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Student Achievement under Foreign Teaching Associates Compared with Native Teaching Associates

Graduate students are extensively used in large United States universities to perform a major portion of the teaching in introductory undergraduate courses. In recent years the number of foreign graduate students performing this function has increased and in all likelihood will continue to increase in the future. These foreign teaching assistants (FTAs) are assumed to be highly intelligent and extremely well qualified in their fields. In many areas such as mathematics, computer science, physics, chemistry, and engineering they are filling a crucial need created by a dwindling pool of American applicants who find the allure of business and industry more attractive than graduate school. A recent survey conducted by the Mathematical Association of America indicated that 45 percent of the total number of classes and recitations at leading mathematics departments are taught by teaching assistants. One-third of these mathematics TAs are foreign-born. The American Institute of Physics reported that more than 40 percent of the first-year graduate students are foreign [3, p. 12]. As the number of foreign teaching assistants has increased, however, there has been an increased number of complaints from undergraduate students (and parents) about the quality of instruction and the preparation of foreign teaching assistants. These complaints have fallen into three basic categories: linguistic, presentational, and cultural.

By far the most frequent complaints are language related, that is, students say that foreign-born TAs cannot speak English clearly. Students complain that foreign instructors do not have adequate control

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over productive and receptive oral skills. Mispronunciation of sounds, misplacement of stress, and faulty intonation patterns may contribute to student noncomprehension. In addition, students cite the inability of some instructors to understand their oral questions and comments. These basic language-related complaints are believed to create major interference that may hinder the student learning process.

The second and third categories of complaints are related. FTAs' presentation skills are often cited as problematic, for example, introducing and organizing ideas, failing to present information clearly and coherently, and using distracting nonverbal behavior (both kinesic and proxemic.) The third category of complaints, cultural, manifests itself in various ways that may create an unpleasant atmosphere. Often an FTA whose educational training occurs in a culture that views the teacher as a very highly respected, ultimate authority, may have difficulty adjusting to the informal environment of American universities. They are not prepared for students who challenge the instructor's answers. Students report that FTAs are too formal and that they interact less with students than do native instructors. One additional example is the perception by female students that a male FTA is condescending and treats them as inferior to male students.

As the number of FTAs has increased, the number and vociferousness of the complaints by undergraduate students has increased. In one case, at a major university, an undergraduate student enrolled in an introductory course on statistical theory claimed an instructor could not communicate with the class and threatened to bring civil suit against the university. Students enrolled in night classes at another large university were given their money back after complaining that they could not understand the instructors. [2, p.1] The student complaints reached state legislatures, several of which (Florida, Minnesota, Missouri, and Ohio) have passed laws requiring the states' public colleges and universities to test the oral English proficiency of the foreign teaching assistants.

Thus, university administrators and program directors have been forced to face these complaints from students and lawmakers. More and more institutions are demanding that graduate students pass tests that demonstrate their ability to speak English before they are awarded teaching assistantships. The Test of Spoken English (TSE) developed in 1981 by the Educational Testing Service (ETS) is now widely used to screen potential foreign TAs. A recent survey conducted by Arizona State found that four-fifths of the institutions in the Big 10, Pacific 10, and Big 8 athletic conferences now require an English-language profi-

ciency test. Training programs ranging from short orientation sessions to semester-long classes have been developed at a number of universities. It has been reported that undergraduate complaints tend to drop once an institution demonstrates a commitment to working with its foreign TAs. [3, p. 12]

However, although training and testing are definitely well motivated, a number of other questions should be investigated. An assumption underlying student complaints is that students believe it is more difficult to learn (get a good grade) in a course taught by an FTA than in a class taught by a native speaker. During course registration, students will often look at the names of instructors and stay away from any sections taught by foreign-sounding names. Because the names of graduate student teaching associates are not usually listed in the schedule of classes, students often don't know they are in a section taught by an FTA until the first day of class. On finding a foreign instructor, many students immediately go to the advisor's office to try to transfer to a section taught by a native-speaking TA (NTA). Do undergraduate students in general perform better in classes taught by native-speaking instructors? The purpose of this study was to compare the performance of students in courses taught by foreign TAs with that of students in the same course taught by native speakers.

