

THE “HOUSING EFFECT” ON FIRST-YEAR OUTCOMES

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The purpose of this analysis is to determine if there are observable academic differences in outcomes for freshmen who live in University Housing compared to freshmen who live off campus¹ with particular attention to evidence of additive effects (more “above average” grades) and preventative effects (fewer “at risk” grades).

Most freshmen live in University Housing’s residence halls (79% of UW-Madison freshmen in fall 2005). University Housing’s integration of academic and student services, diverse residential learning communities and other housing options, highly trained student and professional staff, attention to student transition and developmental needs, and coordination of academic and student services are all designed to facilitate academic success at UW-Madison with particular attention to the transition to college and success in the first year. Increasingly, the line between academic and non-academic space is blurred. University Housing provides classroom space for common freshmen classes allowing students to interact with instructors where they live, course sections are reserved for students who live together, advising is available at “student friendly” times and in the residence halls, academic support and tutoring are available nearby, and faculty interact with students outside of class.

University Housing’s provides opportunities for outstanding students to challenge themselves academically and socially and academic support for students who are struggling. If all of these academic initiatives “make a difference”, evidence of these efforts should be reflected in first-year outcomes such as grades and retention. And because University Housing’s academic services are designed to enhance the freshman year for all students (not just honors students, not just students in need of extra support), we predict evidence of these efforts across the spectrum of students.

KEY FINDINGS

1. The most academically prepared freshmen -- measured by ACT score, high school rank percentile and high school GPA – are most likely to live in University Housing and the least academically prepared freshmen are the most likely to live off-campus.
2. The most academically prepared freshmen are the most likely to achieve high GPAs and conversely, the least likely to achieve low GPAs. Because the freshmen most likely to achieve high GPAs already live in University Housing, controlling for academic preparation is important in order to minimize the chance that any differences in academic outcome are really due to preparation instead. All academic outcomes reported control for preparation differences using ACT scores.
3. Freshmen who live in University Housing are more likely than their off-campus peers to achieve “above average” (GPA above 3.20) first semester and first year grade-point averages.
4. Freshmen who live in University Housing are less likely to be academically “at risk” (GPA < 2.00) than their peers who live off campus. This effect is statistically significant for students in all but the top ACT quartile, those least likely to be academically at risk in the first place.
5. The least academically prepared freshmen are the least likely to be retained for a second year. However, when these freshmen live in University Housing, they are retained at higher rates than would be expected given their preparation.
6. The most academically prepared freshmen are the most likely to be retained for a second year. Even after considering that these freshmen already disproportionately live in University Housing, they are significantly more likely to be retained than their off-campus peers.
7. The positive academic effects of living in University Housing are evident for many sub-populations of freshmen including Wisconsin residents, non-residents, women, men, and targeted minority students. There are positive effects on grades and retention for freshmen in each of these groups.

8. Targeted minority freshmen who live in University Housing are more likely to be retained for a second year than targeted freshmen who live off-campus.
9. Just like freshmen who live in University Housing are more “academically well prepared” than freshmen who live off campus, freshmen who live in University Housing’s residential learning communities are more “academically well prepared” than other students in University Housing. Even considering this, there are positive effects on grades and retention for students who live in residential learning communities compared to students who live in University Housing but not in a residential learning community.
10. The least academically prepared students – those in the bottom ACT quartile – are the least likely to live in University Housing but the most likely to benefit from it. The academic benefits of living in University Housing are evident on all five of the academic outcomes measured. Why these students are not able to or choosing not to take advantage of the benefits of living in University Housing is not completely clear and warrants further investigation.

ACADEMIC PREPARATION AND OUTCOMES

There are statistically significant relationships between high school academic preparation and freshman academic outcomes (grades and retention rates in particular). In general, the most well prepared students are more likely to get higher grades and be retained to the sophomore year. Conversely, the least prepared students are disproportionately represented in the lower GPAs and the least likely to be retained. One example of this relationship is shown in Appendix A. Controlling for academic preparation – ACT/SAT² scores are used in this analysis -- minimizes the chances that observed differences in outcomes are really due to differences in preparation.

