Supplemental Expert Report

of

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***Gratz, et aL v. Bollinger, et aL,* No. 97-75231 (E.D. Mich.)**

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I have reviewed the expert witness report titled "Negative Racial Climates and 'Critical Mass' Issues at Predominantly White Colleges and Universities" prepared by Dr. Joe R. Feagin in this case. In particular, I have reviewed Dr. Feagin's discussion of the importance of having significant numbers of minority students on campus.

As an extension of my prior work and testimony in this case,' I have been asked to calculate the likely racial composition of various important social contexts for learning at the University of Michigan under alternative admissions policies. To do so, I used both the historical admissions data reflecting the University's current policies, and the model I created in my prior work to approximate the effect of an admissions policy that did not take race into account as one of many factors. As this report shows, the policies produce substantial differences in the extent to which key contexts of learning would be diverse with respect to minority status.

Overview of Analyses

In previous reports, I have considered the likely impact of changes in admission policy on the average probability of admission of certain sub-groups of students. I have considered two policies.

Policy A, the current policy, takes students' under-represented minority status into account as one of many factors in making admissions decisions. Other factors include, but are not limited to: test scores, high school grades, the academic reputation of the of the high school attended, the degree of difficulty of the curriculum studied in high school, unusual accomplishments, residence in an under-represented rural geographic area, and the status of family members as University of Michigan alumni.

Policy B would eliminate students' under-represented status as a factor in making admissions decisions. While one cannot know the consequences of implementing policy B on the probability of admission of any student, one can reasonably estimate the average probability of admission of sub-groups of students. In particular, one can estimate the average probability of admission of specific racial/ethnic groups, based on past data, under the assumption that under-represented status played no role in the admissions process. The methods I used to estimate these average probabilities are described in detail in my previous reports.

The key conclusions of those reports are (a) that a change from Policy A to Policy B would produce a substantial decline in the average probability of admission of under-represented minority students (hereafter referred to as "minority" students) and (b) a slight increase in the average probability of admission of students who are not members of an -under-represented minority group (hereafter referred to as "majority" students). This change in the average probability of admission of minority and majority students would inevitably lead to a change in the composition of the student body. In particular, using "yield" statistics,, I estimated the fraction of the student body that would be minority under policies A and B.

In the current report, I extend this analysis to consider the likely composition by minority status of various important social contexts for learning at the University of Michigan. The contexts, selected to broadly represent actual settings at the University of Michigan in which students interact, including Freshman Seminars and Introductory Psychology sections, student government, community service projects, recreational sports, participation in the student newspaper (the Michigan Daily), spectator sports events, and residence halls. If we assume that the minority status of a student is unrelated to membership in these social settings, we can compute the expected composition of such groups under Policy A and Policy B, using the results of my previous reports.

In particular, I considered the expected composition of each setting from the standpoint of a majority student and from the standpoint of a minority student.

From the standpoint of the majority student, I considered the following characteristics of student composition: (1) the probability that no members of a group are minorities (traditionally termed a "segregated" setting with respect to minority status); (2) the probability that at least one member is a minority, a setting that might be regarded as "nominally desegregated"; (3) the probability that at least three group members are minorities; (4) the probability that the composition includes at least three African Americans and at least three Hispanic Americans; and (5) the probability that the composition includes at least three African Americans or at least three Hispanic Americans. It would be preferable also to include Native Americans in this analysis. The problem is that, under either Policy A or Policy B, Native Americans constitute such a tiny minority of all students that such an analysis would not produce useful results.

From the standpoint of the minority student, the following characteristics of student composition were of interest: (1) the probability that if a minority student is a member of a given group, that student will be the only minority student in the group; and (2) the probability that if a minority student is a member of a given group, at least two other students will also be minority students. It is also of interest to examine similar probabilities for African American and Hispanic American students (e.g., the probability that a Hispanic-American student will have at least two Hispanic-American classmates within a given setting).

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[1] The yield is the probability of choosing to attend the University given that one has been admitted.

Methodology

University administrators provided information on important contexts for student learning and on the typical group size of each context. These are described in Table 1.

1. Freshman seminars are limited to an enrolhnent of n = 20 (where "n" denotes the group size). We considered freshman seminars of n = 15 and n = 20.