Another question relates to how FTAs fare in the end-of-semester course evaluations as compared with NTAs in the same courses. After a semester's instruction, how do students perceive the teaching effectiveness of the foreign TAs? The study attempted to address the above question by comparing the class ratings given to foreign and native teaching associates by their students. These ratings included both teaching style and language-related behavior.

The third aspect of the study focused only on the FTAs and investigated the relationship between their scores on English proficiency tests and the achievement and instructor ratings of their students.

There is a paucity of empirical data on the teaching effectiveness of FTAs. In a study conducted at U.C.L.A., Bailey found that students' reported understanding of subject matter was negatively influenced by the English of those foreign teaching assistants who had been rated 1 or lower on the oral interview (a test of spoken language proficiency.) There were statistically significant differences in the students' ratings of TAs who scored 2 or better on the interview scale. In addition, students who were not majoring in the same discipline as their TAs were significantly more critical of the FTAs' spoken English than were students who shared a common academic major with the TAs. Another

part of Bailey's study matched twelve FTAs with twelve NTAs on course and level taught. The native speakers were rated significantly higher on two student evaluation of teaching variables: overall effectiveness and outside helpfulness. [1, p. 309]

Method

The data for this study were collected at a major Midwestern university. Courses with multiple sections taught by both foreign and native graduate students were identified. Only courses where the graduate-student instructors had complete responsibility for the teaching and evaluation of students were used in the study.[1] The other restriction was that the classes had to use a common departmental final examination. Four mathematics courses (M118-Finite Math; M119-Brief Survey of Calculus; M125-Pre-Calculus Math; and M126-Trigonometric Functions) in the College of Arts and Sciences and one course (K201-The Computer in Business) in the School of Business met the above criteria and were selected for the study. There were eighty-seven sections of mathematics taught by forty-five different teaching associates: thirteen foreign and thirty-two native. There were eighteen sections of Business K201 taught by seventeen different graduate students, three of whom were foreign. The number of students enrolled in the classes totaled 2,816.

The departmental offices provided a list of all teaching associates and indicated whether each instructor was native English-speaking or non-native. A questionnaire distributed to all the teaching associates asked about their experience teaching the course and their satisfaction with the teaching experience. The foreign students' scores on the English proficiency examinations were supplied by the Center for English Language Training.

Students' scores on the common final examination were obtained from the departmental offices. Other student information such as SAT scores, high-school rank, and cumulative GPA were supplied by the registrar's office. The instructor ratings required by the mathematics department and the business school were available for the various instructors. In addition, an instructor evaluation form, which included both a general section and a section covering the instructor's language and communication skills, was completed by students in all sections

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[1]Because the graduate students involved in this study had complete responsibility for the teaching, they will henceforth be referred to as teaching associates to distinguish them from teaching assistants who may only serve as test graders, discussion leaders, or laboratory session supervisors.

taught by non-native speaking TAs and in a random sample of the sections taught by native speakers.

In order to compare the achievement of students in the sections taught by foreign teaching associates (FTAs) with the achievement of students taught by native teaching associates (NTAs), it was necessary to control for ability differences in the sections. Multiple regression was used to determine the significance of the ability measures on achievement with the section serving as the unit of analysis. Stepwise multiple regression was used with the common final examination score as the dependent variable and with the independent variables being students' SAT scores, high school rank, cumulative GPA, associate instructors' experience teaching the course, and a dummy variable with a value of 0 if the section was taught by a native teaching associate and a value of 1 if taught by a foreign teaching associate. A second multiple regression with students' ratings of the instructors as the dependent variable was computed. Separate analyses were done for the mathematics and business courses.

Finally, the relationship between foreign teaching associates' English proficiency scores and the examination scores and instructor ratings of their students was examined.