WHICH FRESHMEN LIVE IN UNIVERSITY HOUSING’S RESIDENCE HALLS?

Controlling for these differences in academic preparation is particularly important for this analysis because the freshmen most likely to achieve top grades are disproportionately likely to live in University Housing. Freshmen who live in University Housing are more likely to be from the top ACT quartile whereas freshmen who live off-campus are more likely to be in the bottom ACT quartile.

These trends are similar for other freshman sub-groups and are summarized in Table 1. The “up” arrow indicates groups more likely to live in University Housing, the “down” arrow indicates freshmen less likely to live in University Housing and the equal sign shows when there are no significant differences between ACT quartile and housing type.

Table 1
Summary of Statistically Significant Housing Type Differences by ACT Quartile

	Who Lives in University Housing?			
	ACT Quartile			
	Top (30-36)	Second (28-29)	Third (26-27)	Bottom (14-25)
All Freshmen	↑	↓	↑	↓
Women	↑	=	↑	↓
Men	↑	↓	↓	↓
WI Residents	↑	↑	↑	↓
Non-Residents	↑	↓	↓	↓
Targeted Minorities ³	=	=	=	↓
Learning Communities	↑	=	↓	↓

Note: All arrows indicate chi-square tests that are significant at the .05 level. Appendix B details provides details for the freshman class as a whole.

ACADEMIC OUTCOMES

The academic outcomes measured in this analysis include:

- Attainment of “above average” (above 3.20) GPAs in the first semester and first year⁴
- Avoidance of “at risk” (below 2.00) GPAs in the first semester and first year⁵
- Retention to the second year⁶

Each academic outcome is evaluated for each ACT quartile. This results in 20 academic outcome comparisons (4 quartiles x 5 outcomes) for each group. The statistically significant results are summarized in Table 2 (ACT quartiles in parentheses). Detailed tables are shown for all freshmen in Appendices C-G. Other detailed tables for population subgroups are available on request.

**Table 2
Summary of Statistically Significant Academic Outcome Differences
Between Freshmen who Live in University Housing and Freshmen who Live Off-Campus
By ACT Quartile**

	Freshmen who Live in University Housing’s Residence Halls Are:				
	More Likely to Have “Above Average” GPAs		Less Likely to Have “at Risk” GPAs		More Likely to Return for a Second Year
	First Semester	First Year	First Semester	First Year	
All Freshmen (details in Appendix B)	+ (ACT Q 1,2,3,4)	+ (ACT Q 1,2,3,4)	+ (ACT Q 2,3,4)	+ (ACT Q 2,3,4)	+ (ACT Q 1,4)
Women	+ (ACT Q 1,2,3,4)	+ (ACT Q 1,2,3,4)	=	+ (ACT Q 3,4)	+ (ACT Q 4)
Men	+ (ACT Q 1,3)	+ (ACT Q 1,2,3)	+ (ACT Q 2,3)	+ (ACT Q 3)	+ (ACT Q 1)
WI Residents	+ (ACT Q 1,3)	+ (ACT Q 1,2,3,4)	+ (ACT Q 3,4)	+ (ACT Q 2,3,4)	+ (ACT Q 1,3,4)
Non-Residents	+ (ACT Q 2,3,4)	+ (ACT Q 1,2,3,4)	=	+ (ACT Q 3)	=
Targeted Minorities ⁷	=	=	=	+ (ACT Q 3,4)	+ (ACT Q 4)
Learning Communities	+ (ACT Q 1,2,3,4)	+ (ACT Q 1)	+ (ACT Q 1)	=	+ (ACT Q 1)

Note: All “+” signs represent chi-square tests that are significant at the .00 level. ACT quartiles with statistically significant differences are noted in parentheses. With the exception of the learning communities group, freshmen in population subgroups are compared to other members of that subgroup who live off-campus. For freshmen in University Housing’s residential learning communities, freshmen are compared to other freshmen who live in University Housing.