2. Sections of Introductory psychology have a maximum enrollment of 30, so we considered n = 30.

3. Student government has 19 elected members, but committees tend to have around 7 members. We considered n = 7 and n = 19.

4. For community service projects, we considered the typical community service section (n = 7) as well as the typically much larger Project Outreach section (average n = 6 1).

5. Recreational sports teams (which are not varsity sports teams) average n = 12 while recreational sports clubs average n = 19.

6. The Michigan Daily has n = 54 business staff.

7. To consider informal interaction occurring at a football game or other sports event, I reasoned that a spectator might interact with one or more of 14 people: two persons sitting immediately to the right or left of the spectator, five persons sitting in the row just in front of the spectator, and five persons sitting in the row just behind the spectator.

8. Residence halls consist, on average, of 60 students in a given floor.

To estimate the composition of the entire class, we used results from the 1995 data. The 1995 results were extremely similar to those in 1998, but yield data were unavailable for 1998 at the time of the analysis, so we used the 1995 data. As indicated in my previous reports, the results of comparisons between Policy A and Policy B with respect to expected average probabilities of admission of majority and minority students are similar across years. Choosing a different year's data would have no substantive impact on the results below.

For each sub-group (majority and minority), expected numbers of students in the freshman class as a whole were computed as number of applications times probability of admission times yield. From these expected numbers of students we computed the fraction of students of each group as:

	Policy A	Policy B
Majority	.857	.950
Minority	.143	.050

The proportions under policy A are based on the past data (Table 3) while the proportions under policy B are estimated via logistic regression as described in detail in my previous reports.

Findings

Predicted probabilities of class composition are given in Tables 1 and 2. Table I displays probabilities for a settings including no minority students, one minority student, at least three minority students, at least three African-American and at least three Hispanic-American students, and at least three African-American students or at least three Hispanic-American students. Table 2 displays probabilities relevant to a minority-student's perspective: the probability of being the only minority in a given setting (a "minority of one"), and the probability that at least two classmates in that setting will also be minority students.,

Freshman Seminars. Under the current policy (Policy A), it is very unlikely that a freshman seminar would be segregated (no minority students) (Table 1). For the maximum class size, n = 20, the probability is .05 (one chance in 20 that the class will be segregated). In contrast, under Policy B, segregation is quite likely, with a probability of .36 (better than one chance in three that the class will be segregated). For n = 15, segregation becomes more likely (probability of . 1 0 or one chance in ten under Policy A and .46, nearly one in two, under Policy B). Now let us consider the probability that at least three of the members of a freshman seminar will be members of a minority group. This is quite likely under Policy A (probability = .56) and quite unlikely under Policy B (probability = .08). There is a fairly good chance of having at least three African Americans or at least three Hispanic Americans under Policy A (probability = .3 5) and while such a mix under Policy B is extremely unlikely (probability = .03).

Let us now consider the standpoint of a minority student (Table 2). Such A student attending such a seminar would be quite unlikely to constitute a minority of one under policy A (probability = .16 for n = 20; probability =.27 under n = 15). However, under Policy B, this student would be quite likely to constitute a minority of one (probability .5 9 if n = 20; probability of .68 if n = 15). Moreover, under Policy A, such a student would be quite likely to find at least two other minority students in the seminar under Policy A (probability = .59 if n.= 20; probability =.41 if n = 15). However, under Policy B, that student would be very unlikely to find two or more other minority students in the seminar (probability =.12 if n = 20; probability =.07 if n = 15).

Introductory Psychology. The results for introductory psychology sections (n = 30) are similar to those for freshman seminars except that the psychology sections are a bit larger than the seminars. Thus, segregation is less likely. Indeed, under Policy A, the probability of segregation (no minority students) is negligible at .01, that is, one chance in 1 00. However, under Policy B, the probability of segregation is .21, one chance in five. Contrasts in the probability of having a reasonable mix of students (at least three minorities) are even more striking: .82 under Policy A

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[2] These are conditional probabilities, respectively: the probability that a group includes one minority student given that it includes at least one minority student; and the probability that the group includes three or more minority students given that it includes at least one minority student.

versus .19 under Policy B. The probability of having at least three African Americans and at least three Hispanic Americans in the section is .41 under Policy A and a negligible .03 under Policy B.