Results

The means and standard deviations of the final examinations for sections taught by foreign teaching associates and native teaching associates are shown in table 1. The number of sections and the total number of students in those sections are also presented. The Business K201 final examination had a maximum possible score of 150, while all the mathematics examinations had a maximum possible score of 100. It can be seen that any effect of the teaching associates' nationality was not the same from course to course. In K201, M125, and M126, the sections taught by FTAs had higher mean scores on their final examinations; in M118 and M119, the sections taught by FTAs and the sections taught by NTAs had essentially equal final examination scores. In order to provide a meaningful interpretation of these data, multiple regressions were run with students' SAT scores, relative high-school rank and cumulative GPA, and TAs' nationality and teaching experience as the independent variables; the final examination scores were the dependent variable. Cases with missing data on any of the variables were deleted. The results of the multiple regression are shown in table 2.

TABLE 1

Mean Final Examination Scores for Business and Mathematics Sections Taught by Foreign and Native Teaching Associates (FTA and NTA)

Course	Total N	N of Sections	Test Score	
			$\bar{X}$	SD
*Bus. K201**				
NTA	598	14	99.44	7.15
FTA	157	4	102.71	8.46
Math. M118†				
NTA	417	16	69.81	4.96
FTA	274	12	69.80	7.51
Math. M119				
NTA	776	31	59.83	4.76
FTA	161	7	59.03	5.77
Math. M125				
NTA	107	5	54.73	3.41
FTA	71	4	71.45	15.12
Math. M126				
NTA	150	7	66.13	4.97
FTA	26	2	72.49	1.97

*Maximum possible score for K201 = 150
†Maximum possible score for all Math Tests = 100

Table 2 indicates that the variable, TA nationality, was not a significant factor affecting final examination scores in any of the courses. When other variables such as students' ability and TAs' teaching experience were held constant, the difference in the final examination performance of the students in sections taught by foreign TAs and that of students in sections taught by native TAs was not statistically significant.

Table 3 shows the overall means and standard deviations of the ratings given by students to the native and non-native TAs in the various courses. These data were provided by the standard departmental evaluation forms required of all instructors. The form used in Business K201 consisted of twenty-two statements each to be marked on a seven-point scale, with the most favorable response receiving a weight of seven. The mathematics rating form consisted of fifteen statements each to be marked on a five-point scale with the most favorable response receiving a weight of five. The same form was used in all the mathematics courses.

The foreign TAs received higher overall mean ratings in Business K201 and in M125, whereas the native TAs got higher mean ratings in M118 and M119. The ratings of the FTAs in M126 were not available. In order to control for variables known to influence ratings, a multiple regression was run with instructor ratings as the dependent variable.

TABLE 2
Regression Coefficients with Final Examination Scores as the Dependent Variable

Course	Constant	Cum GPA	SAT Total	HSR	TA Teaching Experience	TA Nationality‡	R	R²	N of Sections
Bus. K201	−211.46	35.98*	0.18	1.68	0.62	1.25	0.77	0.60	15
Math. M118	− 45.51	12.70	0.09†	—§	1.95	−1.78	0.78	0.61	18
Math. M119	33.47	3.20	0.03	−0.32	0.36	−1.50	0.41	0.17	31
Math. M125	43.98	12.87†	−0.07	0.57	6.70	18.84	0.84	0.71	9
Math. M126	113.58	12.86	−0.08	−0.67	4.37	9.29	0.85	0.73	9

*Coefficient is statistically significant at the 0.05 level.
†Coefficient is statistically significant at the 0.01 level.
‡Coded 0 for native and 1 for foreign.
§HSR did not enter the regression equation in M118.