APPENDICES

THE RELATIONSHIP BETWEEN ACADEMIC OUTCOMES AND ACADEMIC PREPARATION

There are statistically significant relationships between high school preparation and freshman outcomes. In general, the most well prepared students are more likely to get higher grades and the least prepared students are disproportionately represented in the lower grades. Readily quantifiable measures of high school preparation include ACT/SAT scores, high school rank percentile, and high school grade point average.

Controlling for preparation in this analysis minimizes the chances that observed differences in outcomes are really due to differences in preparation. An example of a relationship between preparation and outcomes is shown using in Appendix A using ACT quartiles and first-term GPA quartiles for freshmen in fall 2005.

In Appendix A, the first (non-italicized) number is the actual number of freshmen in each category and the second (*italicized*) number is the number that would be “expected” if there was no relationship between the two variables. For example, 663 freshmen from the top ACT quartile were in the top quartile of first-term GPAs. If there was no relationship between ACT and first-term grades, only 401 freshmen would be predicted to be in the top first-term GPA quartile.

Clearly some students from the lower ACT quartile achieve top GPAs and vice versa. However, in both cases, there were far fewer of these cases than “expected” and the strength of the chi-square statistical test indicates that these results are unlikely to be random.

Appendix A
The Relationship Between ACT Quartiles and First-Term GPA Quartiles

ACT Quartiles	First-Term GPA Quartiles				Total
	Top Quartile Mean = 3.82	Second Quartile Mean = 3.39	Third Quartile Mean = 2.99	Bottom Quartile Mean = 2.23	
Top (30-36)	663 <i>(400.5)</i>	403 <i>(402.7)</i>	310 <i>(406.9)</i>	236 <i>(401.9)</i>	1,612
Second (28-29)	356 <i>(363.0)</i>	395 <i>(364.9)</i>	374 <i>(368.8)</i>	336 <i>(364.2)</i>	1,461
Third (26-27)	318 <i>(375.7)</i>	398 <i>(377.7)</i>	413 <i>(381.7)</i>	383 <i>(376.9)</i>	1,512
Bottom (14-25)	168 <i>(365.8)</i>	317 <i>(367.7)</i>	432 <i>(371.6)</i>	555 <i>(367.0)</i>	1,472
Total	1,505	1,513	1,529	1,510	6,060

Number of observations = 6,057. chi-square = 501.10, df = 9, $p = .00$

Number in parentheses are the expected values assuming no relationship between ACT quartile and first-term GPA.

The same relationship between preparation and outcomes is evident with other preparation measures. However, almost all freshmen have ACT or SAT testing information on record while the same is not true for the other variables⁸. For this reason, ACT is used for the control measure in this analysis.

Appendix B
Housing Type and ACT Quartile Distribution of Fall 2005 New Freshmen

ACT Quartiles	Type of Housing		Total
	Off-Campus	University Housing	
Top Quartile	278 (337.3)	1,342 (1,282.7)	1,620
Second Quartile	318 (305.6)	1,150 (1,162.4)	1,468
Third Quartile	308 (317.5)	1,217 (1,207.5)	1,525
Bottom Quartile	366 (309.6)	1,121 (1,177.4)	1,487
Total	1,270	4,830	6,100

Note: Number of observations = 6,100. chi-square = 27.13, df = 3, $p = .00$
Number in parentheses are the expected values assuming no relationship between housing type and ACT quartile.