Let us now consider the standpoint of a minority student (Table 2). Such a student attending such an introductory psychology section would be very unlikely to constitute a minority of one under policy A (probability =.05), while such an event would occur almost half of the time in under Policy B (probability = .43). The contrast between probabilities of having at least two minority students as classmates is striking: .83 under Policy A and .24 under Policy B.

Student Government. Under the current policy (Policy A), it is very unlikely that all elected members of student government (n = 19) would be majority (probability =.05; see Table 1). In contrast, such an event is quite likely under Policy B (probability =.38). The chances of having at least three minority members of student government would be quite good under policy A (probability of .52) and very poor under Policy B (probability of .07).

Now consider the perspective of a minority student elected to student government (Table 2). Such a student is much less likely to be a minority of one under Policy A than Policy B (probabilities of .18 and .61 respectively). And such a student is much more likely under Policy A than Policy B to discover that at least two other minority students are in student government (probabilities of .55 and .11 respectively).

A similar picture emerges when we consider a typical committee within the student government (n = 7). This is a more intimate setting in which much of the detail work is accomplished. Such a small group is much less likely to be all-majority under Policy A than Policy B (probabilities of .34 versus .70; Table 1). A minority student is quite likely to find him or herself to be the only minority student in that setting under both policies (Table 2), but the chances are considerably smaller under Policy A than Policy B (probability of .60 versus .85).

Community Service. A Community Service Project Section tends to be quite small (n = 8). Such a section will typically not be segregated under Policy A (probability = .29) while we can expect that it typically will be segregated under Policy B (probability = .66; see Table 1). A minority student participating in such a project section will often be the only minority student doing so under either policy, but this probability is much higher under Policy B (probability = .83) than under the current Policy A (probability = .55; Table 2).

Project Outreach tends to have comparatively large sections (n = 61 on average). Such a large setting is unlikely to be entirely segregated under either policy (probability of. 00 under Policy A and .04 under Policy B; see Table 1). However, when we consider the probability of such a section including at least three minority students, the differences are very large. Under Policy A, it is virtually certain that at least three members will be minority students (probability rounded to 1.00) while under Policy B, this event occurs with expected probability =.59 (Table 1). The contrast is even more striking if we consider the probability that a Project Outreach section would include at least three African Americans and at least three Hispanic Americans. Under Policy A, the probability is .93; under Policy B, the probability is only .20.

Not surprisingly, a minority student participating in a Project Outreach section would be extremely unlikely to constitute a minority of one under policy A (probability rounded to .00; see Table 2). However, under Policy B, such an event can occur with a non-negligible probability .15. Such a student would be almost sure to find at least two other minority students participating under Policy A (probability = .99). Under Policy B, this event would be likely but far from certain (probability = .62)

Recreational Sports. Under the current policy (Policy A), it is not too likely that all members of a team (n = 12) would be majority (probability =.16; see Table 1). In contrast, such an event is quite likely under Policy B (probability = .54). The results are quite similar for a sports club having a typical n = 19 (probabilities of .05 and .38 under Policies A and B respectively). The chances of having at least three minority members in such a club would be quite good under policy A (probability of .52) and very poor under Policy B (probability of .07).

Now consider the perspective of a minority student on a sports team (Table 2). Such a student is much less likely to be a minority of one under Policy A than Policy B (probabilities of .37 and .74 respectively). And such a student is much more likely under Policy A than Policy B to discover that at least two other minority students are on the team (probabilities of .28 and .04 respectively).

A minority student in a sports club (n = 19) is unlikely to find himself or herself a minority of one under Policy A (probability = 18; Table 2) but is quite likely to do so under Policy B (probability = .6 1). And such a student is much more likely under Policy A than Policy B to discover that at least two other minority students are in student government (probabilities of .55 and .11 respectively).

University Newspaper. The Michigan Daily has a staff that averages n = 54. This fairly large setting is unlikely to be entirely segregated under either policy (probability of .00 under Policy A and .06 under Policy B; Table 1). However, when we consider the probability of the staff including at least three minority students, the differences are very large. Under Policy A, it is virtually certain that at least three members of the Michigan Daily business staff will be minority students (proba7oility =.99), while under Policy B, this event occurs just about half the time (expected probability = .*5* 1). The contrast is more striking if we consider the probability that the Business staff would include at least three African Americans and at least three Hispanic Americans. Under Policy A, the probability is .87; under Policy B, the probability is only .15.