TABLE 4
Regression Coefficients with Instructor Ratings as the Dependent Variable

Course	Constant	Expected Grade§	Size of Class	TA Teaching Experience	TA Nationality‡	R	R²	N
Bus. K201	104.06	4.20	0.45	4.89*	4.79	0.61	0.37	14
Math. M118	70.60	1.62	−0.22	−2.17	−7.92†	0.82	0.68	14
Math. M119	63.53	−8.95†	0.12	0.42	−0.72	0.81	0.65	22
Math. M125	58.22	0.68	−0.68*	8.36	−0.96	0.99	0.99	7

*Coefficient significant at the 0.05 level.
†Coefficient significant at the 0.01 level.
‡TA nationality coded 0 for native and 1 for foreign.
§Expected grade coded 1 for A, 2 for B, and 5 for F.

TABLE 3

Mean Ratings for Business and Mathematics Sections Taught by Native and Foreign Teaching Associates

| | | | Rating | |
Course	Total N	N of Sections	$\bar{X}$	SD
Bus. K201				
NTA	415	13	112.22	12.21
FTA	113	4	120.28	12.07
Math. M118				
NTA	197	10	57.26	2.57
FTA	215	12	52.87	5.61
Math. M119				
NTA	410	21	58.49	4.97
FTA	41	3	55.02	4.18
Math. M125				
NTA	100	6	55.58	5.83
FTA	16	2	59.29	6.07
Math. M126				
NTA	105	7	57.27	3.98
FTA	—	—	—	—*

*Ratings not available for M126

The independent variables were expected course grade, TAs' nationality and teaching experience, and class size. The results of the multiple regression for all courses except M126 are shown in table 4.

In only one course did the nationality of the teaching associate significantly affect the ratings. The native TAs were rated significantly higher than the non-native TAs in M118. There were no significant differences in the ratings of the two groups of instructors in the other three courses. The TAs' teaching experience was a significant variable influencing instructor ratings in K201. The mean ratings were higher in those sections of K201 taught by the more experienced instructors. Students' expected grade significantly influenced ratings in M119 and in the expected direction. That is, students who expected higher grades gave higher ratings to the instructor. Class size was a significant variable affecting ratings in M125.

As pointed out earlier, it is likely that some students on finding that a class is being taught by a foreign TA will transfer from that section. The next analysis therefore looked at the question of whether the students in this study tended to leave the sections taught by FTAs to any greater extent than they left classes taught by NTAs. The original enrollment in each section of the various courses was compared with the final enrollment and an average drop-out calculated for each course.

The number of student dropouts from sections taught by FTAs and

TABLE 5
Drop-Out Rate for Sections Taught by Native and Non-Native TAs

Course	Instructor	N*	Mean	SD	t	p
Bus. K201	Native TA	13	7.46	3.1	−1.11	0.283
	Non-Native TA	4	10.50	8.7		
Math. M118	Native TA	14	3.36	2.4	−2.60	0.017
	Non-Native TA	8	6.50	3.2		
Math. M119	Native TA	29	2.48	6.9	−1.48	0.149
	Non-Native TA	7	6.57	4.9		
Math. M125	Native TA	5	5.2	3.6	−2.05	0.080
	Non-Native TA	4	11.0	5.0		
Math. M126	Native TA	7	4.29	7.7	−0.30	0.773
	Non-Native TA	2	6.0	1.4		

*Number of sections

from sections taught by NTAs did not differ significantly except in M118. In that course, there was a significantly higher number of drop-outs from the sections taught by FTAs.

The last section of the study focused on only the FTAs. All foreign graduate students who want to be TAs at this university must take an English proficiency examination. The examination consists of the following subtests: listening, oral, and general (phonology, grammar, vocabulary, and reading); a total score is also computed by summing the scores on the three subtests. The first analysis looked at the relationship between the FTAs' scores on the English proficiency examination and their students' final examination scores and ratings of the instructor. Because of the small number of foreign teaching associates in Business K201, this course and all the mathematics courses were combined for the analysis.