Appendix C
“Above Average” First Term GPAs for Fall 2005 Freshmen
by ACT Quartile and Housing Type

ACT Quartile	GPA Above Average?	Off Campus	University Housing	Significance
Top	Yes (≥ 3.20)	163 (184.0)	908 (887.0)	chi-square = 8.65 df = 1, $p = .00$
	No (< 3.20)	114 (93.0)	427 (448.0)	
Second	Yes (≥ 3.20)	129 (162.9)	624 (590.1)	chi-square = 18.54 df = 1, $p = .00$
	No (< 3.20)	187 (153.1)	521 (554.9)	
Third	Yes (≥ 3.20)	111 (145.1)	613 (578.9)	chi-square = 19.21 df = 1, $p = .00$
	No (< 3.20)	192 (157.9)	596 (630.1)	
Bottom	Yes (≥ 3.20)	95 (119.9)	398 (373.1)	chi-square = 10.27 df = 1, $p = .00$
	No (< 3.20)	263 (238.1)	716 (740.9)	

Number of observations = 6,057 Number in parentheses are the expected values assuming no relationship between ACT quartile and first-term GPA. Gray shading denotes statistical significance at the .05 level. “Above average” means GPAs over 3.20.

Appendix D
“At Risk” First Term GPAs for Fall 2005 Freshmen
by ACT Quartile and Housing Type

ACT Quartile	GPA at Risk?	Off Campus	University Housing	Significance
Top	Yes (< 2.00)	267 (268.8)	1,297 (1,295.2)	chi-square = 0.46 df = 1, $p = .49$
	No (≥ 2.00)	10 (8.2)	38 (39.8)	
Second	Yes (< 2.00)	290 (300.6)	1,100 (1,089.4)	chi-square = 9.98 df = 1, $p = .00$
	No (≥ 2.00)	26 (15.4)	45 (55.6)	
Third	Yes (< 2.00)	280 (288.8)	1,161 (1,152.2)	chi-square = 7.10 df = 1, $p = .00$
	No (≥ 2.00)	23 (14.2)	48 (56.8)	
Bottom	Yes (< 2.00)	317 (327.6)	1,030 (1,019.4)	chi-square = 5.34 df = 1, $p = .02$
	No (≥ 2.00)	41 (30.4)	84 (94.6)	

Number of observations = 6,057 Number in parentheses are the expected values assuming no relationship between ACT quartile and first-term GPA. Gray shading denotes statistical significance at the .05 level. “At risk” means GPAs under 2.00.

Appendix E
“Above Average” First Year GPAs for Fall 2005 Freshmen
by ACT Quartile and Housing Type

ACT Quartile	GPA Above Average?	Off Campus	University Housing	Significance
Top	Yes (≥ 3.20)	147 (178.2)	916 (884.8)	chi-square = 19.84 df = 1, $p = .00$
	No (< 3.20)	119 (87.8)	405 (436.2)	
Second	Yes (≥ 3.20)	123 (165.8)	638 (595.2)	chi-square = 29.97 df = 1, $p = .00$
	No (< 3.20)	191 (148.2)	489 (531.8)	
Third	Yes (≥ 3.20)	104 (138.9)	581 (546.1)	chi-square = 20.43 df = 1, $p = .00$
	No (< 3.20)	196 (161.1)	599 (633.9)	
Bottom	Yes (≥ 3.20)	80 (116.7)	400 (363.3)	chi-square = 22.84 df = 1, $p = .00$
	No (< 3.20)	270 (233.3)	690 (726.7)	

Number of observations = 5,948. Number in parentheses are the expected values assuming no relationship between ACT quartile and first-term GPA. Gray shading denotes statistical significance at the .05 level. “Above average” means GPAs over 3.20.

Appendix F
“At Risk” First Year GPAs for Fall 2005 Freshmen
by ACT Quartile and Housing Type

ACT Quartile	GPA at Risk?	Off Campus	University Housing	Significance
Top	Yes (< 2.00)	258 (258.1)	1,282 (1,281.9)	chi-square = 0.00 df = 1, $p = .96$
	No (≥ 2.00)	8 (7.9)	39 (39.1)	
Second	Yes (< 2.00)	293 (300.9)	1,088 (1,080.1)	chi-square = 6.41 df = 1, $p = .01$
	No (≥ 2.00)	21 (13.1)	39 (46.9)	
Third	Yes (< 2.00)	276 (288.2)	1,146 (1,133.8)	chi-square = 16.64 df = 1, $p = .00$
	No (≥ 2.00)	24 (11.8)	34 (46.2)	
Bottom	Yes (< 2.00)	310 (325.7)	1,030 (1,014.3)	chi-square = 14.39 df = 1, $p = .00$
	No (≥ 2.00)	40 (24.3)	30 (75.7)	

Number of observations = 5,948 Number in parentheses are the expected values assuming no relationship between ACT quartile and first-term GPA. Gray shading denotes statistical significance at the .05 level. “At risk” means GPAs under 2.00.