A minority student working on the staff of the newspaper would be extremely unlikely to constitute a minority of one under policy A (probability rounded to .00; see Table 2). However, under Policy B, such an event can occur with a non-negligible probability of .19. Such a student would be almost sure to find at least two other minority students on the staff under Policy A (probability = .99). Under Policy B, this event would be far from certain (probability = .54).

Spectator Sports Event. A spectator at a sports event such as a football game might likely interact with person sitting nearby. Such persons might reasonable include two persons sitting to the left, two persons sitting to the right, five persons in front and five behind, for n = 14 total. Under Policy A, it is not likely that such a group of "neighbors" would be all-majority (n = .12),

while such an event occurs with probability .49 under Policy B. Indeed, -under Policy A, there is a reasonably good chance that this group of neighbors would include three or more minority students (probability = .32). In contrast, under Policy B, such an event is very unlikely (probability = .03).

Under Policy A, a minority student is not too likely to be the only minority student sitting nearby at a sporting event (probability = .30) but is fairly likely to do so under Policy B (probability = .70). Indeed there is at least a reasonably good chance that such a student will sit near at least three other minority students under Policy A (probability = .3 7), while this event has little chance of occurring under Policy B (probability = .06).

Residence Hall. This fairly large setting (n = 60) would not likely be segregated (no minority students) under either policy. However, when we consider the probability that the residence hall will include at least three minority students the difference between policies is very large. Under Policy A, this event is much more likely (probability = .99) than under Policy B (probability = .58). Larger yet is the difference between policies in the probability of including at least three African-American and at least three Hispanic-American students (probability = .97 under Policy A, probability = .38 under Policy B).

Now let us consider the perspective of a minority student in a residence hall. Such a student is extremely unlikely to constitute a minority of one under Policy A (probability =.00) while such an event has a non-trivial chance of occurring under Policy B (probability=.15). There are almost certain to be at least two other minority students in the residence hall under Policy A (probability 99). Such an event is much less likely under Policy B (probability =.61).

The approach we have described considers the composition of social contexts for learning overall from the standpoint of a "minority" student (who could be African-American, or Hispanic-American). A more complete description would consider the composition of these contexts from the standpoint of students of more specifically-defined ethnicity (African-American, Asian-American, Hispanic-American and white students). We also considered the composition of social contexts for learning from the standpoint of a student of each of these four ethnic groups. In each case, we asked: How likely is a student of a given ethnicity to be a minority of one under alternative Policies A and B? Also, how likely is it that the group would include at least two other students who share that student's ethnicity?

The results (Tables 4-7) are consistent. For African-Americans and Hispanic-Americans, the answers to these two questions depend strongly on the policy. Specifically, an African-American student is much less likely under Policy A than Policy B to be a minority of one, that is the sole African-American student in the group. And it is much more likely under Policy A than Policy B that the group will include at least two other African-Americans. For Hispanic-Americans parallel findings hold.

For Asian-Americans and white students the findings are quite different. For these groups the answer to the two questions of interest depend very little on the policy. For Asian-Americans, the probability of being a minority of one is 'ust slightly greater under Policy A than Policy B. Similarly, the probability of encountering at least two other Asians is just slightly higher under Policy B than A. A white student is extremely unlikely to constitute a minority of one under either

policy in any social context. And it is near certain under both policies that a white student will encounter a least two other white students in all the social contexts of interest.

Summary

It is of interest to the university and its students to consider how alternative admissions policies would affect the ethnic composition of these social settings, including formal instructional settings and non-academic settings. Using past admissions data, it is possible to compare expected features of the ethnic composition of these settings under alternative policies, here referred to as Policy A (the current policy) and Policy B (a policy in which student ethnicity played no role in admissions decisions). The key assumption in deriving expected compositions under these policies are (a) that if ethnicity were eliminated as a factor in making admissions decisions, other factors would have similar effects on admissions to the effects that they currently have; and (b) that participation in the groups of interest is not related to ethnicity. Under these assumptions, the findings are clear.

1. The probability that a context for learning would be segregated with respect to minority status (that is, the probability that it will have no minority students) is much higher under Policy A than Policy B. This is especially true for smaller contexts, such as committees of student government, community service project sections, recreational sports teams, and freshman seminars, and spectator sports events.