There was a moderate and statistically significant correlation between the FTAs' total scores and general scores on the English proficiency test and their students' final examination scores and instructor ratings. Students of those FTAs whose English proficiency as mea-

TABLE 6
Correlation of Foreign TAs' English Language Proficiency Scores and Student Variables

	Listening	Oral Interview	General	Total	No. of FTAs
Final Examination Scores	0.08	0.38	0.56*	0.46*	21
Instructor Ratings (Departmental Form)	0.41	0.25	0.65*	0.55*	17

*$p < 0.05$

sured by the test was greater tended to make higher final examination scores. The students of these instructors also tended to give them higher overall ratings on the departmental rating forms.

In addition to the departmental rating forms that were used, a second rating form was constructed for the purpose of this study. This rating form consisted of thirteen items, the first eight of which dealt directly with the instructors' English language ability. Four of the remaining five items were general statements related to the instructor's effectiveness, and the fifth attempted to measure students' experience with people from foreign countries. Each statement was rated on a five-point scale with the most favorable response receiving a weight of five. This rating form was administered in all sections taught by foreign TAs and for comparative purposes to a random sample of the sections taught by native TAs. Table 7 shows the mean rating and the distribution of student responses to each of the items of the questionnaire for both native and non-native teaching associates. As would be expected, the NTAs received significantly higher ratings on the eight items dealing with English language ability. However, it was found that a majority of the students of the FTAs also gave them favorable ratings on each of these items. It can be seen that more than 72 percent of the students gave positive responses to items such as: The instructor appeared to understand easily students' questions in class (item 1); when the instructor was talking privately with me about course-related matters, it was easy for me to understand what he/she was saying (item 3); the instructor's English grammar and the instructor's English vocabulary did not interfere with my understanding of the lecture (items 6 and 7). A majority of the students disagreed with the following negatively stated items: When the instructor responded to student questions or statements made in class, his or her English language ability made the answers unclear or difficult (item 2); when I was talking to the instructor, I had to change my own way of speaking to make sure that the instructor understood what I was saying (item 4); the instructor's overall ability to communicate in English interfered with my understanding of what was being said in class lectures (item 8). The lowest mean rating on the English language items received by the FTAs was 3.63 on item 5 (the instructor's *pronunciation* of English did not interfere with my understanding of the lecture).

The NTAs also received significantly higher ratings on the four general rating items. But it is interesting that 53 percent of the students of the FTAs agreed or strongly agreed to the statement: I would recommend a friend taking a class from this instructor (item 11). Only 25

TABLE 7

Responses of Native and Non-Native Teaching Associates' Students to the Instructor Rating
Scale (Percentages). Foreign $N = 430$. Native $N = 172$.

SA = Strongly Agree A = Agree U = Undecided D = Disagree SD = Strongly Disagree

Questions		SA	A	U	D	SD	Means
1. The instructor appeared to easily understand students' questions or statements made in class.	FTA	23	53	9	11	4	3.81
	NTA	36	36	7	8	3	4.64
2. When the instructor responded to student questions or statements made in class, his or her English language ability made the answers unclear or difficult.	FTA	4	18	18	43	15	3.47
	NTA	6	14	13	36	30	4.33
3. When the instructor was talking privately with me about course-related matters, it was easy for me to understand what the instructor was saying.	FTA	28	44	20	6	1	3.92
	NTA	39	38	17	4	1	4.61
4. When I was talking to the instructor, I had to change my own way of speaking to make sure that the instructor understood what I was saying.	FTA	2	9	10	47	30	3.93
	NTA	3	8	8	39	41	4.45
5. The instructor's *pronunciation* of English did not interfere with my understanding of the lecture.	FTA	24	44	9	16	6	3.63
	NTA	38	38	7	11	5	4.68
6. The instructor's English *grammar* did not interfere with my understanding of the lecture.	FTA	23	55	8	9	4	3.84
	NTA	38	46	5	7	3	4.74
7. The instructor's English *vocabulary* did not interfere with my understanding of the lecture.	FTA	23	59	7	9	2	3.92
	NTA	37	48	6	6	2	4.66
8. The instructor's overall ability to communicate in English interfered with my understanding of what was being said in class lecture.	FTA	5	15	11	41	27	3.71
	NTA	6	12	9	33	40	4.36
9. My instructor seemed to know when students didn't understand the material.	FTA	11	49	21	16	2	3.51
	NTA	17	49	19	13	2	4.07
10. My instructor made me feel free to ask questions and express my opinion in class.	FTA	19	54	14	9	9	3.81
	NTA	27	50	12	8	8	4.29
11. I would recommend a friend taking a class from this instructor.	FTA	18	35	20	12	13	3.32
	NTA	26	36	17	10	10	4.25
12. Prior to this semester, I had almost no contact with people from other countries.	FTA	5	19	8	40	27	2.33
	NTA	5	17	10	37	28	2.34
13. I learned a lot from this instructor.	FTA	19	40	20	13	6	3.53
	NTA	24	42	17	10	5	4.15

