Humboldt State University, Arcata, California (M.D. Johnson, Humboldt State University, personal com-

munication). The only other data on academic performance of transfer students in a natural resources academic program (forestry; Auburn University) of which we are aware suggested that transfer students were outperformed by native students (D. N. Laband, Auburn University, unpublished data). Substantial data in the social sciences and education literature have documented that native students tend to have greater GPAs than their transfer counterparts (Cohen and Brawer 1989). Approximately 2 out of 3 studies published have

documented that native students obtain better grades than transfer students (Hills 1965). This has been attributed to social and academic challenges that transfer students face (Eggleston and Laanan 2001) and the difficulty of 4-year colleges and universities to meet the needs of these students (Townsend 1995). We hypothesize that our data are representative of other wildlife programs because of the similarity of results with the Humboldt State University wildlife program and

Table 3. Results of ANCOVA (Model 3) that examined academic performance, as measured by grade point average (GPA), of transfer wildlife students ($n = 57$) that reported ACT/SAT scores at Auburn University, Alabama from 1995–2000.

Source	df	$\beta \pm 1$ SE	F	P
Model	8		5.92	<0.001
Main effects				
Gender	1	0.294 \pm 0.118	3.06	0.087
Residency (AL or out-of-state)	1	0.779 \pm 0.320	0.25	0.620
Interactions				
Gender \times Residency	1	-1.345 \pm 0.428	9.86	0.003
Covariates				
ACT/SAT score	1	0.039 \pm 0.019	4.11	0.048
High school GPA	1	0.273 \pm 0.130	4.44	0.040
Age at graduation	1	0.055 \pm 0.041	1.83	0.182
Transfer GPA	1	0.328 \pm 0.115	8.02	0.007
Number of transfer credits	1	-0.001 \pm 0.002	0.07	0.798
Error	48			
Total	56			

believe they suggest that transfer students in wildlife science programs may be better able to adjust to their new institution than other transfer students. We suspect this could be due to the small class sizes found in wildlife programs (normally 20–30 at Auburn University) and the greater sense of social security they may create. Students in our program know most of their classmates and normally have close relationships with their professors. Previous research suggested that spending quality time with faculty positively affects student's academic performance (Astin 1984) and could lessen transfer shock (Hills 1965).

One potential shortcoming of our results from Model 1 was the inclusion of the ACT-equivalent score variable. Because students were not required to take either the ACT or SAT to gain admittance to a community college in Alabama and could transfer to Auburn University after taking 32 credit hours at a community college, many transfer students (those who did not take the ACT or SAT) were not included in this analysis. We hypothesized that in general these students would have lower academic performance than their counterparts, either because they had performed poorly on the ACT or SAT and chose not to submit their scores, or were less focused in their desire to advance their education. However, we found no evidence that those students who reported ACT or SAT scores outperformed their counterparts. This suggests that even if the 24 students with no reported ACT or SAT score had been included in Model 1, it was unlikely our find-

ing of no difference between transfer and native students would have been altered.

Overall, our models suggested that traditional measures of a student's potential (e.g., GPA and standardized test scores) seemed to be the best predictors of how a student would perform in wildlife sciences at a 4-year institution. When including all students with this information in our analysis, high-school GPA and ACT scores were the strongest predictors of academic performance. Similarly,

GPA prior to transfer was the best predictor of academic performance for transfer students. For those transfer students who did report standardized test scores, transfer GPA, ACT or SAT score, and high-school GPA were significant predictors. Our findings are similar to most other studies in which previous academic performance has been used to predict GPA at 4-year colleges and universities. Among the most useful predictors of academic performance of transfer students has been GPA at their community college (Holahan and Kelley 1978), and others studies (Nickels 1970, Wray and Leischuck 1971) have reported similar results. We have identified several variables that appear to be positive indicators of a student's subsequent academic performance in the required wildlife sciences curriculum: ACT (or SAT equivalent) score, high-school GPA, and transfer GPA. The problem is there is no single indicator for which we have information on all students.

In the absence of a single positive predictor of subsequent academic performance in the required wildlife sciences curriculum that is common across all students, how should student recruitment efforts (e.g., scholarship offers) be structured so as to target students who likely will prove to be high performers? Our results suggest a bifurcated strategy whereby recruitment efforts aimed at native students should focus on their ACT or SAT scores and high-school GPA, while transfer students should be targeted on the basis of their transfer GPA, regardless of whether or not they have taken

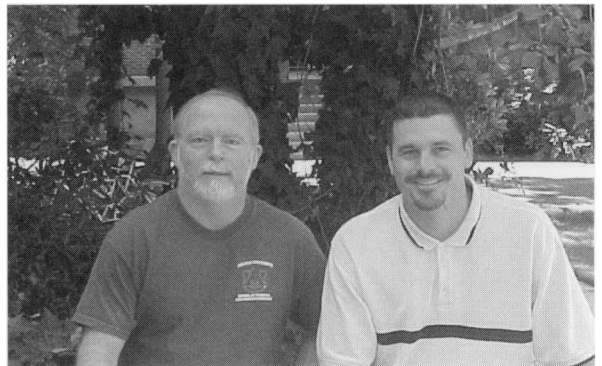
the ACT or SAT. However, if they have taken the ACT or SAT, their scores provide additional useful information about their likely future academic performance in the wildlife sciences curriculum. We certainly find no reason to "prefer" native students over students who transfer from community colleges.

We caution that our results are a nonrandom sample from Auburn University only. Course offerings and content can vary substantially among wildlife programs at different institutions. While we understand that in many states other than Alabama the 4-year public institutions of higher education also accept transfer students without requiring them to submit ACT or SAT scores or their high-school GPA, it is not clear that our results should be taken as definitive. In this regard, we need confirmatory findings from an analysis of students from other institutions before accepting these findings as broadly applicable. Furthermore, our findings may not hold up for wildlife sciences degree programs located in private institutions as opposed to public institutions, because some private institutions have different application requirements for acceptance. We regard this work as a pilot study and the data generated as provocative rather than definitive. We hope that wildlife educators will use this information as a springboard for additional investigations on this general issue.

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Stephen S. (Steve) Ditchkoff (right) is an assistant professor in the School of Forestry and Wildlife Sciences at Auburn University. He received his Ph.D. in wildlife ecology from Oklahoma State University, M.S. in wildlife ecology from University of Maine, and B.S. in fisheries and wildlife from Michigan State University. His primary research interests focus on the evolutionary ecology of large mammals, with specific emphasis on white-tailed deer.

David N. Laband (left) is a professor in the School of Forestry and Wildlife Sciences at Auburn University, where he is also a member of the Forest Policy Center. He received his B.S., M.S., and Ph.D. in economics from Virginia Polytechnic Institute and State University. He is author of 6 books and over 80 articles in peer-reviewed journals, and his research and teaching interests include natural resources law and economics, the causes and consequences of public policy, exchange relationships between producers and consumers, and the production and dissemination of science. **Kent Hanby** recently retired as the Director of Student Services in the School of Forestry and Wildlife Sciences at Auburn University. He received his B.S. in forest management from Auburn University and M.F. in forest management from Yale University. Prior to his employment at Auburn, he was the State Lands Forester for the Alabama Department of Conservation and Natural Resources.

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