2. The probability that a context will have at least three minority members is much greater under Policy A than under Policy B. This is especially true for medium-sized contexts (e.g., freshman psychology sections) and larger contexts (e.g., community outreach sections, the newspaper business staff, residence halls).

3. The probability that a context will have at least three African Americans and at least three Hispanic-Americans is much greater under Policy A than Policy B. Indeed, in the larger contexts, the probability of this mix is very high under Policy A and very low under Policy B.

4. For minority students, the consequences are also dramatic. The probability of being a 64 minority of one" in a given context is much higher under Policy B than Policy A. And the probability having at least two minority classmates ,s much higher under Policy A than policy B.

These are very substantial differences in the extent to which key contexts for learning are diverse with respect to minority status. To assess the impact of such differences on the quality of learning opportunities is beyond the scope of this report. The magnitude of these differences suggests the importance of undertaking such an assessment, and it is my understanding that Professor Patricia Y. Gurin has considered these issues in her supplemental expert report.

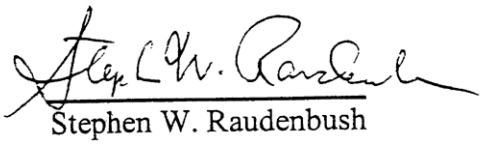

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Table 1

Organization	Setting Number of Participants	Probability that setting will include: No minority students		Three or more minority students		At least three African-Americans AND at least three Hispanic-Americans		At least three African-Americans OR at least three Hispanic-Americans	
		Policy A	Policy B	Policy A	Policy B	Policy A	Policy B	Policy A	Policy B
Freshman Seminar	n = 15	.10	.46	.37	.04	.07	.00	.20	.01
(Maximum n = 20)	n = 20	.05	.36	.56	.08	.16	.01	.35	.03
Introductory Psychology Section (Maximum n = 30)	n = 30	.01	.22	.82	.19	.41	.03	.64	.09
Student Government	Committee, n = 7	.34	.70	.07	.00	.01	.00	.03	.00
	Elected members, n = 19	.05	.38	.52	.07	.14	.01	.32	.03
Community Service	Project Community Section, n = 8	.29	.66	.09	.01	.01	.00	.04	.00
	Project Outreach Section, n = 61	.00	.04	1.00	.59	.93	.20	.98	.39
Recreational Sports	Team, n = 12	.16	.54	.24	.02	.04	.00	.12	.01
	Club, n = 19	.05	.38	.52	.07	.14	.01	.32	.03
Michigan Daily	Business Staff, n = 54	.00	.06	.99	.51	.87	.15	.95	.32
Spectator, Sport Event	n = 14	.12	.49	.32	.03	.06	.00	.17	.01
Residence Hall	n = 60	.00	.05	.99	.58	.92	.19	.97	.38

Table 2

Organization	Setting Number of Participants	Probability of being sole minority		Probability of at least 2 others	
		Policy A	Policy B	Policy A	Policy B
Freshman Seminar	n = 15	.27	.68	.41	.07
(Maximum n = 20)	n = 20	.16	.59	.59	.12
Introductory Psychology Section					
(Maximum n = 30)	n = 30	.05	.43	.83	.24
Student Government	Committee, n = 7	.60	.85	.10	.01
	Elected members, n = 19	.18	.61	.55	.11
Community Service	Project Community Section, n = 8	.55	.83	.13	.02
	Project Outreach Section, n = 61	.00	.15	.99	.62
Recreational Sports	Team, n = 12	.37	.74	.28	.04
	Club, n = 19	.18	.61	.55	.11
Michigan Daily	Business Staff, n = 54	.00	.19	.99	.54
Spectator Sports Event	n = 14	.30	.70	.37	.06
Residence Hall	n = 60	.00	.15	.99	.61

Table 3: Applications, Admissions, and Yields from 1995 Freshman Class, by Race/Ethnicity

	Number of Applicants	Percent of Total Applicants	Number of Admitted Students	Percent Admitted	Number of Fall 1995 New Freshman	% 1995 Yield	Percent of Fall 1995 New Freshman
African American	1,053	7.4%	871	82.7%	356	40.9	9.9%
Asian	2,304	16.3%	1,670	72.5%	447	26.8	12.4%
Native American	66	0.5%	65	98.5%	33	50.8	0.9%
Hispanic	490	3.5%	450	91.8%	183	40.7	5.1%
White	8,858	62.6%	6,178	69.7%	2,353	38.1	65.4%
Multi-Racial	0	0.0%	0				0.0%
No Identification	1,092	7.7%	733	67.1%	108	14.7	3.0%
Total	14,157		10,141	71.6%	3,599	35.5	