Appendix G
Retention to the Second Year for Fall 2005 Freshmen
By ACT Quartile and Housing Type

ACT Quartile	Retained to Second Yr.?	Off Campus	University Housing	Significance
Top	Yes	252 (262.0)	1,275 (1,265.0)	chi-square = 8.09 df = 1, $p = .00$
	No	26 (16.0)	67 (77.0)	
Second	Yes	295 (297.4)	1,078 (1,075.6)	chi-square = 0.39 df = 1, $p = .53$
	No	23 (20.6)	72 (74.4)	
Third	Yes	283 (287.4)	1,140 (1,135.6)	chi-square = 1.26 df = 1, $p = .26$
	No	25 (20.6)	77 (81.4)	
Bottom	Yes	321 (332.5)	1,030 (1,018.5)	chi-square = 5.79 df = 1, $p = .02$
	No	45 (33.5)	91 (102.5)	

Number of observations = 6,100 Number in parentheses are the expected values assuming no relationship between ACT quartile and first-term GPA. Gray shading denotes statistical significance at the .05 level.

NOTES:

¹ Freshmen who live off-campus live in student apartments, private residence halls, or with their families. Information about their specific living arrangement is not available.

² For the purpose of this analysis, SAT scores for students who only took the SAT (mainly non-residents) have been concorded to ACT scores using a table provided by the College Board. Because of the limited scoring range of the ACT (1-36) and the skewed distribution of the ACT scores of freshmen at UW-Madison (towards the higher scores) it is not possible to divide the class exactly into four even quartiles. The differences in numbers in the quartiles do not affect the statistical analysis.

³ Targeted minority students are those targeted under Plan 2008 and include African American, Hispanic/Latino, American Indian and Southeast Asian freshmen who are citizens, permanent residents or refugees. For freshmen in the top three ACT quartiles, targeted minority freshmen are no more or less likely to live in University Housing than non-targeted freshmen. However, targeted minority freshmen in the bottom ACT quartile (64% of targeted minority freshmen) are significantly less likely to live in University Housing and more likely to live off-campus than their non-targeted peers. In particular, African American and Southeast Asian freshmen are less likely to live in University Housing.

⁴ For all freshmen, the average first-semester GPA was 3.11 and the average first-year GPA was 3.12. The median GPA in both terms was 3.19. For this analysis, GPAs of 3.20 and above are considered "above average".

⁵ GPAs below 2.00 trigger academic intervention and warnings (i.e. probation) and possibly other negative sanctions (loss of scholarships and/or other aid, athletic ineligibility etc.). These students are "at risk" of not being retained (either by choice or because they are academically ineligible).

⁶ Retention rates are measured from fall to fall. The official retention rate for fall 2005 freshman class is the proportion who enroll for fall 2006, measured as of the 10th day of the fall semester. For this analysis, it is the proportion enrolled for fall 2006 as of July 20, 2006.

⁷ This group is the smallest of all the sub-groups measured (516 freshmen) and observable differences in GPA and retention rates would have to be quite large to be statistically significant. Therefore, it is not surprising that this group has the least statistically significant outcomes. Almost 80% of targeted minority freshmen are in the bottom two ACT quartiles so any significant differences for this group encompass most of the targeted minority freshmen.

⁸ In Fall 2005, there were 6,141 new freshmen enrolled at UW-Madison. All but 41 had either an ACT or SAT score. Other preparation measures that could have been used (and also showed significant differences between University Housing and off-campus freshmen were high school rank percentile (not available for 1,562 freshmen, mainly non-residents) and high school grade point average (not available for 291 freshmen).