percent disagreed with this statement. There was no significant differ-
ence between the students of the foreign TAs and the students of native
TAs on item 12: Prior to this semester, I had almost no contact with
people from other countries.

Discussion

The evidence in this study indicates that, as far as student perfor-
mance on final course examinations is concerned, foreign TAs are just
as effective in teaching undergraduates as native TAs. Students' final
examination scores in sections taught by FTAs did not differ signifi-
cantly from the scores in sections taught by NTAs. An important ca-
veat must be given here, however. The foreign associate instructors in
this study, with one or two exceptions, had all been tested and screened
with a local English proficiency instrument. Had no screening taken
place, the results of this study might have been quite different. Also,
since the number of sections included in the multiple regressions was
small, some caution may be in order when interpreting the results.
However, when multiple regressions were run with the individual stu-
dent as the unit of analysis and therefore large N's, essentially the same
results were obtained.

The data do not indicate a great deal of student dissatisfaction with
the foreign teaching associates in the courses investigated in this study.
It was found that on the end-of-semester departmental ratings the un-
dergraduate students tended to rate the foreign TAs just as highly
overall as they did the native speakers. In only one course (M118) was
the nationality of the TA a significant factor in the rating score. The
native speakers received significantly higher overall ratings in M118.

Although the students of the foreign associate instructors in M118
performed equally well on the final examination, they expressed more
dissatisfaction with the instructors. One might hypothesize that M118
(the first mathematics course most students take) represents the stu-
dents' first exposure to foreign instructors, and hence more frustration
is evidenced. Data showed that there was a significantly higher number
of drop-outs from the sections taught by foreign TAs in M118 than
from sections taught by native speakers. With additional exposure to
foreign TAs in succeeding courses, however, students become more
adjusted and tend to persist in the courses and to give equally high
ratings. Factors other than the TA's nationality were found to be more
important in influencing ratings. The significance of these variables
was not the same, however, from course to course. In the business

course (K201), the more experienced instructors, regardless of nationality, were rated significantly higher by the students. The grade that students expected from the course was a significant factor in Math M119. Students who expected higher grades tended to give the instructor higher ratings. Teaching associates in M119 with the smaller sections received significantly higher ratings.

When the analysis focused on only the FTAs it was found that their English proficiency was an important factor affecting both student achievement and the ratings they received from students. Moderate and statistically significant correlation coefficients were found between the foreign TAs' English proficiency scores and the students' final examination scores and instructor ratings. Finally, when ratings of specific English language communication skills were examined, it was found that the majority of the students gave satisfactory ratings to the FTAs' English language skills.

Conclusion

The contribution of this study is that it is one of a very few studies providing data on the teaching effectiveness of foreign teaching associates. More importantly, it shows that foreign TAs can be just as effective in the undergraduate classroom as native speakers. It is essential, however, that foreign graduate students who want to teach be screened and that those non-native speaking students with the best oral English proficiency scores be chosen as teaching associates.

Because this study involved only five different courses at one university, it is recommended that the study be replicated at other universities employing foreign graduate students as teaching associates. With further replications, a more general picture of the teaching effectiveness of foreign teaching associates should emerge.

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