Table 4

Organization	Setting Number of Participants	Probability of being sole Hispanic-American		Probability of at least 2 others	
		Policy A	Policy B	Policy A	Policy B
Freshman Seminar	n = 15	.70	.89	.06	.01
(Maximum n = 20)	n = 20	.61	.85	.11	.02
Introductory Psychology Section (Maximum n = 30)	n = 30	.45	.78	.22	.03
Student Government	Committee, n = 7	.86	.95	.01	.00
	Elected members, n = 19	.62	.86	.11	.01
Community Service	Project Community Section, n = 8	.84	.94	.02	.00
	Project Outreach Section, n = 61	.16	.58	.59	.13
Recreational Sports	Team, n = 12	.75	.91	.04	.01
	Club, n = 19	.62	.86	.10	.01
Michigan Daily	Business Staff, n = 54	.21	.62	.52	.10
Spectator Sports Event	n = 14	.71	.90	.04	.01
Residence Hall	n = 60	.17	.58	.58	.12

Table 5

Organization	Setting Number of Participants	Probability of being sole African-American		Probability of at least 2 others	
		Policy A	Policy B	Policy A	Policy B
Freshman Seminar (Maximum n = 20)	n = 15 n = 20	.45 .33	.78 .71	.21 .34	.03 .06
Introductory Psychology Section (Maximum n = 30)	n = 30	.16	.59	.58	.12
Student Government	Committee, n = 7 Elected members, n = 19	.73 .35	.90 .72	.05 .32	.01 .05
Community Service	Project Community Section, n = 8	.69	.89	.06	.01
	Project Outreach Section, n = 61	.01	.30	.94	.38
Recreational Sports	Team, n = 12 Club, n = 19	.54 .35	.82 .72	.14 .32	.02 .05
Michigan Daily	Business Staff, n = 54	.03	.36	.90	.32
Spectator Sports Event	n = 14	.48	.80	.19	.03
Residence Hall	n = 60	.02	.31	.94	.37

Table 6

Organization	Setting Number of Participants	Probability of being sole Asian-American		Probability of at least 2 others	
		Policy A	Policy B	Policy A	Policy B
Freshman Seminar (Maximum n = 20)	n = 15 n = 20	.29 .18	.25 .14	.38 .56	.44 .63
Introductory Psychology Section (Maximum n = 30)	n = 30	.06	.04	.81	.86
Student Government	Committee, n = 7 Elected members, n = 19	.62 .20	.58 .16	.09 .53	.11 .59
Community Service	Project Community Section, n = 8	.56	.52	.12	.15
	Project Outreach Section, n = 61	.00	.00	.99	.99
Recreational Sports	Team, n = 12 Club, n = 19	.39 .20	.35 .16	.27 .53	.32 .59
Michigan Daily	Business Staff, n = 54	.00	.01	.98	.99
Spectator Sports Event	n = 14	.32	.28	.34	.40
Residence Hall	n = 60	.00	.00	.99	.99

Table 7

Organization	Setting Number of Participants	Probability of being sole European-American (white)		Probability of at least 2 others	
		Policy A	Policy B	Policy A	Policy B
Freshman Seminar (Maximum n = 20)	n = 15 n = 20	.00 .00	.00 .00	.99 .99	.99 .99
Introductory Psychology Section (Maximum n = 30)	n = 30	.00	.00	.99	.99
Student Government	Committee, n = 7 Elected members, n = 19	.00 .00	.00 .00	.98 .99	.99 .99
Community Service	Project Community Section, n = 8	.00	.00	.99	.99
	Project Outreach Section, n = 61	.00	.00	.99	.99
Recreational Sports	Team, n = 12 Club, n = 19	.00 .00	.00 .00	.99 .99	.99 .99
Michigan Daily	Business Staff, n = 54	.00	.00	.99	.99
Spectator Sports Event	n = 14	.00	.00	.99	.99
Residence Hall	n = 60	.00	.00	.99	.99